

25th European Conference on General Thoracic Surgery

28 – 31 May 2017 Congress Innsbruck, Innsbruck, Austria



TABLE OF CONTENTS

Monday, 29 May 2017	
Session I: Brompton	5
ESTS Vogt-Moykopf Lecture	16
Session II: Video I	18
Session III: MITIG VATS Resection	24
Session IV: Young Investigators Award	33
Session V: Mixed Thoracic I	42
Session VI: Innovative/Experimental	51
Tuesday, 30 May 2017	
Session VII: Video II	59
Session VIII: Esophagus/Mediastinum	65
Session IX: Interesting Cases	76
Session X: Moderated Posters	85
Session XI: Pulmonary Neoplastic I	103
Session XII: Mixed Thoracic II	115
Session XIII: Pulmonary Neoplastic II	125
Session XIV: Mixed Thoracic III	135
Wednesday, 31 May 2017	
Session XV: Video III	145
Posters	
E-Posters 1	154
E-Posters 2	277
List of Authors	385



MONDAY, 29 MAY 2017 08:30 - 10:30 SESSION I: BROMPTON ROOM: TIROL

B-001

PULMONARY HYPERTENSION MAY IMPROVE IN SELECTED PATIENTS AFTER LUNG VOLUME REDUCTION SURGERY

<u>Carlson Aruldas</u>, C. Caviezel, D. Schneiter, I. Inci, W. Weder, I. Opitz *Division of Thoracic Surgery, University Hospital Zurich, Zurich, Switzerland.*

Objectives:

Pulmonary hypertension (PHT) is considered as contraindication for lung volume reduction surgery (LVRS). Since it has been reported that endobronchial lung volume reduction may have a beneficial effect on PHT in emphysema patients we evaluated the long term effect on pulmonary hypertension in selected patients undergoing thoracoscopic LVRS.

Methods:

From January 2014 until June 2016 119 LVRS have been performed at our institution. PHT was an absolute contraindication for patients with a homogeneous but tolerated for those with heterogeneous emphysema. Preoperative echocardiography was performed in patients with enlarged pulmonary artery on CT or suspected cardiac disease. Thirty five patients (29.4%) had a transthoracic echocardiography before and after LVRS. Fifteen patients had sPAP pressures > 35mmHg (PHT group) and 20 patients (control group) had normal pulmonary artery (PA) pressures. The effect of LVRS on PA pressures as well as the benefit on lung function were analyzed.

Results:

Ninety-day mortality of all 35 patients was 0%, ICU and hospitalization time did not differ significantly between the two groups. During a median time of follow-up of 12 months after LVRS, pulmonary hemodynamics improved in 32 out of 35 patients. 3 patients showed no significance change.For the patients with PHT, PA pressures decreased significantly from median sPAP 40.5mmHg (IQR 39 – 47) to median 36.5mmHg (IQR 36.5 – 39.25, p = 0.04). Furthermore, these patients had a significant improvement of FEV1 from 25% (IQR 23 – 34) to 35% (IQR 28 – 41.5, p = 0.01) at 3 months postoperative. All patients including PHT group and control group had an improvement from 25% (IQR 22 – 33.25) to 29% (IQR 25.5 – 37, p < 0.001). All patients are still alive in the PHT group with a median follow up of 18 months.

Conclusion:

This is the first report which demonstrates that LVRS may improve PHT in patients with heterogeneous emphysema beside improved lung function and survival. However we consider PHT still an absolute contraindication in patients with homogeneous emphysema.

Disclosure: No significant relationships.

Keywords: pulmonary hypertension, emphysema, lung volume reduction surgery

B-002

CONVERSION DUE TO VASCULAR INJURY DURING VIDEO ASSISTED THORA-COSCOPIC SURGERY (VATS) LOBECTOMY

<u>Fabio Davoli</u>¹, L. Bertolaccini¹, D. Argnani², J. Brandolini², A. Pardolesi², D. Divisi³, R. Crisci³, P. Solli¹, on behalf of the Italian VATS Group⁴

¹Thoracic Surgery, AUSL Romagna - Ravenna Teaching Hospital, Ravenna, Italy

²Thoracic Surgery, AUSL Romagna - Forlì Teaching Hospital, Forlì, Italy

³Thoracic Surgery, University of L'Aquila - "Mazzini" Teaching Hospital Teramo, Teramo, Italy

⁴Thoracic Surgery, National Registry, National Registry, Italy

Objectives:

VATS lobectomy experienced a dramatic growth worldwide in the last 25 years. Vascular injuries are acknowledged among the most serious causes of unplanned emergency conversion. We assessed the incidence of vascular injuries and analysed the related risk factors using our prospective National VATS lobectomy registry.

Methods:

A National Registry for VATS lobectomy established in 2013 was used to collect data from 65 Thoracic Surgery Units. Out of more than 3,700 patients enrolled, only information from Units with >100 VATS lobectomies were retrospectively analysed. Unpaired Student's t–tests, Fisher's exact-tests, Pearson's χ^2 , Spearman's-rho were applied as needed. Univariate analysis was performed on selected variables; significant variables (p <0.30) were entered into a Cox multivariable logistic regression model.

Results:

Ten institutions contributed a total of 1,679 patients (Table 1a). Vascular injuries leading to conversion occurred in 44 (2.6%) patients; surgical details were summarized in Table 1b. Seniority was inversely related to the risk of vascular injuries (rho=-0.54). Univariate analysis (Table 1c) showed that age, gender, surgical volume activity, Charlson Index Score and number of resected lymph-nodes were crucial variables (p<0.30). Unexpectedly, triportal vs. biportal vs. uniportal approaches were not significantly associated with injuries leading to conversion. Multivariate analysis (Table 1d) showed that only number of resected lymph-nodes, VATS experience ratio (i.e., number of VATS lobectomies/total lobectomies performed in same year at same centre), and surgical volume of centre were variables significantly associated with the risk of conversion. Emergency thoracotomy was strongly correlated with postoperative morbidity (rho=0.68).



Monday A.M. Abstracts 001 - 007



Table 1. Demographics, surgical details, univariate and multivariate analysis. CI = Confidence Interval, ECOG = Eastern Cooperative Oncology Group, NA = Not Applicable, OR = Odds Ratio, SD = Standard Deviation								
	Table 1a. Demographics							
No. %								
Condon	Male	1003	59.74					
Genuer	Female	676	40.26					
Age (mean ± SD)		67.27 ± 10.37						
	Malignant	1560	92.91					
Histology	Metastasis	68	5.98					
	Benign	51	3.04					
	Left upper lobectomy	367	21.86					
	Left lower lobectomy	277	16.50					
	Right upper lobectomy	607	36.15					
Stratified Procedure	Right lower lobectomy	290	17.27					
	Right middle lobectomy	120	7.15					
	Upper bilobectomy	6	0.36					
	Lower bilobectomy	12	0.71					
Side	Left	644	38.36					
	Right	1035	61.44					
	Chemotherapy	57	3.39					
Neoadjuvant Therapy	Radiotherapy	8	0.47					
	None	1614	96.12					
VATS Experience Ratio (mean	± SD)	44.24 ± 19.98						
	Adenocarcinoma	1084	68.56					
	Squamous cell carcinoma	265	16.76					
Definitive Histology (Avail-	Typical carcinoid	83	5.24					
able data on 1581 patients)	Atypical carcinoid	30	1.89					
	Metastasis	68	4.30					
	Benign	51	3.03					
	IA	949	58.29					
	IB	338	20.76					
p Stage (TNM VII Edition,	IIA	150	9.22					
2009) [Available data on 1628	IIB	51	3.14					
patients]	IIIA	128	7.86					
	IIIB	3	0.19					
	IV	9	0.56					

Table 1b. Surgical details of the 44 converted patients					
		No.	%	p-value	
6:1-	Left	19	43.18	0.501	
Side	Right	25	56.82	0.501	
	Left upper lobectomy	14	31.81		
	Left lower lobectomy	5	11.36		
Studified Duppedung	Right upper lobectomy	13	29.55	0.721	
Stratified Procedure	Right lower lobectomy	8	18.18	0.731	
	Right middle lobectomy	3	6.82		
	Lower bilobectomy	1	2.28		
	<2	19	43.18		
Tumour size (am)	2-3	11	25.00	0.167	
Tumour size (cm)	3 — 5	9	20.46		
	5 — 7	5	11.36		
	1	4	9.09		
Number of Incisions	2	7	15.91	0.052	
	3	27	61.36	0.835	
	>3	6	13.64	1	
Neoadjuvant Therapy	Chemotherapy	1	2.27	NA	

Table 1c. Univariate Analysis				
Variable	p-value			
Age	0.0042			
Surgical Volume	0.102			
VATS Experience Ratio	0.126			
Gender	0.247			
Previous Surgery	0.810			
Neoadjuvant Chemotherapy	0,319			
Neoadjuvant Radiotherapy	0,783			
Side	0.505			
Charlson Index	0.009			
ECOG Score	0.884			
Number of Incisions	0.492			
Number of Resected Lymph Nodes	0.150			
Overall Postoperative Complications	0.106			
Hospital Length of Stay	0.757			



Table 1d. Multivariate Analysis					
Variable	OR	95% CI	p-value		
Age	1.01	0.98 - 1.06	0.18		
Gender	0.94	0.86 - 1.80	0.16		
Surgical Volume	0.97	0.94 - 0.99	0.0021		
VATS Experience Score	1.56	1.21 - 2.34	0.043		
Charlson Index	1.48	0.71 - 3.11	0.34		
Number of Resected Lymph Nodes	2.64	1.11 - 3.28	0.041		
Overall Postoperative Complications	1.07	0.91 - 1.36	0.054		

Conclusion:

Vascular injuries during VATS lobectomies represent infrequent complications, but directly affect postoperative outcome. Not surprisingly, the surgical volume and the patient comorbidities are among the strongest predictive factors for conversion. Number of ports used for VATS lobectomy did not influence the risk of vascular damages while the number of resected lymphnodes strongly increased the risk of injuries and conversion.

Disclosure: No significant relationships.

Keywords: vascular injury, complications, lymphadenectomy, National Registry, VATS lobectomy, conversion

B-003

VIDEO-ASSISTED THORACOSCOPIC SURGERY VERSUS OPEN SURGERY FOR STAGE I THYMIC EPITHELIAL TUMORS: A PROPENSITY-SCORE MATCHED ANALYSIS OF THE CHINESE ALLIANCE FOR RESEARCH IN THYMOMAS RET-ROSPECTIVE DATABASE

 <u>Zhitao Gu</u>¹, W. Fang¹, C. Chen², P. Zhang³, Y. Wei⁴, J. Fu⁵, Y. Liu⁶, R. Zhang⁷, K. Chen⁸, Z. Yu⁹
¹Thoracic Surgery, Shanghai Chest Hospital, Shanghai, China
²Thoracic Surgery, Fujian Medical University Union Hospital, Fuzhou, China
³Department of Endocrinology, Tianjin Medical University General Hospital, Tianjin, China
⁴Thoracic Surgery, Affiliated Hospital of Qingdao University, Qingdao, China
⁵General Thoracic Surgery, Sun Yat-sen University Cancer Center, Guangdong Esophageal Cancer Institute, Guangzhou, China
⁶Thoracic Surgery, Liaoning Cancer Hospital, Shenyang, China
⁷Thoracic Surgery, Beijing Cancer Hospital, Beijing, China
⁸Thoracic Surgery, Beijing Cancer Hospital, Beijing, China
⁹Department of Esophageal Cancer, Tianjin Cancer Hospital, Tianjin, China

Objectives:

Video-assisted thoracoscopic surgery (VATS) has been increasingly used in the management of thymic epithelial tumors (TETs). However, its oncologic efficacy remains to be proved. The purpose of this study is to compare the oncologic outcomes following thoracoscopic versus open surgery in case-matched groups of patients with early stage thymic tumors from the Chinese Alliance for Research in Thymomas (ChART) retrospective database.

Methods:

Between 1994 and 2012, a total of 1087 patients having surgery for pathological stage I (International Association for the Study of Lung Cancer and International Thymic Malignancy Interest Group TNM staging proposal) tumors in ChART retrospective database were retrieved for this study. A propensity-score matched analysis was used to compare the long-term outcomes in patients who received VATS or open surgery.

Results:

Thoracoscopic resection was performed in 271 (24.9%) and open surgery in 816 patients (75.1%). Before propensity-score matching, the VATS group had smaller tumor size (p=0.002), lower grade histology (p=0.034), lower T stage (p<0.001), and less adjuvant radiotherapy (p<0.001). Propensity-score matching by gender, myasthenia gravis, tumor size, histologic classification, pathological T stage, extent of thymectomy, adjuvant radiotherapy, and adjuvant chemo therapy produced 110 patients in each group. After matching, the differences in tumor size, histology type, T stage, and adjuvant therapy were no longer statistically significant. All matched patients had R0 resection. Overall survival (p=0.539), disease-free survival (p=0.773), cumulative incidence of recurrence (p=0.522), and improvement of myasthenia gravis (p=0.589) were similar between the two matched groups (Table). In univariable analysis,



only adjuvant chemo was a predictor of OS [hazard ratio (HR) 4.527, 95% confidence interval (CI) 1.133-18.085] or DFS (HR 3.696, CI 1.186-11.514).

Table. Characteristics and outcomes	in propensity-score matched	patients undergoing VATS	or open surge
	VATS (N=110)	Open (N=110)	P Value
Patients characteristics			
Gender			0.499
Male	49 (44.5)	54 (49.1)	
Female	61 (55.5)	56 (50.9)	
MG			0.86
Yes	20 (18.2)	19 (17.3)	
No	90 (81.8)	91 (82.7)	
WHO classification			0.206
A+AB	44 (40.0)	54 (49.1)	
B1+B2+B3	59 (53.6)	46 (41.8)	
С	7 (6.4)	10 (9.1)	
Tumor size (cm)	4.85±1.89	5.02±1.76	0.303
Pathological T stage			0.683
Tla	106 (96.4)	108 (98.2)	
T1b	4 (3.6)	2 (1.8)	
Extent of thymectomy			0.400
Total	67 (60.9)	73 (66.4)	
Partial	43 (39.1)	37 (33.6)	
Radiotherapy			0.875
None	84 (76.4)	83 (75.5)	
Adjuvant	26 (23.6)	27 (24.5)	
Chemotherapy			0.734
None	106 (96.4)	105 (95.5)	
Adjuvant	4 (3.6)	5 (4.5)	
Outcomes			
R0 resection	110 (100)	110 (100)	-
5-year CIR (%)	7.1	5.8	0.522
5-year OS (%)	85.7	93.1	0.539
5-year DFS (%)	92.5	91.9	0.773
Improvement rate of MG(%)	83.3	88.2	0.589

Monday A.M. Abstracts 001 - 00

Conclusion:

This propensity-score matched study suggests that VATS and open surgery are associated with similar oncologic outcomes for stage I thymic epithelial tumors. Minimally invasive surgery is an acceptable surgical approach for early stage TETs.

Disclosure: No significant relationships.

Keywords: open surgery, propensity-score match, thymic epithelial tumors, video-assisted thoracoscopic surgery

B-004

PROPHYLACTIC CONTINUOUS POSITIVE AIRWAY PRESSURE AFTER PUL-MONARY LOBECTOMY FOR LUNG CANCER: A RANDOMIZED CONTROLLED TRIAL

<u>Mario Nosotti</u>¹, E. Privitera¹, M. Lazzeri², S. Mariani¹, L. Rosso¹, D. Tosi¹, A. Palleschi¹, P. Mendogni¹, I. Righi¹, R. Carrinola¹, M. Montoli¹, M. Torre², M. Reda², L. Santambrogio¹ ¹Thoracic Surgery and Lung Transplantation Unit, IRCCS Fondazione Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy ²Thoracic Surgery Unit, Grande Ospedale Metropolitano Niguarda, Milan, Italy

Objectives:

The utility of continuous positive airway pressure (cPAP) after pulmonary resection is debated. The aim of this trial was to evaluate the clinical outcomes in patients treated with prophylactic cPAP after pulmonary lobectomy for lung cancer. The primary end point was the aggregate rate of cardio-pulmonary adverse effects; secondary end-points were cardio-respiratory functional parameters, length of hospital stay and 30-day mortality.

Methods:

Design: prospective randomized, controlled, trial approved by the local ethical committee and registered on-line. Setting: one university hospital and one tertiary hospital. Patients: adults with stage I non-small cell lung cancer scheduled for pulmonary lobectomy. Intervention: con-tinuous positive airway pressure, tailored on body mass index, administered six hours a day during the first three postoperative days. Study arms: study group received intervention and standard physiotherapy (early mobilization and assisted cough); the control group received standard physiotherapy. Measurements: number of postoperative atelectasis, pneumonia, prolonged air leak (> seven days) and cardiac complications were summarized in the aggregate rate; cardio-respiratory and functional parameters were also tested during the first five postoperative days.

Results:

Randomization allocated 81 patients to the study group and 82 to the control group. The two groups resulted homogeneous in demographic and physiological characteristics except higher rate of male (p=0.043) and lower FEV1% (p=0.044) in the control group. Lobectomy types, approaches (open vs. VATS), operative time and allocation (university vs. tertiary hospital) were homogeneous between the two arms. The mean effective application of the intervention was 11.5 (\pm 3.9) hours. The study group had lower aggregate complication rate (p=0.005); lower pulmonary complication rate (p=0.04) and lower hospital stay (p=0.031). None of the cardiorespiratory and functional parameters resulted significantly different between groups at any postoperative time- point (table 1); there was no operative mortality in both groups.



Table 1: Selection of clinical variables	Study group	Control group	Р
Patients	81	82	15-1
Age	67 (63 – 69)	66 (64 -68)	n.s.
Gender, male	54 (55.6%)	59 (72%)	0.043
BMI	25.84 (±3.94)	25.68 (±3.92)	n.s.
Currentsmoker	38 (48.1%)	37 (45.7%)	n.s.
Preop. pO ₂	83.5 (79 - 89)	87 (83 - 88)	n.s.
Preop. FEV1 (%)	96.8 (±18.9)	90.8 (±18.6)	0.044
Preop. 6MWT (m)	465 (450 - 495)	480 (457 - 498)	n.s.
Surgical approach, thoracotomy	50 (61.7%)	53 (64.6%)	n.s.
4th postop. day pO2	74 (70- 78)	74 (68 – 77)	n.s.
4th postop. day FEV1 (%)	54 (48 - 57)	53 (49 - 57)	n.s.
5th postop day 6MWT (m)	408 (±81)	412 (±89)	n.s.
Length of hospital stay (days)	6 (5 -6)	7 (6 – 7)	0.031
Pulmonary complications (atelectasis,	16 (19.8%)	29 (35.4%)	0.04
pneumonia, prolonged air leak)			
Aggregate cardio-pulmonary	18 (22.2%)	36 (43.95%)	0.005
complications			

Conclusion:

Prophylactic postoperative cPAP significantly reduced cardio-respiratory complications after pulmonary lobectomy.

Disclosure: No significant relationships.

Keywords: pulmonary lobectomy, continuous positive airway pressure, lung cancer, postoperative complications

B-005

VAGUS NERVE STIMULATION ATTENUATES THE ACUTE POSTSURGICAL INFLAMMATORY RESPONSE AFTER LUNG LOBECTOMY

Mohamed Salama, A. Akan, M. Mueller Thoracic Surgery, Otto-Wagner Hospital, Vienna, Austria

Objectives:

Systemic inflammation is a potentially debilitating complication of thoracic surgeries that can result in significant physical and economic morbidity for afflicted patients. There is compelling evidence for the role of central nervous system in the regulation of systemic inflammatory responses through humoral mechanisms. Activation of afferent vagus nerve fibers by cytokines triggers anti-inflammatory responses. Direct electrical stimulation of the peripheral vagus nerve in vivo during lethal endotoxaemia in rats inhibited Tumor necrosis factor (TNF) synthesis in liver preventing the development of shock. The vagal regulatory role of systemic inflammation after lung lobectomy is unknown. We address this issue.

Methods:

Hundred patients who underwent lobectomy via anterolateral thoracotomy were recruited and equally randomized to treated or control group. Intermittent stimulation of the vagus nerve in the triangular fossa was applied in the treated group using neurostimulator V (Ducest®, Germany), starting 24 hours preoperatively and continued till the 4th postoperative day. Inflammatory interleukins (IL) were analysed using ELISA preoperatively, on the 1st and 4th postoperative days.

Results:

On the first postoperative day, patients who underwent vagal neurostimulation were associated with reduced serum concentrations of CRP (p=0.01) and IL6 (p=0.02) and elevated IL10 (p=0.03) as compared to controls. Furthermore, on the fourth postoperative day, the serum concentrations of CRP, IL6 and IL10 were similar in both study groups. However, vagal neurostimulation showed no effect on the postoperative serum concentrations of IL1, IL18 and TNF α . Interestingly, the treated group had less fluid drained when compared to controls (p=0.04) and the drainage tube was removed earlier in tread group than in controls

Conclusion:

Modulations in the brain stem caused by stimulation of the vagus nerve, without active substances and minimal invasive, reduces the amount of fluid drainage after lung lobectomy and attenuates the acute postsurgical inflammatory response by the regulation of IL6 and IL10

Disclosure: No significant relationships.

Keywords: vagus nerve, post surgical inflammation, lung lobectomy



RISK AND BENEFIT OF NEOADJUVANT THERAPY AMONG PATIENTS UNDER-GOING RESECTION FOR NON-SMALL CELL LUNG CANCER (NSCLC)

<u>Sai Yendamuri</u>, T. Demmy, M. Hennon, E. Dexter, A. Picone, C. Nwogu, G. Dy Department of Thoracic Surgery, Roswell Park Cancer Institute, Buffalo, NY, United States of America

Objectives:

Neoadjuvant therapy has been used as a treatment paradigm for patients with clinical N2 disease undergoing surgical resection for NSCLC. Whether this strategy impacts perioperative outcomes is unclear. We sought to examine the National Cancer Database to assess the impact of neoadjuvant therapy on perioperative outcomes as well as long term survival in patients undergoing surgical resection for NSCLC.

Methods:

All patients with NSCLC undergoing a surgical resection (lobectomy or greater) between 2004 and 2014, without a history of any other cancer, were included. Univariate and multivariate analyses compared 30 and 90 day mortality of all patients having neoadjuvant therapy vs. those that did not. The second analyses examined the impact of neoadjuvant therapy on the overall survival of patients with clinical N2 disease.

Results:

Ten thousand, two hundred and eighty eight (7.8%) of 134428 patients having surgery had neoadjuvant therapy. Patients undergoing neoadjuvant therapy had a higher 30 day (3% vs. 2.6%; P<0.01) and 90 day mortality (6.7% vs. 4.9%; P<0.01). This association remained after adjusting for age, gender, Charlson-Deyo comorbidity score (CDCS), stage and extent of resection (lobectomy vs. pneumonectomy). Long-term survival analyses were then focused on patients with clinical N2 disease (N=10,139). Of these patients, 42.3%, 35.3% and 22.4% of patients had neoadjuvant, adjuvant and no chemotherapy respectively. Univariate survival analysis demonstrated no difference between patients having neoadjuvant and adjuvant chemotherapy, but a survival advantage of these groups over those patients getting no chemotherapy (Figure 1). Multivariate analyses adjusting for age, gender, race, stage, grade, CDCS, surgical margins and extent of resection nullified these differences.

Conclusion:

Induction therapy adversely impacts peri-operative outcomes. In clinical-N2 NSCLC, it does not provide a survival advantage. In an era of increasing use of minimally invasive surgery that enables administration of adjuvant therapy more reliably, the paradigm of routine neoadjuvant therapy for limited N2 disease should be reconsidered.

Disclosure: No significant relationships. **Keywords:** neoadjuvant, NSCLC, outcomes

11:30 - 11:50 ESTS VOGT-MOYKOPF LECTURE ROOM: TIROL

O-007

ANATOMICAL RESECTIONS ARE SUPERIOR TO WEDGE FOR THE OVERALL SURVIVAL IN STAGE I TYPICAL CARCINOID PATIENTS

<u>Pier Luigi Filosso</u>¹, F. Guerrera¹, A. Evangelista², P. Thomas³, S. Welter⁴, E.A. Rendina⁵, F. Venuta⁶, M. García-Yuste⁷, G. Rocco⁸, A. Brunelli⁹, L. Ampollini¹⁰, M. Nosotti¹¹, W. Travis¹², F. Raveglia¹³, F. Ardissone¹⁴, P. Casado¹⁵, O. Rena¹⁶, V. Larocca¹⁷, D. Sagan¹⁸, ESTS NET Working Group Contributors¹

¹Thoracic Surgery, University of Torino, Torino, Italy ²Unit of Cancer Epidemiology and CPO Piedmont, San Giovanni Battista Hospital, Torino, Italy ³Thoracic Surgery, APHM-AMU North University Hospital, Marseille, France ⁴Division of Thoracic Surgery, Ruhrlandklinik, Essen, Essen, Germany ⁵Thoracic Surgery Unit, University La Sapienza, Sant'Andrea Hospital, Rome, Italy ⁶Thoracic Surgery Unit, University La Sapienza, Policlinico Umberto I Hospital, Rome, Italy ⁷Thoracic Surgery, Clínico Universitario Hospital, Valladolid, Spain ⁸Division of Thoracic Surgery, Department of Thoracic Surgical and Medical Oncology, Istituto Nazionale Tumori, Fondazione Pascale, IRCSS, Naples, Italy ⁹Department of Thoracic Surgery and Thoracic Endoscopy, St. James's University Hospital, Leeds, United Kingdom ¹⁰Thoracic Surgery Unit, University of Parma, Parma, Italy ¹¹Thoracic Surgery and Lung Transplantation Unit, IRCCS Fondazione Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy ¹²Pathology, Memorial Sloan Kettering Cancer Center, New York, United States of America ¹³Thoracic Surgery, AO San Paolo, Milan, Italy ¹⁴Thoracic Surgery, San Luigi Hospital, Orbassano, Italy ¹⁵Thoracic Surgery Unit, University Hospital 'Reina Sofia', Cordoba, Cordoba, Spain ¹⁶Thoracic Surgery Unit, "Amedeo Avogadro" University, Novara, Italy ¹⁷Thoracic Surgery Unit, Ospedale 'Spirito Santo' Azienda ASL di Pescara, Pescara, Italy

¹⁸Thoracic Surgery Unit, Medical University of Lublin, Lublin, Poland

Objectives:

As for other uncommon neoplasms, management of typical carcinoids (TCs) is steeped in dogma carried out from early clinical observations, sometimes based on small cohort of patients. In particular, non-anatomical resections (wedge) are often advocated for Stage I TCs (SITCs) because of their indolent biological behavior. The aim of this paper was to evaluate the most effective type of surgical resection, in terms of survival, for SITCs, using the European Society of Thoracic Surgeons (ESTS) retrospective NET-WG database.



Methods:

Using the ESTS NET-WG database, an analysis on effect of surgical procedure on SITC's survival was performed. Overall survival (OS) was calculated starting from the date of intervention. The impact of surgical procedure (i.e. lobectomy vs. sleeve lobectomy vs. segmentectomy vs. wedge resection) on OS was investigated using the Cox model with shared frailty (accounting for the within-centre correlation). An adjusted model was carried out using the typical carcinoid prognostic score for survival (Eur.J.Cardiothorac.Surg.2015;48:441-7).

Results:

Eight-hundred and seventy-six patients operated for Stage I TC (307 males,35%) were available for the final analysis. Median age was 47 years (IQR 60-69). At the last follow-up, 66 patients died: the 5-year OS rate was 94.3% (95%CI: 92.2–95.9). At univariable analysis, wedge resection resulted to be associated with a poor prognosis (5-year OS 82%, 95%CI: 0.71-0.89, P<0.001) compared to other anatomical resections. At multivariable score-adjusted analysis, wedge resection confirmed to be an independent predictors of poor prognosis (HR 2.2, 95%CI: 1.26-3.85, P=0.005) (Figure 1).

Conclusion:

In one of the largest cohort of patients never collected, we were able to demonstrate the superiority of anatomical surgical resection for Stage I TCs in terms of OS. This result should therefore be considered for future clinical guidelines for TC's management. Figure 1: Overall Survival by type of surgery on typical carcinoid. Median follow-up time 53 months



Disclosure: No significant relationships.

Keywords: lung, neuroendocrine neoplasms, typical carcinoid, surgery, survival

13:30 - 14:30 SESSION II: VIDEO I ROOM: TIROL

V-008

ROBOTIC ASSISTED THORACOSCOPIC REMOVAL OF ESOPHAGUS FOREIGN BODY (DENTURE)

N.S. Nanda, <u>Belal Bin Asaf</u>, A. Kumar Department of Thoracic Surgery, Sir Ganga Ram Hospital, New Delhi, India

Objectives:

To demonstrate the feasibility of robotic assisted VATS in removal of oesophageal foriegn bodies.

Video description:

The video demonstrates our technique of robotic assisted VATS removal of esophageal foriegn body using a four port technique involving the following stages – VATS adhesiolysis and mobilisation of lung, robotic esophagotomy and removal of foriegn body (denture) and followed by hemostasis and chest tube placement. In our experience Robotic assisted VATS removal of esophageal foriegn body has an excellent result.

Conclusions:

Robotic assisted VATS removal of esophageal foriegn body is technically feasible with excellent outcomes.

Disclosure: No significant relationships.

Keywords: oesophagus, oesophageal foreign body, robotic surgery, VATS



A CASE OF MEDIASTINAL TRACHEOSTOMY FOR TRACHEOSTENOSIS AFTER TRACHEOSTOMY WITH TRACHEOMALACIA BY MUCOPOLYSACCHARIDOSIS

<u>Yasuhiro Chikaishi</u>, M. Takenaka, K. Kuroda, N. Imanishi, F. Tanaka 2nd Department of Surgery, University of Occupational and Environmental Health. Kitakyushu, Japan

Objectives:

Treatment of tracheostenosis for granulation after tracheostomy in congenital diseases is often difficult for several season. Mucopolysaccharidosis are a lysosomal storage diseases that are complicated by severe obstruction of the upper airways, tracheobronchial malacia, and/or stenosis of the lower airways.

Video description:

We present a case of a 16 year old boy. He had been followed up for mucopolysaccharidosis type II since postnatal period. Five years ago, when he was 11 years old, tracheostomy was performed for laryngeal stenosis by primary disease. One week ago, he had an emergency transportation to our hospital for major dyspnea. He was diagnosed with tracheostenosis due to granulation after tracheostomy, so he was admitted under ventilation. Difficulties were encoutered in orientation of airway for macroglossia, swelling of tonsil and tracheomalacia from mucopolysaccharidosis. For airway management, mediastinal tracheostomy was performed with percutaneous cardio pulmonary support (PCPS). The trachea was then exposed at head site. Trachea was resected by the minimum required length. In order to keep the blood flow, skin incision of mediastinal trachea hole had been cut sharp without electorotome. Mediastinal tracheostomy was performed with inlay graft of thymus between innominate and trachea. The postoperative course was uneventful, and the patient was weaned from ventilator on postoperative day 19. He was discharged on postoperative day 45. Airway patency was maintained up to one year after surgery.

Conclusions:

Mediastinal tracheostomy was useful for treatment of tracheostenosis for granulation after tracheostomy to laryngeal stenosis by mucopolysaccharidosis. We presented this case in a video image file.

Disclosure: No significant relationships.

Keywords: mucopolysaccharidosis, tracheomalacia, tracheostenosis after tracheostomy, mediastinal tracheostoma

V-010

A DANCE WITH THE SUTURES

E. Kaba¹, <u>Tugba Cosgun</u>², K. Ayalp², A. Toker² ¹*Thoracic Surgery, Istanbul Bilim University, Istanbul, Turkey* ²*Department of Thoracic Surgery, Istanbul Florence Nightingale Hospital, Istanbul, Turkey*

Objectives:

Fully robotic right upper sleeve lobectomy is technically feasible

Video description:

A female patient, 59 year-old has been followed up for two years with a solitary pulmonar nodule at the right upper lobe. Her last CT and PET scan revealed that the diameter of the nodule increased and a FDG active lymphnode around upper lobe brochus was detected. After a negative mediastinoscopy, robotic arms were docked. After confirmation of the solitary pulmonary nodule as lung cancer and lymphnode at lobar bronchus had invasion to the secondary carina a right upper sleeve lobectomy was planned and performed. 3/0 V-LOC® sutures are used for the anastomosis. Postoperative bronchoscopy and chest CT at 1stpostoperative month could be seen in the video.

Conclusions:

Robotic surgery allows 3D view and increased maneuverability of the wrist instruments, may provide higher technical capability to perform sleeve lobectomy operations in a minimally invasive way.

Disclosure: No significant relationships. **Keywords:** resection, robot, cancer, lung, sleeve



LEFT PNEUMONECTOMY EXTENDED TO THE DESCENDING THORACIC AORTA WITHOUT USING EXTRACORPOREAL CIRCULATION AND WITHOUT CROSS-CLAMPING THE AORTA

<u>Antonio Francisco Honguero Martinez</u>¹, M.D. Garcia Jimenez¹, M. Landaluce Chaves², J.D. Molina Nuevo³, R. Jimenez Palmer², E. Julia Moya³, M. Genoves Crespo¹, C.R. Rodriguez Ortega¹, M. Lazaro Sahuquillo⁴, P. Leon Atance¹

¹Thoracic Surgery, University General Hospital of Albacete, Albacete, Spain ²Vascular Surgery, University General Hospital of Albacete, Albacete, Spain ³Interventional Radiology, University General Hospital of Albacete, Albacete, Spain ⁴Mental Health, General Hospital La Mancha Centro, Alcazar de San Juan, Spain

Objectives:

Lung cancer can occasionally invade adjacent structures. We present a video showing and easy and effective method to perform en bloc resection of lung cancer and descending thoracic aorta avoiding riks of extracorporeal circulation and aorta cross-clamping

Video description:

A 52-year-old man was diagnosed of NSCLC with suspicion of invasion of the descending thoracic aorta (DTA) and pericardium adjacent to the inferior pulmonary vein on CT-scan images. Weight=78Kg, height=175cm, hemoglobin=14.2gr/dL, FEV1=2770mL (81.9%), DLCO=63.9%, left lung perfussion scintigraphy=29.8%. A left posterolateral thoracotomy was performed, exploration showed an invasion of the muscular layer of the DTA. Incision has closed and an aortic endoprosthesis was deployed via left femoral artery (28x155mm) on supine position. Then the patient was repositioned and left thoracotomy was reopened to perform a left pneumonectomy with en bloc resection of a patch of the DTA, a patch or the left atrium and pericardium. The patient was discharged eight days after the intervention, no blood transfusion was required and no major complications happened. Pathology specimen revealed a 4cm-sized adenocarcinoma with invasion of the aorta muscular layer and left atrium muscle (T4N0M0) p. Adjuvant radio- and chemotherapy was administerd. One year later, the patient is doing well and free of disease.

Conclusions:

Insertion of an endoaortic prosthesis in the same anesthesic procedure facilitates en bloc resection of lung cancer invading the thoracic descending aorta avoiding risks derived from extracorporeal circulation or aorta cross-clamping.

Disclosure: No significant relationships.

Keywords: endoaortic prosthesis, T4 non-small cell lung cancer, invasive lung cancer, extended pneumonectomy, descending thoracic aorta

V-012

SUCCESSFUL SURGICAL TREATMENT OF BRONCHOESOPHAGEAL FISTULA WITH ROBOTIC SURGICAL SYSTEM

<u>Piotr Yablonskii</u>, G. Kudriahov, S. Nuraliev, I. Vasilev, A. Kozak Thoracic Surgery, St. Petersburg State Research Institute of Phthisiopulmonology, St. Petersburg, Russian Federation

Objectives:

The successful surgical treatment of a patient with bronchoesophageal fistula after tracheal resection is reported.

Video description:

A 56 year old woman with benign tracheal stenosis and tracheoesophageal fistula underwent repeatedly endoscopic treatment without positive results. Therefore tracheal resection with closure of tracheaoesophageal fistula was performed (21/05/2015). Postoperative course was complicated by tuberculous sterno - mediastinitis and bronchoesophageal fistula between left main bronchus and middle third of oesophagus. Closure of the fistula was obtained after robotassisted thoracoscopic procedure (29/11/2015). We used right side approach and five ports (two assistant ports, two instrumental robotic ports and one port for camera). Patient was positioned on the left side with a slight turning of the abdomen. The azygos vein was divided to get a good access to the area of the tracheal bifurcation and fistula. Details of the procedure were isolation and closure of the fistula with endostapler. Additional stitches were placed on the wall of the esophagus and the left main bronchus. After that, stitches were reinforced by plate, which consist of fibrinogen and thrombin. Then the stump of the azygos vein was positioned between the trachea and oesophagus. The postoperative period was uneventful. The chest tube was removed on postoperative day four. Tuberculous sterno - mediastinitis was successfully treated with vacuum assisted closure therapy and reoperation. The patient is in good general conditions 12 months after surgery.

Conclusions:

Robotic surgical system provides good access to the structures of the mediastinum. In this case, we were able to demonstrate a successful outcome following closure of a bronchoesophageal fistula.

Disclosure: No significant relationships.

Keywords: bronchoesophageal fistula, robotic surgery, bronchial surgery



MICROLOBECTOMY: A NOVEL VIDEO-ASSISTED THORACIC SURGICAL (VATS) APPROACH

<u>Marco Nardini</u>¹, V. Naruka², S. Jayakumar³, R. Calvert¹, M. Migliore⁴, M. Elsaegh¹, J. Dunning¹ ¹Cardiothoracic, James Cook University Hospital, Middlesbrough, United Kingdom ²School of Clinical Medicine, University of Cambridge, Cambridge, United Kingdom ³Medical School, King's College School of Medicine, London, United Kingdom ⁴Thoracic Surgery, University of Catania, Catania, Italy

Objectives:

Although VATS, since its adoption, improved significantly the outcome of patients underwent lung surgery, we have still experienced a considerable amount of postoperative pain with the anterior approach VATS lobectomy. In the last two years we performed a novel technique of Minimally-Invasive Thoracic Surgery (MITS), for major lung resection which we have called Microlobectomy, with the aim to eliminate the utility port and do not create lesions in the intercostal space wider than five millimetres in diameter. We performed this procedure in 84 consecutive cases.

Video description:

In this video we demonstrated the microlobectomy technique in a 57 year old lady affected by adenocarcinoma of the right upper lobe. In the initial slide we state the principles of this approach: no incision in the intercostal spaces larger then 5mm with continuous carbon dioxide insufflation, a 12 mm subxiphoid port, subxiphoid removal of the resected specimen, use of 5mm diameter 30 degree camera and stapling of vascular structure with small devices. After local analgesia, the first step is the thoracic port position under direct vision. The camera is pushed within the transparent trocar inside the hemithorax and insufflation of carbon dioxide is administered. Afterward further two intercostal 5mm ports are performed alongside a 1.2cm subxiphoid port. The procedure then starts as per routine anterior VATS upper lobectomy fissure last. The vessels are divided with an automatic stapler which fit the 5mm trocars. After completion of bronchus and fissure the specimen is finally delivered through the subxiphoid port (enlarged to five cm as shown). The chest drain is placed through this site as shown by the post operative chest x ray.

Conclusions:

We are very encouraged by the results of this first series of patients and therefore we will investigate this further.

Disclosure: M. Nardini: I have a consulting agreement with Dextera (they provided a laptop for video editing).

J. Dunning: Proctor for Dextera

Keywords: lobectomy, minimally invasive thoracic surgery, VATS, subxiphoid incision, lung cancer

14:30 - 15:30 SESSION III: MITIG VATS RESECTION ROOM: TIROL

F-014

MULTICENTRIC EVALUATION OF THE IMPACT OF CENTRAL TUMOR LOCA-TION WHEN COMPARING N1 UPSTAGING BETWEEN VIDEO ASSISTED THO-RACOSCOPIC SURGERY (VATS) AND OPEN SURGERY FOR CLINICAL STAGE I NON SMALL CELL LUNG CANCER (NSCLC)

Herbert Decaluwe¹, R.H. Petersen², A. Brunelli³, C. Pompili³, A. Seguin-Givelet⁴, L. Gust⁵, C. Aigner⁶, P. Falcoz⁷, P. Rinieri⁸, F. Augustin⁹, Y. Sokolow¹⁰, A. Verhagen¹¹, L. Depypere¹, K. Papagiannopoulos³, D. Gossot⁴, X.B. D'Journo⁵, F. Guerrera⁷, J. Baste⁸, T. Schmid⁹, A. Stanzi¹, J. Bardet⁴, P. Thomas⁵, G. Massard⁷, J. Moons¹, C. Dooms¹, P. De Leyn¹, H.J. Hansen² ¹Thoracic Surgery, University Hospitals Leuven, Leuven, Belgium ²Department of Cardiothoracic Surgery, University Hospital of Copenhagen, Copenhagen, Denmark ³Department of Thoracic Surgery and Thoracic Endoscopy, St. James's University Hospital, Leeds, United Kingdom ⁴Department of Thoracic Surgery and Thoracic Endoscopy, Institut Mutualiste Montsouris, Paris, France ⁵Thoracic Surgery, APHM-AMU North University Hospital, Marseille, France ⁶Tüschener Weg 40, Essen University Hospital, Essen, Germany ⁷Department of Thoracic Surgery and Thoracic Endoscopy, University Hospital of Strasbourg, Strasbourg, France ⁸General and Thoracic Surgery Unit, Rouen University Hospital, Rouen, France ⁹Visceral-, Transplantation- and Thoracic Surgery, Innsbruck University Hospital, Innsbruck, Austria ¹⁰Department of Thoracic Surgery and Thoracic Endoscopy, Université Libre de Bruxelles, Brussels, Belgium ¹¹Department of Cardiothoracic Surgery, Radboud University Medical Centre, Nijmegen, Netherlands

Objectives:

Several retrospective series showed lower pN1 nodal upstaging after VATS compared to open resections. Central tumor location was not included in their analysis. As open surgery is more often performed for central tumors, this could create a selection bias in case central location is associated with more frequent pN1-upstaging. Our objective was to verify the association between location of tumour and pN1-upstaging in resected clinical stage-I (cStage-I; TNM 7) NSCLC.



Methods:

All consecutive patients operated for cStage-I NSCLC in 2014 were selected from prospectively managed surgical databases in 11 European centers. Tumor location was classified as central if CT showed contact with lobar or first segmental branches of vessels or bronchi.

Results:

Eight hundred and ninety five patients underwent resection by open thoracotomy (n=196) or VATS (n=699; conversion rate 9%). Preoperative PET-CT and invasive mediastinal staging were performed in 100% and 22%, respectively. Pathologic nodal upstaging was found in 16%(n=140) of cStage-I patients. Nodal pN1 and pN2 upstaging was 15% and 6%, respectively, for the open group, and 8% and 7%, respectively, for the VATS group. pN1 was found in 27% of patients with central tumors (n=38/140). More central tumors were found in the open compared to the VATS group (29%vs.13%, p<0.001). Logistic regression analysis (including central location, surgical technique, cT1vs.cT2a, gender, invasive mediastinal staging, histology and correction for center effect) showed that only tumor location had a significant impact on pN1 upstaging (central vs. peripheral; OR 6.2, CI 3.5-10.7,p<0.001), while surgical technique had no impact (VATS versus open; OR 0.76,CI 0.41-1.4,p=0.55). Similar results were found if visibility on bronchoscopy was used as definition of tumor location.

Conclusion:

We found that central tumor location was the only independent factor associated with pN1upstaging, diminishing the evidence for lower pN1 upstaging after VATS resections. Studies investigating pN1-upstaging after VATS compared to open resections should match patients according to central tumor location.

Disclosure: R.H. Petersen: Speaker for Medtronic, Ethicon, Medela. **Keywords:** bias, cStage-I, NSCLC, VATS, central tumor, nodal upstaging

F-015

MINIMALLY INVASIVE SURGICAL APPROACHES FOR THE TREATMENT OF NON-THYMOMATOUS MYASTHENIA GRAVIS. A COMPARATIVE PROPENSITY-SCORE ADJUSTED MULTICENTER STUDY

<u>Francesco Guerrera</u>¹, S. Renaud², N. Santelmo³, A. Evangelista⁴, P. Lyberis¹, A. Mazzella³, A. Olland³, G. Bora¹, P. Falcoz⁵, P.L. Filosso¹, E. Ruffini¹, A. Oliaro¹, G. Massard⁵ ¹Thoracic Surgery, University of Torino, Torino, Italy

²Thoracic Department, University Hospital of Nancy, Nancy, France

³Thoracic Department, Nouvel Hopital Civil, University Hospital of Strasbourg, Strasbourg, France ⁴Unit of Cancer Epidemiology and Cpo Piedmont, San Giovanni Battista Hospital, Torino, Italy ⁵Department of Thoracic Surgery and Thoracic Endoscopy, University Hospital of Strasbourg, Strasbourg, France

Objectives:

Evidence of benefits of thymectomy by complete sternotomy in the treatment of non-thymomatous myasthenia gravis (MG) was recently proven by a multicenter randomized trial. Several recent papers proposed different minimally invasive surgical approaches for the treatment of MG and compared them with the classic complete sternotomy. Nevertheless, the best procedure is still matter of debate. The aim of our study is to compare clinical outcomes of the available minimally invasive approaches: cervicotomy with upper sternotomy (C-US), video-assisted (VATS) and robotic-assisted (RATS) thoracic surgery.

Methods:

We conducted a retrospective analysis of 267 consecutive non-thymomatous MG-patients, operated in two European Thoracic Surgery Institutions between 1990 and 2015. Explored clinical outcome parameters were (1) remission rate, (2) improvement of Myasthenia Gravis Foundation of America(MGFA) clinical status and (3) reduction (<10 mg of prednisone) or suspension of steroids therapy. Crude and Propensity score(PS) adjusted comparisons by type of surgical approach C-US vs. RATS/VATS were performed using logistic regression method. Missing data were multiple-imputed and combined estimates were obtained from 5 imputed datasets.

Results:

Two-hundred nine patients were available for the final analysis. Median age was 33 years (interquartile range 24-44) and 199 patients were female (72%)(Table). Two-hundred twenty patients (82%) were operated by C-US, 47(16%) by RATS and 4(2%) by VATS. MGFA clinical-status improved in 89%(186/209) of the patients, a remission of symptoms (clinical or pharmacological) was observed in 42%(87/209) and 47%(32/68) suspend/reduce steroid treatment. Considered C-US as reference, we did not observe at PS-adjusted models a significant difference in terms of remission rate (RATS/VATS OR: 1.35,95%CI 0.65-2.77,P=0.418), improvement of MGFA clinical-status (RATS/VATS OR:0.58,95%CI 0.18-1.93,P=0.378) and reduction/suspension of steroid treatment (RATS/VATS OR:1.43,95%CI 0.45-4.57,P=0.548).



Conclusion:

Table. Patients Characteristics (* Variables included in Propensity Score)					
	Total Cohort	Cervicotomy with upper sternotomy	RATS/VATS		
	(N=267)	(N=220)	(N=47)		
Age (years), median (IQR)*	33 (24-44)	33 (24-45)	36 (24-46)		
Gender*					
Female	72% (193)	73% (160)	70% (33)		
Male	28% (74)	27% (60)	30% (14)		
BMI, median (IQR)*	24 (21-28)	24 (21-27)	25 (22-28)		
Smoke*					
No	77% (69)	79% (34)	74% (35)		
Yes	23% (21)	21% (9)	26% (12)		
ECOG*					
0	61% (43)	88% (21)	47% (22)		
1	28% (20)	12%(3)	36% (17)		
2	8% (6)	0% (0)	13% (6)		
3	3% (2)	0% (0)	4% (2)		
ASA*					
Ι	18% (13)	0% (0)	28% (13)		
II	46% (33)	50% (12)	45% (21)		
III	35% (25)	50% (12)	28% (13)		
MGFA Clinical Classes*					
I	17% (46)	18% (40)	13% (6)		
II	54% (143)	52% (115)	60% (28)		
III	21% (56)	20% (45)	23% (11)		
IV	7% (19)	8% (17)	4% (2)		
V	1% (3)	1% (3)	0% (0)		
MG symptoms length (months), median (IQR)*	9 (5-18)	9 (5-12)	13 (8-37)		
Histology *					
Involution	48% (126)	53% (114)	26% (12)		
Hyperplasia	52% (137)	47% (102)	74% (35)		
Preoperative acetylcholinesterase inhibitors *					
No	12% (32)	14% (30)	4% (2)		
Yes	88% (230)	86% (186)	96% (44)		
Steroids preoperative treatment *					
No	74% (196)	78% (170)	57% (26)		
Yes	26% (68)	22% (48)	43% (20)		

Our results indicated that RATS/VATS had same clinical results as C-US. The choice of the optimal surgical approach should be tailored on the base of availability, desired aesthetic results and physicians and patient preferences.

Disclosure: No significant relationships.

Keywords: robotic, sternotomy, cervicotomy, myasthenia gravis, VATS, RATS

F-016

THE BURDEN OF FREQUENT EMERGENCY ROOM UTILIZATION AFTER ESOPHAGECTOMY

Biniam Kidane¹, B. Jacob², V. Gupta³, J. Peel³, R. Saskin⁴, T. Waddell³, G. Darling³ ¹Department of Surgery, University of Manitoba, Winnipeg, MB, Canada ²CAMH, Toronto, ON, Canada ³Department of Surgery, University of Toronto, Toronto, ON, Canada ⁴ICES Central, Toronto, ON, Canada

Objectives:

Esophagectomy is a complex operation with potential for prolonged recovery. The aim of this study was to evaluate healthcare resource utilization, specifically emergency department (ED) visits within one year of esophagectomy and to identify risk factors for ED visits as well as frequent ED use (FEDU).

Methods:

A retrospective cohort study of consecutive esophagectomies for cancer in all Ontario hospitals was conducted using linked health data (2000-2012) including the ability to identify ED visits at non-index hospitals. Ontario has a single-payer healthcare system with a population of 13.8 million people. Multivariable regression was used to identify independent factors associated with ED visits and FEDU (\geq 3 ED visits) within one year after esophagectomy.

Results:

Risk Factor	Adjusted Odds Ratio (95% CI)	p	Adjusted Odds Ratio (95% Cl)	p
	<u>For ED visits</u>		<u>For Frequent</u> <u>ED visits</u>	
Higher Comorbidity	1.08 (1.05-1.11)	<0.0001	1.11 (1.08-1.14)	<0.0001
Rural status	1.40 (1.10-1.78)	0.006	1.66 (1.31-2.10)	<0.0001
Radiation therapy	4.17 (2.75-6.31)	<0.0001	2.91 (2.00-4.23)	<0.0001
Chemotherapy	1.30 (1.00-1.69)	0.048	1.41 (1.03-1.93)	0.03
Older age	All comparisons cross OR=1	>0.3	All comparisons have OR>1	<0.05
Year of esophagectomy	1.23 (1.20-1.26)	<0.0001	1.13 (1.10-1.16)	<0.0001
Lack of thoracoscopic assisted surgery	0.67 (0.45-0.99)	0.049	0.9 (0.62-1.31)	0.58



There were 3344 esophagectomies with in-hospital mortality of 5.8% (n=193). Of those discharged, 16.4% (n=549), 36.0% (n=1203) and 55.8% (n=1866) had ED visits within 30-days, 90-days and 1 year. Higher comorbidity (adjusted odds ratio [aOR]=1.08, 95%CI:1.05-1.11,p<0.0001), rurality (aOR=1.40, 95%CI:1.10-1.78, p=0.006) and radiation therapy (aOR=4.17, 95%CI:2.75-6.31, p<0.0001) or chemotherapy (aOR=1.30, 95%CI:1.00-1.69, p=0.048) independently predicted increased ED visits within 1-year of esophagectomy. Thoracoscopic-assisted surgery was independently associated with **decreased** ED visits (aOR=0.67, 95%CI: 0.45-0.99, p=0.049). Eight hundred & thirteen (24.3%) patients had FEDU. Higher comorbidity (aOR=1.11, 95%CI: 1.08-1.14,p<0.0001), rurality (aOR=1.66, 95%CI:1.31-2.10, p<0.0001) and radiation therapy (aOR=2.91, 95%CI:2.00-4.23, p<0.0001) or chemotherapy (aOR=1.41, 95%CI:1.03-1.93, p=0.03) independently predicted FEDU. Older patients were more likely to have FEDU (p<0.05). One health region had more ED visits (p=0.04) and more FEDU (p=0.001) compared to the other regions. There were higher ED visits and FEDU in the later years of the study period (both p<0.0001).

Conclusion:

ED visits are common after esophagectomy with almost 25% of patients having ≥ 3 visits and $\geq 50\%$ having ≥ 1 visit within one year of esophagectomy. We have identified demographic, surgical and regional risk factors for potential targeted quality improvement.

Disclosure: No significant relationships.

Keywords: esophageal cancer, esophageal surgery, health systems research, quality improvement, resource utilization

F-017

NODAL UPSTAGING IN CLINICALLY NODAL NEGATIVE LUNG CANCER IS MORE INFLUENCED BY TUMOR SIZE THAN BY THE SURGICAL APPROACH

<u>Gregor Laimer</u>¹, F. Augustin¹, F. Kocher², C. Ng¹, M. Sacher¹, H. Maier¹, P. Lucciarini¹, T. Schmid¹

¹Department of Visceral, Transplant and Thoracic Surgery, Medical University Innsbruck, Innsbruck, Austria ²Internal Medicine V, Medical University Innsbruck, Innsbruck, Austria

Objectives:

Recently, several studies reported a lower rate of nodal upstaging in patients undergoing VATS anatomical lung resection compared to patients treated with an open approach. Aim of our analysis was to investigate differences in nodal upstaging between surgical techniques in primary surgically treated patients considering tumor location and tumor size.

Methods:

All clinically nodal negative (cN0) patients treated at our institution between 2004 and 2016 were retrospectively analyzed. We classified a tumor as "central", if it had contact to the main bronchus or first segmental branch of the bronchus in a CT scan or was visible during bronchoscopy. All other tumors were classified "peripheral".

Results:

In total, 395 patients were included: 282 (71.4%) VATS and 113 (28.6%) open resections. Nodal upstaging was detected in 75 (19.0%) patients. The rate of upstaging was 18.1% and 21.2% in VATS and open resection, respectively (p=0.470). Tumor size had a significant influence on the rate of nodal upstaging, and was higher in larger tumors (p<0.001). No difference in nodal upstaging between VATS and open resection was observed when looking at different tumor stages: cT1: 13.9% vs. 10.9%, p=0.567; cT2: 28.8% vs. 27.1%, p=0.842; cT3: 28.6% vs. 50%, p=0.285. There was significantly more upstaging in centrally located tumors treated with thoracotomy (33.3% vs. 10.3%, p = 0.045). No difference was found in peripherally located tumors (VATS vs open: 18.5% vs. 19.0%, p=0.917). cT stage was significantly higher in thoracotomy patients and centrally located tumors (p<0.001).

Conclusion:

Pathologic upstaging did occur in one out of five clinically nodal negative patients. Surgical technique had no influence on the rate of nodal upstaging in all patients. cT status was a predictive factor for nodal upstaging. The higher rate of nodal upstaging in centrally located tumors with open resection might be biased by a larger tumor size.

Disclosure: No significant relationships.

Keywords: nodal upstaging, VATS, thoracotomy

EFFECT OF HIGH-DOSE PREOPERATIVE METHYLPREDNISOLONE IN VIDEO-ASSISTED THORACOSCOPIC SURGERY LOBECTOMY: A DOUBLE BLIND, RAN-DOMISED CONTROLLED TRIAL

L.S. Bjerrgaard¹, P.F. Jensen², D.R. Bigler³, <u>René Horsleben Petersen⁴</u>, H.M. Sørensen³, K. Gefke³, H.J. Hansen⁴, H. Kehlet¹

¹Section for Pathophysiology, University Hospital of Copenhagen, Copenhagen, Denmark ²Department of Anaesthesia, Næstved Hospital, Næstved, Denmark ³Department of Cardiothoracic Anaesthesia, University Hospital of Copenhagen, Copenhagen, Denmark

⁴Department of Cardiothoracic Surgery, University Hospital of Copenhagen, Copenhagen, Denmark

Objectives:

We hypothesized that high-dose preoperative methylprednisolone improves postoperative analgesia after VATS lobectomy, when combined with a multimodal, opioid sparing analgesic regime.

Methods:

The study included 120 adult patients undergoing VATS lobectomy that were equally randomized to receive 125 mg methylprednisolone or isotonic saline. Group allocation was blinded to patients, investigators and caregivers, and all patients received a standardized multimodal postoperative analgesic regime of oral paracetamol, ibuprofen and gabapentin, supplemented by an intraoperative paravertebral nerve block and an intercostal catheter with continous marcain at the chest drain site. Our primary outcome was area under the curve for pain scores within the first 48 hours after surgery on a numeric rating scale, ranging from 0-10. Clinical follow-up was 2-3 weeks and telephone follow-up 12 weeks after surgery.

Results:

Methylprednisolone significantly decreased median pain scores on the day of surgery; at rest (NRS 1.6 vs. 2.0, p=0.019) and after mobilization to sitting position (NRS 1.7 vs. 2.5, p=0.004), but not during arm abduction and coughing (p=0.052 and 0.083, respectively). Nausea and fatigue were reduced on the day of surgery (p=0.04 and 0.03), whereas no outcome was improved on postoperative day one and two. MP did not increase the risk of complications, but increased blood glucose levels on the day of surgery (p<0.0001).

Conclusion:

High-dose preoperative methylprednisolone significantly reduced pain at rest and after mobilisation to sitting position on the day of surgery, without later analgesic effects. Nausea and fatigue was improved, without side effects except transient higher postoperative blood glucose levels.

Disclosure: R.H. Petersen: Speaker, Medtronic, Ethicon, Medela H.J. Hansen: Speaker, Medtronoc, Bard, Medela **Keywords:** VATS lobectomy, postoperative analgesia, pain, methylprednisolone

F-019

ADVANTAGES OF WOUND RETRACTOR DEVICE VERSUS RIGID TROCAR AT CAMERA PORT IN VIDEO ASSISTED THORACOSCOPIC SURGERY (VATS). SINGLE CENTER RANDOMIZED STUDY

<u>Federico Raveglia</u>¹, A. Rizzi¹, A. Baisi¹, C. Tinelli² ¹*Thoracic Surgery, AO San Paolo, Milan, Italy* ²*Biometric and Statistical Unit, Policlinico IRCCS "San Matteo", Pavia, Italy*

Objectives:

Rigid trocars are widely adopted in VATS, despite some disadvantages: 1) cannula strong pressure on intercostal nerve stimulating postoperative pain, 2) limited movement of thoracoscopic devices on their fulcrum when extreme acute angles with the chest wall are needed. Wound retractor (WR) device, designed for laparoscopic surgery, it is also used in VATS but to protect mini-thoracotomy. We compared the use of extra-small WR versus rigid trocar at camera port, that is the most painful thoracostomy. The aim was to determine if WR guarantees less postoperative pain and better scope maneuverability.

Methods:

Clinical trial approved by the ethics committee at our hospital. We enrolled 40 patients (statistical power 88%), randomized in two groups (SAS® software). Group A underwent VATS lung resection using WR at camera port, group B using rigid trocar. Intra-operative data collected were maximum acute angle obtained between the camere and chest wall (figure 1), and chest wall thickness; post-operative were pain, that was measured by NAS at 6, 12, 24, 48 and 72 hours after surgery and total morphine consumption at 72 hours administered by PCA (patient controlled analgesia) system. T test for independent data and regression linear model for repeated data were used to analyzed use of morphine at 72 h and NAS between two groups, respectively.

Results:

No statistical significance was found in the demographic traits of the two groups (p=1). Statistically significant differences were found in favor of group A for both pain control and morphine consumption (p<0.001) and camera maneuverability (described as maximum acute angle obtained/chest wall thickness) (p<0.001).

Conclusion:

WR proved to be more effective than trocar at camera port in VATS. Moreover, in our experience, WR presented other practical advantages: camera protection by small bleeding from chest wall, adaptability with every chest wall thickness, absence of skin injury around the port.

Disclosure: No significant relationships.

Keywords: wound retractor device, trocar, VATS, postoperative pain, camera port

14:30 - 15:30 SESSION IV: YOUNG INVESTIGATORS AWARD ROOM: BRUSSEL

F-020

VIDEOTHORACOSCOPIC APPROACH IS ASSOCIATED WITH FAVOURABLE OUTCOME IN THE TREATMENT OF EARLY-STAGE NON SMALL CELL LUNG CANCER - A PROPENSITY SCORE-MATCHED ANALYSIS

<u>Robert Dziedzic</u>, T. Marjanski, W. Rzyman Department of Thoracic Surgery, Medical University of Gdansk, Gdansk, Poland

Objectives:

Videothoracoscopic approach has become a standard for early stage Non-Small Cell Lung Cancer (NSCLC). Recently published meta-analyses proved the benefit of videothoracoscopic approach regarding overall survival and postoperative complications comparing with open thoracotomy. The aim of the study was to compare early, long-term survival and rate of postoperative complications of videothoracoscopic approach comparing with open thoracotomy.

Methods:

In this retrospective cohort study we performed an analysis of 982 individuals who underwent surgical resection for stage I-IIA of NSCLC between 2007 and 2015 in the Department of Thoracic Surgery. Thirty-day, 90-day mortality, length of hospital stay, rate of respiratory and cardiovascular complications, and overall survival were assessed. Subsequently propensity score-matched analysis (PSMA) was performed to compare two groups of patients. Five hundred and five individuals from open thoracotomy and 203 patients from videothoracoscopic group were exactly matched with pTNM, sex, Charlson Comorbidity Index, type of surgical resection and type of NSCLC.

Results:

In the unmatched and matched groups of patients the videothoracoscopic approach was associated with a significant benefit regarding overall survival (log-rank p=0.04). Correspondingly, the Cox proportional hazard ratio of matched patients was 0.64 (95%CI: 0.41 - 0.98) indicating significant improvement in survival. We observed reduced rate of postoperative atelectasis (3.4% vs. 9.5% p=0.006) and need for blood transfusion (4.4% vs. 10.3% p=0.01) without significant impact on postoperative length of stay (mean 7.5 vs. 8.5 days p=0.07), 30-day mortality (1.0% vs. 1.6% p= 0.8) and 90-day mortality (1.0% vs. 2.6% p=0.2).

Conclusion:

Patients operated due to early stage NSCLC through videothoracoscopic approach have better overall survival comparing to those operated through thoracotomy.

Disclosure: No significant relationships.

Keywords: videothoracoscopic resection, non-small cell lung cancer, propensity scorematched analysis.

F-021

IS ADJUVANT CHEMOTHERAPY HELPFUL OR HARMFUL IN R0 RESECTED STAGE IB NON-SMALL CELL LUNG CANCER?

Xiao Li, M. Teng, J. Wang

Department of Thoracic Surgery, Beijing University People's Hospital, Beijing, China

Objectives:

The use of adjuvant chemotherapy in R0 resected stage Ib (T2aN0) non-small cell lung cancer is still controversial. The present study investigated the effect of adjuvant chemotherapy on survival among patients undergoing R0 resection for T2aN0 NSCLC.

Methods:

Patients with pT2aN0 NSCLC who underwent R0 resection (by either video assisted thoracoscopic surgery VATS or thoracotomy) were identified in our prospectively collected database from 2004 to 2014. Kaplan-Meier and log-rank tests were used to compare disease free survival (DFS) and overall survival (OS), and a Cox proportional hazards model was used to determine the significant contributors to survival. A subset analysis was performed with stratification by risk factor index and tumor size. Number of all risk factors included in NCCN guideline was defined as risk factor index here.

Results:

Of 306 patients identified in the study, 191(62.4) underwent surgery alone, 115(37.6%) underwent surgery followed by adjuvant chemotherapy. Median follow up was 53 (8~148) months. Adjuvant chemotherapy was not associated with better prognosis for the whole group. Poor differentiated tumors and adjuvant chemotherapy were even independent risk factors for shorter DFS in the multivariable analysis (as deaths were too few in this group patients with such early stage tumors, we just showed the data of DFS) (Table 1). The subgroup analysis by tumor size identified that adjuvant chemotherapy even indicated worse prognosis in patients with tumors ≤ 4 cm, especially in patients whose tumors are ≤ 3 cm. Adjuvant chemotherapy did nothing help with prognosis in patients whose tumors ≤ 3 cm, even with risk factor index ≥ 2 .

QUET	OF TH	ORACIC
NVALOREAN	人	SUR NOS
1	• 1993 • •	

Table 1. Univariable and Multivariable Analysis of DFS of R0 Resected T2aN0 NSCLC								
	Univariable Analysis				Multivariable Analysis			
	HR	95.0%	CI	P Value	HR	95.0% CI		P Value
Sex (male vs.female)	1.399	0.524	3.732	0.503	NA	NA	NA	NA
Age (>60yrs vs. ≤60yrs)	1.632	0.748	3.562	0.219	1.773	0.825	3.809	0.142
Procedure (VATS vs.Open)	0.705	0.225	2.211	0.549	NA	NA	NA	NA
Pathological type (Aden vs. Squa)	0.613	0.21	1.79	0.371	NA	NA	NA	NA
Differentiation(poor vs. others)	2.143	1.01	4.546	0.047	2.295	1.139	4.625	0.02
Diameter (>4cm vs. ≤4cm)	2.176	0.771	6.139	0.142	NA	NA	NA	NA
Pleural invasion (Y vs.N)	0.88	0.392	1.975	0.757	NA	NA	NA	NA
LVI (Y vs.N)	1.277	0.283	5.771	0.751	NA	NA	NA	NA
Neuroendocritic (Y vs.N)	2.766	0.506	15.124	0.24	NA	NA	NA	NA
Adjuvant Chemo (Y vs.N)	2.235	1.048	4.763	0.037	2.282	1.119	4.654	0.023
Smoking histor (Y vs.N)	1.729	0.681	4.388	0.249	NA	NA	NA	NA
LVI=Lymphaticvesselinvasion, NA=not applicable								

Conclusion:

Adjuvant chemotherapy is not helpful to patients with R0 resected stage Ib (T2aN0) non-small cell lung cancer, even when the tumor is >4cm, or patients with more than two risk factors. Further larger sample sized multiple center study is needed to identify this item.

Disclosure: No significant relationships.

Keywords: NSCLC, risk factors, adjuvant chemotherapy, R0 resected

F-022

A STUDY OF THE LEARNING CURVE OF ROBOTIC ESOPHAGECTOMY FOR ESOPHAGEAL CANCER

Samina Park, K.Y. Hyun, Y. Hwang, H.J. Lee, I.K. Park, Y.T. Kim, C.H. Kang Department of Thoracic and Cardiovascular Surgery, Seoul National University Hospital, Seoul, Republic of Korea

Objectives:

Robotic esophagectomy (RE) enables radical and meticulous dissection of the esophagus and lymph nodes, which might reduce postoperative complications and improve oncological outcomes. However, RE is a technically demanding procedure and requires a significant learning period. We aimed to identify serial gains in surgical proficiency by analyzing short-term outcomes of RE.

Methods:

We conducted a retrospective review of patients who underwent RE for esophageal cancer between May 2008 and July 2016. Total operation time, thoracic procedure time, length of hospital stay, the number of harvested lymph nodes, and postoperative complications were analyzed. Risk-adjusted observed-expected cumulative sum (O-E CUSUM) curves were constructed to identify the change point of proficiency gain.

Results:

A total of 144 patients with a median age of 66 years were included. Complete resections were achieved in 139 patients (96.5%); the median number of harvested lymph nodes of 40. Ninety-day mortality occurred in 4 patients (2.7%). The change points of risk-adjusted O-E CUSUM curves were similar to those of the unadjusted curves except thoracic procedure time and the number of harvested lymph nodes. Two notable change points were identified around 30 and 80 cases in the risk-adjusted O-E CUSUM curves. After the first change point, the number of harvested lymph nodes increased (22 vs. 45, P<0.001) and the respiratory complication rate decreased, though without statistical significance (16% vs. 6%, P=0.13). After the second change point, the total operation time (502 vs. 431 minutes, P<0.001), thoracic procedure time (190 vs. 180 minutes, P=0.37), length of hospital stay (24 vs. 14 days, P=0.003), and leakage rate decreased (15% vs. 2%, P=0.008).




Conclusion:

We demonstrated temporal changes in perioperative outcomes by cumulated experience in RE. The adjusted O-E CUSUM curves were similar to the unadjusted curves, which represent the significant impact of a learning period on the postoperative outcomes in RE for esophageal cancer.

Disclosure: No significant relationships.

Keywords: esophageal cancer, robotic surgery, learning curve

CHEST DRAIN REMOVAL AT MINIMAL AIR FLOW: COMPARISON BETWEEN POST REMOVAL PLEURAL ULTRASOUND AND CHEST X-RAY IN DETECTING CLINICALLY SIGNIFICANT RESIDUAL PNEUMOTHORAX

<u>Miriam Patella</u>, R. Pini, S. Cafarotti *Thoracic Surgery, EOC, ORBV, Bellinzona, Switzerland*

Objectives:

To evaluate the effectiveness of pleural ultrasound (PUS) compared to chest x-ray (CXR) in detecting residual pneumothorax (PNX) after chest drain removal at a threshold of 10-20ml/ min of air flow digitally recorded, in patients undergoing lung resection.

Methods:

Fifty patients undergoing lung resection were enrolled. Inclusion criteria were: complete expansion of the lung at post-operative CXR, pleural effusion <300ml/24h, absence of surgical emphysema, body mass index <40, air leak digitally recorded 10-20ml/min with a plateau or a sloping down trend during the last six hours. Two hours after the chest drain removal, PUS at the second and the third intercostal spaces was performed to evaluate the presence of pleural sliding. Patients with no detected PNX or with asymptomatic apical PNX were considered for discharge. The same patients were contemporary, blindly evaluated with a CXR by a second operator and a comparison between the two methods was performed. Clinical decisions were taken based on CXR results.

Results:

PUS detected seven significant PNX (pleural sliding absent at third intercostal space), 10 apical PNX. Thirty-three patients had no residual PNX. CXR confirmed 5/7 significant PNX (1 chest drain re-inserted, 4 patients were observed) while 2/7 PNX were considered clinically irrelevant. 8/10 apical PNX were confirmed and in 2/10 patients there was no PNX at CXR. The 33 patients with no PNX at PUS were confirmed to have full lung expansion at CXR. Overall, PUS has a negative predictive value of 100% in excluding large PNX and a positive predictive value of 71% as it overestimated 2 PNX.

Conclusion:

10-20ml/min of air flow is an acceptable cut-off for chest drain removal, but in this subgroup of patients it is auspicable to perform an imaging study to verify the absence of PNX, however, when PUS confirms the lung expansion or the presence of an apical PNX, CXR is not needed.

Disclosure: No significant relationships.

Keywords: chest drain management, thoracic sonography, lung resection



VIDEO ASSISTED THORACOSCOPIC SURGERY YIELDS BETTER OUTCOMES THAN THORACOTOMY FOR ANATOMIC LUNG RESECTIONS IN BRAZIL: A PROPENSITY SCORE -MATCHED ANALYSIS OF THE BRAZILIAN SOCIETY OF THORACIC SURGERY DATABASE

Maria Teresa Ruiz-Tsukazan¹, R. Terra², Á. Vigo³, A. Gomes-Neto⁴, H. Alves De Oliveira⁵, D. Pinto-Filho⁶ ¹Thoracic Surgery, Hospital São Lucas da PUCRS, Porto Alegre, Brazil ²Thoracic Surgery Division, Heart Institute (INCOR) - Clinicas Hospital / Medicine School, Sao Paulo University, Sao Paulo, Brazil ³Epidemiology, Universidade Federal do Rio Grande do Sul - UFRGS, Porto Alegre, Brazil ⁴Thoracic Surgery, Hospital de Messejana, Fortaleza, Brazil ⁵Thoracic Surgery, Hospital de Base do Distrito Federal, Brasilia, Brazil

⁶Thoracic Surgery, Universidade de Caxias do Sul, Caxias do Sul, Brazil

Objectives:

Video-assisted anatomical lung resections have been increasingly performed worldwide for lung cancer and non-neoplastic diseases with excellent outcomes. Nonetheless, no comparative analysis has been done in Latin America where we find a different mix of cases when compared to the US or Europe. The purpose of this study was to compare the outcomes of VATS versus thoracotomy for anatomical lung resection in patients from the Brazilian Society of Thoracic Surgery (BSTS) database.

Methods:

This study was a propensity score-matched analysis of all 1355 patients who underwent anatomic lung resections (704 thoracotomies and 651 VATS) registered in the BSTS database from its inception in August 2015 until December 2016. A propensity-score model was built using the following baseline characteristics age at surgery, gender, comorbidities, pulmonary lung function, type of resection, cancer and non-cancer diagnosis. The propensity score-matched sample comprised a well-matched group of 882 patients total. The main outcomes were mortality and major cardiopulmonary complications (according to ESTS database definition).

Results:

The demographic data of the 882 matched patients is depicted in Table 1. Standardized difference analysis suggested that a balanced matching was achieved. Major cardiopulmonary complications were significantly more frequent in patients who underwent thoracotomy (15.9%) in comparison to VATS (10.9%), OR: 1.50; 95% CI 1.02-2.20. A similar result was observed when analyzing all complications, more events were registered in patients who underwent thoracotomy (31.3%) in comparison to VATS (23.6%), OR: 1.47; 95% CI 1.09-1.99. With regards to mortality, no significant difference was observed when comparing thoracotomy (2.7%) to VATS (1.8%), OR 1.5; 95% CI 0.61-3.67.

	Overall sample (N=1355)		Matched samples (N=882)	
-	VATS (n=651)	Thoracotomy (<u>n</u> =704)	VATS (n=441)	Thoracotomy (n=441)
Male gender	291 (44.7)	357 (50.7)	201 (45.6)	216 (49.0)
Age at surgery (years)				
Mean (SD)	63.4 (12.85)	58.0 (15.29)	62.2 (12.98)	62.1 (12.60)
BMI (kg/m ²)				
Mean (SD)	26.2 (4.38)	25.4 (5.08)	26.3(4.4)	25.6(5.2)
ppoFEV1< 40%	52 (8.5)	111 (16.2)	45 (10.2)	44 (10.0)
ASA				
1	134 (20.5)	87 (12.4)	50 (11.3)	57 (12.9)
II	356 (54.7)	398 (56.5)	269 (61.0)	267 (60.5)
111	145 (22.3)	184 (26.1)	108 (24.5)	106 (20.0)
≥IV	16 (2.5)	35 (5.0)	14 (3.2)	11 (2.5)
Coronary artery disease	25 (3.8)	34 (4.8)	20 (4.5)	24 (5.4)
Serum creatinine >2 mg/dl	6 (0.9)	14 (2.0)	6 (1.4)	5 (1.1)
Cerebrovascular history	9 (1.4)	11 (1.6)	9 (2.0)	7 (1.6)
Insulin-dependent diabetes	71 (10.9)	78 (11.1)	50 (11.3)	50 (11.3)
Lung Excision	. ,			
Lobectomy	515 (79.1)	498 (70.7)	358 (81.2)	358 (81.2)
Segmentectomy	114 (17.5)	66 (9.4)	62 (14.1)	59 (13.4)
Bilobectomy	9 (1.4)	50 (7.1)	9 (2.0)	8 (1.8)
Pneumonectomy	13 (2.0)	90 (12.8)	12 (2.7)	16 (3.6)
Cancer diagnosis	416 (63.9)	389 (55.3)	276 (62.6)	267 (60.5)
Extended resection	9 (1.4)	62 (8.8)	9 (2.0)	5 (1.1)
Any complication	151 (23.2)	238 (33.8)	104 (23.6)	138 (31.3)
Major Cardiopulmonary complication	63 (9.7)	104 (14.8)	48 (10.9)	70 (15.9)
Mortality	12 (1.8)	22 (3.1)	8 (1.8)	12(2.7)

Table 1. Patients baseline characteristics and outcomes in the overall samples and propensity scorematched sample – mean (SD) or n (%).

Conclusion:

In Brazil, minimally invasive surgery (VATS) for anatomic lung resections is associated with a significantly lower rate of complications when compared to conventional thoracotomy.

Disclosure: No significant relationships.

Keywords: database, lung, surgery, VATS



PRE-EMPTIVE GLOTTIC ENLARGEMENT BEFORE LARYNGOTRACHEAL SURGERY IN PATIENTS AT HIGHEST RISK FOR POSTOPERATIVE BILATERAL VOCAL CORD PARALYSIS

<u>Thomas Schweiger</u>¹, K. Hoetzenecker¹, I. Roesner², B. Schneider-Stickler², D. Denk-Linnert², W. Klepetko¹

¹Thoracic Surgery, Medical University of Vienna, Vienna, Austria, ²Phoniatrics and Logopedics, Medical University of Vienna, Vienna, Austria

Objectives:

Bilateral vocal cord paralysis (VCP) is a severe complication after laryngotracheal surgery. Due to the subsequent reduced glottic opening, it prompts the placement of a tracheostomy. This negatively affects the success of the procedure by adding additional trauma to the subglottic area and post-operative morbidity. In a high-risk patient population with pre-existing or expected VCP, tracheostomy might be avoided by pre-emptive glottic enlargement before laryngotracheal surgery.

Methods:

All patients referred to our institution for laryngotracheal surgery received an initial screening for VCP. High-risk patients with pre-existing VCP or a planned recurrent nerve resection due to tumor extent received glottic enlargement before laryngotracheal surgery. Glottic enlargement was performed by resecting the *Processus vocalis* endoscopically using a CO2 laser.

Results:

From October 2011 to December 2016 six patients (four female, two male) received pre-emptive glottic enlargement. Median age was 64 years (range 34-80). Indication for laryngotracheal surgery was malignant disease in five patients (thyroid cancer (n=4), thymic cancer (n=1)); one patient had non-malignant disease. Four patients underwent failed surgical procedures before referral. All patients received cricotracheal resections (resection length 39 ± 7 mm (mean \pm SD)). Extubation within 24h after surgery was achieved in five of six patients, despite all patients had post-operative unilateral (n=5) or bilateral (n=1) VCP as anticipated. However, in one patient a utility tracheostomy was placed at the end of the procedure due to severe glottic edema and removed at the 9th POD. The median post-operative ICU stay was one day (range 1-14).

Conclusion:

Pre-emptive glottic enlargement appears to be a valuable treatment strategy in patients at highest risk for bilateral VCP. Immediate post-operative extubation could be achieved in the vast majority of patients, despite at least unilateral VCP and extensive laryngotracheal surgical procedures.

Disclosure: No significant relationships.

Keywords: trachea, cricotracheal resection, airway surgery

16:00 - 17:00 SESSION V: MIXED THORACIC I ROOM: INNSBRUCK

F-026

RIGHT-TO-LEFT INVERTED LIVING-DONOR LOBAR LUNG TRANSPLANTA-TION: PATIENT CHARACTERISTICS AND INTERMEDIATE OUTCOMES

Toyofumi Chen-Yoshikawa, M. Hamaji, H. Motoyama, K. Hijiya, A. Aoyama, H. Date *Thoracic Surgery, Kyoto University, Kyoto, Japan*

Objectives:

Because of the severe donor shortage in Japan, living-donor lobar lung transplantation (LDLLT) still remains an essential therapy. In adult cases, LDLLT is often difficult because of small donor grafts. To overcome this obstacle, we developed a new surgical technique, right-to-left inverted LDLLT. The aim of this study was to investigate its characteristics and intermediate outcomes. In this procedure, the right lower lobe, which is 125% bigger than the left lower lobe, is used instead of the left lower lobe.

Methods:

The first right-to-left inverted LDLLT was performed in 2014. Since then, 32 LDLLTs were performed at Kyoto university Hospital. Among them, 12 right-to-left inverted LDLLTs (38%) were performed. Their characteristics and intermediate outcomes were retrospectively reviewed.

Results:

The median age was 42 years (range, 22-63 years). The diagnoses were interstitial pneumonia (N=7), pulmonary complication after hematopoietic stem cell transplantation (N=4), and hemosiderosis (N=1). The reasons for choosing an inverted procedure instead of standard LDLLT were the small-for-size graft in eight cases and the anatomical variation of donor vessels in four cases. The first patient underwent single LDLLT using a right lower lobe graft and the next 11 patients underwent bilateral LDLLT using two right lower lobe grafts. Additional native lung-sparing procedure was also combined in two patients. There was no operative mortality and all patients were discharged home after LDLLT. As of now, two patients developed chronic allograft dysfunction. All but one patient are alive with a median follow-up period after LDLLT of 455 days (range, 136-1039 days). In terms of donor outcomes, there were no mortalities or severe postoperative complications. Furthermore, all 23 donors were well and returned to their ordinal lives after donor lobectomies.

Conclusion:

We performed 12 right-to-left inverted LDLLT with acceptable early outcomes. In our institution, right-to-left inverted technique is one of the useful and feasible options for LDLLT.

Disclosure: No significant relationships.

Keywords: size matching, right-to-left inversion, lobar lung transplantation, living-donor, lung transplantation, inverted lung transplantation



LUNG TRANSPLANTATION FOR IDIOPATHIC PULMONARY ARTERIAL HYPER-TENSION ON INTRAOPERATIVE AND POSTOPERATIVELY PROLONGED EXTRACORPOREAL MEMBRANE OXYGENATION (ECMO) PROVIDES OPTI-MALLY CONTROLLED REPERFUSION AND EXCELLENT OUTCOME

<u>Bernhard Moser</u>¹, P. Jaksch¹, S. Taghavi¹, G. Muraközy¹, G. Lang¹, H. Hager², C. Krenn³, G. Roth³, P. Faybik³, A. Bacher³, C. Aigner¹, J. Matilla¹, P. Hacker¹, I. Lang⁴, W. Klepetko¹ ¹Thoracic Surgery, Medical University Vienna, Vienna, Austria

²Department of Cardiothoracic and Vascular Anesthesiology and Intensive Care Medicine, Medical University Vienna, Vienna, Austria

³Department of Anesthesiology, General Intensive Care and Pain Medicine, Medical University Vienna, Vienna, Austria

⁴Cardiology, Medical University Vienna, Vienna, Austria

Objectives:

Lung transplantation for idiopathic pulmonary arterial hypertension (iPAH) has the highest reported postoperative mortality of all indications. Reasons lie in the complexity of treatment of these patients and the frequent occurrence of postoperative left ventricular failure. Transplantation on intraoperative extracorporeal membrane oxygenation (ECMO) support instead of cardiopulmonary bypass (CPB) and even more the prolongation of ECMO into the postoperative period helps to overcome these problems. We reviewed our experience with this concept.

Methods:

All patients undergoing bilateral lung transplantation (BLTX) for iPAH on intraoperative ECMO plus prophylactic ECMO prolongation into the postoperative period between January 2000 and December 2014 were retrospectively analyzed.

Results:

Forty-one patients entered the study. Venoarterial ECMO support was prolonged into the postoperative period for a median of 2.5 days (range 1–40). Ninety day, 1-, 3- and 5-year survival rates for the patient collective was 92.7%, 90.2%, 87.4% and 87.4%, respectively. When compared to 31 patients with iPAH transplanted in the same period of time without prolongation of ECMO into the postoperative period, the results compare favorably (83.9%, 77.4%, 77.4%, and 77.4%) although statistical significance was not achieved. Furthermore, these results are among the best results ever reported for this particularly difficult patient population.

Conclusion:

BLTX for iPAH with intraoperative venoarterial ECMO support provides superior outcome compared to results reported about use of CPB. Prophylactic prolongation of venoarterial ECMO into the early postoperative period provides stable postoperative conditions and seems to further improve results.

Disclosure: No significant relationships. **Keywords:** transplantation, ECMO, pulmonary hypertension, PGD

PREDICTORS OF TRIMODALITY THERAPY AND TRENDS IN THERAPY FOR MALIGNANT PLEURAL MESOTHELIOMA

David Nelson, D. Rice, J. Niu, A. Vaporciyan, M. Antonoff, W. Hofstetter, G. Walsh, S. Swisher, J. Roth, S. Giordano, R. Mehran, B. Sepesi

Thoracic and Cardiovascular Surgery, MD Anderson Cancer Center, Houston, TX, United States of America

Objectives:

Malignant pleural mesothelioma (MPM) is a rare malignancy that is usually fatal, with much controversy and heterogeneity regarding treatment strategies. Our goal was to identify the practice patterns of MPM in the United States.

Methods:

Patients with histologically proven MPM were identified within the National Cancer Data Base (2004-2014). Predictors of trimodality therapy were analyzed by multivariate logistic regression using available clinical and demographic data. Time-trend analysis was evaluated using Somer's D association test.

Results:

Twenty thousand, five hundred and sixty one patients met the inclusion criteria. Complete clinical staging information was available for 15,150 patients: stage I (N=3400, 22%), stage 2 (N=2146, 14%), stage 3 (N=3137, 21%), and stage 4 (N=6467, 43%). Only 3,282 (16%) underwent cancer-directed surgery, among whom only 533 (2.59%) had trimodality therapy. Patients undergoing trimodality therapy were more likely to be treated at an academic center (OR 1.9, 95% CI 1.1 – 3.0), less likely to be treated in the South (OR 0.37, 95% CI 0.24-0.58), more likely to travel >25 miles to the treatment facility (OR 1.9, 95% CI 1.4-2.6), more likely to be in the upper income quartile (OR 1.4, 95% CI 1.0-2.0), less likely to be greater than 70 years of age (OR 0.22, 95% 0.13 – 0.36), and less likely to have a Charlson comorbidity score of 1 or greater (OR 0.60, 95% CI 0.47 – 0.77), with no significant difference by race, gender, or insurance status. Over the 10 years study period there was an increase in patients who underwent cancer-directed surgery and surgery with chemotherapy, whereas the proportion undergoing surgery with radiation therapy decreased (see figure).



Conclusion:

Many patients with MPM are not treated with aggressive therapy, with significant variation in treatment patterns. Referrals to high volume and specialized centers may help offer more therapeutic options and trial or registry enrollment.

Disclosure: No significant relationships. **Keywords:** database, pleura, mesothelioma, cancer

FALSE-NEGATIVE RATE AND VOLUME OF ENDOBRONCHIAL ULTRASOUND GUIDED TRANSBRONCHIAL NEEDLE ASPIRATION PROCEDURES FOR NON SMALL CELL LUNG CANCER STAGING: A MULTICENTER STUDY IN ITALY

Nicola Rotolo¹, M. Nosotti², L. Santambrogio², A. Imperatori¹, L. Dominioni¹, G. Crosta³, P. Foccoli⁴, G. Pariscenti⁵, E. Passera⁶, L. Bortolotti⁶, G. Falezza⁷, M. Infante⁷, L. Rosso² ¹Department Thoracic Surgery, University of Insubria, Varese, Varese, Italy ²Thoracic Surgery and Lung Transplantation Unit, IRCCS Fondazione Ca'Granda Ospedale Maggiore Policlinico, Milan, Italy ³Respirology, Ospedale di Circolo di Varese, Varese, Italy ⁴Bronchoscopy, Spedali Civili di Brescia, Brescia, Italy ⁵Thoracic Surgery, Spedali Civili di Brescia, Brescia, Italy ⁶Thoracic Surgery, Cliniche Gavazzeni, Bergamo, Italy ⁷Thoracic Surgery, Ospedale Borgo Trento, Verona, Italy

Objectives:

Results of endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) for lymph node (LN) staging of lung cancer are difficult to compare among institutions. We aimed to assess in a multicenter study the impact of volume on EBUS-TBNA false negative (FN) rate.

Methods:

Between January 2012 and July 2016 in five Italian thoracic surgery units without pre-defined EBUS-TBNA quality standards, the data of 1,180 consecutive EBUS-TBNA cases in total were prospectively collected. Of these, we retrospectively analyzed only cases with the following stringent criteria, using an identical database in all centers: ascertained Non-Small Cell Lung Cancer (NSCLC), candidate to active oncological treatment, mediastinal node enlargement <3cm at CT scan or/and PET-positive node(s). Cancer-positive EBUS-TBNA biopsies were considered true-positive (TP). Cancer-negative biopsies were classified true negative (TN) or FN based on the mediastinal nodes' status subsequently shown by mediastinoscopy, or by lymphadenectomy during NSCLC resection, or by N2/N3 PET-positivity/enlargement during one-year follow-up in unresected patients.

Results:

The five centers respectively contributed 222, 98, 77, 58, 30 EBUS-TBNA cases with inclusion criteria (total=485 patients; male, 75%; mean age, 68 + 10 SD; mean LN size, 16 mm + 6 SD). A single nodal station was biopsied in 68% of cases, multiple stations in 32%. Of all 485 samplings, 49 (10%) proved to be inadequate, 301 (62%) were classified TP, 135 (28%) were cancer-negative. However, 30 of the 436 adequate samplings were FN (7%). Overall the sensitivity, negative predictive value, accuracy of EBUS-TBNA for N2/N3 disease were 90%, 78%, 93%, respectively. Among centers the FN rate varied from 4% to 11% of all adequate

samplings, and inversely correlated with EBUS-TBNA volume (R Square=0.925; p=0.009; Figure 1).



Figure 1. Correlation between false-negative rate and volume of EBUS-TBNA procedures performed between January 2012-July 2016 in five units of thoracic surgery

Conclusion:

The FN rate of mediastinal node biopsy inversely correlated with the EBUS-TBNA volume in the five participating units, being 4% in the center with the highest volume.

Disclosure: No significant relationships.

Keywords: EBUS-TBNA, lung cancer staging, false negative, mediastinal staging

DEVELOPMENT OF A CLINICAL SCORE TO DISTINGUISH MALIGNANT FROM BENIGN ESOPHAGEAL DISEASE IN AN UNDIAGNOSED PATIENT POPULATION REFERRED TO AN ESOPHAGEAL DIAGNOSTIC ASSESSMENT PROGRAM

<u>Yaron Shargall</u>¹, W. Hanna¹, C. Wen², L. Mbuagbaw², L. Schneider³, M. Coghlan¹, M. Coret², E. Reynolds², C. Finley¹, C. Schieman², S. Demay²

¹Division of Thoracic Surgery, McMaster University/St. Joseph's Healthcare Hamilton, Hamilton, ON, Canada,

²Division of Thoracic Surgery, St. Joseph's Healthcare Hamilton, Hamilton, ON, Canada, ³Surgery, McMaster University/St. Joseph's Healthcare Hamilton, Hamilton, ON, Canada

Objectives:

Esophageal cancer is associated with poor prognosis. Diagnosis is often delayed, resulting in presentation with advanced disease. We developed a clinical score to distinguish malignant from benign diagnoses in symptomatic patients prior to any diagnostic tests.

Methods:

Data from patients referred to a regional esophageal diagnostic assessment program between May 2013 and August 2016 prior to first clinical visit were analyzed. Logistic regression was performed to identify predictors of malignancy based on patient characteristics and symptoms. Predicted probabilities were used to develop a score from one to 10 which was weighted according to beta coefficients for predictors in the model. Score accuracy was evaluated using a receiver operating characteristic curve and internally validated using bootstrapping techniques.

Results:

Of 530 patients, 363 (68%) were diagnosed with malignancy. Factors predictive of malignancy included: male (p<0.001), family history of cancer (p=0.010) or esophageal cancer (p=0.023), fatigue (p=0.004), chest/throat/back pain (p=0.001), age (p=0.040), melena (p=0.041), and weight loss (p=0.001). Dysphagia was the most common symptom (68%) but was not retained in the model (p=0.35). Malignancy predictors' scores were: male, family history of esophageal cancer, melena, 2 points each; family history of cancer, fatigue, chest/throat/back pain, and weight loss, 1 point each. For clinical application, patients were classified into low (1-2), medium (3-6), and high (7-10) risk. Low-risk patients had 70% lower chance of malignancy (RR=0.28, 95% CI 0.21-0.38), medium-risk had 50% higher chance of malignancy (RR=1.5, 95% CI 1.26-1.77), and high-risk patients were 8 times more likely to be diagnosed with malignancy (RR=8.2, 95% CI 2.60-25.86). The AUC for malignancy was 0.82 (95% CI 0.77-0.87) (figure). Model fit for the bootstrapped and development models was good (x2[8, n=530]=5.8, p=0.670).





Diagonal segments are produced by ties.

Conclusion:

A simple score using patient characteristics and symptoms reliably distinguished malignant from benign diagnoses. This score might be useful in expediting investigations and eventual diagnosis of malignancy.

Disclosure: No significant relationships.

Keywords: esophageal cancer, clinical score, diagnostic, malignant, benign

NEVER-SMOKERS WITH RESECTED LUNG CANCER: DIFFERENT DEMO-GRAPHICS BUT SIMILAR SURVIVAL

Brendon Stiles, M. Rahouma, M. Kamel, A. Nasar, A. Nguyen, S. Harrison, B. Lee, J. Port, N. Altorki

Cardiothoracic Surgery, Weill Cornell Medicine, New York-Presbyterian Hospital, New York, NY, United States of America

Objectives:

There is a perceived increase in the rate of lung cancer among never-smokers. We sought to examine changes over time in the proportion of never-smokers among surgical lung cancer patients and to determine whether smoking history independently affected survival.

Methods:

This was a review of a prospective database (1997-2016). Among smokers and never-smokers who underwent lung cancer resection demographic, clinical, and pathological data were compared. Disease-free and cancer-specific survival (DFS, CSS) were analyzed using Kaplan-Meier and differences compared using log-rank test. Propensity matching (1:1 including age, gender, location, histology, grade, pT, pN) was performed for further comparison of survival in a matched cohort.

Results:

Among 3,232 resected lung cancer patients, we identified 718 never-smokers (22%), 993 smokers with <30 pack history (31%), and 1521 smokers with \geq 30 pack history (47%). The proportion of never-smokers increased over time, comprising 26.6% of the cohort after 2007 compared to 16.1% prior (p=<0.001). Never-smokers (Table) were younger, more likely to be female and Asian, more frequently had adenocarcinoma and lower lobe tumors, and were more often pStage I. In pStage matched cohorts (excluding carcinoid tumors), there were no differences in DFS or CSS (Table). Similarly, in propensity matched groups (498 patients each), there was no difference in 5-year DFS (66% vs. 67%, p=0.661), CSS (84% vs. 81%, p=0.350), or in freedom from recurrence (71% vs.71%, p=0.626). On univariate analysis of the matched cohort, never-smoking status had no effect upon DFS (HR 1.05, p=0.661) or CSS (HR1.16, p=0.350).

Conclusion:

The proportion of never-smokers undergoing resections for lung cancer is increasing, although it is unclear whether this represents an increase in overall incidence. Never-smokers have distinct demographic patterns and tend to be younger females with adenocarcinoma. Despite these differences, stage and propensity matched never-smokers have the same survival as smokers and remain at equal risk for recurrence and death.

Disclosure: No significant relationships.

Keywords: lung cancer, tobacco, indolent, lung cancer screening



17:00 - 18:00 SESSION VI: INNOVATIVE/EXPERIMENTAL ROOM: TIROL

F-032

BLOOD MEASUREMENT OF NEUROENDOCRINE GENE TRANSCRIPTS IS DIAGNOSTIC FOR BRONCHOPULMONARY CARCINOID AND IDENTIFIES THE EFFECTIVENESS OF SURGICAL RESECTION

P.L. Filosso¹, <u>Irvin Modlin</u>², M. Roffinella¹, A. Lewczuk³, K. Chung⁴, A. Kolasinska-Cwikla⁵, J. Cwikla⁶, M. Kidd⁴

¹Thoracic Surgery, University of Torino, Torino, Italy ²Surgery, Yale University School of Medicine, New Haven, CT, United States of America ³Endocrinology, Medical University of Gdansk, Gdansk, Poland ⁴Research and Development, Wren Laboratories, Branford, CT, United States of America ⁵Oncology, Maria Skłodowska-Curie Memorial Cancer Center, Warsaw, Poland ⁶Radiology, University of Warmia and Mazury, Olsztyn, Poland

Objectives:

Defining Bronchopulmonary Neuroendocrine Tumors (BPNETs) management is difficult since imaging, histology and biomarkers (Chromogranin A) are limited in predicting malignancy and assessing therapy. Biopsies are invasive and often difficult to interpret. We therefore developed a NET multigene blood test (NETest) to diagnose and assess BPNET management.

Methods:

Material: Cohort I (retrospective): BPNET (n=108; progressive n=34, stable n=74); Cohort II (prospective surgery): BPNET (n=12; typical carcinoid (n=9), atypical (n=1), LCNEC (n=2)). Cohort III controls: normal (n=90) and lung disease (COPD: n=18; adenocarcinoma n=7, squamous n=5). Cohort II bloods were pre surgery, POD 1, 5, 7 and 30. BP-NETest measurement: qPCR (0-100% scale: normal <25%, stable <40%, intermediate 40-70%, progressive >70%). CgA (ELISA; normal <109ng/ml) was the comparator. Analysis: Cohort I/III: 2-tailed Mann-Whitney U-test, ROC-statistics; Cohort II: Wilcoxon-matched pairs, 1-way ANOVA.

Results:

Cohort I: All BPNETs (n=108) were positive. Controls (n=90) 6±1%, stable (n=74) - levels 38±3%; progressive (n=34): 74±5%; (p<0.0001). AUC for NET vs controls: 0.94±0.03 (p<0.0001). CgA was positive in 41% and not different to controls. Cohort II: NETest was positive in all; pre-surgical: 81±12% {Typical (78±9%), atypical (100%), LCNEC (84+3%)}. For all patients: POD1 (66±10%), POD5 (65±11%), POD7 (38±3%, p=0.015) and POD30 (35±3%, p<0.01). 1-way ANOVA analysis was significant (F=11.2, p<0.0001). At 30 days, levels had decrease in all patients by 230%±33%. CgA was positive in only 33% (pre-surgery) and not informative (1-way ANOVA: F=0.88, p=0.51). Cohort III: NETest controls: 6±1%; COPD 24±1%, adenocarcinoma 12±2% and squamous cancers 16±3%. AUC vs. BPNETs: 0.90±0.03 (p<0.0001).

Conclusion:

Blood NET gene levels identified BPNETs in 100%. NETest differentiated controls, benign or malignant lung disease (>93%). Resection decreased blood values in all patients. CgA was of no clinical utility. Given the accuracy/sensitivity of NET transcript measurement, we predict that follow up NETest levels will prognosticate residual disease and recurrence post-surgery.

Disclosure: K. Chung: Employee of Wren Laboratories M. Kidd: Employee of Wren Laboratories. **Keywords:** NETest, surgery, bronchopulmonary, carcinoid, biomarker



THE USE OF ULTRASOUND TO PREDICT FROZEN SECTION RESULTS IN DIAGNOSING GROUND-GLASS OPACITIES

<u>Alfonso Fiorelli</u>¹, G. Messina¹, R. Scaramuzzi¹, E. Frongillo¹, I. Minerva¹, G. Natale¹, M. Accardo², I. Cozzolino², G. Vicidomini¹, R. Franco², M. Santini¹ ¹Department of Cardio-thoracic Disease, Thoracic Surgery Unit, Second University of Naples, Naples, Italy ²Department of Pathology, Second University of Naples, Naples, Italy

Objectives:

Ground glass opacities (GGOs) remain a diagnostic challenge. The intraoperative localization may be difficult and several frozen section biopsies could be required before obtaining a definitive diagnosis. We reported a new strategy as the use of an ultrasound convex probe for the detection of GGO in the surgical specimens with the aim of submitting to pathologist a sample of tissue appropriate for frozen section analysis.

Methods:

This strategy was applied in 15 consecutive patients undergoing thoracoscopic resection of GGOs. All GGOs were preoperatively localized under CT guidance and marked with methylene blue injections. After resection, the ultrasound probe was placed firmly in the surgical specimen to detect the lesion. The ultrasound images were then compared to radiological and pathological findings to assess the feasibility of the procedure.

Results:

A total of 20 samples were reviewed. Ultrasound showed no-abnormalities in 5/20 samples; an enlarged, diffuse hyperintense acoustic shadow (blizzard finding) in 6/20 cases; and some diffuse heterogeneity with several hyperechotic dots (mixed blizzard) in 9/20 cases. Samples without ultrasound abnormalities reamined undiagnosed on frozen section analysis; blizzard lesions were pure GGO on CT scan and resulted to be an adenocarcinoma in situ (n=1) and a well differentiated adenocarcinoma (n=5); mixed blizzard lesions had part-solid GGO on CT scan and a histological diagnosis of moderately (n=3) and poorly differentiated adenocarcinoma (n=6).



Conclusion:

The detection of GGO with ultrasound is a feasible procedure and seems to be associated with the radiological and histological characteristics of the tumor. Our strategy could predict a sample of tissue as adequate and thus reduce the number of frozen section biopsies and consequently the operative time.

Disclosure: No significant relationships. **Keywords: ultrasound, frozen section analysis,** ground glass opacity



KINESIOLOGY TAPING IMPROVES RECOVERY OF VENTILATORY FUNCTION AFTER THORACOTOMY LOBECTOMY FOR LUNG CANCER

<u>Andrea Imperatori</u>¹, M. Castiglioni¹, L. Gasperini², J. Borrelli², A. Grande², E. Nardecchia¹, M. Desio¹, L. Dominioni¹, N. Rotolo¹

¹Department of Thoracic Surgery, University of Insubria, Varese, Varese, Italy ²Department of Physiotherapy, Ospedale di Circolo di Varese, Varese, Italy

Objectives:

To evaluate the impact of chest Kinesiology Taping (KT) on ventilatory function after pulmonary lobectomy performed via open thoracotomy.

Methods:

Between October 2014 and November 2016, we enrolled in a single-center, prospective, randomized, controlled study, 51 lung cancer patients (male, 67%; mean age, 67 ± 10 SD) who had undergone lung lobectomy via lateral thoracotomy. Standard postoperative analgesia was administered in both groups, with supplemental analgesia boluses at request. Exclusion criteria were: >24 h postoperative ICU treatment, recent thoracic trauma, neoadjuvant therapy, previous KT application, patient refusal. On postoperative day (POD) 1, patients were randomized to KT group (kinesiology taping; n=26) or placebo control group (placement of usual tape mimicking KT in colour and shape; n=25), and the respective tape was applied to the chest by a dedicated physiotherapist. To evaluate ventilatory function, in all patients the inspiratory volume was measured with a standard incentive spirometer (Coach2®) by the physiotherapist at 9 am, sequentially: on the day before surgery, on POD 1 (twice: before and immediately after tape application) and on POD 2, 5 and 8.

Results:

Preoperatively the mean inspiratory volume was similar in KT group and in control group $(1878 \pm 477 \text{ ml and } 1727 \pm 704 \text{ ml}; \text{p}=0.386)$. On POD 1, before tape application the percent reduction of inspiratory volume did not significantly differ in the two groups (Figure 1); however, immediately after tape application in KT group the inspiratory volume significantly improved (p=0.037) remaining significantly greater than in controls, until day 5 (Figure 1). Only minor postoperative complications occurred among all randomized patients, unrelated to tape application.

Conclusion:

Chest KT significantly improved the recovery of early postoperative inspiratory volume loss after lung lobectomy by thoracotomy.

Disclosure: No significant relationships.

Keywords: lobectomy, kinesiology taping, postoperative chest pain, thoracotomy

THE EFFECT OF PREGABALIN AND METHYLCOBALAMIN COMBINATION ON THE CHRONIC POSTTHORACOTOMY PAIN SYNDROME

Serda Kanbur¹, B. Meydan², S. Evman¹, T. Dogruyol³, V. Baysungur¹ ¹Thoracic Surgery, Sureyyapasa Chest Disease and Thoracic Surgery Training and Research Hospital, Istanbul, Turkey ²Anesthesiology and Algology, Sureyyapasa Chest Disease and Thoracic Surgery Training and Research Hospital, Istanbul, Turkey ³Thoracic Surgery, Tunceli Hospital, Tunceli, Turkey

Objectives:

Chronic post-thoracotomy pain (CPTP) consists of different types of pain. Some characteristics of CPTP are the same as those of recognized neuropathic pain syndromes. We aimed to determine the safety and efficacy of pregabalin and methylcobalamin combination (PG-B12) in comparison to diclofenac potassium (DP) in patients with CPTP.

Methods:

One hundred consecutive patients with CPTP after posterolateral/lateral thoracotomy were prospectively randomized and evaluated. Fifty patients were given PG-B12 and another 50 were given DP treatment. Visual Analogue Scale (VAS) and the Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) scorings were performed previous to the treatment (day 0) and on the 15th, 30th, 60th, and 90th days. Adverse events were questioned.

Results:

The mean ages were 58.7 ± 12.2 and 54.6 ± 14.5 years and the mean durations of pain were 4.01 ± 1.04 and 3.8 ± 1.02 months, respectively. The number of patients with a VAS score<5 at the latest follow-up (VAS90<5) was 44 (88%) and 18 (36%) in PG-B12 and DP groups, respectively (p<0.05). Forty four patients (88%) in the PG-B12 and 16 patients (32%) in the DP group had a LANSS score <12 at the latest follow-up (p<0.05). Minor adverse events which did not mandate discontinuation of the treatment were observed in 14 (28%) patients in the PG-B12 and 2 (4%) patients in the DP group.

Conclusion:

Pregabalin and methylcobalamin combination is safe and effective in the treatment of CPTP with minimal side effects and a high patient compliance. These results should be supported by multidisciplinary studies with larger sample sizes and longer follow-ups.

Disclosure: No significant relationships.

Keywords: pregabalin, methylcobalamin, postthoracotomy pain syndrome



THREE-DIMENSIONAL MEAN COMPUTED TOMOGRAPHY VALUE OF PURE OR PART-SOLID GROUND-GLASS NODULE CAN PREDICT TUMOR INVASIVE-NESS OF SMALL LUNG ADENOCARCINOMA

Shinsuke Kitazawa, Y. Saeki, N. Kobayashi, S. Kikuchi, Y. Goto, Y. Sato General Thoracic Surgery, University of Tsukuba, Tsukuba, Japan

Objectives:

CT value of ground glass nodule (GGN) on high-resolution CT images has been reported to be one of the prognostic factors in lung adenocarcinoma. However, in previous reports, radiological evaluations have demonstrated only by two-dimensional CT images. CT value of GGN detected with three-dimensional CT might reflect the tumor invasiveness more precisely because quantitative evaluation will be possible for every axis. Thus, we aimed to investigate the relationship between three-dimensional CT value of GGN and tumor invasiveness in lung adenocarcinoma.

Methods:

A retrospective study was conducted on surgically treated 96 nodules in 95 patients with pure or part-solid GGNs≦2cm. CT value with three-dimensional CT was detected using an automated volumetric software (Synapse Vincent®, Fuji Film Co., Tokyo, Japan). Clinical characteristics, maximum diameter, mean CT value with conventional two-dimensional CT, mean CT value with three-dimensional CT, SUV value with FDG-PET were evaluated. The invasiveness of adenocarcinoma was diagnosed according to the International Association for the Study of Lung Cancer (IASLC))/American Thoracic surgery (ATS)/European Respiratory Society (ERS) classification. Preinvasive lesions and minimally-invasive adenocarcinoma were categorized into noninvasive adenocarcinoma.

Results:

There were 66 noninvasive adenocarcinoma and 30 invasive adenocarcinoma. Univariate analysis demonstrated four predictors of tumor invasiveness: maximum diameter, mean CT value with two- and three-dimensional CT, SUV value (p<0.05, respectively). The area under the receiver operating characteristic curve to predict invasive adenocarcinoma for three-dimensional mean CT value was higher than the one for two-dimensional mean CT value (0.831, 0.803, respectively). For differentiation between noninvasive and invasive adenocarcinoma, the threedimensional mean CT value was -489 Hounsfield units was optimal.

Conclusion:

Mean CT values with both two- and three-dimensional CT were independent predictors of pathological invasiveness in pure or part-solid GGN. Three-dimensional mean CT value was more strongly correlated with tumor invasiveness than two-dimensional mean CT value.

Disclosure: No significant relationships.

Keywords: computed tomography value, ground-glass opacity, lung cancer

A SHORT-TERM HIGH-INTENSIVE PATTERN OF PREOPERATIVE REHABILITA-TION BETTER SUITS SURGICAL LUNG CANCER PATIENTS

Xin Wang, G. Che, L. Liu

Department of Thoracic Surgery, West China Hospital, Sichuan University, Chengdu, China

Objectives:

Preoperative pulmonary rehabilitation (PR) has been shown as an effective strategy to reduce the incidence of postoperative complications (PPCs) as well as the postoperative hospital length of stay in patients undergoing resection, via a 2-4 weeks' duration. However, the feasibility and practicability of the PR program published are remains quite controversial.

Methods:

A three-armed randomized controlled trial with a total of 90 surgical lung cancer (LC) patients with risk factors was conducted. Grouping with a 1:1:1 ratio and all treated with a one-week time preoperative intervention. Intervention patterns were performed with preoperative in-patient high-intensive PR (Combined with inspiratory muscle training (IMT) and aerobic endurance training), conventional PR (Single IMT) and routine preoperative preparation (Control) respectively. Primary endpoints were PPCs occurred in 30 days and length of hospital stay, secondary endpoints included the scores of quality of life (QoL), six minute walk distance (6-MWD), peak expiratory flow (PEF), etc.

Results:

All groups were comparable at the baseline. The intention-to-treat analysis of the 90 randomized patients revealed that the Combined PR Group had a significant increase in 6-MWD (by 32.67m between-group difference, p=0.002), PEF (by 14.3L/min, p=0.001), Global scores (by 3.7, p=0.035); and a reduce in length of average total hospital stay (by 3.2d, p=0.001) and postoperative stay (by 3.6 d, p=0.001) compared with controls. No either statistic difference in PPCs occurrence between two PR groups and Control, while the PPCs severity occurred in Combined PR Group (grade II-V) was statistic slighter compared to Single IMT Group.

Conclusion:

This hospital-based short-term pattern of the preoperative rehabilitation combining with highintensive inspiratory muscle training and aerobic endurance training is superior to conventional IMT pattern, indicating its potential as a feasible strategy for LC patients especially the patients with risk factors awaiting surgery.

Disclosure: No significant relationships.

Keywords: preoperative rehabilitation, short-term, lung cancer, lobectomy



TUESDAY, 30 MAY 2017 10:00 - 11:00 SESSION VII: VIDEO II ROOM: TIROL

V-038

SLIDE TRACHEOPLASTY FOR CONGENITAL TRACHEAL STENOSIS IN CHIL-DREN: OPERATIVE TECHNIQUE

<u>Nizar Asadi</u>¹, C. Butler², C. Bieli¹, D. Mcintyre¹, N. Mcintosh¹, C. Wallis³, D. Roebuck⁴, C. Mclaren⁴, N. Muthialu¹, R. Hewitt², M. Elliott¹

¹Cardiothoracic, Great Ormond Street Hospital, London, United Kingdom ²ENT, Great Ormond Street Hospital, London, United Kingdom ³Respiratory, Great Ormond Street Hospital, London, United Kingdom ⁴Interventional Radiology, Great Ormond Street Hospital, London, United Kingdom

Objectives:

Congenital long segment tracheal stenosis is a severe and often life-threatening anatomical anomaly. Slide tracheoplasty has become our treatment of first choice for this condition; this technique has been used in our department to perform more than 136 operations for the last 20 years.

Video description:

All repairs were performed in cardiopulmonary bypass (CPBP). The stenotic length of the trachea is mobilized by dissection close to the trachea and pushing the recurrent laryngeal nerves laterally. Diathermy division of the thyroid isthmus considerably increase tracheal mobilization include division of the posterior pericardial reflections behind the left atrium and freeing of the carinal lymph nodes. After transection of the trachea at the midpoint of the stenosis, longitudinal incisions are made on the posterior surface of the cephalic segment and anterior surface of the caudal end. Caudal incisions should only be extended to the bronchi if they have confirmed stenosis. Anastomosis is then performed using 5:0 polydioxanone sutures with an interrupted technique. Check of the repair by fibreoptic bronchoscopy is mandatory for ET repositioning at the centre of the repair.

Conclusions:

The previously fatal disorders of long segment tracheal stenosis in children has become treatable with success. Slide tracheoplasty is a versatile and reliable technique associated with low morbidity and mortality when compared with previous strategies for children with long segment stenosis.

Disclosure: No significant relationships.

Keywords: slide tracheoplasty, airway surgery, tracheal surgery, tracheal stenosis, airway stent

V-039

COMPLETE RESECTION OF THE ANTERIOR MEDIASTINAL TUMOR THROUGH TOTAL ARCH REPLACEMENT AND PULMONARY ARTERY TRUNK RESECTION WITH A PERICARDIUM PATCH

<u>Yasuhiro Chikaishi</u>, M. Takenaka, K. Kuroda, N. Imanishi, F. Tanaka 2nd Department of Surgery, University of Occupational and Environmental Health. Kitakyushu, Japan

Objectives:

Undiagnosed anterior mediastinal tumors commonly undergo surgery for a diagnosis and treatment. However, determining the optimum therapeutic strategy is difficult in cases of tumors with substantial invasion, such as lesions touching the aortic arch. In the present case, we performed complete resection with total arch replacement and pulmonary artery trunk resection with a pericardium patch for an anterior mediastinal tumor.

Video description:

A 76-year-old Japanese man presented at our hospital because of an abnormal chest computed tomographic (CT) scan showing a 50×40 mm anterior mediastinal tumor. This tumor surrounded the left subclavian vein and touched the aortic arch. The patient had only a persistent cough with no remarkable medical history. Although a definite pathological diagnosis of the tumor was impossible before operation, we suspected the tumor to be malignant, based on the CT and positron emission tomography findings. We therefore decided to resect the tumor with preparation for total arch replacement. The operation was performed in three steps. First, we performed mediastinal sternotomy. However, the tumor was found to have invaded the subclavian vein, so we resected this vein after adding a transmanuburial approach. The tumor was also found to have invaded the aortic arch. Second, we shifted the patient to the right lateral decubitus position and performed anterior lateral incision. We performed partial resection of the left upper lobe and exfoliated the peripheral side of the aortic arch while maintaining the vessel on the peripheral side. Third, we shifted the patient to the dorsal position and implanted an artificial cardiopulmonary device, after which we performed aortic arch resection, total arch replacement and pulmonary artery trunk resection with a pericardium patch. The operation was successful, with no major adverse events. Pathologically, the tumor was diagnosed as diffuse large B-cell lymphoma.

Conclusions:

We presented this case in a video image file.

Disclosure: No significant relationships.

Keywords: anterior mediastinal tumor, total arch replacement, pulmonary artery trunk resection with a pericardium patch



LUNG RESECTION BY DISSECTION OF INTERATRIAL SEPTUM IN TWO CASES OF LUNG CANCER PATIENT

Koji Kuroda, Y. Chikaishi, F. Tanaka

2nd Department of Surgery, University of Occupational and Environmental Health. Kitakyushu, Japan

Objectives:

Combined resection with the left atrium in lung cancer patients is not yet established technique. It is necessary to secure the margins in order to completely resection of the tumors invading from the pulmonary vein to the left atrium

Video description:

Case1 is 66-year old man. Chest computed tomography showed a 40x36mm tumor in the hilum of right middle lobe invading left atrium through the middle lobe pulmonary vein. We diagnosed right lung cancer, cT4N0M0 stage IIIA and occlusive ventilation disorder for FEV1.0% 54% by a ventilatory function test. Anterolateral thoracotomy was performed and the tumor invaded to the middle lobe pulmonary vein and left atrium extensively. He underwent right middle lobectomy combined resection of left atrium by dissection of interatrial septum. Pathological diagnosis was large cell neuroendcrine carcinoma, pT4N0M0 stage IIIA, and the tumor invaded the Left atrium myocardium. Surgical margin was negative. Case2 is 72-year old man. Chest computed tomography showed a 63x59mm tumor that invaded middle lobe vein in the hilum of right middle lobe to lower lobe. We dissected interatrial septum and performed right middle and lower lobectomy by intrapericardial superior pulmonary vein plasty.

Conclusions:

When a tumor invades the left atrium or the intrapericardial pulmonary vein, we can make negative margin distance from tumor by cutting the serous pericardium and dissection of interatrial septum. In addition, the pulmonary vein elongation technique can preserve lung to avoid bilobectomy or pneumonectomy.

Disclosure: No significant relationships. **Keywords:** lung cancer, interatial seputum, lung resection

V-041

PLEURECTOMY/DECORTICATION FOR PLEURAL DISSEMINATION OF COLON CANCER

Kazunori Okabe, H. Tao, M. Hayashi, M. Furukawa, D. Murakami, R. Miyazaki, A. Hara *Thoracic Surgery, Yamaguchi Ube Medical Center, Ube, Japan*

Objectives:

To show that pleurectomy/decortication can be successfully performed for right pleural dissemination of colon cancer.

Video description:

The patient was mid-40s male. In 2012, he had sigmoid colectomy for colon cancer, and postoperative chemotherapy. In 2014, he underwent complete reduction surgery (11 hours 25 minutes) with intra-peritoneal heated chemotherapy for peritoneal dissemination. In 2015, he was referred to us to treat right pleural dissemination of colon cancer by pleurectomy/decortication. In his left decubitus position, a 23 cm postero-lateral incision was made. The extrapleural plane was entered in the sixth interspace. The seventh rib was shingled posteriorly. The parietal pleura was dissected bluntly and sharply. It was dissected from the pericardium. The diaphragmatic muscle was divided with cautery at its chest wall insertion. The diaphragm and the liver severely adhered due to the complete reduction surgery for peritoneal dissemination. The liver was partially resected to remove the diaphragm. The right diaphragm was subtotally resected. The liver was repaired by sutures. Very thin visceral pleura was dissected using a periosteum elevator with the lung inflated. The entire visceral pleura was removed. The liver was covered by tissue sealing sheets. The diaphragm was reconstructed with a prosthetic patch. The lung was repaired with tissue sealing sheets and fibrin glue. Operation time was 11 hours 42 minutes. Bleeding amount was 1,510 g. Small nodules were seen on the resected parietal and thin visceral pleura. Pathologically, sparse viable adenocarcinoma cells were consistent with colon cancer metastasis. No invasion into lung parenchyma was detected. This operation was classified as R0 resection. Post operative course until 17 months has been uneventful with excellent performance status. One small metastasis to the L1 vertebra was treated by radiation. No definite tumor in the chest cavity has been pointed out.

Conclusions:

Pleurectomy/decortication is feasible for selected patients with pleural dissemination of colon cancer.

Disclosure: No significant relationships.

Keywords: pleurectomy/decortication, pleural dissemination, colon cancer



BILATERAL PULMONARY SEQUESTRATION WITH BRIDGING ISTHMUS

Pascal Thomas

Thoracic Surgery, APHM-AMU North University Hospital, Marseille, France

Objectives:

Bilateral pulmonary sequestration with bridging isthmus (Horseshoe sequestration) is an extremely rare congenital anomaly of the lungs in adults. Cases reported in the literature to date have all been treated through a bilateral thoracotomy, and resection of at least one lower lobe. The objective of this video presentation is to report on a video assisted thoracoscopic surgery (VATS) unilateral and lung sparing technique to treat this condition.

Video description:

This video shows the VATS resection of a bilateral pulmonary sequestration with a mediastinal bridging isthmus in a 47-year-old patient who presented with repeated episodes of pneumonia in the left lower lobe for decades. The originality of this case report lies in the rarity of this congenital anomaly, especially in adults, in the significant number and size of aberrant nourishing arteries originating from the thoracic aorta, and in its treatment. The latter consisted of a minimally invasive technique, a left unilateral three-port posterior approach and a complete resection sparing both lower lobes. The patient was discharged home at day four. Outcome was characterized by the absence of any painful or functional sequels and the complete cure of the condition with no infectious recurrence at two-year follow-up.

Conclusions:

VATS is a safe, feasible and efficient approach to rare congenital anomalies of the lung in the adult.

Disclosure: P. Thomas: Ethicon Endosurgery - counseling & "hands-on" sessions on VATS **Keywords:** VATS, pulmonary sequestration, congenital anomaly of the lung

V-043

MODIFIED UNIPORTAL THORACOSCOPIC SLEEVE LOBECTOMY OF RIGHT UP LOBE: SINGLE-INTERCOSTAL TWO-PORT APPROACH

<u>Guofang Zhao</u>, M. Yang, X. Xu, C. Dong, Z. Zeng Cardiothoracic Surgery, Ningbo No.2 Hospital, Ningbo, China

Objectives:

Uniportal thoracoscopic lobectomy has the advantage of only affecting a single intercostal space, but carries the potential disadvantages of instrument crowding through the single port and unclear visualization of the stapler anvil. A modified approach for uniportal thoracoscopic lobectomy has been published. Herein, we describe an analogical modified uniportal approach performed in a case of video-assisted thoracoscopic right up lobe sleeve lobectomy via two two cm incisions made in a single intercostal space.

Video description:

The most important step during our single-intercostal two-port video assisted thoracoscopic surgery (VATS) sleeve lobectomy is the bronchial anastomosis. The fourth intercostal space was preferred for upper lobe lesions to gain the best exposure of the bronchus, and to keep the instruments and camera in a nearly vertical position toward the chest wall to avoid incision twisting and thus potentially decrease postoperative pain. The running suture was in a relaxed state before being tied, which allowed us to easily make essential manipulations. In order to avoid the suture twisting, the suture and the needle holder were never placed into the same port.

Conclusions:

This modified uniportal VATS approach carries the advantage of affecting only one intercostal space, while avoiding the potential crowding and visualization problems associated with uniportal thoracoscopic lobectomy.

Disclosure: No significant relationships.

Keywords: thoracoscopy/VATS, sleeve lobectomy, bronchoplasty





COULT OF THORACLE SUR

11:00 - 12:00 SESSION VIII: ESOPHAGUS/MEDIASTINUM ROOM: TIROL

F-044

DETECTION OF TUMOR-SPECIFIC MUTATIONS IN PLASMA DEOXYRIBONU-CLEIC ACID (DNA): A POTENTIAL ESOPHAGEAL ADENOCARCINOMA BIO-MARKER

Matthew Egyud¹, J. Jackson¹, E. Yamada¹, A. Ståhlberg², S. Filges², P. Krzyzanowski³, G. Nielsen⁴, M. Tejani⁴, Z. Zhou⁵, A. Pennathur⁶, J. Luketich⁶, V. Litle¹, L. Stein³, T. Godfrey¹ ¹Surgery, Boston Medical Center, Boston, MA, United States of America ²Department of Pathology, Sahlgrenska Cancer Center, University of Gothenburg, Gothenburg, Sweden ³Genomics, Ontario Institute for Cancer Research, Toronto, ON, Canada ⁴Hematology/oncology, University of Rochester, Rochester, NY, United States of America ⁵Pathology, University of Rochester, Rochester, NY, United States of America ⁶Cardiothoracic Surgery, University of Pittsburgh, Pittsburgh, PA, United States of America

Objectives:

There has recently been renewed interest in the use of "liquid biopsy" and detection of cell-free tumor DNA as a potential biomarker for cancer diagnosis, prognosis, treatment-monitoring and therapeutic selection. We have developed a novel, barcoded next-generation sequencing approach called SimSen-Seq to facilitate ultra-sensitive detection of circulating tumor DNA and we are applying it to samples from patients with esophageal adenocarcinoma (EAC). The purpose of this study is to determine how detection and quantification of circulating tumor DNA (ctDNA) changes with disease burden in patients with EAC and to thus evaluate its potential as a biomarker in this patient population.

Methods:

Blood samples were obtained from patients with Stage I-IV EAC. Longitudinal blood samples were collected from a subset of patients undergoing a combination of neoadjuvant therapy, surgery and adjuvant chemotherapy. Imaging studies and pathology reports were reviewed to determine disease course. Tumor samples were obtained and tumor DNA was sequenced using a targeted EAC panel to identify mutations. SimSen-Seq assays were developed for each patient and used to generate sequencing libraries from cell-free DNA isolated from plasma. Mutations in plasma were identified, quantified and associations with disease stage and response to therapy were explored.

Results:

Plasma from 30 patients has been analyzed; 5 stage I, 6 stage II, 14 stage III, and 5 stage IV. Mutations have been detected in 15 plasma samples (1/5 stage I, 3/6 stage II, 7/14 stage III, 4/5 stage IV). The fraction of ctDNA was found to increase with tumor stage. Longitudinal plasma samples have been analyzed from two patients and the fraction of ctDNA shows correlation with disease burden and response to therapy (Figure 1).



Conclusion:

ctDNA can be detected in plasma of EAC patients and correlates with disease burden. ctDNA should be explored further as a possible biomarker in EAC.

Disclosure: No significant relationships.

Keywords: circulating tumor DNA, esophageal adenocarcinoma, treatment monitoring, early diagnosis, liquid biopsy



MANAGEMENT OF THYMIC NEUROENDOCRINE TUMORS: A MULTICENTRE EXPERIENCE

Pier Luigi Filosso¹, F. Guerrera¹, D. Van Raemdonck², N.M. Novoa³, P. Thomas⁴, B. Louie⁵,
F. Venuta⁶, E.A. Rendina⁷, P. Marinus⁸, M. Lucchi⁹, M. Cattoni¹⁰, G. Marulli¹¹, F. Rea¹¹
¹Thoracic Surgery, University of Torino, Torino, Italy
²Thoracic Surgery, University Hospitals Leuven, Leuven, Belgium
³General Thoracic Surgery, University Hospital of Salamanca, Salamanca, Spain
⁴Thoracic Surgery, APHM-AMU North University Hospital, Marseille, France
⁵Thoracic Surgery, Swedish Cancer Institute and Medical Center, Seattle, WA, United States of America
⁶Thoracic Surgery Unit, University La Sapienza, Policlinico Umberto I Hospital, Rome, Italy
⁷Thoracic Surgery, VU University, Amsterdam, Netherlands
⁹Division of Thoracic Surgery, University of Pisa, Pisa, Italy
¹⁰Thoracic Surgery, University of Varese Insubria, Varese, Italy
¹¹Cardiac, Thoracic and Vascular Sciences Department, University of Padua, Padova, Italy

Objectives:

Primary thymic neuroendocrine tumors (TNTs) are exceedingly rare and their optimal treatment is still controversial. We aimed to study survival predictors by analyzing a large multiinstitutional series of TNTs.

Methods:

This is a retrospective study of TNTs patients treated between 2000 and 2014 in nine institutions worldwide. All patients were discussed at the local multi-disciplinary tumor board (MDT). The primary and secondary study end-points were Overall Survival (OS) and Disease-Free Survival (DFS), respectively, calculated using the Kaplan-Meier method. Differences in OS and DFS were assessed with log rank test. Univariate and multivariate Cox models with shared frailty (accounting for the within-center correlation) were assessed to determinate predictors of OS and DFS.

Results:

A total of 40 TNT patients (28 males, 70%) were treated. Mean age was 51.2±12.1 years; Seventeen patients (42.5%) had clinical symptoms at presentation while 19 (47.5%) presented with an endocrine paraneoplastic syndrome. Seven TNTs (18%) received induction therapy; data on resection status were available in 57.5%: complete resection (R0) was achieved in 20 patients. Masaoka-Koga stages I, II, III, and IV were observed in four, eight, 19, and nine cases, respectively. Well-differentiated neuroendocrine carcinoma was the most common histological tumor subtypes (27 cases; 68%). Twenty-four TNTs received adjuvant therapy: 19 patients died and 23 had a recurrence. Median OS was 69.1 months; 5-year OS was 72% and 5-year DFS

was 57%. Multivariate analysis showed a trend that OS was influenced by Masaoka-Koga stage (HR 3.40;95%CI:0.92-12.56, P= 0.066) (Figure 1), whilst histologic subtype was not associated with either OS or DFS.

Conclusion:

Our results confirm the high biologic aggressiveness of these rare neoplasms; Masaoka-Koga stage slightly influenced OS. This finding stresses the importance of early diagnosis and treatment as soon as clinical symptoms and/or paraneoplastic syndromes arise. Figure 1





Disclosure: No significant relationships.

Keywords: outcome, thymus, neuroendocrine tumors, surgery



MEDIASTINOSCOPY FOR MEDIASTINAL STAGING OF NON-SMALL CELL LUNG CANCER; SURGICAL PERFORMANCE ACCORDING TO CURRENT GUIDELINES IN THE NETHERLANDS

<u>Fieke Hoeijmakers</u>¹, D. Heineman², N. Beck¹, J. Klamer³, M. Wouters⁴, W. Schreurs⁵ ¹Surgery, LUMC, Leiden, Netherlands ²Cardiothoracic Surgery, VUMC, Amsterdam, Netherlands ³Dutch Institute for Clinical Auditing, Leiden, Netherlands ⁴Surgery, NKI - Antoni van Leeuwenhoek, Amsterdam, Netherlands ⁵Surgery, Noordwest Ziekenhuisgroep, Alkmaar, Netherlands

Objectives:

For considering treatment options in non-small cell lung cancer (NSCLC), accurate staging of the mediastinum is of great importance. Endosonographic biopsies combined with mediastinoscopy is the gold standard, but diagnostic value stands or falls by how it is technically performed. The aim of this study is to evaluate surgical performance of mediastinoscopies in the Netherlands.

Methods:

In the Dutch Lung Cancer Audit for Surgery (DLCA-S), a nationwide audit to evaluate quality of care, lung surgeons prospectively register their performed mediastinoscopies since 2012. Data of patients who had a mediastinoscopy for staging of (suspected) NSCLC were analyzed. Location and number of biopsied zones and adherence to guidelines for performing mediastinoscopy were studied. Dutch guidelines recommend sampling of at least 2 ipsilateral lymph node zones (N2 and N4); 1 contralateral zone (N2 or N4) and zone 7. Analysis of false negative procedures was performed.

Results:

From 2012 to 2015, 2499 mediastinoscopies for staging of NSCLC were registered. Of all patients undergoing a subsequent resection for NSCLC, the percentage of performed mediastinoscopies was 22.6% (n=1971). In 49.9% of the performed mediastinoscopies \geq 4 lymph node zones were sampled or biopsied (figure 1), which is obligatory to fulfill the Dutch guideline criteria. In 39.8% these guidelines were correctly followed and the correct zones for the concerned anatomical location of the tumor were biopsied. In the 1949 patients with a negative mediastinoscopy and subsequent resection, 10.0% (n=195) had unforeseen N2-disease.

Conclusion:

In this national database 2499 patients undergoing mediastinoscopy are registered. In 40% of these patients the correct zones corresponding with primary tumor location were biopsied. It is important to realize that accuracy of staging procedures is subject to how a procedure is technically performed. There is room for improvement in the presented cohort.

Disclosure: No significant relationships.

Keywords: mediastinoscopy, staging, non-small cell lung cancer, performance

CLINICAL T1N0 ESOPHAGEAL CANCER: PATTERNS OF CARE AND OUTCOMES OVER 25 YEARS

M. Kamel, <u>Brendon Stiles</u>, M. Rahouma, A. Nasar, A. Nguyen, S. Harrison, B. Lee, J. Port, N. Altorki

Cardiothoracic Surgery, Weill Cornell Medicine, New York-Presbyterian Hospital, New York, NY, United States of America

Objectives:

Historically, surgical resection was the standard treatment for clinical T1N0 esophageal cancer (EC). More recently, endoscopic techniques have been utilized. However, the effect of endoscopic therapy upon survival rates in large population series is unknown.

Methods:

We analysed the United States SEER cancer registry for patients diagnosed with cT1N0M0 EC (1988-2013). Procedure codes were used to identify patients treated with esophagectomy, radiation therapy, or with local excision/ablation, excluding patients with multiple treatment types. Time periods were divided by five-year increments. Overall (OS) and cancer-specific survival (CSS) were compared in the cohort and in propensity matched subgroups using Kaplan-Meier and Cox proportional-hazard models.

Results:

We identified 5,497 patients with cT1N0M0 EC, whose treatment changed significantly over time (Figure). While esophagectomy was performed in 61% of patients in 1988-1992, it decreased to 34% by 2008-2013. Local excision/destruction was only used in 4% of patients in 1988-1992, but increased steadily to 25% by 2008-2013. The ratio of esophagectomy: endoscopic therapy decreased from 15:1 to 1.4:1 over the time period. The proportion of patients treated with radiation slightly increased (35% vs. 41%). Five-year OS (40% vs. 43%, p=0.022) and CSS (54% vs. 58%, p=0.056) increased in the entire cohort over time. In propensity matched groups (n=150 per group), 5-year CSS was similar in patients treated with esophagectomy and endoscopically (76% vs. 85%, p=0.276), both superior to radiation alone (25%, p<0.001). On MVA, significant predictors of poor CSS included age (HR 1.022, CI 1.015-1.030), T size (HR 1.005, CI 1.003-1.008), radiation therapy (HR 3.67, CI 3.03-4.44), tumor grade III/IV (HR 1.25, CI 1.07-1.46), and early time period of diagnosis (HR 1.75, CI 1.21-2.52).

Conclusion:

Esophageal sparing endoscopic techniques have been increasingly utilized for patients with cT1N0 EC. Endoscopic treatment has not adversely affected CSS of T1N0 patients. Both endoscopic techniques and surgery remain superior to radiation therapy.

Disclosure: No significant relationships.

Keywords: esophageal cancer, early stage, surgery, endoscopic mucosal resection, esophagectomy



APHASE III CLINICALTRIAL OF NEOADJUVANT CHEMORADIOTHERAPY FOL-LOWED BY SURGERY VERSUS SURGERY ALONE FOR LOCALLY ADVANCED SQUAMOUS CELL CARCINOMA OF THE ESOPHAGUS (NEOCRTEC5010)

J. Fu¹, M. Liu², Y. Chen³, Z. Chen⁴, C. Zhu⁵, H. Yang⁶, W. Fang⁷, J. Wang⁸, Z. Yu⁹, Q. Pang¹⁰, W. Mao¹¹, X. Zheng¹², J. Xiang¹³, H. Yang¹⁴, Y. Han¹⁵, <u>Hong Yang¹</u>

¹General Thoracic Surgery, Sun Yat-sen University Cancer Center, Guangdong Esophageal Cancer Institute, Guangzhou, China

²Radiotherapy, Sun Yat-sen University Cancer Center, Guangdong Esophageal Cancer Institute, Guangzhou, China

³General Thoracic Surgery, Cancer Hospital of Shantou University Medical College, Shantou, China

⁴Radiotherapy, Cancer Hospital of Shantou University Medical College, Shantou, China

⁵General Thoracic Surgery, Taizhou Hospital, Taizhou, China

⁶Radiotherapy, Taizhou Hospital, Taizhou, China

⁷General Thoracic Surgery, Shanghai Chest Hospital, Shanghai Jiao Tong University, Shanghai, China

⁸Radiotherapy, Shanghai Chest Hospital, Shanghai Jiao Tong University, Shanghai, China

⁹General Thoracic Surgery, Tianjin Medical University Cancer Hospital, Tianjin, China

¹⁰Radiotherapy, Tianjin Medical University Cancer Hospital, Tianjin, China

¹¹General Thoracic Surgery, Zhejiang Cancer Hospital, Hanzhou, China

¹²Radiotherapy, Zhejiang Cancer Hospital, Hanzhou, China

¹³General Thoracic Surgery, Fudan University Shanghai Cancer Center, Shanghai, China

¹⁴Radiotherapy, Fudan University Shanghai Cancer Center, Shanghai, China

¹⁵General Thoracic Surgery, The Second People's Hospital of Sichuan, Chengdu, China

Objectives:

Surgery is the main treatment of esophageal squamous cell carcinoma (ESCC), but the prognosis of patients with locally advanced ESCC is rather poor. We are to carry out a phased III clinical trial to investigate the effect of preoperative chemoradiotherapy followed by surgery for the overall survival of patients with locally advanced ESCC.

Methods:

According to Sixth Edition AJCC Cancer Staging, patients with IIB-III staged ESCC are randomly allocated to either preoperative chemoradiotherapy followed by surgery (arm A), or surgery alone (arm B). In the arm A, Chemotherapy and radiotherapy are performed concurrently. Patients received two cycles of vinorelbine and cisplatin. Vinorelbine at 25 mg/m2 per day is administered in bolus infusion on d1, d8, d22 and d29. Cisplatin at 75 mg/m2 is administered by intravenously infusion on d1 and d22 (or 25 mg/m2 days 1 to 4 and 22 to 25). A total radiotherapy dose of 40 Gy is delivered in 20 daily fractions of 2.0 Gy each (given 5 d/wk for 4 weeks). McKeown esophagectomy or Ivor Lewis esophagectomy will be performed 4-6 weeks after chemoradiotherapy. Primary outcomes are three and five years overall survival.

Results:

From July 2007 to December 2014, 451 eligible patients were randomly assigned in eight cooperative cancer centers (224 cases in arm A, and 227 cases in arm B). In arm A, 185 cases continued to undergo surgery after chemoradiotherapy. The rate of R0 resection was 98.4% (182/185) in arm A versus 91.2% (207/227) in arm B (P=0.002). A pathological complete response was achieved in 80 of 185 patients (43.2%) who underwent resection in the arm A. The overall survival at 3 years in arm A was significantly higher than arm B (69.6% vs 62.4%; HR 0.71 [95% CI 0.52–0.98]; log-rank P=0.035).

Conclusion:

Neoadjuvant chemoradiotherapy plus surgery improved survival among patients with locally advanced esophageal squamous cell carcinoma.

Disclosure: No significant relationships.

Keywords: neoadjuvant therapy, preoperative chemoradiotherapy, surgery, esophageal cancer




OUTCOMES OF MODIFIED ENHANCED RECOVERY AFTER SURGERY (M-ERAS) PROTOCOLS FOR THE PATIENTS UNDERGOING MINIMALLY INVA-SIVE ESOPHAGECTOMY

Bin Zheng, S. Zhang, T. Zeng, W. Zheng, C. Chen Thoracic Department, Fujian Medical University Union Hospital, Fuzhou, China

Objectives:

Esophagectomies are accompanied with a high rate of post-operative complications. However, rare studies regarded the differences between the outcomes of enhanced recovery after surgery and standard care in minimally invasive esophagectomy. In recent years, we have modified our ERAS protocols. We conducted this study to compare outcomes of modified ERAS (mERAS) and conventional standard care (SC).

Methods:

The mERAS was implemented from 1st November 2015. In mERAS group, we did accurate nutrition evaluation, did the additional oral care, modified the procedures of the anatomosis, used normothermia system, used pneumatic compression stockings and intra-operatively placed patient controlled intravenous analgesia. In both groups, we did the skeletonization of recurrent laryngeal nerves, using esophageal suspension method. In mERAS group, if it was possible, we used low-molecular-dextran and low-molecular-weight heparin after the operation, and postponed the fasting time. The mERAS patients were instructed to implement all the elements that listed in Table.

Elements of the peri-operative routines applied in the modified enhanced recovery after surgery (mERAS) group				
Peri-operative protocols		SC group		
Pre-operative protocols				
Nutrition evaluation (abPG-SGA)	+	-		
Oral hygiene care	+	-		
Preoperative patient education	+	+		
Preoperative bowel prep	+	+		
Prophylactic antibiotics	+	+		
Cardiopulmonary exercise	+	+		
No pre-operative sedative	+	+		
Deep vein catheterization	+	-		
Intra-operative protocols				
Intubation with single lumen tube	+	+		
Skeletonization of RLNs and en-bloc resection, with esophageal suspension method	+	+		
Modified procedure of nasogastric tube setting	+	-		
Modified suture (VCP771D)	+	-		
Adapted/limited intravenous fluids	+	+		
Setting of PCIA	+	-		
Prevention of hypothermia	+	-		
Pneumatic compression stockings	+	-		
Jejunostomy	+	+		
Avoidance of undue drains	+	+		
Post-operative protocols				
Early ambulation	+	-		
Using of low molecular dextran and low molecular weight heparin	+	-		
Early enteral nutrition	+	+		
Active use of bronchoscope sputum suction	+	+		
Ultrasonic examination of pleural effusion	+	+		
Postponed fasting time	+	-		
Multimodal analgesia	+	+		
Moderate/limited intravenous fluid	+	+		
Early removal of thoracic drains	+	+		

Results:

This study included 254 patients (142 in mERAS group, 112 in SC group). There was no significant difference in characteristics. In mERAS group, 96.4% of the patients had completed the mERAS items, patients passed flatus and a stool 2 days earlier (P=0.041) and median length of hospital stay was significantly shorter (P=0.039). Surprisingly, incidence rate of anastomotic leakage was significantly lower (0.0% vs. 8.9%, P=0.000), as well as overall morbidity. There was no significant difference in incidence rates of vocal cord pareses and pulmonary infection, both of which were lower than the rates of reported studies.



Conclusion:

To the best of our knowledge, this is the largest reported series of ERAS protocols in patients undergoing esophagectomy. According to our study, the implementation of mERAS protocols in the patients undergoing minimally invasive esophagectomy was feasible and safe, and could result in better functional recovery and reduction in overall morbidity and length of hospital stay.

Disclosure: No significant relationships.

Keywords: minimally invasive esophagectomy, esophageal carcinoma, modified enhanced recovery after surgery (mERAS)

12:30 - 13:30 SESSION IX: INTERESTING CASES ROOM: TIROL

F-050

PLATELET DISORDER AFTER EXTRACORPOREAL MEMBRANE OXYGEN-ATION (ECMO) BRIDGING TO LUNG TRANSPLANTATION: ETIOLOGY AND BEST TREATMENT

Carlson Aruldas¹, M. Schuurmans², R. Scheuepbach³, B. Grande⁴, I. Opitz¹, W. Weder¹, I. Inci¹ ¹Division of Thoracic Surgery, University Hospital Zurich, Zurich, Switzerland ²Department of Pneumology, University Hospital Zurich, Zurich, Switzerland ³Division of Surgical Research, University Hospital Zurich, Zurich, Switzerland ⁴Department of Anesthesiology, University Hospital Zurich, Zurich, Switzerland

Objectives:

Acute respiratory failure secondary to progressive pulmonary disease is often associated with a poor prognosis. Patients with acute respiratory failure requiring respiratory support with invasive mechanical ventilation while awaiting lung transplantation are known to be at a high risk of death. Currently, extracorporeal membrane oxygenation (ECMO) as a bridge to lung transplantation (LTx) may be the only remaining therapeutic option left in irreversible respiratory failure. Exposing blood to the ECMO system's artificial surface activates the coagulation system and increases the risk of thromboembolic events. HIT is a life-threatening disorder that follows exposure to unfractionated or less commonly low-weight heparin. Several studies have reported successful use of bivalirudin for cardiopulmonary bypass patients. To our knowledge no reports are available describing the use of bivalirudin for lung transplant patient's using ECMO as a bridge.

Case description:

A 65-year-old man, with past history of idiopathic pulmonary fibrosis (sarcoidosis) and deep vein thrombosis was admitted to our intensive care unit with acute pulmonary failure and initially treated with non-invasive ventilation and medical therapy, later placed on ECMO due to further deterioration of respiratory symptoms. Following rapid decrease in platelet count, suspicion of HIT was made, heparin was stopped and the diagnosis of Heparin-induced throm-bocytopenia confirmed, bivalirudin therapy was initiated. With isolated lung failure, the patient was listed for a high urgency lung transplant. On Day 15, with availability of donor lung, unilateral lung transplantation was carried out Inverse-ratio ventilation was required to ventilate the transplanted lungs and the patient required hemo transfusion. The recipient was later successfully weaned from VA-ECMO and transferred to ICU. Post operative follow up lasted for nine months.



Conclusions:

Bivalirudin is a direct thrombin inhibitor with properties that makes it a possible alternative for anti-coagulation in patients who cannot receive heparin. Lung transplantation may be successfully performed with bivalirudin as primary anti-coagulant, using ECMO as a bridge.

Disclosure: No significant relationships.

Keywords: ECMO, lung transplantation, HIT, Bivalirudin

F-051

PULMONARY VASCULAR COMPLICATION AFTER FIBROSING MEDIASTINI-TIS: WHAT IS THE BEST APPROACH?

Berk Cimenoglu¹, B. Ozkan¹, S. Duman¹, O. Sayın², M. Basaran², A. Toker¹ ¹Goğüs Cerrahisi - Thoracic Surgery, Istanbul Medical School, Capa - Istanbul, Turkey ²Cardiovascular Surgery, Istanbul University Istanbul Medical School, Capa - Istanbul, Turkey

Objectives:

Fibrosing mediastinitis is a rare disorder caused by a diffuse fibrosis reaction in mediastinum, resulting in compression of the major mediastinal structures, especially vascular ones. This report presents an exceptional procedure to by-pass the stenosed main pulmonary arteries.

Case description:

A 58 year old female patient presented with neck pain and dyspnea five years ago. Computed tomography (CT) revealed a mass lesion expanding from mediastinum to the cervical region surrounding the major vascular structures. Biopsy interventions including 3 surgical biopsies confirmed the fibrosing mediastinitis. During the follow ups, the patient developed severe pulmonary hypertension (PAP: 90 mmHg). CT angiography showed severe stenoses of the bilateral main pulmonary arteries. To decrease pulmonary arterial pressure and improve the blood flow to lung, grafting from the pulmonary trunk to bilateral interlober pulmonary arteries under cardiopulmonary bypass was performed. In order to expose the interlobar pulmonary arteries and prevent kinking of the PTFE grafts (6 mm and 8 mm ringed), right middle lobectomy and lingulectomy were performed. The operation was completed successfully and the patient was discharged at postoperative day 10.





Conclusions:

An uncommon case of fibrosing mediastinitis causing compression of the pulmonary arteries, which was treated by means of an exceptional procedure, pulmonary artery bypass grafting, is reported herein. Pulmonary artery bypass grafting may be an option to treat the pulmonary hypertension caused by extensive fibrosis.

Disclosure: No significant relationships.

Keywords: fibrosing mediastinitis, pulmonary arterial hypertension, pulmonary artery bypass grafting

F-052

SYNCHRONOUS MULTIPLE PRIMARY LUNG TUMORS IN A GENETIC FAMIL-IAR SYNDROME: HOW TO APPROACH?

Jozsef Furak¹, T. Geczi¹, K. Polyak², L. Kovacs³, L. Tiszlavicz⁴, A. Ottlakan¹, B. Pecsy¹, A. Maráz⁵

¹Department of Surgery, Division of Thoracic Surgery, University of Szeged, Szeged, Hungary ²Laboratory for Molecular Medicine, Harvard Medical School, Cambridge, MA, United States of America ³Rheumatology, University of Szeged, Szeged, Hungary

⁴Department of Pathology, University of Szeged, Szeged, Hungary ⁵Department of Oncology, University of Szeged, Szeged, Hungary

Objectives:

Primary pulmonary leiomyosarcoma is an uncommon disease, but the synchronous appearance with a lung adenocarcinoma is extremely rare. Li-Fraumeni syndrome (LFS) is an autosomal dominant cancer predisposition syndrome commonly caused by germline mutations in the *TP53* gene. The combination of these variants was not published yet.

Case description:

A routine chest X-ray identified four bilateral lesions in a 40-year old woman. A 6 cm multinodal primary pulmonary leiomyosarcoma without lymph node metastasis was removed with a left upper lobectomy, and subsequent a right upper segmentectomy for a T1aN0 adenocarcinoma and a middle lobe wedge resection for an inflammatory pseudotumor were performed. No adjuvant treatment was given. 20 months later a retroperitoneal liposarcoma was excised, but despite adjuvant chemotherapy the patient died soon after. Because of multiple early-onset malignant lesions in her family including osteosarcoma of her mother at age 40, *TP53* was analyzed in peripheral blood DNA of the patient, her daughter and son, and brother. Sequencing of the coding region and splice sites of *TP53* in the patient and her son identified a heterozygous variant (722C>G, S241C). Shortly after her death, her son was diagnosed with a large (10 cm) osteosarcoma on the right anterior chest wall at age 17 during a biking accident and treated with resection. Despite adjuvant chemotherapy he died two years later. Ten malignant tumors (gastric, breast, colon and two lung cancers, leukaemia, leiomyosarcoma, liposarcoma and two osteosarcomas) were diagnosed in eight members of the patient's family over four generations with a mean age of 43.2 (13-70) at diagnosis.

Conclusions:

The syncronous appearance of a primary pulmonary leiomyosarcoma and adenocarcinoma is extremely rare. Surgical resections are indicated, if possible. Genetical examination is recommended to verify a *TP53* mutation and a possible Li-Fraumeni syndrom with poor outcome. This abstract is in honor of our lady colleague.

Disclosure: No significant relationships.

Keywords: pulmonary leiomyosarcoma, Li-Fraumeni syndrome, TP 53 mutation



WHAT CAN TECHNOLOGY DO FOR CHEST WALL RECONSTRUCTION? A NOVEL TECHNIQUE FOR STERNAL REPLACEMENT

<u>Nicola Oswald</u>¹, E. Senanayake², A. Aliverti³, B. Naidu¹, H. Khalil², E. Bishay² ¹Institute of Inflammation and Ageing, University of Birmingham, Birmingham, United Kingdom ²Thoracic Surgery, Heartlands Hospital, Birmingham, United Kingdom ³Bioengineering, Politecnico di Milano, Milan, Italy

Objectives:

The choice of reconstruction following chest wall resection is subject to ongoing debate. Advances in technology have allowed 3D printed prostheses to be used to reconstruct bone. New techniques warrant detailed evaluation; we present the functional outcome of a custom made 3D printed prosthesis implanted following sternal resection.

Case description:

An active 55 year old initially presented with osteomyelitis of the sternum. The second and third costal cartilages were resected bilaterally along with the attached manubrio-sternum; the defect was covered with a pedicled left pectoralis major flap. Clearance of infection was achieved but the patient felt vulnerable and unable to resume sporting activity. Five years after the initial operation a rigid titanium prosthesis, 3D printed based upon CT scans of the patient, was implanted. Pectoralis major muscle flaps were raised bilaterally and approximated in the midline. Chest wall motion analysis was performed before and after insertion of the rigid prosthesis using optoelectronic plethysmography; infrared markers were placed according to anatomical landmarks and their movement tracked during rest and cycle ergometry. The patient suffered no complications and returned to normal activities two months after surgery. Preoperatively asynchronous movement of the thoracoabdominal wall was striking with paradoxical movement of the anterior chest wall over the defect; postoperatively synchrony of motion in the thoracic and abdominal compartments was restored. Spirometry values also normalised with an FEV1/FVC ratio of 61% preoperatively and 84% postoperatively.

Conclusions:

This case illustrates the function of both a soft tissue reconstruction and a rigid prosthetic reconstruction after sternal resection. The results support the use of a rigid prosthesis, tailored to the shape of the defect, following sternal resection with the aim of preserving respiratory mechanics. Further studies of chest wall motion in the context of chest wall resection at different anatomical locations may help guide operative technique.

Disclosure: No significant relationships.

Keywords: 3D printing, prosthesis, chest wall resection, respiratory function

F-054

HEMOPTYSIS AFTER RADIOFREQUENCY LUNG ABLATION: MINOR OR MAJOR TREATMENT?

Nikolaos Papakonstantinou¹, C. Zisis¹, D. Rontogianni², G. Stratakos³

¹Cardiothoracic Surgery Department, General Hospital of Athens "Evangelismos", Athens, Greece ²Department of Anatomic Pathology, General Hospital of Athens "Evangelismos". Athens, Greece ³Ist Pulmonary Medicine Department of National And Kapodistrian University of Athens, General Hospital of Thoracic Diseases of Athens "Sotiria", Athens, Greece

Objectives:

Radiofrequency catheter ablation is an effective, well-known treatment for atrial fibrillation. Nevertheless, pulmonary vein stenosis/occlusion constitutes a rare, potentially lethal complication that can be easily misdiagnosed as pulmonary embolism or pneumonia.

Case description:

We herein present a case of post-ablation pulmonary vein occlusion in a 50-year old man with repeated hemoptysis episodes and persisting migratory pulmonary infiltrations of his left upper lobe submitted to transcatheter radiofrequency ablation due to atrial fibrillation 8 months ago. After administration of antibiotic treatment for pneumonia, interstitial pulmonary disease or lung cancer was suspected, and wedge resection of three different segments of his upper lobe was performed. Multiple infarctions of his left upper lobe with hemorrhagic infiltrations were revealed in the histological examination. In a postoperative chest CT-pulmonary angiogram, the left superior pulmonary vein was not detected due to total occlusion of the vein as a consequence of the ablation. Left upper lobectomy was performed and recovery was uneventful. **FIGURE. Left upper lobe with occluded superior pulmonary vein**







The yellow arrow shows the contracted left upper lobe, whereas the blue, dotted line corresponds to the interlobar fissure. The difference between the upper lobe and the lower one is obvious

· Left upper lobe after its excision. Comparison of its size with scissors

Conclusions:

Pulmonary vein occlusion is a rare complication after an ablation procedure for atrial fibrillation and must be highly suspected in case of migratory pulmonary infiltrations and/or hemoptysis. In such a case, a radical pulmonary procedure like a lobectomy was necessary.

Disclosure: No significant relationships.

Keywords: ablation, pulmonary vein thrombosis/occlusion, migratory infiltrations, lobectomy

F-055

AN UNUSUAL CAUSE OF CARINAL STENOSIS: WHAT TO DO?

<u>Thomas Schweiger</u>¹, K. Hoetzenecker¹, H. Prosch², T. Stork¹, M. Hackl³, B. Oszvath¹, G. Lang⁴, W. Klepetko¹

¹Thoracic Surgery, Medical University of Vienna, Vienna, Austria ²Biomedical Imaging and Image-guided Therapy, Medical University of Vienna, Austria ³Pneumonology, Landeskrankenhaus Natters, Natters, Austria ⁴Thoracic Surgery, Medical University Vienna, Vienna, Austria

Objectives:

Carinal resection due to benign disease is extremely rare. We herein describe the work-up, surgical procedure and outcome of a patient with progressive stenosis of both main bronchi.

Case description:

A 55 year-old female patient was referred to our department with increasing dyspnea and inspiratory stridor. A CT-scan showed a bilateral stenosis of both main bronchi starting at the level of the carina. A pre-operative bronchoscopy confirmed this finding and in addition showed a blind-ended pouch originating from the carina. Differential diagnoses of diffuse narrowing of the central airways include a variety of infectious, autoimmune and malignant diseases, which could be excluded during the pre-operative work-up. Recurrent infection of the blindended pouch remained a possible explanation of this unusual stenosis. After a failed attempt to dilate the stenosis, indication for a surgical resection and reconstruction was set. The operation was performed through a posterolateral thoracotomy with central veno-arterial extracorporeal membrane oxygenation (VA-ECMO) support. The complete central tracheobronchial tree was exposed. Afterwards the carina with both stenotic main bronchi was resected. Reconstruction of the airways was performed by reimplantation of the left main bronchus to the bronchus intermedius and an end-to-end anastomosis of the right main bronchus to the trachea. At the end of the reconstruction the VA-ECMO was removed and the patient was ventilated until the end of the operation. The post-operative course was uneventful, except of a temporary vocal cord dysfunction, which resolved completely. Carinal resection and reconstruction with intraoperative ECMO support resulted in excellent long-term outcome.

Conclusions:

To the best of our knowledge, this is the first case in literature of a progressive stenosis of both main bronchi most likely due to recurrent infections of a blind-ended pouch at the carinal level. Surgical resection appears to be the treatment of choice in this condition.

Disclosure: No significant relationships.

Keywords: carinal resection, airway surgery, ECMO

12:30 - 13:30 SESSION X: MODERATED POSTERS ROOM: BRUSSEL

P-089

MANUAL VERSUS DIGITAL ASPIRATION FOR FIRST-LINE TREATMENT OF PRIMARY SPONTANEOUS PNEUMOTHORAX: THE AMVADI STUDY, A RAN-DOMISED CLINICAL TRIAL

Borja Aguinagalde, J. Zabaleta, I. Lopez, J.M. Izquierdo, J.A. Redin, D. Lopez, A. Fernandez-Monge, J.I. Emparanza *Thoracic Surgery, Donostia University Hospital, Donostia, Spain*

Objectives:

The effectiveness of needle aspiration in the initial treatment of primary spontaneous pneumothorax has been widely studied. The objective of this research is to compare digital with manual aspiration in a randomised clinical trial.

Methods:

We designed a blind parallel-group randomised clinical trial with a 1:1 allocation ratio. The clinical trial is performed in line with the guidelines of the CONSORT group. The primary outcome variables were immediate success and hospital admission, while the secondary outcome measures were relapse, re-admission and need for surgery, as well as length of hospital stay. Further, a satisfaction survey was carried out among clinicians who perform the two types of aspiration.

Results:

A total of 67 patients were included in the study (n=36, control group; n=31, experimental group) with no losses to follow-up. In both groups, 58% of procedures were immediately successful, avoiding hospital admission. No differences were found in rates of relapse, re-admission, or need for surgery or in length of hospital stay (table 1). Overall, 80% of clinicians who performed aspiration preferred the digital system, and considering only clinicians who performed more than five procedures a year, this preference rose to 100%.

Table1	Manual aspiration group	Digital aspiration group	P value
n	36	31	
Success, n (%)	21 (58)	18 (58)	0.98
Hospitalisation, n (%)	15 (42)	13 (42)	0.98
Recurrence, n (%)	8 (22)	6 (19)	0.77
Recurrence < 1 month, n (%)	1 (2.7)	2 (6.4)	0.47
Mean length of stay in days (SD)	2.73 (1.6)	4.76 (2.7)	0.98
Need for surgery, n (%)	9 (25)	9 (29)	0.71

Conclusion:

Both manual and digital aspiration provide good immediate results avoiding hospital admission, digital drainage being preferred by clinicians responsible for first-line treatment of pneumothorax

Disclosure: No significant relationships.

Keywords: pneumothorax, aspiration, clinical trial



LEARNING CURVE OF VIDEO ASSISTED THORACOSCOPIC SURGERY (VATS) LOBECTOMY: THE NATIONAL VATS REGISTER EVALUATION

Duilio Divisi¹, L. Bertolaccini², D. Argnani³, G. Zaccagna¹, R. Crisci¹, P. Solli³ ¹Thoracic Surgery, University of L'Aquila, "G. Mazzini" Hospital of Teramo, Teramo, Italy ²Thoracic Surgery, "Morgagni" Hospital, Forlì, Italy ³Thoracic Surgery, AUSL Romagna - Forlì Teaching Hospital, Forlì, Italy

Objectives:

The expertise curve of VATS lobectomies still stirs debate and controversy both of the number of procedures to carry out and of the evaluation of the learning threshold. In fact, several parameters were taken into account in order to consider acquired the minimally invasive technique. The purpose of our study was the examination of the variables related to the learning curve of the video-assisted approach, in order to establish what may be an expression of the technical maturity of the surgeon.

Methods:

A National Registry for VATS lobectomy established in 2013 was used to collect data from 65 Thoracic Surgery Units. Out of more than 3,700 patients enrolled, only information from Units with \geq 100 VATS lobectomies were retrospectively analysed. Unpaired Student's t-tests, Fisher's exact tests, Pearson's χ 2 were applied as needed. Cumulative summative analysis and one-way ANOVA were used to identify the expertise curve of VATS lobectomy.

Results:

Ten institutions contributed a total of 1,679 patients (Table 1), who were divided into three uniform groups according to the chronological sequence of surgery. The length of utility incision, the number of dissected lymph node and the operative time were not statistically significant (p=0.999, p=0.972 and p=0.307 respectively) among groups. Conversion to thoracotomy and postoperative air leaks, occurred in 125 (7.44%) and 109 (6.49%) patients, gradually declined to Group 3 with statistical significance (p=0.048 and p=0.00086).

Conclusion:

The conversion rate and the percentage of air leaks seem to define the expertise of VATS lobectomy, being linked to the ability to manage more complicated surgical cases or intraoperative adverse events.

Table 1: Demographic aspects of patients					
Gender		No.	%		
	Male	1003	59.74		
	Female	676	40.26		
Age (mean ± SD)			67.27±10.37		
	Malignant	1200	90.98		
Histology	Metastasis	68	5.98		
	Benign	51	3.04		
	Lobectomy	1661	98.93		
Procedure	Bilobectomy	18	1.07		
	Pneumonectomy	0	0		
	Left upper lobectomy	367	21.86		
	Left lower lobectomy	277	16.50		
	Right upper lobectomy	607	36.15		
Stratified procedure	Right lower lobectomy	290	17.27		
	Right middle lobectomy	120	7.15		
	Upper Bilobectomy	6	0.36		
	Lower Bilobectomy	12	0.71		
	Left	644	38.36		
Side	Right	1035	61.44		
VATS experiencescore (menn+)	SD)		44.24±19.98		
	Adenocarcinoma	1084	64.56		
	Squamous cell carcinoma	265	15.78		
	Typical careinoid	83	4.94		
Deriningenistongy	Atypical careinoid	30	1.79		
	Metastasis	68	5.98		
	Other	51	3.04		
	IA	949	58.29		
	IB	338	20.76		
	IIA	150	9.22		
p Stage	IIB	51	3.14		
	IIIA	128	7.84		
	IIIB	3	0.19		
	IV	9	0.56		
Overall mortality		2	0.12		
Overall complications	Atrial fibrillation	119	7.09		
	Transient ischemic attack (TIA)	6	0.36		
	Pulmonary embolism	2	0.12		
	Acute respiratory distress syndrome (ARDS)	5	0.30		
	Acute renal failure	6	0.30		

Disclosure: No significant relationships.

Keywords: non-small cell lung cancer, learning tools, learning curve, database, VATS lobectomy



IMMEDIATE EFFECTS OF SYSTEMIC ADMINISTRATION OF HIGH-OXYGEN-AFFINITY HEMOGLOBIN VESICLES IN A RAT PNEUMONECTOMY MODEL

<u>Ryo Hashimoto</u>¹, M. Kohno¹, M. Watanabe², H. Horinouchi³, H. Sakai⁴, K. Kobayashi², M. Iwazaki¹

¹General Thoracic Surgery, Tokai University School of Medicine, Isehara, Kanagawa, Japan

²General Thoracic Surgery, Keio University School of Medicine, Shinjuku-ku, Tokyo, Japan

³General Thoracic Surgery, Saitama City Hospital, Saitama, Japan

⁴Chemistry, Nara Medical University School of Medicine, Kashihara, Nara, Japan

Objectives:

Hemoglobin vesicle (HbV) is a red blood cell (RBC) substitute that encapsulates purified hemoglobin in a phospholipid bilayer membrane. It has polyethylene modified surface, 250 nm in diameter, 28 Torr in P50, and can be preserved for years and used despite blood type and free from risk of infection. Its notable characteristic is that an oxygen affinity can be modified by changing allosteric effectors.

Methods:

Left pneumonectomy was performed under mechanical ventilation on rats and followed by rapid exsanguination of \sim 30% of total circulating blood volume. Saline, 5% serum albumin solution, rat red blood cells shed in 5% albumin (rat-RBC), HbV suspended in 5% albumin (HbV, P50=28 Torr), or HbV with high oxygen affinity in 5% albumin (lowP50-HbV, P50= 9 Torr) was infused for resuscitation.

Results:

Systemic arterial blood pressure significantly decreased after exsanguination and elevated after infusion. In the HbV, lowP50-HbV as well as rat-RBC groups, all the rats were liberated from mechanical ventilation and the blood pressure was stabilized, although all the rats of the saline group and 30% of the albumin group died within 1 hour after extubation. Partial pressure of oxygen in arterial blood (PaO2) for 1 hour after liberation from mechanical ventilation in the rat-RBC, HbV and lowP50-HbV groups were 59.4 ± 12.5 , 58.3 ± 10.1 , and 70.5 ± 14.5 mmHg, respectively. The PaO2 of the lowP50-HbV group was significantly higher than those of the ratRBC and HbV groups (P = 0.05 for both). Elevation of serum lactate due to hypoxic damage was minimized by HbV or lowP50-HbV as well as rat-RBC.

Conclusion:

The ability of HbV as oxygen carrier was comparable with rat-RBC even under impaired lung function after pneumonectomy in evaluation of hemodynamic stability and arterial blood oxygenation. HbV with high oxygen affinity may have more advantageous effect on oxygenation in pulmonary resection.

Disclosure: No significant relationships. **Keywords:** pneumonectomy, hemoglobin vesicle, transfusion

P-092

THE INFLUENCE OF ANASTOMOSIS ON THE BLOOD SUPPLY OF GASTRIC TUBE - RESULTS FROM ANIMAL EXPERIMENT AND CLINICAL CASE-CON-TROL STUDY

Yang Hu, X. Zhang, G. Che Department of Thoracic Surgery, West China Hospital of Sichuan University, Chengdu, China

Objectives:

Surgeons have done a lot to improve the blood supply of the gastric wall where anastomosis was made. Narrow tubular stomach is one of these methods. But with the use of it, gastric fistula and anastomotic leakage were more commonly seen. Reason was obscure. Few has considered the influence of anastomosis-induced gastric wall defect on the blood supply of gastric tube.

Methods:

Animal experiment and clinical case-control study have been carried out. Narrow gastric tube group and wide gastric tube group were compared (3 vs 5cm in gastric non-vascular area). For animal experiment, three pigs in each group. Arteriography with methylene blue and blood gas analysis with the blood collected from gastric wall distal or proximal to the anastomosis were used to evaluate the blood supply of these area. For case-control study, 166 patients were enrolled with 24 in narrow group and 142 in wide group. The incidence of alimentary tract leakage was compared.

Results:





For animal experiment, before anastomosis, methylene blue could reach the tip of gastric tube and no metabolic acidosis was found in both group. But after anastomosis, methylene blue could not reach the gastric wall distal to the anastomosis, and the blood gas analysis shows metabolic acidosis with the blood from the same area, only in narrow group. These indicated insufficient blood supply in this area. For the clinical case-control study, the incidence of alimentary tract leakage was much higher in narrow group than that in wide group.

Conclusion:

Anastomosis itself can influence the blood supply of the gastric tube distal to it. It is the reason of the increase of alimentary tract fistula incidence with the use of narrow gastric tube. Widen the gastric non-vascular area is an effective way to eliminate this effect.

Disclosure: No significant relationships.

Keywords: alimentary tract fistula, blood supply, narrow gastric tube, esophagectomy, end-toside anastomosis

P-093

TRANSITION OF NEUTROPHIL-LYMPHOCYTE RATIO CAN PREDICT LUNG CANCER RECURRENCE AFTER SURGERY

Hiroyuki Ishikawa

Thoracic Surgery, Nishi-Kobe Medical Center, Kobe City, Japan

Objectives:

Although preoperative neutrophil-lymphocyte ratio (NLR) is a possible prognostic factor for early lung cancer, sequential changes of NLR after surgery have not been investigated. We aimed to clarify the significance of NLR transition after surgery for lung cancer.

Methods:

In total, 202 pathological stage IB-IIIB Non-Small Cell Lung Cancer (NSCLC) patients without steroid-treated, autoimmune, hematological, or other advanced malignant diseases who had been completely resected at our institution between 2005 and 2013 were enrolled in this study. NLR before and after initial therapy (surgery with or without adjuvant therapy), at the time of recurrence or two years after surgery without recurrence were compared.

Results:

Patient characteristics were as follows: male/female (143/59), mean age of 69 years (range 36-87), adenocarcinoma/squamous cell carcinoma/others (120/50/30), pathological stage IB/ II/III (93/62/47). Preoperative NLR was associated with staging but not sex, age, or histology. Preoperative NLR decreased significantly postoperatively (p=0.036), but did not differ before and after adjuvant therapy (p=0.13). NLR in the recurrent-free group decreased after initial therapy (p<0.01) and maintained at a low level. By contrast, NLR in the recurrent group did not decrease after initial therapy but increased (p<0.01) at recurrence. Although preoperative NLR and reduction rate of NLR did not predict recurrence, NLR after initial therapy with a cutoff value of 2.27 (AUC 0.642) by ROC analyses predicted recurrence after surgery.

Conclusion:

NLR in the recurrent-free group decreased after initial therapy and maintained at a low level thereafter. NLR in the recurrent group did not decrease after initial treatment but increased at recurrence. NLR after initial therapy could predict recurrence after surgery in stage IB-IIIB NSCLC patients.

Disclosure: No significant relationships.

Keywords: sequential changes, non-small cell lung cancer, recurrence, neutrophil-lymphocyte ratio (NLR)



PROPENSITY SCORE MATCHING ANALYSIS OF SEGMENTECTOMY COM-PARED WITH LOBECTOMY FOR CLINICAL STAGE I LUNG CANCER WITH PURE SOLID TUMOR

Hisashi Iwata, K. Shirahashi, H. Yamamoto, M. Matsumoto, Y. Miyamoto, K. Doi General and Cardiothoracic Surgery Respiratory Center, Gifu University, Gifu, Japan

Objectives:

We had reported feasibility of segmental resection in non-small-cell lung cancer with groundglass opacity. (Eur J Cardiothorac Surg. 2014:46(3):375-9). In this study, segmentectomy was compared with lobectomy for clinical stage I lung cancer with pure solid tumor using propensity score matching analysis.

Methods:

Segmentectomy and lobectomy for clinical stage I lung cancer with pure solid tumor were performed in 44 and 324 patients, respectively. Propensity scores were calculated using logistic regression analysis, and matched within score ± 0.01 for age, sex, size of tumor, FDG-PET SUV value, CEA, clinical stage, pathological stage and histology.

Results:

In the non-matched analysis, the results for segmentectomy and lobectomy, respectively, were as follows: FEV1.0, 2001 \pm 510 and 2219 \pm 538ml (p=0.012); tumor size, 20 \pm 10 and 26 \pm 12 mm (p=0.001); operative time, 250 \pm 83 and 285 \pm 108 min(p=0.016); clinical stage (IA/IB), 36/8 and 220/104 (p=0.060); blood loss, 70 \pm 161 and 139 \pm 240 mL (p=0.015); pathological stage (IA/IB/IIA&IIB/IIIA&IIIB&IV), 39/2/1/2 and 238/47/38/1 (p=0.003); 5-year overall survival, 70.5% and 69.6% (log-rank p=0.833) ; and disease free survival, 56.4% and 60.5% (log-rank p=0.577). In 40 matched cases, the results for segmentectomy and lobectomy, respectively, were as follows: FEV1.0, 2009 \pm 524 and 2134 \pm 428ml (p=0.244); tumor size, 19 \pm 8 and 19 \pm 8 mm (p=0.732); operative time, 244 \pm 71 and 255 \pm 103 min (p=0.598); blood loss, 46 \pm 61 and 95 \pm 216 mL (p=0.172); pathological stage (IA/IB/IIA&IIB/IIIA&IIB&IV), 36/1/1/2 and 36/2/2/0 (p=0.708); 5-year overall survival, 66.1% and 82.7% (log-rank p=0.126); and disease free survival, 48.0% and 81.7% (log-rank p=0.050).

Conclusion:

On propensity score matching, segmentectomy showed inferior outcomes compared to lobectomy for clinical stage I lung cancer with pure solid tumor in spite of with less than 2cm.

Disclosure: No significant relationships.

Keywords: clinical stage I lung cancer, segmentectomy, pure solid tumor

P-095

PROLONGED ANTIBIOTIC PROPHYLAXIS REDUCES PERIOPERATIVE RESPI-RATORY COMPLICATIONS RATE AFTER CURATIVE RESECTIONS DUE TO LUNG CANCER

<u>Tomasz Marjanski</u>¹, R. Dziedzic¹, M. Ostrowski¹, A. Sledzinska², W. Rzyman¹ ¹Thoracic Surgery Department, Medical University of Gdansk, Gdansk, Poland ²Department of Monitored Therapy and Pharmacogenetics, Medical University of Gdansk, Gdansk, Poland

Objectives:

Gram-negative bacteria susceptible to ciprofloxacin are the most common pathogens responsible for postoperative infections after major pulmonary resections. Postoperative infectious complications significantly influence 30-, 90-day mortality and long-term survival. The aim of the study was to assess the efficacy of prolonged antibiotic prophylaxis in high risk patients.

Methods:

Between January 2007 and August 2016 1764 patients were operated due to lung cancer in one institution. Between March 2016 and August 2016 a procedure of prolonged antibiotic prophylaxis with ciprofloxacin in high risk patients was implemented. In this period 86 patients (study group) were operated and within this group 30 patients (34%) were identified as high risk patients and had prolonged antibiotic prophylaxis implemented. Direct analysis in whole study cohorts and a propensity score matched analysis (PSMA) were performed. The data for the analysis were gathered in prospective database. Due to missing data 181 patients were excluded from the analyses.

Results:

In analyses of whole study cohorts: 81 patients (study group) and 1502 patients (controls) patients were comparable concerning age, gender, Charlson Comorbidity Index (CCI), pTNM stage, type of resection but with higher number of VATS operations in study group (40,7%vs.16,4% p<0,001). The patients in study group had lower rate of respiratory complications (23,5%vs.44,7% p<0,001) and similar rate of cardiovascular complications (12,3%vs.16,4% p=0,3). The 30-day and 90-day mortality did not differ between the groups. These observations were confirmed by the PSMA with patients being exactly matched by age, gender, CCI, pTNM, type of resection and type of operative access (study group n=75, controls n=718). The rate of respiratory complications was lower in study group than in controls (24%vs.44,6% p<0,001) with similar rates of cardiovascular complications and perioperative mortality.

Conclusion:

Prolonged antibiotic prophylaxis with ciprofloxacin reduces rate of respiratory complications after curative resections due to lung cancer.

Disclosure: No significant relationships.

Keywords: complications, pneumonia, NSCLC, surgery, lobectomy



RISK ADJUSTED COMPARISON OF PERFORMANCE BETWEEN THREE ACA-DEMIC THORACIC SURGERY UNITS USING THE EUROLUNG RISK MODELS

Cecilia Pompili¹, Y. Shargall², H. Decaluwe³, J. Moons³, M. Chari², A. Brunelli⁴

¹Leeds Institute of Cancer and Pathology, University of Leeds, Leeds, United Kingdom

²Thoracic Surgery, McMaster University, Hamilton, Canada

³Thoracic Surgery, University Hospitals Leuven, Leuven, Belgium

⁴Department of Thoracic Surgery and Thoracic Endoscopy, St. James's University Hospital, Leeds, United Kingdom

Objectives:

To compare the performance of three thoracic surgery centers using the Eurolung risk models for morbidity and mortality.

Methods:

Retrospective analysis on prospective databases from 3 academic centers (2014-2016). 2,011 patients (721 patients from center 1, 857 from center 2 and 433 from center 3) undergoing anatomic lung resections (1,640 lobectomies, 227 segmentectomies and 144 pneumonectomies, 63% by minimally invasive techniques) were analyzed. The Eurolung1 and Eurolung2 models were used to risk-adjust cardiopulmonary morbidity and 30-day mortality rates. ANOVA and Student's t-test were used to compare average outcomes between and within centers.

Results:

Overall cardiopulmonary complication and 30-day mortality rates were 25% and 2.08%. Analysis of morbidity: The observed morbidity rate of center 3 (41%) was significantly higher than the ones of centers 1 (21.2%, p<0.0001) and 2 (20.2%, p<0.0001). The observed morbidity of center 1 was in line with the predicted one (22.7% vs.21.1%, p=0.3). Center 2 performed better than expected (observed morbidity 20.2% vs. predicted 26.7%, p<0.0001), whereas the observed morbidity of center 3 was higher than the predicted one (41.1% vs.24.3%, p<0.0001). Analysis of Mortality: The observed mortality of center 1 (3.6%) was higher than those of centers 2 (1.2%, p=0.001) and 3 (1.4%, p=0.03). The mortality rate observed in center 1 was in line with the predicted one (3.6%vs.4.3, p=0.3), whereas centers 2 (1.2%vs.5.2%, p<0.0001) and 3 (1.4%vs.5%, p<0.0001) had observed mortality rates significantly lower than the predicted ones (Fig 1). The mortality rates observed in those patients with major cardiopulmonary complications (according to the TMM score>2) were 32% in center 1 (vs. predicted mortality 8%, p=0.0001), 8.2% in center 2 (vs. predicted mortality 8.1%, p=0.9) and 9% in center 3 vs.predicted mortality 7.1%, p=0.7).



Conclusion:

The use of Eurolung models allow for an objective comparison of performance between different centers by reliably identifying outcome differences. Our analysis should be interpreted as a methodological template for future quality improvement initiatives.

Disclosure: No significant relationships.

Keywords: risk-modelling, lung resection, outcome analysis, mortality



PREOPERATIVE EVALUATION FOR LUNG RESECTION IN BRONCHIECTASIS PATIENTS: SHOULD WE RELY UPON STANDARD PREDICTED POSTOPERA-TIVE VALUES?

C. Vallilo, A. Albuquerque, M. Salge, A. Mariani, M. Augusto, M. Suesada, P. Pego-Fernandes, <u>Ricardo Terra</u>

Thoracic Surgery Division and Pulmonology Division, Heart Institute (INCOR) - Clinicas Hospital / *Medicine School, Sao Paulo University, Sao Paulo, Brazil*

Objectives:

Predicted postoperative(PPO) lung function values are frequently used to define functional operability in lung cancer patients. However, due to the peculiar lung damage associated with bronchiectasis, this method could be inaccurate in such scenario. Therefore, we aimed to evaluate the accuracy of ppoFEV1, DLCO and VO2 in lung resection for bronchiectasis.

Methods:

Prospective study evaluating the lung function test and cardiopulmonary exercise test of individuals with symptomatic non-cystic fibrosis bronchiectasis before, 3 months and 9 months after lung resection. Predicted values were calculated as a function of observed preoperative values and the number of resected segments as proposed for the preoperative assessment of patients with lung cancer candidates for resection.

Results:

Forty four patients [42.1 (\pm 13.2) years and 50% male] completed the nine months' follow-up period. Tuberculosis was the most frequent etiology (56.8%). 18% of the procedures were pneumonectomy, 78% lobectomy. Median ICU stay was two days (IQ 0 – 3.25) and hospital stay was 7 days (IQ 5-12.5). 11 (25%) patients developed complications, three patients need reoperation (one in the first 30 days and the other two months after the procedure) and two patients died. The data comparing predicted and observed PPO FEV1, DLCO, VO2max 3 and 9 months after surgery are summarized in Table 1. Waterfall graphs in Figure 1 depicts individual differences between observed and predicted values of FEV1, DLCO, VO2max. Numbers are expressed as percentage of the individual predicted value. More than 70% of the studied patients had observed values higher than that predicted.

Table 1: Predicted (PPO) and observed (3M and 9M) postoperative lung function values.					
FEV ₁ (L)	FEV ₁ PPO	FEV ₁ 3M	FEV ₁ 9M		
(n 44) mean (SD)	1.7 (± 0.7)	$1.9 (\pm 0.8)^{a}$	2.0 (± 0.8) ^b		
DLCO mL/min/mmHg	DLCO PPO	DLCO 3M	DLCO 9M		
(n 37) mean(SD)	18.0 (± 6.6)	21.5 (± 5.6)°	21.7 (± 8.2) ^d		
VO ₂ mL/Kg/min	VO ₂ max PPO	VO ₂ max 3M	VO ₂ max 9M		
(n 44) mean (SD)	16.2 (± 6.8)	19.3 (± 6.4) ^e	$20.2 (\pm 8.0)^{f}$		

p values compares FEV1, DLCO and VO2max PPO to 3 and 9 months respectively: a p 0.216 / b p 0.109 / c p 0.026 / d p 0.049 / e p 0.035 / f p 0.016



Conclusion:

PPO approach underestimates the real postoperative lung function values in patients with symptomatic bronchiectasis who undergo anatomic resection.

Disclosure: No significant relationships.

Keywords: bronchiectasis, pulmonary surgical procedures, preoperative care



VIDEO ASSISTED THORACOSCOPIC SURGERY (VATS) NEAR-INFRARED FLU-ORESCENCE-GUIDED SURGICAL INTERVENTION OF POSTOPERATIVE CHY-LOTHORAX

Feng Yang, J. Zhou Thoracic Surgery, Beijing University People Hospital, Beijing, China

Objectives:

Chylothorax is the complication of thoracic surgery, the real-time location of intraoperative thoracic duct is difficult. We report a technique to image the thoracic duct. The technique can enable to locate the thoracic duct injury site in chylothorax surgery and to determine the precise ligation. Meanwhile, it can avoid damage to the thoracic duct in the thoracic surgery. Finding the leakage site and identification of thoracic duct (TD) are the key points of surgical intervention for chylothorax. In this study, we demonstrated near-infrared (NIR) fluorescence imaging with indocyanine green (ICG) in human VATS surgical intervention of chylothorax for the first time.

Methods:

This study involved four patients diagnosed as chylothorax after lung cancer surgery who received VATS surgical intervention. 0.2mg/kg of ICG was injected subcutaneously at the bilateral inguinal region about 30 minutes before surgery. The D-light P® NIR thoracoscope was used for intraoperative fluorescence imaging.

Results:

All patients received VATS surgical intervention from the right side. Chyle leak points were detected at the point of dissection of the station of #4R lymph node behind azygos vein for three patients, and at the adjacent point of prophylactic ligation of TD for one patient. The fluorescent hotspot of ICG leakage oozing could be detected firstly. The SBR of TD or oozing chyle was average 4 .41 (range 2.31-6.72). The fluorescent signals of TD were last for at least one hour. With the guide of real-time fluorescent lymphography, the fistulas and main trunk of TD were identified and double ligated. Small branches of TD could also be detected and ligated occasionally. Chylothorax were managed successfully by surgical interventions in all patients.

Conclusion:

NIR fluorescence imaging with ICG could provide highly sensitive and real-time imaging of thoracic duct in human VATS surgical intervention of chylothrax.

Disclosure: No significant relationships.

Keywords: thoracic duct, chylothorax, near-infrared fluorescence

P-099

PREDICTION OF LYMPH NODE METASTASIS IN CLINICAL STAGE I ADENO-CARCINOMA OF THE LUNG

<u>Masaya Yotsukura</u>¹, T. Ohtsuka¹, K. Kaseda¹, K. Masai¹, T. Hishida¹, Y. Hayashi², H. Asamura¹ ¹Division of Thoracic Surgery, Keio University School of Medicine, Tokyo, Japan ²Department of Pathology, Keio University Hospital, Tokyo, Japan

Objectives:

Despite a preoperative finding of negative regional lymph node metastasis, microscopic nodal involvement is still possible in resected lung cancer. The purpose of this study was to establish a method for predicting the pathological nodal status in surgical candidates preoperatively, using demographic and radiographic findings.

Methods:

We retrospectively collected data from 405 patients who had clinical stage I adenocarcinoma of the lung, and underwent at least lobectomy and hilar/mediastinal lymph node dissection. Of these 405 patients, 351 (86.7%) were pathological N0 (pN0), and 54 (13.3%) were N1/2 (pN1/2). Uni- and multivariate analyses were performed to find the best combination of factors that could be accurately related to pathological nodal status.

Results:

Younger age at operation (p = 0.028), higher level of preoperative serum carcinoembryonic antigen (CEA) (p = 0.032), larger diameter of the solid component of the tumor (p < 0.001) and larger consolidation/tumor ratio (CTR) on preoperative computed tomography (p < 0.001) were found to be significantly associated with pN1/2 by univariate analyses. After the optimal cutoff values were determined using a receiver operating characteristics curve, multivariate logistic regression analysis revealed that a preoperative serum CEA level of more than 4.0 ng/ml (p = 0.026) and a CTR of more than 0.95 (p < 0.001) were significantly associated with pN1/2. Pathological N1/2 disease was found in 23 (38.3%) of 60 patients who had both CEA > 4.0 ng/ml and CTR > 0.95, while 4 (2%) of 196 patients who did not meet the cutoff values for either CEA or CTR had pN0 disease.

		CTR	
		≤ 0.95	> 0.95
	≤ 4.0	2.0% (4/196 cases)	25.0% (23/92 cases)
Serum CEAlevel (ng/mi)	> 4.0	5.7% (3/57 cases)	38.3% (23/60 cases)

Table. Percentages of patients with pathological N1/2 diseases according to CTR and CEA levels

CT, computed tomography, CTR, consolidation/tumor ratio;

CEA, carcinoem bryonic antigen



Conclusion:

The combination of CEA level and CTR could be useful for predicting the pathological nodal status.

Disclosure: H. Asamura: Unrestricted institutional funds from Eli Lilly Japan K.K., Pfizer Japan Inc., Shionogi & Co., Ltd., Ono Pharmaceutical Co., Ltd., Tsumura & Co., Taiho Pharmaceutical Co., Ltd., Meiji Seika Pharma Co., Ltd., and Covidien Japan Inc. **Keywords:** adenocarcinoma, lymph node metastasis, consolidation/tumor ratio

P-100

THE APPLICATION OF NEAR-INFRARED FLUORESCENT THORACOSCOPY IN VIDEO-ASSISTED THORACIC SURGERY (VATS) POSTERIOR MEDIASTINAL TUMOR RESECTION

Jian Zhou, F. Yang, H. Li, R. Xiao, F. Yang Thoracic Surgery, Beijing University People's Hospital, Beijing, China

Objectives:

Posterior mediastinal tumors may invade the stellate ganglion. It is challenging to accurately differentiate the sympathetic trunk and the tumor. This may lead to post-operative complications such as Horner's syndromes. The purpose is to visualize the margin of the tumor and sympathetic ganglion.

Methods:

Fifteen patients, six males and nine females, diagnosed as PMTs were included in the study. All patients were confirmed to have no allergy to iodine or Indocyanine Green (ICG). All the patients were injected with 5mg/Kg ICG preoperatively. The D-light P system from Karl-Storz company was used to perform the surgeries. All patients underwent thoracoscopic explorations under "Standard" white light mode, "Standard" near infrared light mode, and "Spectra A" near infrared light mode. Then the tumor was dissected under routine VATS procedures.

Results:

The median age was 32.5(median, 28-43). The average diameter of the tumors was 3.65cm (mean, 2.0cm-5.5cm). Preoperatively, 13 patients were diagnosed as neurogenic tumors, and the other 2 were diagnosed as masses originated from the esophagus or trachea. 2 patients were accompanied with facial anhidrosis, and the other 13 were asymptomatic. Tumors were fluorescent in 14 of 15 patients. In all 15 patients, the sympathetic ganglions were fluorescent (figure 2). The signal to background ratio(SBR) was measured by ImageJ. The mean SBR of the tumors were 2.52.

The mean intraoperative blood loss was 25(mean, 10-50) ml. Mean operation duration was 105.2(mean, 60-150) minutes. The surgeries were followed by uneventful recovery. No more nerve damage was observed. Mean chest tube duration was 75(mean, 24-120) hours.

Conclusion:

The near-infrared fluorescent thoracoscopy can help to visualize the margin of the tumor and sympathetic ganglion with the enhanced permeability and retention (EPR) effect of the tumor. This technique may help to identify the margin of the tumor, and to reduce the chance of unnecessary collateral damages to the adjacent structures.

Disclosure: No significant relationships.

Keywords: near-infrared fluorescent thoracoscopy, mediastinal tumor, ICG

ON WHITH OF THOMAS

13:30 - 15:00 SESSION XI: PULMONARY NEOPLASTIC I ROOM: TIROL

O-056

A LUNG CANCER SURGERY RISK MODEL OF 78,594 CASES FROM 2014 TO 2015 IN A JAPANESE NATIONWIDE WEB-BASED DATABASE

Shunsuke Endo¹, N. Ikeda², T. Kondo³, J. Nakajima⁴, H. Kondo⁵, K. Yokoi⁶, M. Chida⁷, S. Toyooka⁸, M. Sato⁹, Y. Sato¹⁰, Y. Okada¹¹, K. Yoshida², M. Okada¹², M. Okumura¹³, K. Chihara¹⁴, H. Miyata¹⁵ ¹Thoracic Surgery, Jichi Medical University, Tochigi, Japan, ²Thoracic Surgery, Tokyo Medical University, Tokyo, Japan, ³Thoracic Surgery, Tohoku Medical and Pharmaceutical University, Miyagi, Japan, ⁴Thoracic Surgery, University of Tokyo, Tokyo, Japan, ⁵General Thoracic Surgery, Kyourin University, Tokvo, Japan, ⁶Thoracic Surgery, Nagoya University, Aichi, Japan, ⁷General Thoracic Surgery, Dokkyo Medical University, Tochigi, Japan, ⁸Thoracic Surgery, Okayama University, Okayama, Japan, ⁹General Thoracic Surgery, Kagoshima University, Kagoshima, Japan, ¹⁰Thoracic Surgery, University of Tsukuba, Ibaraki, Japan, ¹¹Thoracic Surgery, Tohoku University, Miyagi, Japan, ¹²General Thoracic Surgery, Hiroshima University, Hiroshima, Japan, ¹³General Thoracic Surgery, Osaka University, Osaka, Japan, ¹⁴Thoracic Surgery, Shizuoka City Shizuoka Hospital, Shizuoka, Japan, ¹⁵Health Policy and Management, Keio University, Tokyo, Japan

Objectives:

This study aimed to establish a risk model of mortality and morbidity after lung cancer surgery using a Japanese nationwide annual database, which is a web-based entry system by linkage to the Japanese Surgical Board Certification System.

Methods:

Patient characteristics, operation data, and postoperative data of 80095 patients who underwent lung cancer surgery were entered into the National Clinical Database of Japan (NCD) between 2014 and 2015 from 811 different surgical units. After 1501 patients were excluded because of emergent surgery, etc., the development dataset for risk models included 38,277 patients in NCD 2014 and the validation dataset included NCD 40,317 patients in 2015. Receiver operator characteristic (ROC) curves were generated as outcome of mortality and composite mortality or major morbidity. The concordance index was used to assess the model's discriminatory ability and its validity.

Results:

The 30-day mortality rate and overall mortality rate were 0.4% (154 patients) and 0.8% (315 patients), respectively, in NCD 2014; 0.4% (168 patients) and 0.8% (309 patients), respectively, in NCD 2015. The major morbidity rate was 5.6% (2134 patients) in NCD 2014 and 5.6% (2261 patients) in NCD 2015. Significant risk factors for mortality and composite mortality or morbidity were described in Table. The concordance index of the development dataset for mortality and composite mortality or morbidity showed 0.855 (confidential interval: 0.835 – 0.875, p = 0 .01) and 0.719 (confidential interval: 0.709 – 0.730, p = 0 .005), respectively. The validation dataset showed 0.852 (confidential interval: 0.833–0.870, p = 0 .01) and 0.722 (confidential interval: 0.712 – 0.732, p = 0 .005), respectively.

Significant risk factors for mortality and composite mortality or morbidity after lung cancer					
surgery					
	n Value	OR	Mortality 95%CI		
	p value		lower	upper	
gender_male	.000	2.327	1.508	3.591	
age 5-year increase (60 - 80 yrs)	.000	1.421	1.300	1.552	
performance status 1	.007	1.452	1.110	1.901	
2 or more	.000	2.603	1.809	3.746	
%VC 10% decrease(170 - 50%)	.000	1.355	1.261	1.455	
comorbidity					
liver dysfunction (Child B or C)	.011	3.011	1.293	7.014	
hemodialysis	.006	2.855	1.346	6.060	
interstitial pneumonia	.000	3.687	2.788	4.877	
ischemic heart disease (with/without intervention)	.023	1.506	1.058	2.142	
smoking history	.018	1.713	1.095	2.679	
tumorsize > 3 cm (radiological)	.027	1.355	1.036	1.771	
clinical stgae					
II or more	.007	1.532	1.126	2.083	
III or more	.010	1.559	1.114	2.183	
supeior sulcus tumor	.034	1.743	1.044	2.911	
surgical procedure					
right lower lobectomy	.001	1.599	1.209	2.115	
lobectomy or bilobectomy	.000	1.983	1.390	2.828	
pneumonectomy	.000	5.261	2.888	9.586	
chest wall resection (other then 1 st rib)	.000	2.779	1.564	4.938	
histology other than adenocarcinoma	.001	1.485	1.168	1.889	



			Morbidity &	
	n Valua	OP	Mortality 95%CI	
	p value	UK	lower	upper
gender_male	.000	1.642	1.443	1.869
age 5-year increase (60 - 80 yrs)	.000	1.172	1.135	1.210
performance status 1	.000	1.233	1.098	1.385
2 or more	.000	1.487	1.228	1.801
%VC < 80%	.003	1.226	1.069	1.405
%FEV1 10% decrease(170 - 50%)	.000	1.079	1.047	1.112
FEV1 < 50%	.014	1.329	1.060	1.665
comorbidity				
hemodialysis	.002	1.889	1.255	2.843
interstitial pneumonia	.000	2.334	2.014	2.704
stroke	.036	1.187	1.011	1.392
untreated DM	.025	1.553	1.058	2.278
autoimmune disease	.019	1.395	1.057	1.841
arrythmia	.000	1.850	1.554	2.202
smoking history > 30 pack year	.000	1.226	1.096	1.371
induction radiotherapy	.000	1.758	1.344	2.299
clinical stgae II or more	.000	1.343	1.211	1.490
surgical procedure				
pneumonectomy	.000	4.315	2.912	6.394
lobectomy or bilobectomy	.000	2.064	1.515	2.812
segmentectomy	.013	1.496	1.090	2.054
nodal dissection > 0	.003	1.539	1.161	2.040
ND2a-2 or more	.000	1.216	1.102	1.342
combined resection				
pulmonary artery	.020	1.712	1.089	2.692
chest wall(other than 1 st rib)	.004	1.601	1.159	2.212
chest wall(1 st rib)	.004	2.572	1.349	4.904
partial pulmonary resection or segmentectomy	.000	1.555	1.220	1.983
histology other than adenocarcinoma	.000	1.230	1.116	1.355

Conclusion:

The risk stratification study on lung cancer surgery in Japan using NCD2014 was developed and feasible when the model was applied to NCD2015. The model will contribute to improving the surgical quality for lung cancer.

Disclosure: No significant relationships.

Keywords: lung cancer surgery, risk model, nationwide database

O-057

TRAINED DOGS CAN DISCRIMINATE LUNG CANCER IN EXHALED AIR

<u>Angela Guirao Montes</u>¹, L. Molins¹, Á. Agustí Garcia-Navarro², J.J. Fibla³, J. Hernandez³, R.M. Marrades², I. Ramon⁴, G. Sunyer⁵, N. Viñolas⁶ ¹General Thoracic Surgery Department, Hospital Clinic of Barcelona, Barcelona, Spain ²Pneumology Department, Hospital Clinic of Barcelona, Barcelona, Spain ³General Thoracic Surgery Department, Hospital Universitari Sagrat Cor, Barcelona, Spain ⁴Argus Detection Dogs, Argus Detection dogs, Barcelona, Spain ⁵Ciber Enfermedades Respiratorias (ciberes), CIBER, Barcelona, Spain ⁶Oncology Department, Hospital Clinic de Barcelona, Barcelona, Spain

Objectives:

To confirm if a trained dog can discriminate between the exhaled air samples of individuals with and without lung cancer (LC).

Methods:

A prospective, controlled, two-phase study. Phase I was the training of the dog in order to teach him how to identify LC odours. Phase II tested the success rate of the dog when confronted with samples obtained from individuals with and without LC. We collected samples of exhaled air from 85 patients with LC and 28 individuals without LC. Exclusion criteria were other neoplasm, and chemotherapy treatment. Participants refrained to eat and smoke 30 minutes before they exhaled inside a crystal tube filled with hydrophilic and hydrophobic wool and closed with silicon taps. The training of the dog was based on a progressive prize-dependent learning method. Tubes containing the samples were introduced in wood boxes with an open side to enable the smelling of the sample. During Phase I, the dog was teached to identify LC odour. During Phase II, the dog was confronted to samples with and without LC in a proportion of ¹/₄ in order to discriminate LC.

Results:

After a successfully training (Phase I) During Phase II, the dog was confronted with 230 samples with LC and 140 samples without LC. With a total of 785 attempts the dog achieved successful results with a sensitivity of 0,95; a specificity of 0,98; a PPV of 0,95 and a PPN of 0,98.

Conclusion:

Trained dogs can discriminate the presence of LC from exhaled air samples with and without LC with an extraordinarily high degree of reliability.

Disclosure: No significant relationships.

Keywords: exhaled gas, sniffer dog, lung cancer





CLINICAL IMPACT OF CIRCULATING TUMOR CELL IN METASTATIC COLORECTAL CANCER PATIENTS WHO UNDERWENT PULMONARY METAS-TASECTOMY

Masaki Hashimoto¹, F. Tanaka², K. Yoneda², Y. Okumura³, T. Takuwa⁴, N. Kondo⁴, S. Hasegawa⁴ ¹Hyogo College of Medicine, Hyogo College of Medicine, Nishinomiya, Japan

²2nd Department of Surgery, University of Occupational and Environmental Health. Kitakyushu, Japan

³Thoracic Surgery, Itami City Hospital, Itami, Japan ⁴Thoracic Surgery, Hyogo College of Medicine, Nishinomiya, Japan

Objectives:

Circulating tumor cell (CTCs) is a tumor cell that is shed from primary tumor and circulates in the peripheral blood. CTC is a potential surrogate of distant metastasis, and reported as a useful clinical prognostic marker for metastatic colorectal cancer (mCRC).

Methods:

We conducted a prospective study to evaluate clinical value of CTC. Patients, who receive curative-intended surgery for pulmonary metastases from CRC, were enrolled. Surgical criteria of curative-intended surgery for pulmonary metastases from CRC in our hospital as follows: (1) the metastases seem to be technically resectable; (2) the general and functional risks are tolerable; (3) the primary tumor is controlled; (4) no active extra-thoracic lesions are detected. For each patient, a 7.5mL of peripheral blood were sampled just before operation, and was served for quantitative evaluation of CTC with the CellSearch® system.

Results:

A total of 79 patients were enrolled, six patients were excluded due to incomplete resection, and 73 patients were finally eligible for this study. For all eligible patients, the disease-free survival (DFS) rate and overall survival (OS) rate at 5-years after pulmonary metastectomy were 36.1% and 64.6%, respectively. CTC-count (/7.5mL) was "0" in 61 patients (83.6%), "1" in 7 (9.6%), and "2" in 3 (4.1%), "3" in 1 (1.4%), and "6" were in 1 (1.4%). When a cut-off value of "2" was employed, DFS for the low-CTC group (CTC-count < 2 cells/7.5mL) was significantly longer than that for the high-CTC group (CTC-count \geq 2 cells/7.5mL) with the hazard ratio (HR) of 0.058 (p=0.0012), and OS was also significantly longer in the low-CTC group (HR 0.067, P=0.0159).

Conclusion:

Detection of CTCs (≥ 2 cells/7.5mL) was associated with a significantly poor prognosis in mCRC patients underwent pulmonary metastasectomy. The CTC-test can be useful in determination of surgical indication of ulmonary metastasectomy in mCRC patient.



Disclosure: No significant relationships.

Keywords: pulmonary metastasectomy, metastatic colorectal cancer, circulating tumor cell


SURVIVAL IS NOT COMPROMISED IN PATIENTS WITH INVASIVE ADENOCAR-CINOMA FOUND IN GROUND GLASS LESIONS RECEIVING SUBLOBAR RESEC-TION DUE TO INTRA-OPERATIVE FROZEN SECTION AMBIGUITY: A PROPEN-SITY SCORE MATCHED ANALYSIS

Luis Hernandez-Arenas, Y. Zhou, G. Jiang

Thoracic Surgery Department, Shanghai Pulmonary Hospital, Shanghai, China,

Objectives:

With expanding use of CT screening, pulmonary ground-glass opacities(GGOs) are increasingly and frequently identified and resected–with the extent of surgery dependent on frozen section analysis. How patient outcomes are affected by inaccuracies of frozen section in these situations is not known.

Methods:

From January 2012 to October 2015, 200 consecutive adult patients were identified who received VATS resection for GGO's that were declared non-malignant on intra-operative frozen section, but later found to have invasive adenocarcinoma on formal histology. Propensity scores were calculated using logistic regression analysis and matched with a score of 0.03 Of the 200 patients, video-assisted thoracoscopic lobectomy resection was performed in 113 patients, and 87 patients with sublobar resection. After adjustment for propensity scores, 50 patients were selected from each group.

Results:

The patients in the two study arms were closely matched for all demographic and clinical variables (See table). The results for video-assisted thoracoscopic lobectomy and sublobar resections respectively, were as follows: complications, 5.5%/2%. Prolonged air leak was the most common complication. Two cases were converted to conventional VATS due to technical difficulties in the lobar group, and none of them were converted to thoracotomy. Postoperative 30-day mortality was zero. Overall survival at 12, 36 and 50 months was 100%/100%, 100%/100% and 100%/98%, (long-rank p = 0.86) respectively and cancer-free interval disease at 12, 36 and 50 months was 100%/100%, 92%/100% and 92%/100%(long-rank p = 0.66) respectively. The sublobar group showed a faster return to normal daily activities.(p=0.04).

	Lobar (n=50)	(n=50)	p-value
Age (years)	60±9	60±10	0.83
Sex Male (%)	23	23	1
Female (%)	27	27	
BMI (kg/m ²)	23.9±5.0	22.3±6.2	0.18
Weight (kg)	64.4±12.7	63.8±9.8	0.78
Smoking History			0.41
Yes (%)	6	10	
No (%)	44	40	-
Tuberculosis			1
Yes (%)	1	1	
No (%)	49	49	
Previous Cancer		1	0.23
Yes	3	5	
No	47	45	
Cardiovascular risk	22	-	1
Tes	4	5	
No	40	45	
Lung Function lest	26406	3 2 4 0 7	0.14
FEVI (L)	2.010.0	2.3±0.7	0.14
FEVI 75	93.1214.3	300410	0.07
FVC (L) Ground alace lation have	3.0±0.07	2.99±1.0	0.76
Burge	10	47	
Mixed	40	3/	
Maan size of humours (ml)	11 2+2 8	111+45	0.97
Mean operation time (min)	132+20	114+36	0.008
Mean operative blood loss (ml)	95+37	70+35	0.001
Mean length of hospital stay (days)	60+39	5.0+3.1	0.15
Mean duration of chest drain use (days)	4.8+3.1	3.6+2.1	0.037
Adjuvant chemotherapy		are and a	1
Yes (%)	1	1	
No (%)	49	49	
Histology types:		10	0.95
Lepidic-papinary (%)	14	10	
Lepidic (%)	28	30	
Lepidic-acinar (%)	5	0	
Acinar-lepidic (%)	1.5	1	
Actual (20)	1 1	1	
Papillary (%)	1	2	
Complications	199	1.2	0.68
Yes (%)	2	4	
No (%)	48	46	
Conversion to conventional VATS	0	0	1
Conversion to thoracotomy (%)	0	0	1
Mortality 30-days	0	0	1

Table 1. Propensity	score-matched	demographic	and clinical d	data.
---------------------	---------------	-------------	----------------	-------

FEV1: forced expiratory volume in 1 s

FVC: forced vital capacity

Cardiovascular risk includes patients with high blood pressure and hypercholesterolemia.

Conclusion:

For patients with GGOs that were declared non-malignant on frozen section but later found to be invasive adenocarcinoma, survival is not compromised if they only received a sublobar resection based on the frozen section result. Concern regarding frozen section accuracy should not be a reason for not managing these patients by surgery.

Disclosure: No significant relationships. **Keywords:** VATS, GGOs, adenocarcinoma



PULMONARY SARCOMATOID CARCINOMA (PSC): AN ANALYSIS OF A RARE CANCER FROM THE SURVEILLANCE, EPIDEMIOLOGY AND END RESULTS (SEER) DATABASE

M. Rahouma¹, M. Kamel¹, N. Narula², A. Nasar¹, S. Harrison¹, B. Lee¹, <u>Brendon Stiles¹</u>, N. Altorki¹, J. Port¹

¹Cardiothoracic Surgery, Weill Cornell Medicine, New York-Presbyterian Hospital, New York, NY, United States of America

²Pathology, Weill Cornell Medicine/New York Presbyterian Hospital, New York, NY, United States of America

Objectives:

Pulmonary Sarcomatoid Carcinoma (PSC) is a rare malignant neoplasm that has both carcinomatous and sarcomatous components and is often associated with a poor prognosis. There is little data from retrospective studies about these rare tumors. We reviewed a large national database for clinico-pathological characteristics and surgical outcomes for this rare tumor.

Methods:

The Surveillance,Epidemiology and End Results(SEER)database was queried from 1973-2013 for PSC patients.We included pleomorphic carcinoma(13.4%),giant and spindle cell carcinoma(72.9%),pulmonary blastoma(2.2%)and carcinosarcoma(11.5%)in the analysis.A comparison between PSC and a contemporaneously treated group of NSCLC patients was performed. Cox regression to identify predictors of overall survival(OS)and logistic regression analysis for predictors of node +ve disease were performed.A propensity matched(1:2) analysis(including age,gender,grade and stage)among surgically treated cases was done to compare OS in PSC vs other NSCLC patients.

Results:

955,899 non-small cell lung cancer patients were identified of whom 4987 had PSC (0.52%). The majority were men(60.9%) and the median age was 68 years. High grades tumors represented 97.2% of PSC's vs 61.9% of other NSCLC's(p<0.001).Stage I represented 20.5% of PSC's vs other NSCLC's(24.2%,p<0.001,Table).More advanced T stages were prevalent in PSC(54.8%) vs other NSCLC's(45.5%, p<0.001).Median tumor size was 5 cm vs 3.5 cm in PSC's and NSCLC's respectively(p<0.001).Significantly more patients with PSC had node positive disease as well as M1 disease.

In the PSC cohort, predictors of N+ disease on MVA were advanced T stage(p<0.001)). Predictors of OS in stages I/II PSC on MVA were advanced age(p<0.001,HR=1.03), male gender(p=0.024, HR=1.25),carcinosarcoma(p=0.002,HR=1.76), grade(p=0.033,HR=1.81), T stage(p=004,HR=1.75))N status(p=0.001,HR=1.90)and surgical resection(p<0.001,HR=0.58).

An analysis of propensity matched groups of surgically resected PSC's(n=1,069)and other NSCLC's(n=2,138)revealed worse OS among PSC's in early stages(I/II)compared to other NSCLC's(p=0.009;Table).

Conclusion:

Patients with PSC present with more advanced and high grade disease with worse survival compared to other NSCLC patients. While surgical resection conveys a survival advantage in PSC, this group represents a high-risk population for relapse and should be evaluated for novel adjuvant therapies.

Path characteristics		$DSC_{(n-4097)}$	NSCI C (n=050 012)	Р	
		rsc (n-4987)	NSCLC (II-950,912)	value	
Grade 3-4		2528(97.2)	295672(61.9)	< 0.001	
Median T size (cm)		5 (3.3-7.5)	3.5 (2.3-5.4)	<0.001	
Tatage	T1-2	1370 (45.2%)	294115 (54.5%)	<0.001	
1 stuge	T3-4	1662 (54.8%)	245535 (45.5%)	-0.001	
	Stage I	779 (20.5%)	172231 (24.2%)		
Stage	Stage II	321 (8.4%)	39259 (5.5%)	<0.001	
Stuge	Stage III	995 (26.1%)	189637 (26.7%)	-0.001	
	Stage IV	1713 (45%)	307910 (43.4%)		
Matched Surgical	Cohort (Medi	an OS; 5-yr OS)			
	All Stages	18 months (30.5%)	27 months (32.5%)	0.004	
Stago	Stage I/II	32 months (40.3%)	47 months (43.9%)	0.009	
Stage	Stage III	12 months (23.2%)	18 months (21.9%)	0.375	
	Stage IV	5 months (8.5%)	7 months (7.9%)	0.296	

Disclosure: No significant relationships.

Keywords: rare malignant neoplasm, overall survival, propensity matched, pulmonary sarcomatoid carcinoma, SEER database



NOMOGRAM PREDICTS OVERALL SURVIVAL FOR PATIENTS WITH NON-SMALL CELL LUNG CANCER INCORPORATING PRETREATMENT PERIPH-ERAL BLOOD MARKERS

Dong Xie¹, M. Allen², R. Marks³, G. Jiang¹, Z. Sun⁴, F. Nichols², M. Zhang⁴, M. Aubry⁵, A. Jatoi³, Y. Garces⁶, A. Mansfield³, D. Wigle⁷, J. Molina³, C. Deschamps², P. Yang⁴ ¹Thoracic Surgery Department, Shanghai Pulmonary Hospital Tongji University, Shanghai, China ²Division of General Thoracic Surgery, Mayo Clinic, Rochester, MN, United States of America ³Division of Medical Oncology, Mayo Clinic, Rochester, MN, United States of America ⁴Division of Epidemiology, Department of Health Sciences Research, Mayo Clinic, Rochester, MN, United States of America ⁵Division of Laboratory Medicine and Pathology, Mayo Clinic, Rochester, MN, United States of America ⁶Department of Radiation Oncology, Mayo Clinic, Rochester, MN, United States of America ⁷Thoracic Surgery, Mayo Clinic, Rochester, MN, United States of America

Objectives:

We sought to build a novel prognostic nomogram in Non-Small Cell Lung Cancer (NSCLC) incorporating before treatment peripheral blood markers beyond known pathoclinical predictors.

Methods:

We analysed 7,158 patients with NSCLC diagnosed between 1997 and 2012 from a single institution with uniform medical record and routine follow-up information. Besides common clinical and pathological factors, we investigated the prognostic value of the neutrophil to lymphocyte ratio (NLR), monocytes, hemoglobin in peripheral blood before treatment. Patients were randomly assigned to training (4,772 patients, 66.7%) or validation cohorts (2,386 patients, 33.3%). Cox Proportional Hazards models determined the effects of multiple factors on overall survival (OS). A nomogram was developed to predict median survival and 1-, 3-, 5- and 10-year OS for NSCLC. The performance of the nomogram was assessed by concordance index and calibration curve.

Results:

In the training cohort, the multivariate Cox model identified the NLR, monocytes and hemoglobin before treatment as significant prognostic factors for OS independent of patient age, gender, smoking history of intensity and cessation, performance status, disease stage, tumor cell type and differentiation grade, and therapies. All the significant prognostic variables were incorporated into a nomogram. In the validation cohort, the nomogram shows notable accuracy in predicting OS, with a concordance index of 0.81, and was well calibrated for predictions of OS.

ABSTRACTS

Points	0		10		20		30		40		50		60		70		80		90		100
NLR	0.1		0.25	_	0.5	_	1	2	3	4	_	6	8	10	1	5	20	30	40	50	60
Monocytes	0	0.5	1		1.5	5	2	-	2.5	3		3.5	-	4	4	.5	5	5.6	5	6	
Hemoglobin	20	19	18	17	16	15	14	13	12	11	10	9	8		7 6	5					
Age	20	30	40	5	0	60	70	(80		90		100								
Gender	Féma	lle	rent	Male																	
Smoking status	Neve	r	Forme	r																	
Smoking secassion	Quit >	Quit 1 yea	at dia r	gnosi	Neve	r quit															
Stage	la	lb	-		lla	þ			11	la	llb				- 1	v					
Cell type	Carci	noid				200			AC		Sar	comat	oid								
Tumor grade	Well		Mec	N	on-gra	de					22										
ECOG PS	<2		64	c		C+E				C+P			P	only							
Treatment	S+N		5	Sonly	6	St	C+R			UTR	Co	nly	K	Uliy				NT			
Total points	0	• • •	50		100		150	20	0	250		300		350	• • • •	400	450		500	•••	550
1-year survival						0.97	5	0.	9	0.8	0.7	0.6 0	.5 0.4	0.3 0	2 0.1	0	.01				
3-year survival						0.	9	0.8	0.7 0	.6 0.5	0.4 0	3 0.2	0.1	0	.01						
5-year survival					0.9	9	0.8	0.7	0.6 0.5	5 0.4 0	.3 0.2	0.1	0	.01							
10-year survival				0.9	C	.8	0.7 0.	6 0.5 0	.4 0.3	0.2 0.	1	0.01									
Median survival (yea	ar)					1	5 1	2 10	7 5	4 3	2		1	0.5	5 (0.25					

Conclusion:

The proposed nomogram incorporating peripheral blood markers and known prognostic factors could accurately predict individualized survival probability of patients with NSCLC. It could be used in treatment planning and stratification in clinical trials.

Disclosure: No significant relationships.

Keywords: non-small cell lung cancer, prediction model, survival, neutrophil to lymphocyte ratio, monocytes, nomogram

15:30 - 16:30 SESSION XII: MIXED THORACIC II ROOM: TIROL

F-062

SLIDE TRACHEOPLASTY FOR TRACHEAL STENOSIS IN CHILDREN: EXPERI-ENCE FROM 20 YEARS IN A NATIONAL REFERRAL CENTRE

<u>Nizar Asadi</u>¹, C. Butler², D. Mcintyre², N. Mcintosh³, D. Roebuck⁴, C. Mclaren⁴, C. Wallis⁵, N. Muthialu³, R. Hewitt², M. Elliott³

¹Thoracic Surgery, Royal Brompton Hospital, London, United Kingdom ²ENT, Great Ormond Street Hospital, London, United Kingdom

³Cardiothoracic, Great Ormond Street Hospital, London, United Kingdom

⁴Interventional Radiology, Great Ormond Street Hospital, London, United Kingdom

⁵Respiratory, Great Ormond Street Hospital, London, United Kingdom

Objectives:

Tracheal stenosis in children may be congenital or acquired after trauma or prolonged intubation. Congenital long segment tracheal stenosis is a severe and often life-threatening anatomical anomaly. Slide tracheoplasty is an operation used in the management of long-segment tracheal stenosis. We describe the results from a national referral centre over the last 20 years.

Methods:

Pre, intra- and postoperative data, and outcomes measures, including the need for endoscopic airway intervention and mortality, were collected for children undergoing slide tracheoplasty between February 1995 and November 2016.

Results:

One hundred and thirty six patients underwent slide tracheoplasty; the median age was six months (range five days- 15 years). 68 % (n= 93) had associated cardiovascular anomalies. Preoperative ventilation was necessary in 71 (52%) patients, and extracorporeal membrane oxygenation was required in 11 (8%) patients. Abnormal anatomy was present in 56 (41%) children, which included 31 patients with an anomalous right upper lobe bronchus, 15 with tracheal trifurcation, and 10 with a single lung. Preoperative malacia was present in 29 (21%) patients. Overall survival was 88% (mortality in 13 patients). Postoperative balloon dilatation was necessary in 66 and one or more stenting procedures were required in 26 patients. Multivariate analysis revealed preoperative extracorporeal membrane oxygenation (P<0.05), preoperative malacia (P=0.042), and bronchial stenosis (P<0.05) to be adverse predictors of survival.

Conclusion:

STP is a versatile and reliable technique associated with low morbidity and mortality when compared with previous strategies for children with long segment stenosis. The presence of preoperative distal airway malacia and stenosis are significant risk factors for death and post-operative stenting.

Disclosure: No significant relationships.

Keywords: congenital tracheal stenosis, airway surgery, endoscopic airway operation, airway malacia, slide tracheoplasty



EXTENDED SLEEVE LOBECTOMY FOR CENTRALLY LOCATED NON-SMALL CELL LUNG CANCER (NSCLC) : A 20-YEAR SINGLE CENTER EXPERIENCE

<u>Tae Hee Hong</u>, J.H. Cho, S.M. Shin, H.K. Kim, Y.S. Choi, J.I. Zo, Y.M. Shim, J. Kim Department of Thoracic and Cardiovascular Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Republic of Korea

Objectives:

Extended sleeve lobectomy (ESL), an atypical bronchoplasty with resection of more than one lobe, have theoretical advantages including avoidance of pneumonectomy. However, little have been known about clinical outcome after ESL including hospital mortality, type and pattern of complications, and local recurrence rate.

Methods:

Between March 1995 and April 2016, a total of 565 patients with centrally located Non-Small Cell Lung Cancer (NSCLC) underwent sleeve resection. Among them, 63 patients had ESL procedure with various indications (Table 1). We retrospectively analyzed those patients in terms of hospital mortality, postoperative complications, and local recurrence.

Table 1. Classifications of ESL Indications (ESL; Extended Sleeve Lobectomy)						
Categories of Unresectability Using Stan- dard Procedure (1,2,3) and Categories of Operability for Pneumonectomy (A,B)	A. Able to Tolerate Pneumonectomy	B. Unable to Tolerate Pneu- monectomy	Total			
1. Preoperatively Expected for the ESL	N=25	N=6	N=31 (49%)			
2. Preoperatively Expected for the Simple sleeve lobectomy, but Converted to ESL due to Positive Bronchial Resec- tion Margin	N=16	N=2	N=18 (29%)			
3. Inevitable ESL Due to Metastatic In- terlobar Lymph Nodes (N1)	N=12	N=2	N=14 (22%)			
Total	N=53 (84%)	N=10 (16%)	N=63 (100%)			

Results:

The patients were classified into four types (Fig.1): (A) Anastomosis between the right main and lower bronchi with upper bilobectomy(n=14), (B) Anastomosis between the right main and upper bronchi with lower bilobectomy(n=37), (C) Anasotmosis between left main and basal segmental bronchi with left upper lobectomy and lower lobe superior segmentectomy(n=4), and (D) Anastomosis between the left main and upper division bronchi with left lower lobectomy and lingular segmentectomy(n=8). There were no operative deaths within 30 days, but two hospital deaths from postoperative acute lung injury. Eight (12.7%) of the 63 patients had complications at the anastomosis site including 3 strictures and 5 bronchopleural fistulas. Two patients (3.2%) had pulmonary vein thrombosis, which might be attributed to overstretching of pulmonary vein. Five patients (7.9%) had local control failure with relapse at the anastomosis site. In the comparison to patients undergone simple sleeve lobectomy, there was no significant differences of hospital mortality (3.2% vs 2.3%, p=0.344), incidence of morbidity (15.9% vs 14.4%, p=0.737) as well as local failure rate (7.9% vs 5.5%, =0.284).



Conclusion:

ESL is technically more demanding, but it does not increase morbidity or mortality compared to simple sleeve lobectomy. We think ESL is helpful for avoidance of pneumonectomy and a feasible surgical option for the patients with centrally located NSCLC.

Disclosure: No significant relationships.

Keywords: lung cancer, sleeve resection, atypical bronchoplasty



SURFACTANT PROTEIN-D: A SENSITIVE PREDICTOR FOR EFFICIENCY OF PREOPERATIVE PULMONARY REHABILITATION

G. Che, Yutian Lai

Thoracic Department, West China Hospital of Sichuan University, Chengdu, China

Objectives:

Surfactant Protein D (SP-D) has been proposed as a lung-derived biomarker for inflammatory lung disease. However, the relationship between serum level of SP-D and Rehabilitation Program (PRP) stays unclear, and in this study, we aimed to explore the correlation between the SP-D and PRP, validate the feasibility of SP-D level to predict the effectiveness of PRR.

Methods:

A prospective study with a total of 80 lung cancer patients with risk factors of PPCs was conducted, randomly divided into Intervention Group (IG, n=36) and Control Group (CG, n=44). IG was treated with one-week time of PRP, and CG with the same duration of routine preoperative preparation, and then followed lobectomy. Peripheral venous bloods were collected at five time points respectively, and serum SP-D levels were detected by enzyme-linked immunosorbent assay (ELISA). We analyzed the serum level changes of SP-D, as well as the PPCs occurred in hospital stay between the groups.

Results:

Sixteen patients were excluded. Both groups were comparable at the baseline. The average levels of SP-D in two groups showed a decline trend with time, and levels before operation day showed a significant decline range in IG compared with CG (6.56 ± 5.30 vs. 1.05 ± 2.79 ng/ml, P<0.001). The incidence of PPCs in IG was significantly higher compared with CG (2/36 vs. 10/44, p=0.032), as well as the person-times of PPCs occurred from postoperative day 1 to 4 (POD1-4) (5/36 vs. 15/44, p=0.038) and the total person-times (5/36 vs. 19/44, p=0.004). SP-D levels of the day before operation in patients with PPCs were significantly higher than those without (34.07 ± 4.32 vs. 30.30 ± 6.52 ng/ml, p=0.005), and SP-D levels of admission day in CG patients with PPCs were significantly higher compared with those without (34.93 ± 4.15 vs. 29.81 ± 7.47 ng/ml, p=0.045).

Conclusion:

Serum SP-D level may be a potential predictor to evaluate the efficiency of PRP and the risk of PPCs.

Disclosure: No significant relationships.

Keywords: blood biomarker, preoperative rehabilitation program, postoperative complications, surfactant protein D

F-065

IS CLINICAL T1MI USEFUL? - VALIDATION OF $8^{\rm TH}$ TNM CLASSIFICATION FOR LUNG CANCER

Takeshi Matsunaga, K. Suzuki, A. Hattori, K. Takamochi, S. Oh General Thoracic Surgery, Juntendo University School of Medicine, Tokyo, Japan

Objectives:

In 8th edition, cT1mi was defined as tumor \leq 30mm with solid component (SC) \leq 5mm. However, the criteria of cT1mi is not supported by any evidence.

Methods:

We evaluated 763 surgically resected cT1N0M0 stage IA on basis of 7th edition of the TNM classification for lung cancer between 2008 and 2013 and all tumors were evaluated on thinsection CT. Tumors consisted of only ground glass opacity (GGO) (=Tis) or pure solid tumor (ST) (=T1a, b, c in ST) were excluded and we evaluated 312 patients having tumors consisted of GGO and SC, so-called part-solid tumor (PST). We investigated cancer-specific overall survival (C-OS), recurrence-free survival (RFS), lymphatic invasion (Ly), vascular invasion (V) and nodal involvement (NI) in PST to validate whether the size of SC \leq 5mm was appropriate for cT1mi. Furthermore, we compared prognosis between PST and T1a, b, c in ST.

Results:

	Cancer-specific overall survival (5y) (%)	Recurrence-free survival (5y) (%)	Ly (%)	V (%)	Nodal involvement (%)	
≤ 5mm	100%	100%	0%(0/86)	0%(0/86)	0%(0/86)	
≤ 7mm	100%	100%	0.7%(1/129)	0%(0/129)	0%(0/129)	
≤ 10mm	100%	100%	3.3%(6/180)	1.7%(3/180)	0%(0/180)	
≤ 12mm	96.4%	99.4%	3.4%(7/206)	1.9%(4/206)	0%(0/206)	
≤ 15mm	99.4%	98.9%	5.8%(14/243)	4.1%(10/243)	0.4%(1/243)	
≤ 20mm	99.5%	97.2%	9.1%(27/298)	6.0%(18/298)	2.0%(6/298)	
≤ 30mm	99.2%	96.7%	9.9%(31/312)	6.7%(21/312)	1.9%(6/312)	
Tis	100%	100%	0%(0/130)	0%(0/130)	0%(0/130)	

Table. 1



Median follow-up time was 53.8 months. C-OS (5y), PFS (5y), frequency of Ly, V, NI in cT1mi (= PST with SC \leq 5mm) were 100%, 100%, 0%, 0% and 0%. In PST with SC \leq 10mm, those were 100%, 100%, 3.3%, 1.7% and 0%. In PST with SC < 30mm (= overall PST, n=312), those were 99.2%, 96.7%, 9.9%, 6.7% and 1.9% in table1. In cTis, C-OS (5y), PFS (5y), frequency of Ly, V, NI were 100%, 100%, 0%, 0% and 0%. And, in overall PST and T1a, b, c in ST, C-OS (5y) were 99.2%, 94.4%, 86.3% and 71.2%, and RFS (5y) were 96.7%, 86.2%, 76.6% and 62.9%. Among four groups, the differences were significant (p-value<0.0001/p-value<0.0001).

Conclusion:

cT1mi was equivalent to cTis and appropriate in prognosis and malignant behavior. However, even PST with SC < 30mm (= overall PST) had a better prognosis (99.2%) than cT1a, b, c in ST, so we could propose new category of cT1-PST.

Disclosure: No significant relationships.

Keywords: lung cancer, 8th TNM classification, staging, cT1mi

F-066

BLOOD AND LYMPHATIC VESSELS CONSTITUTE AN ESSENTIAL COMPONENT OF THE IMMUNE MICROENVIRONMENT AND ITS IMPACT ON NON SMALL CELL LUNG CANCER (NSCLC) CLINICAL OUTCOME

Federico Quaini¹, G. Armani¹, D. Madeddu¹, G. Mazzaschi¹, G. Bocchialini², F. Sogni¹, C. Frati¹,
 K. Urbanek³, B. Lorusso¹, A. Falco¹, C.A. Lagrasta¹, E. Quaini⁴, P. Carbognani², L. Ampollini²
 ¹Clinical and Experimental Medicine, University of Parma, Parma, Italy
 ²Thoracic Surgery Unit, University of Parma, Parma, Italy
 ³Experimental Medicine, Second University of Naples, Naples, Italy
 ⁴San Donato Hospital, Clinical Institute Sant'Ambrogio, Milan, Italy

Objectives:

Angiogenesis has been repeatedly implicated in cancer progression and treatment. Although blood and lymphatic vessels regulate lymphocyte trafficking and homing to neoplastic tissues their involvement in NSCLC immune contexture has not been fully elucidated. The recent success of immune checkpoint inhibitors prompted us to determine whether the number and distribution of vascular structures correlate with PD-1/PD-L1 immune checkpoint status differentially affecting the clinical outcome of NSCLC patients.

Methods:

Fifty Squamous Cell Carcinomas (SCC) and 42 Adenocarcinomas (ADC) histologic samples were immunohistochemically analyzed to detect blood capillaries (vWF), arteries (a-SMA) and lymphatic vessels (D2-40). Vascular density was computed considering intratumor, peritumor or distal localization. PD-1/PD-L1 immune checkpoint was investigated by the immunohistochemical assessment of: 1) neoplastic PD-L1 expression;2) PD-1pos cells and 3) PD-L1posto PD-1posnumerical ratio. Tissue data and clinical records were statistically analyzed.

Results:

Blood and lymphatic vessels were more numerous in ADC compared to SCC. The tissue distribution showed in both histotypes a decreasing gradient of vWFposcapillaries and venules from the distal throughout the invasive margin and neoplastic lung while D2-40pos lymphatic vessels increased from distal to the invasive margin to fade reaching the neoplastic core. In addition, double vWFpos/D2-40posvessels increased in neoplastic areas, indicating inflammatory phenotypic changes in tumor lymphatics. Lymphangiogenic structures had an impact on clinical outcome (average OS 30.7 months) since patients with higher OS had a nearly 2-fold lower vascular density compared to cases with an OS below the average. NSCLC with high PD-L1 score displayed lower blood and lymphatic vessels density while high number of PD-1pos infiltrating lymphocytes was associated with increased lymphangiogenic structures. Interestingly, patients with high PD-L1pos/PD-1posratio together with vascular rarefaction had more than one year gain in OS compared to NSCLC with low PD-L1pos/PD-1posratio and prominent vascularity.



Conclusion:

The number and localization of blood and lymphatic vessels may affect the clinical outcome of NSCLC by shaping the PD-1/PD-L1 centered immunecontexture.

Disclosure: No significant relationships.

Keywords: immune contexture, PD-1/PD-L1 immune checkpoint, NSCLC

F-067

PULSATIONS OF ARTERIES CAN BE FELT THROUGH THE FIRST ENDOSCOPIC GRASPERS WITH REALTIME HAPTIC FEEDBACK

Michel Vleugels, C. Alleblas, B. Nieboer *O/g, UMCN Nijmegen, Malden, Netherlands*

Objectives:

For the purpose of restoring the sense of touch in endoscopic surgery a new grasper with real time haptic feedback was developed (Force Reflecting Operative Instrument: FROI). During endoscopic surgery tissue recognition is predominantly based on visual perception, since haptic perception is hampered due to the mechanical characteristics of the graspers. Currently, tissue is squeezed until the tip will practically not close further. On that moment the blocking of the handle will give the sensation that the surgeon has something between the tip of the grasper. While the perception of the tissue properties of arteries and veins might be of ultimate importance in complicated procedures like thoracic-vascular procedures. The aim of this study was to evaluate the potential of the FROI to enable surgeons to detect arterial pulsations and differentiate arteries from veins.

Methods:

This was a sub-experiment of an animal study using the live porcine model. A multispecialty group of endoscopic surgeons were requested to palpate arteries and veins and were requested to attempt to detect pulsation of arteries more deeply situated into tissue with both a conventional grasper and the FROI. Procedures were videotaped and a performance scores of each instrument was calculated by means of a 6-point Likert scale ranging from 0 to 5 questioning whether the instrument enabled detection of arterial pulse.

Results:

A significantly improved performance of the FROI (4.3; SD 1.0) compared to the conventional instrument (0.5; SD 0.7) was found (p < 0.001). Both small arterial pulsations and hidden arteries could be detected creating the possibility to differentiate between veins and arteries.

Conclusion:

The real time haptic feedback provided by the FROI enabled surgeons to detect arteries based on the sense of touch and differentiate between arteries and other structures. These features might eventually improve the performance during complex high risk operations.

Disclosure: M. Vleugels: founder patent holder **Keywords:** feeling, realtimehaptics, pulsations, hapticfeedback



ABSTRACTS

15:30 - 16:30 SESSION XIII: PULMONARY NEOPLASTIC II ROOM: INNSBRUCK

F-068

WITHDRAWN

F-069

CLINICAL AND RADIOLOGICAL CHARACTERISTICS TO PREDICT MALIG-NANCY OF MULTIPLE PULMONARY NODULES FOR PATIENTS UNDERGOING LUNG RESECTION

Kezhong Chen, H. Xing, F. Yang, X. Wang, J. Wang Thoracic Surgery, Beijing University People's Hospital, Beijing, China

Objectives:

Previous study has established clinical prediction model to estimate the probability of malignancy in solitary pulmonary nodule (SPN). Few studies focus on the preoperative diagnosis of multiple pulmonary nodules (MPNs). This study investigated predictors of malignancy of MPNs according to clinical and radiographic features in patients undergoing lung resection.

Methods:

We reviewed a cohort of consecutive patients with pulmonary nodules undergoing resection between January 2005 and December 2015. Clinical characteristics and radiological features were collected. The malignant possibility was calculated by the SPN model (P=ex/(1+ex),x=- $4.496+(0.07\times age)+(0.676\times diameter)+(0.736\times speculation)+(1.267\times famil)$ tumor history)-(1.615×calcification)-(1.408×border)) which has been published by our center.

Results:



of multiple pulmonary nodules



The consort diagram and histological distribution were shown in Figure 1. 574 cases were enrolled for analysis. 20.5% were false positive and 43.8% were false negative when using SPN model to predict malignancy of MPNs. A series of clinical and radiological characteristics were evaluated by univariate and multivariate analysis. The logistic regression showed the nodule diameter difference between the main nodule and the secondary nodule (OR, 1.062; 95% confidence interval (CI), 1.038-1.088), ipsilateral nodules (OR, 3.172; 95%CI, 2.078-4.841) and the estimation result of the main nodule (OR, 3.681; 95%CI, 2.299-5.895) were independent predictors of malignancy of the main nodule. For the secondary nodule, the nodule diameter difference (OR, 1.022; 95% CI, 1.008-1.037), bilateral nodules (OR, 3.84; 95%CI, 2.311-6.382) were independent predictors. The area under the receiver operating characteristic curve for the main nodule was 0.781(95% CI, 0.740-0.822) and 0.801(95% CI, 0.756-0.846) for the secondary nodule.

Conclusion:

The identification of MPNs on CT scans for surgical patients is a common occurrence. This is the first study to investigate the predictors of malignancy of MPNs. SPN prediction model cannot estimate MPNs alone. Combining clinical features with SPN prediction model could contribute to identify the malignancy of MPNs.

Disclosure: No significant relationships.

Keywords: diagnosis, surgery, multiple pulmonary nodule, lung cancer

F-070

SURGICAL INTERVENTION FOR GROUND GLASS DOMINANT LESIONS: WATCHING OR SURGERY OUTRIGHT?

Mariko Fukui, K. Suzuki, T. Matsunaga, K. Takamochi, S. Oh General Thoracic Surgery, Juntendo University School of Medicine, Tokyo, Japan

Objectives:

Resection or watching? The management of persistent ground glass opacity (GGO) on computed tomography (CT) remains controversial. We investigated the relationship between clinical behavior and pathological invasiveness in GGO dominant tumor.

Methods:

Among resected 1762 lung cancers at our institute between 2010 and 2015, the following criteria was used for extracting cohort of the study: 1) adenocarcinoma histology, 2) tumor having 50% or more GGO on CT, 3) resection after at least three months follow up with CT. The patients were categorized into four groups: pure GGO with or without changes, and part-solid tumor with or without changes. The relationship between clinical behavior and pathological invasiveness was investigated. Predictors of growing GGO are also examined.

Results:

There were 250 patients selected for the study: pure GGO with changes (G-C group; n = 35), pure GGO without changes (G-N group; n = 118), part-solid tumor with changes (S-C group; n = 20), part-solid without changes (S-N group; n = 78). The ratio of invasive adenocarcinoma was 0.53 in G-N group, 0.89 in G-C group, 0.86 in S-N group, and 0.90 in S-C group. There was significant difference between G-C group and G-N group (p < 0.001). However there were no significant differences between G-C group, S-C group and S-N group. A Univariate analysis revealed that the predictors of size up or increase the consolidation in preoperative follow up were age, smoking index, and the presence of solid part. A multivariate analysis revealed that the predictor was age (OR=1.04, p=0.021).

Conclusion:

Surgery for part-solid lesions can be deferred until those lesions demonstrate changes in size or density. The pathological results of pure GGO with changes were equivalent to those of part-solid nodules. Therefore, even for pure GGO lesions, follow up of the lesions is necessary especially in elderly patients.

Disclosure: No significant relationships. **Keywords:** GGO, CT change, pathology



THE USEFULLNESS OF PERCUTANEOUS LIPIODOL MARKING FOR LUNG RESECTION: EXPERIENCE WITH 594 MARKINGS IN 354 OPERATIONS

Daishiro Kato¹, J. Shimada², M. Simomura³, K. Terauchi⁴, H. Tunezuka², S. Okada², T. Furuya², M. Inoue² ¹Surgery, Kyoto Prefectural University of Medicine, Kyoto, Japan ²Division of Thoracic Surgery, Department of Surgery, Kyoto Prefectural University of Medicine, Kyoto, Japan ³General Thoracic Surgery, Ayabe City Hospital, Kyoto, Japan ⁴Surgery, Nara City Hospital, Nara, Japan

Objectives:

Recently, opportunities to consider excision of impalpable lesions has been increasing. This is corresponded by using markings for partial lung resection or anatomical excision, but the latter causes a larger loss of lung, making surgery hesitant because of the invasion. Also, the usage of coloring matters and markings are effective when removing lesions that are near the visceral pleura, but it cannot guide the removal of lesions that have a deeper location, including margins. For these reasons, our group has conducted lipiodol marking: injecting lipiodol under a computed tomography (CT)-fluoroscopy guide near the lesion.

Methods:



From May 2006 to October 2016, 354 patients underwent CT-guided lipiodol marking operations. Before operation, we injected 0.1-0.5 ml of lipiodol for one marking, and during surgery checked and resected the lipiodol-marked lesions under X-ray fluoroscopy. 41% of the cases underwent multiple markings, with the maximum of six markings in one operation.

Results:

We successfully performed lipiodol markings on 83 nodules of lung cancer showing ground glass nodule, 44 nodules of advanced primary lung cancer, 499 nodules of metastatic tumor, and 95 nodules of benign lesions. The proportion of malignant lesion is 84% in all lesions, and 84.6% in lesions under 5mm or less in diameter. The most common complication was pneumothorax (60.7%), with a chest tube being required in 10.6% of all cases. However, no other complication in need for treatments was acknowledged, and neither was air embolism. All patients were operated as planned and are discharged without major complication. Half-years cumulative radiation exposure for operators and assistant operators was 0.2 mSv and 0.0 mSv. respectively.

Conclusion:

Preoperative percutaneous lipiodol marking was safely used in operation, and is a reliable technique for the detection and resection of impalpable and invisible small-sized lung nodules.

Disclosure: No significant relationships. Keywords: lipiodol marking, surgery, lung resection



PROGNOSTIC IMPACT OF PATHOLOGIC MICROSCOPIC LYMPHOVASCULAR INVASION IN COMPLETELY RESECTED EARLY STAGE NON-SMALL CELL LUNG CANCER (NSCLC): IMPLICATION TO THE T DESCRIPTOR

Sumin Shin, Y.S. Choi, J.H. Cho, H.K. Kim, J. Kim, J.I. Zo, Y.M. Shim Thoracic and Cardiovascular Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Republic of Korea

Objectives:

The prognostic significance of microscopic lymph vascular invasion (MVI) in Non-Small Cell Lung Cancer (NSCLC) remains controversial. The aim of this study is to investigate the effect of MVI in the recurrence free survival (RFS) for early stage NSCLC and determine the implication of MVI to the T descriptor.

Methods:

Between 2008 and 2012, a total of 1,236 eligible patients with pathologic T1-2aN0 NSCLC who underwent complete resection with systematic lymph node dissection without induction treatment were included the study. Patients were categorized as six groups according to combination of pathologic T stage and the presence of MVI [T1a/MVI (-), T1a/MVI (+), T1b/MVI (-), T1b/MVI (+), T2aMVI (-), T2aMVI (+)]. RFS were estimated using Kaplan-Meier methods and the log-rank tests. The Cox proportional hazard model was used to assess independent effect of MVI for RFS.

Results:

MVI was observed in 346 patients (28%), incidence of MVI was gradually increasing according to T stage [p<0.001, T1a; n=83(19.3%), T1b; n=100 (27.4%), T2a; n=163 (37%)] Estimated 5-year RFS in patients with pT1a/MVI (+) was consistent with those of patients with pT2a/MVI (-) (72.8 vs. 70.4%, p=0.994). Also, RFS in patients with pT1b/MVI (+) was comparable consistent with those of patients with pT2a/MVI (+) (59.0 vs 54.3%, p=0.174). In multivariable analysis adjusting clinical variables including age, sex, histology, differentiation and type of surgery, MVI(+) groups showed significantly worse prognosis compare to those of MVI(-) groups (Table1).

Table 1. Multivariate analysis for recurrence free survival according to pathologic T stage and MVI							
Hazard Ratio (95% CI) p-value							
T1a/MVI(-)	1 (reference)	0.000					
T1a/MVI(+)	2.67 (1.54 – 4.63)	0.009					
T1b/MVI(-)	1.82 (1.16 – 2.84)	< 0.001					
T1b/MVI(+)	3.77(2.33 - 6.11)	< 0.001					
$T_{20}/MVI()$	2.48(1.62, 2.78)	< 0.001					
$T_2a/WV(-)$	2.46(1.02 - 5.78)	< 0.001					
1 2a/1VI V I(+)	4.08 (3.00 - 7.10)						

Conclusion:

This study demonstrated that MVI was a significant prognostic factor for survival in the completely resected pT1-T2a NSCLC. MVI could be considered additional T descriptor in the future revision of the TNM system for NSCLC.

Disclosure: No significant relationships.

Keywords: TNM staging, outcomes, non-small cell lung cancer



CONCOMITANT MUTATIONS OF DRIVER GENES IN NON-SMALL CELL LUNG CANCER: PREVALENCE AND CLINICAL RELEVANCE

Yang Yang¹, W. Yin¹, A. Sihoe², G. Jiang¹

¹Department of Thoracic Surgery, Tongji University Affiliated Shanghai Pulmonary Hospital, Shanghai, China ²Department of Surgery, The University of Hong Kong, Hong Kong, China

Objectives:

While mutations of driver genes in Non-Small Cell Lung Cancer (NSCLC), including EGFR, KRAS and PIK3CA, are well known, concomitant mutations in individual patients were thought to be rare. This study aimed to analyze the prevalence of concomitant mutations in NSCLC and the phenotypic characters of affected patients.

Methods:

Consecutive patients receiving curative-intent surgery for primary NSCLC at a quaternary-referral university teaching hospital from January 2013 to October 2016 were recruited. Patients receiving any pre-operative anticancer therapies, and those with recurrent or metastatic disease were excluded. All patients had mutation detection of lung cancer driver genes at the hospital laboratory which has received full score in quality control by the European Molecular Genetics Quality Network (EMQN). All clinical data were recorded three times by three physicians to ensure the accuracy.

Results:

A total of 9709 patients were recruited. Their mean age was 61.2 years (Range: 12-91). Of these patients, 5322 (54.8%) were male. Histologically, 6959 (71.7%) specimens were lung adenocarcinomas. In total, EGFR, KRAS, PIK3CA, ROS1, BRAF and RET gene mutations as well as EML4-ALK rearrangements were detected in 5350 (55.1%) patients. Concomitant mutations of these genes occurred in 203 (2.1%) patients. Female patients accounted for 109 cases (53.7%). The most frequent combination was concomitant EGFR and PIK3CA mutations (62 patients, 0.6%). Patients with concomitant EGFR and PIK3CA mutations and those with concomitant KRAS and PIK3CA mutations had higher prevalence of lymph node metastases (21.0% and 25.0% respectively, P<0.05) (Table 1). Table 1 The clinical characteristics of lung cancer patients with concomitant mutations of driver genes

	EGFR+	EGFR+	EGFR+	EGFR+	EGFR+	KRAS+	KRAS+	KRAS+
	KRAS	BRAF	ALK	ROS1	PIK3CA	BRAF	ALK	ROS1
Age								
<30	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<40	2.78%	0.00%	1.64%	6.67%	1.61%	0.00%	0.00%	0.00%
<50	8.33%	0.00%	9.84%	20.00%	1.61%	0.00%	0.00%	0.00%
<60	22.22%	40.00%	34.43%	20.00%	32.26%	0.00%	25.00%	100.00%
<70	41.67%	40.00%	45.90%	33.33%	38.71%	0.00%	50.00%	0.00%
<80	22.22%	20.00%	8.20%	20.00%	22.58%	100.00%	25.00%	0.00%
<90	0.00%	0.00%	0.00%	0.00%	3.23%	0.00%	0.00%	0.00%
>90	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Gender								
Female	41.67%	60.00%	52.46%	66.67%	64.52%	100.00%	25.00%	100.00%
Male	58.33%	40.00%	47.54%	33.33%	35.48%	0.00%	75.00%	0.00%
Diameter of	of lesion (cm)						
0.0-1.0	8.33%	40.00%	8.20%	6.67%	6.45%	0.00%	25.00%	0.00%
1.1-2.0	16.67%	20.00%	9.84%	46.67%	32.26%	0.00%	0.00%	0.00%
2.1-3.0	11.11%	0.00%	13.11%	26.67%	30.65%	100.00%	0.00%	100.00%
3.1-4.0	8.33%	0.00%	0.00%	0.00%	14.52%	0.00%	0.00%	0.00%
4.1-5.0	0.00%	0.00%	0.00%	0.00%	8.06%	0.00%	25.00%	0.00%
5.1-6.0	0.00%	0.00%	0.00%	13.33%	0.00%	0.00%	0.00%	0.00%
6.1-7.0	0.00%	0.00%	1.64%	6.67%	4.84%	0.00%	0.00%	0.00%
7.1-8.0	0.00%	0.00%	0.00%	0.00%	1.61%	0.00%	0.00%	0.00%
8.1-9.0	0.00%	0.00%	0.00%	0.00%	1.61%	0.00%	0.00%	0.00%
9.1-10.0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
10.1-11.0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
>11.1	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Conclusion:

Concomitant driver gene mutations occur in a small but not insignificant proportion of patients with NSCLC. Certain combinations may be associated with more aggressive clinical behavior. Future studies are needed to assess whether detection of concomitant mutations may be useful in selecting patients for perioperative adjuvant therapy.

Disclosure: No significant relationships.

Keywords: KRAS gene, ROS1 gene, concomitant mutation, non-small cell lung cancer, prevalence, EGFR gene

OS NY HILD A JA . 1993 . SHOP

16:30 - 17:30 SESSION XIV: MIXED THORACIC III ROOM: TIROL

F-074

PECTUS PRESS IN THE NUSS PROCEDURE - A PILOT STUDY

<u>Jose Ribas Campos</u>¹, M. Tedde¹, A. Yamamura², M.C. Luzo², M. Scarci³ ¹Thoracic Surgery, Hospital das Clinicas, Sao Paulo, Brazil ²Occupacional Therapy, Hospital das Clinicas, Sao Paulo, Brazil ³Thoracic Surgery, University College London, London, United Kingdom

Objectives:

Evaluation of Pectus Press (PP) and pectus whistle on patients with pectus excavatum (PE) as initial and post-operative of the Nuss procedure for increase flexibility, correction of posture, preparation for surgical procedure, reduction of pain and prevention of bar displacement.

Methods:

Between August2015 / December 2016, 89 patients with PE were treated. On first visit patients received the equipment and oriented to follow a home exercise program. 36 (40.4%) underwent surgery. The main characteristics of the PP are: correction and preservation of posture avoiding thoracic kyphosis, shoulder anteversion and prominent costal flaring. All patients easily adapted to this single piece with axillary padding and the back rest rigid plastic. All parts have cushioned supports. We checked the correct size, position of thoracic supports and the pressure of shoulder straps on each visit (30-60 days). Valsalva maneuver with a pectus whistle and a program of exercises was started.

Results:

Better posture and more flexibility of the thorax were observed by patients and parents after three weeks including reduction of costal flaring in 73 (82%) that used the device for more than 12 hours/day, including nighttime use. In the first 30-60 days of post-operative period, it helped to reduce the pain and the possibility of bar bending. No bar displacement was observed in the operated group and less pain medication was prescribed after discharge from hospital.

Conclusion:

Treatment using orthotic and exercises for PE has been described (Haje Method). Pectus Press is a flexible low profile orthosis, a promising alternative and has shown to be a useful tool in the pre and post-operative periods of the Nuss procedure. It provides better posture, increase chest wall flexibility, less pain and no bar displacement in this pilot study. The success of treatment was directly linked to patient age, time and frequency of use of the device.

Disclosure: J.R. Campos: consultant of Johnson & Johnson Keywords: thoracoscopy, pectus excavatum, chest wall

F-075

THE COST/BENEFIT OF UNIDIRECTIONAL ENDOBRONCHIAL VALVES IMPLANT FOR MANAGEMENT OF PERSISTENT AIR-LEAKS: RESULTS OF A MULTICENTER STUDY

Alfonso Fiorelli¹, A. D'Andrilli², M. Anile³, R. Cascone¹, L. Occhiati¹, D. Diso⁴, F. Cassiano², C. Poggi³, M. Ibrahim², G. Cusumano⁵, A. Terminella⁵, G. Failla⁶, A. La Sala⁶, M. Bezzi⁷, M. Innocenti⁷, E. Torricelli⁷, F. Venuta⁴, E.A. Rendina², M. Santini¹, C. Andreetti² ¹Department of Cardio-thoracic Disease, Thoracic Surgery Unit, Second University of Naples, Naples, Italy ²Thoracic Surgery Unit, University La Sapienza, Sant'Andrea Hospital, Rome, Italy ³Thoracic Surgery Unit, University La Sapienza, Rome, Italy ⁴Thoracic Surgery Unit, University La Sapienza, Policlinico Umberto I Hospital, Rome, Italy ⁵Thoracic Surgery Unit, Hospital of Catania, Catania, Italy ⁶Endoscopic Unit, Civico Hospital, Palermo, Italy ⁷Endoscopic Unit, Hospital of Florence, Florence, Italy

Objectives:

Persistent air-leaks (PALs) are associated with increased morbidity, mortality and hospitalization costs. The treatment is challenging due to the poor ability of the diseased to heal. Recently, the implant of Endo-Bronchial Valves (EBVs) has been proposed as a minimally invasive treatment of PALs, but the high cost of the procedure and the poor diffusion of the technique remain the main drawbacks. Thus, we aimed at analyzing the cost-benefit of this procedure, an issue under-evaluated before.

Methods:

The data of all consecutive patients with PALs undergoing valve treatment in 6 Italian centers in the last 10-year were retrospectively reviewed. To assess the cost/benefit of the procedure we statistically compared the outcome of the procedure and hospitalization-cost before and after valves deployment. For this analysis, we considered the estimated *cost* per bed-*day* (Euros 650,00); per operating room hour (Euros 1.200); per valve (Euros 3.500,00-small valve and Euros 5.500,00-large valve); and per delivery catheter (Euros 400,00).

Results:

Sixty seven patients undergoing EBV treatment for PALs due to secondary pneumothorax (n=23), post-operative (n=36), iatrogenic (n=6), and traumatic (n=6) were included in the analysis. An earlier resolution of air-leaks (<0.0001) and faster discharge (<0.0001) were observed after valve implant. No mortality and morbidity related to procedure were seen. The total amount of the cost for PAL valve treatment including the cost of the valves, catheters, operating room hours, post-EBV hospitalization was similar to the hospitalization cost before EBV treatment (p=0.6).



Vari	iables	Values	Before EBV	After EBV	p*
Pati	ents	67			
Mal	e/Female	47/20			
Age	(years)	64 ± 13			
Co-	Morbidity				
	COPD	41 (57%)			
•	Cancer	9 (12%)			
•	Cardiovascular	8 (11%)			
•	Hyperthension	7 (10%)			
•	Diabetes	5 (7%)			
•	Systemic Rheumatic Disease	2 (3%)			
Cha	rlson Comoribidity Index score	4.7 ± 1.3			
ASA	physical status	2.6 ± 0.5			
Cau	ses of air-leaks				
•	Secondary Pneumothorax	23 (34%)			
•	Post-operative	36 (54%)			
•	latrogenic	6 (9%)			
•	Trauma	2 (3%)			
Loc	ation of air-leaks				
•	Right Upper Lobe	23 (34.3%)			
•	Middle Lobe	3 (4.4%)			
•	Right Lower Lobe	6 (9%)			
•	Left Upper Lobe	13 (19.4%)			
•	Culmen	4 (6%)			
•	Lingula	11 (16.4%)			
•	Left Lower Lobe	6 (9%)			
•	Right Upper + Middle Lobe	1 (1.5%)			
Nur	mber of valves used total / per patient	132/2±0.9			
•	Large	39(30%)/1.1± 0.3			
•	Small	93(70%)/2.1 ± 0.7			
Tim	e of the procedures (minutes)	49 ± 15			
Oth	er treatments		-Blood patch: 8 (12%) -Talc pleurodesis:11 (16.4%) -Pneumoperitoneum: 6 (9%) -None: 42 (62.6%)	-Blood patch: 3 (37.5%) -Pneumoperitoneum: 4 (50%) -Surgery: 1 (12.5%)	
Air-	leaks after EBV treatment				
•	Complete resolution	59 (88%)			
•	Moderate Reduction	6 (9%)			
•	Persistence	2 (3%)			
Dur	ation of air-leaks (days; median [IQR])	27 [8-57]	21 [12-29]	3 [1-14]	<0.0001
Tota	I Hospitalization (days; median [IQR])	29 [10-57]	21 [12-29]	5 [3-16]	<0.0001
Ren	noval of valves/ Times (days)	48 (71%)/134 ± 83			
Foll	ow-up (months-median[IQR])	31 [1-120]			
e	tool in the second second second		10 000 10 000 10 0001	10 000 140 040 44 000	0.000

Conclusion:

EBV deployment is a safe and effective procedure for management of PALs. Despite expensive, however the early resolution of PALs obtaining with valve implant assures a reduction of hospitalization cost that overcomes the initial cost for the acquisition of the valves.

Disclosure: No significant relationships.

Keywords: persistent air-leaks, bronchoscopic treatment, unidirectional endobronchial valves

F-076

LYMPHATICS-RELATED GENES ARE DOWN-REGULATED AT TRANSCRIPTION LEVEL IN NON-SMALL CELL LUNG CANCER

<u>Miroslaw Kozlowski</u>¹, O. Kowalczuk², W. Laudanski¹, W. Niklinska³, P. Dziegielewski¹, G. Lapuc¹, J. Kisluk², J. Niklinski²

¹Department of Thoracic Surgery, Medical University of Bialystok, Bialystok, Poland ²Department of Clinical Molecular Biology, Medical University of Bialystok, Bialystok, Poland ³Department of Histology and Embryology, Medical University of Bialystok, Bialystok, Poland

Objectives:

The role of the lymphatic system in lung cancer cell dissemination remains uncertain. To verify a possibility of lymphangiogenesis induction in Non-Small Cell Lung Cancer (NSCLC) we examined the expression at mRNA level of 15 well-known lymphatics-related genes, namely *VEGFC*, *VEGFD*, *VEGFA*, *VEGFR1/FLT1*, *VEGFR2/KDR*, *VEGFR3/FLT4*, *NRP2*, *ITGA9*, *FGF2*, *PROX1*, *FOXC2*, *LYVE1*, *PDPN*, *SYK* and *DSP*.

Methods:

The study was performed on 140 pairs of fresh-frozen surgical specimens of NSCLC crosssections and matched unaffected lung tissues derived from NSCLC stage I-IIIA patients. To evaluate gene mRNA level the real-time PCR method was used. Both relative expression in tumors and the difference in the expression between the tumor and normal tissue for each gene was analyzed respectively to patients' clinicopathological characteristics.

Results:

In the NSCLCs, mRNA level almost all analyzed genes was similar to (*VEGFA*, *SYK*, *PDPN* and *PROX1*) or significantly lower (*VEGFC*, *VEGFD*, *VEGFR3*, *VEGFR2*, *VEGFR1*, *LYVE1*, *ITGA9*, *FOX2*, *NRP2*, *FGF2*; *p*<0.001 for all) than that in matched normal lung tissues. Only a desmoplakin encoding gene DSP was upregulated (*p*<0.001). More significant gene down-regulation occurred in squamous compared with non-squamous histological type cancers. Strong correlations between mRNA levels of the particular genes was found, suggesting common patterns of their regulation. In most cases, no association was identified between the expression of the genes and patients' clinicopathological characteristics or survival.

Conclusion:

Our results are in contradiction to the hypothesis of lymphangiogenesis induction in NSCLC.

Disclosure: No significant relationships.

Keywords: non-small cell lung cancer, lymphangiogenesis, gene expression



ESOPHAGEAL ADENOCARCINOMA HAS A HIGHER RISK OF LYMPH NODE METASTASIS THAN SQUAMOUS CELL CARCINOMA: A PROPENSITY SCORE MATCHED STUDY

Yidan Lin

Thoracic Department, West China Hospital of Sichuan University, Chengdu, China

Objectives:

Adenocarcinoma and squamous cell carcinoma (SCC) are actually two different types of esophageal malignances. Controversy still exists in which histology type of esophageal cancer is more likely to have lymph node metastasis. This study tried to draw an objective description on this topic providing evidence for applying different therapeutic strategies for these two malignant entities.

Methods:

A retrospective analysis of patients who underwent radical esophagectomy with lymphadenectomy without preoperative treatment for pathologically and immunohistochemically diagnosed esophageal adenocarcinoma or SCC was conducted. Data was retrieved from "Esophageal Cancer Database of West China Hospital". Factors for analysis included age, gender, body mass index (BMI), pathologic findings, procedures of esophagectomy, and rate of lymph node metastasis. Propensity-score matched (PSM) analysis was conducted to eliminate the bias effects of confounding factors.

Results:

A total of 1204 patients (including 118 adenocarcinoma patients and 1086 SCC patients) were included for analysis. In the analysis of unmatched patients, adenocarcinoma had a significantly larger mean number of positive lymph node (P<0.001) and higher rate of lymph node metastasis (p<0.001) than SCC. However, other confounding factors such as surgical procedures, tumor location, pT stage, lymphovascular invasion also differed significantly between adenocarcinoma and SCC. In the analysis of 96 matched patients, those confounding factors were well matched. However, adenocarcinoma still had a significantly larger mean number of positive lymph node (P=0.003) and higher rate of lymph node metastasis (p=0.003) than SCC (table 1). Table 1. The baseline data of matched patients with adenocarcinoma or squamous cell carcinoma. Note: SD= standard deviation; BMI= body mass index; *: p<0.05.

Characteristics	Adenocarcinoma No. in group (%) (N=48)	Squamous cell car- cinoma No. in group (%) (N=48)	P value
Mean age \pm SD (years)	59.7 ± 6.7	60.8 ± 10.0	0.553
Gender			1.000
Male	42 (87.5)	42 (87.5)	
Female	6 (12.5)	6 (12.5)	
Mean BMI \pm SD (kg/m ²)	21.6 ±3.8	21.5 ±3.5	0.916
Esophagectomy			0.648
Sweet	41(85.4)	39(81.3)	
Ivor-Lewis	4(8.3)	6(12.5)	
McKeown	2(4.2)	3(6.3)	
Transhiatal	1(2.1)	0(0)	
Tumor location			0.935
Upper	1(2.1)	2(4.2)	
Middle	6(12.5)	5(10.4)	
Lower	21(43.8)	21(43.8)	
Esophagogastric junction	20 (41.7)	20(41.7)	
Tumor grade			0.598
G1	0(0)	1 (2.1)	
G2	18(37.5)	17(35.4)	
G3	30 (62.5)	30(62.5)	
pT stage			0.926
T1	1(2.1)	1(2.1)	
T2	6(12.5)	8(16.7)	
Т3	29(60.4)	29(60.4)	
T4	12(25.0)	10(20.8)	
Lymphovascular invasion			0.749
Yes	6(12.5)	5(10.4)	
No	42(87.5)	43(89.6)	
Mean number of lymph node dissected \pm SD	17.3 ±9.3	15.8 ±8.9	0.420
Mean number of positive lymph node \pm SD	4.5 ±4.9	1.8 ±3.3	0.003*
Lymph node metastasis			0.003*
Yes	36(75.0)	22(45.8)	
No	12(25.0)	26(54.2)	

Conclusion:

Esophageal adenocarcinoma has a higher risk of lymph node metastasis than SCC, which indicates different therapeutic modalities should be applied for theses two different malignant entities.

Disclosure: No significant relationships.

Keywords: lymph node metastasis, esophagus, adenocarcinoma, squamous cell carcinoma



RANDOMISED TRIAL TO EVALUATE THE BENEFICIAL EFFECTS OF AN UNSU-PERVISED POSTOPERATIVE PHYSICAL TRAINING PROTOCOL AFTER LUNG RESECTION: NEGATIVE RESULTS

Nuria M. Novoa, P. Esteban, N. Hernandez, M.T. Goméz Hernández, G. Varela General Thoracic Surgery, University Hospital of Salamanca, Salamanca, Spain

Objectives:

We investigate if unsupervised physical training protocol performed at home after lung resection improves exercise capacity and QOL three months after hospital discharge.

Methods:

Prospective, randomized, single-blind study on 58 NSCLC consecutive patients undergoing elective anatomical lung resection (no pneumonectomy) without induction chemotherapy. Patients were randomly allocated to control or experimental group. Experimental patients had to perform a standardized training program and fill a daily checklist to evaluate their compliance to the program. Control cases followed standard written instructions. Follow up: 1 and 3 months after hospital release. Exercise capacity was evaluated by a continuous incremental exercise up to exhaustion on a cycle ergometer and QOL was measured using 15D questionnaire. Recorded variables: demographics and adjuvant therapy; Preoperative, and postoperative at 1 and 3 months: FEV1%, DLCO%, 15D: QOL global and individual subscales, power at cycle ergometer (in watts). Variation in exercise capacity (δ -watt) was calculated in both arms at 3 months. A comparative analysis of QOL subscales was also performed between control and experimental groups and between individual preoperative and 3 months' postoperative data using non-parametric tests. Cutoff for relevant QOL differences was fixed at ±0.015.

Results:

31/58 cases were experimental. Mean age: 64.5 ± 11.1 years (36.2-82.2). No differences were found in age, weight, sex distribution, adjuvant treatment and pulmonary function between arms (p>0.1). 24 lobectomy in experimental vs 23 in the control arm. Lower decrease of exercise capacity, but not statistically significant, was found in the experimental arm, both in cases with and without adjuvant treatment (Figure 1). Exercise training had no influence on changes in any QOL subscale. In most cases, lower anxiety was recorded after surgery but no clear exercise-dependent pattern could be identified.

40 20 p=0.42 Delta Watts -20 40 p=0.19

Figure 1. Decrease of the exercise capacity at 3 months' after discharge (Delta Watts)

Conclusion:

A simple, unsupervised exercise protocol developed at home is not effective to improve the exercise capacity or QOL three months after minimally-invasive anatomical lung resection.

Disclosure: No significant relationships.

Keywords: postoperative exercise capacity, postoperative QOL, randomized trial, 15D questionnaire, unsupervised physical training protocol, anatomical lung resection;





PERIOPERATIVE AND LONG TERM EFFECTS OF COMPREHENSIVE PUL-MONARY REHABILITATION ON EXERCISE CAPACITY, POSTOPERATIVE OUTCOME AND QUALITY OF LIFE IN PATIENTS UNDERGOING LUNG RESEC-TION: A RANDOMISED CONTROLLED TRIAL GRANTED BY THE MINISTRY OF HEALTH

<u>Sara Tenconi</u>¹, C. Galeone¹, S. Fugazzaro², C. Rapicetta¹, R. Piro³, D. Formisano⁴ ¹Thoracic Surgery, IRCCS Arcispedale Santa Maria Nuova, Reggio Emilia, Italy ²Rehabilitation Unit, IRCCS Arcispedale Santa Maria Nuova, Reggio Emilia, Italy ³Respirology Unit, IRCCS Arcispedale Santa Maria Nuova, Reggio Emilia, Italy ⁴Statistical Unit, IRCCS Arcispedale Santa Maria Nuova, Reggio Emilia, Italy

Objectives:

Perioperative rehabilitation in patients undergoing lung surgery has been investigated in small, heterogeneous, non randomised series with short follow up. We are conducting a randomised controlled trial granted by the Ministry of Health to assess immediate and long-term effects of this intervention.

Methods:

We plan to enrol 140 patients with early stage lung cancer, randomised to comprehensive rehabilitation versus standard care [Table 1]. Primary aim is the effect on exercise capacity (6 minutes walking test); additional aims include improvement in pulmonary function, Quality of Life (Short Form12, pain and anxiety-depression questionnaires) and postoperative outcomes. Patients are assessed at baseline (T0), the day before surgery (T1), 30 day after surgery (T2) and 6 months after surgery (T3). The need for additional treatments is an exclusion criterion.

Preoperative Rehabilitation 14 sessions – 2/3 weeks	Postoperative Rehabilitation 39 sessions – 8 weeks
 <u>6 outpatient sessions</u> Aerobic training for 30-40 minutes on a cycle ergometer, with an intensity of 60-80% of their Workpeak Resistance training for lower and upper limbs and abdominal wall Breathing exercises including breathing patterns and PEP bottle training, incentive spirometry, Inspiratory Muscle Training One educational session on active lifestyle 	 15 outpatient sessions Aerobic training Muscular strength training Breathing exercises Groups Gymnastic: general mobilization and flexibility (3-4 patients together for 30 minutes, once a week) Scar massage
 8 home-based sessions Breathing exercises twice daily until surgery Aerobic training by walking with an intensity of 60%80% of Max Heart Rate, for at least 30 minutes daily. A training diary is used to record compliance to home training. 	 24 home-based sessions (three times per week) Breathing exercises Aerobic training by walking with an intensity of 60%80% of Max Heart Rate, for at least 30 minutes daily. A training diary is used to record compliance to home training.

Results:

To date we have enrolled 50 patients, 25 randomised to treatment. The two groups are similar for demographics and functional parameters at baseline (T0). So far, 50 patients had T0-T1 assessments and surgery, 44 reached T2 and 32 completed T3 evaluations. We performed interim analysis on the primary outcome and enrolment status: pre-operative rehabilitation significantly improved 6MWT (448.0 ± 72.3 mt vs 476.3 ± 86.7 mt; p=0.006). The impact on exercise capacity persists after surgery and comparison between the two groups shows a significant difference (462.8 ± 99.2 mt in treated patients vs 375 ± 82.9 mt in control group; p=0.009). We noticed that Forced Vital Capacity also improved in treated patients ($104.5\%\pm22.1$ vs $111.3\%\pm21.2$; p=0.003). Against and estimated 10% drop out, 12 patients were excluded after randomization (24%): five had unexpected lymph-nodal disease, two were unable to complete postoperative rehabilitation and five withdrew their consent.

Conclusion:

Interim analysis confirms that pulmonary rehabilitation improves exercise capacity. Although enrolment is progressing, we are currently experiencing a significant drop-out due to the actual incidence of lymph-nodal upstaging and the impact of surgery on the ability to exercise and ultimately the patients' compliance.

Disclosure: No significant relationships.

Keywords: lung cancer, rehabilitation, exercise, quality of life


WEDNESDAY, 31 MAY 2017 08:30 - 10:00 SESSION XV: VIDEO III ROOM: TIROL

V-080

NEW PARIETAL PLEURAL RELEASE TECHNIQUE FOR THE TREATMENT OF SPONTANEOUS PNEUMOTHORAX

Indrek Benno, T. Laisaar Thoracic Surgery, Tartu University Hospital, Tartu, Estonia

Objectives:

Surgical treatment of spontaneous pneumothorax includes, in addition to lung resection, mechanical or chemical pleurodesis. Common methods are parietal pleurectomy or talc pleurodesis, both resulting in tense pleural adhesions and potentially complicating future thoracic surgery. We developed a parietal pleural release technique, which ensures pleurodesis, yet avoids adhesions at the side of mediastinum. A video demonstrates the surgical technique.

Video description:

Two-port VATS access is created to the thoracic cavity. In the upper part of thorax parietal pleura is released from the chest wall between thoracic internal vessels and the sympathetic trunk. Thereafter, an incision is made into parietal pleural from thoracic internal vessels at the level of fourth intercostal space to the sympathetic trunk at the level of fifth intercostal space to form a pleural flap. The flap is transposed medially, so that the upper lobe will be in contact with either the chest wall without parietal pleura, or the external side of the parietal pleural flap. As mediastinal pleura stays in contact with the internal side of the parietal pleural flap, no dense adhesions should develop. In the case demonstrated in the video, wedge resection of the upper lobe apex was performed due to large bulla. At the end of the operation one chest tube was left in the pleural space. A 14-year old patient with recurrent spontaneous pneumothorax was operated on using the above-described technique. The operation lasted 40 minutes, postoperative pleural drainage 21 hours, and hospital stay one day.

Conclusions:

This novel pleural release technique in surgical treatment of spontaneous pneumothorax was feasible and had an excellent short-term outcome. It is likely that less adhesions with medias-tinum will develop with this technique, and thus future thoracic operation(s), if indicated, will be less impeded.

Disclosure: No significant relationships.

Keywords: release, technique, spontaneous, pneumothorax, pleural

V-081

PERFORMING A THORACOSCOPIC RIGHT UPPER LOBECTOMY AFTER AN INITIAL ANATOMIC PULMONARY RESECTION OF THE LOWER LOBE

Hitoshi Igai¹, M. Kamiyoshihara¹, R. Yoshikawa¹, F. Osawa¹, N. Kawatani¹, T. Ibe¹, K. Shimizu² ¹General Thoracic Surgery, Maebashi Red Cross Hospital, Maebashi, Japan ²Division of General Thoracic Surgery, Gunma University Hospital, Maebashi, Japan

Objectives:

Although it is difficult to redo an anatomical pulmonary resection on the ipsilateral side due to the adhesions or dense fissures caused by the initial anatomic pulmonary resection, a few reports describe surgical techniques to overcome the difficulty, especially with a thoracoscopic approach, which is considered less invasive than the alternative of a thoracotomy. Here, we focus on thoracoscopic right upper (RU) lobectomy after an initial anatomic pulmonary resection of the right lower lobe, and explain the nuances of performing it.

Video description:

We performed a thoracoscopic RU lobectomy after a lower lobectomy (Case 1, a 70-yearold male, disease: metastatic lung cancer, operation time: 260 minutes, blood loss: a small amount, duration of postoperative drainage: two days, morbidity: pneumonia) or lateral and posterior basal segmentectomy (Case 2, a-69-year-old male, disease: metastatic lung cancer, operation time: 270 minutes, blood loss: 100g, duration of postoperative drainage: 4 days, morbidity: none). The video presents the surgery for Case 1. First, the adhesions between the upper lobe and chest wall were detached. The fissure between the upper and middle lobes had fused. Therefore, we adopted a fissureless approach to avoid any postoperative air leakage or incidental injury to the pulmonary arteries while dissecting tissue at the fissure. With the upper lobe retracted posteriorly, the upper lobe vein and anterior pulmonary artery trunk to the upper lobe were divided. After dividing the upper lobe bronchus using a stapler, the ascending artery was divided. Finally, the dense fissure was divided using staplers. An intraoperative sealing test revealed no air-leakage.

Conclusions:

Thoracoscopic RU lobectomy after an initial anatomic pulmonary resection of the right lower lobe is safe and feasible. A fissureless technique is useful in such cases to avoid incidental injury of the pulmonary arteries at the fissure or any postoperative air leakage.

Disclosure: No significant relationships.

Keywords: thoracoscopy, right upper lobectomy, reoperation, fissureless technique



SUPERIOR SULCUS TUMOR RECURRED AFTER DEFINITIVE CHEMORA-DIOTHERAPY SUCCESSFULLY RESECTED WITH TRANS-MANUBRIAL AND PAULSON APPROACH

<u>Hiroyuki Ito</u>¹, H. Nakayama¹, T. Nagashima¹, J. Samejima¹, J. Osawa², A. Wada¹, M. Nito¹, K. Yamada², T. Yokose³

¹Department of Thoracic Surgery, Kanagawa Cancer Center, Yokohama, Japan ²Department of Thoracic Oncology, Kanagawa Cancer Center Hospital, Yokohama, Japan ³Department of Pathology, Kanagawa Cancer Center, Yokohama, Japan

Objectives:

Standard treatment for clinical N2 primary lung cancer is chemoradiotherapy. Salvage surgery for local recurrence after definitive chemoradiotherapy with sometime past will be one of good option because it means no distant metastases occurred even in N2 disease. Salvage surgery is difficult and risky, especially for superior sulcus tumor.

Video description:

Fifty one year old man, current smoker. Tumor of adenocarcinoma was located in apex of right upper lobe, clinical stage T3N2(#4R) M0 stage IIIA. Because of apparent N2, definitive chemoradiotherapy with 4 course of CDDP+VNR and sequential radiotherapy of 66Gy was given. The main tumor shrunk and #4R lymph node disappeared. Even maintenance chemotherapy was given, but 15 months later, CT and FDG-PET revealed regrowth of the tumor adjacent to subclavian artery and first and second rib. Recurrence was confirmed pathologically. Horner symptoms and sensory disorder o of the forearm started to appear. No distant and lymph node metastases were found. Initially, transmanubrial approach was made. Because tumor invaded first and second rib, third intercostal space was entered. Even #4R was shrunk by chemoradiotherapy, tissue around right innominate vain was stiff and hard to dissect. To obtain good exposure of right subclavian artery, right innominate vain was transected. After dissection of right subclavian artery, innominate vain was reconstructed using 10mm prostitute vessel. Once closed anterior wound, patient was set to left decvitus position. High posterolateral approach was made and entered into third intercostal space. First and second ribs were transected at the cost-transvers junction. Sympathetic nerve and Th1 brachoplexus nerve were also transected. Finally, hilum was transected and systemic lymph node dissection was performed. Operative time was 10 hours 24 minutes and blood loss was 1460 g.

Conclusions:

Postoperative course was uneventful and the patient was discharged at 11th postoperative day. Final pathological stage was T3N0M0. SST, even if recurred after definitive CRT, can be resectable with precise preoperative plan and intraoperative management.

Disclosure: No significant relationships.

Keywords: superior sulcus tumor, salvage surgery, definitive chemoradiotherapy, lung cancer

V-083

VIDEO-ASSISTED THORACIC DUCT LIGATION FOR MASSIVE CERVICAL CHYLE LEAK FOLLOWING THYROIDECTOMY WITH BILATERAL LYMPHAD-ENECTOMY

<u>Hicham Masmoudi</u>¹, G. Chambon², P. Thomas¹, X.B. D'Journo¹ ¹Thoracic Surgery, APHM-AMU North University Hospital, Marseille, France ²ENT Surgery, Caremeau Nîmes University Hospital, Nimes, France

Objectives:

Massive cervical chyle leak complicating thyroidectomy for cancer remains a challenging complication. Its ranges between 1 to 6.5 % depending of the extent of the neck dissection. Its management can be difficult with either medical or surgical treatment. When cervical chyle leak remains intractable despite optimal medical treatment and iterative revisional surgeries, thoracic duct ligation (TDL) seems to be a valid option but has been exceptionally reported in this indication. Herein, we report the case of a 42-year-old woman successfully treated by video-assisted thoracic surgery (VATS)-TDL for intractable high-volume cervical chyle leak following total thyroidectomy with bilateral lymphadenectomy for cancer.

Video description:

We performed a three-ports VATS technique through an anterior approach. The first step consisted in opening the posterior mediastinal pleura with an electrocoagulation hook between the oesophagus, the azygos vein and the descending thoracic aorta. The second step consisted in applying metallic clips to close it.

Conclusions:

When after optimal treatment, cervical chyle leak remains intractable even in the absence of associated chylothorax, TDL represents the most effective treatment option to stop chyle leakage at the neck level. TDL following head and neck surgery or after extent cervical lymph node dissection has been poorly reported. Usually, TDL is carried out through a right thoracotomy with substantial morbidity. VATS procedure is a safe and simple approach especially when the right thoracic cavity is free from any surgery or associated chylothorax. Anatomy of thoracic duct into the chest presents less variability unlike the neck making its closure much easier and efficient. The dissection of the posterior mediastinal pleura is relatively simple with a short duration of surgery and a short length of hospital stay. VATS-TDL is a safe, efficient and reproducible technique in case of high-volume intractable isolated cervical chyle leak after thyroidectomy with bilateral lymphadenectomy.

Disclosure: No significant relationships.

Keywords: thoracoscopic ligation, video-assisted thoracic surgery, thyroid neoplasm, thoracic duct, chyle leak





VIDEO ASSISTED THORACOSCOPIC SURGERY (VATS) RETRIEVAL OF BRON-CHIAL FOREIGN BODY

Navdeep Singh Nanda, B.B. Asaf, A. Kumar

Department of Thoracic Surgery, Sir Ganga Ram Hospital, New Delhi, India

Objectives:

To demostrate the feasibility of VATS in retrieval of bronchial foreign bodies

Video description:

The video demonstrates our technique of VATS in retrieval of foreign body using a three port technique. Involves the following steps - opening of the posterior mediastinal pleura, identification of the site of tear, maneuvring out the foreign body and repair of the bronchial tear. In our experience VATS retrieval of bronchial foreign bodies leads to excellent results and no morbidity.

Conclusions:

VATS retrieval of foreign bodies lodged in bronchus, not amenable to retrieval via bronchoscpic techniques can be safely obtained with VATS. The trick lies in proper patient positioing and exposure of the target anatomy. Outcome is excellent.

Disclosure: No significant relationships. **Keywords:** failed bronchoscopy, VATS, bronchial foreign bodies

V-085

THE REAMER-IRRIGATOR-ASPIRATOR (RIA) TECHNIQUE FOR MANUBRIO-STERNAL REPAIR

V. Naruka¹, Marco Nardini², J. Mcvie², J. Dunning²

¹School of Clinical Medicine, University of Cambridge, Cambridge, United Kingdom ²Cardiothoracic Unit, James Cook University Hospital, Middlesbrough, United Kingdom

Objectives:

Several options exist for the operative treatment of chronic sternal injury. These include bonegrafting and fixation with standard or locked plates. Autogenous iliac crest bone graft has been the gold standard to aid achievement of desired alignment and decrease non-union, however its risk associated with donor site morbidity have questioned its use. We describe this novel approach to repair sternal non-union. We adopted it in four cases of different aetiology (previous trauma or cardiac surgery).

Video description:

The RIA technique has the advantage to be simultaneously able to ream, irrigate and aspirate contents of the medullary canal with a single pass of the reamer. This prevents heat necrosis of the bone and reduces intramedullary pressure by aspiration of the marrow. The amount of bone graft procured is larger compared with iliac crest bone graft harvest. The 63 year old patient of this video had a mini Aortic-valve replacement in 2015 with post-operative unstable sternum. Imaging demonstrated a non-union of the manubrio-sternal joint. It was thought that rewiring would not be helpful. RIA bone marrow harvest approach was proposed and performed as shown. The first step is the assessment of the defect by midline incision down to the sternum. Six samples are sent for microbiologic culture as per BOS guidelines. Afterwards we move on the femour to perform bone marrow. Finally, we implant the marrow in the defect and cover it with two sternal plate. The patient was discharged without complication, the sternum is stable at four weeks follow up, with plates in good position on chest x ray.

Conclusions:

This method has not been previously described in the literature. It necessitates further investigations in order to offer a chance of cure to patients affected by chronic non-union of the sternum.

Disclosure: No significant relationships.

Keywords: manubrio-sternal repair, non healing sternum, reamer irrigator aspiratory (RIA)



COMPLICATIONS AFTER SURGICAL TREATMENT FOR SUBGLOTTIC TRA-CHEAL STENOSIS

Joaquin Pac Ferrer, L. Hernández Pérez, R. Rojo Marcos, J.C. Rumbero Sánchez, N. Uribe-Etxebarria Lugariza-Aresti, U. Jimenez Maestre, M. Lorenzo Martín, M. Fernando Garay, J. Rosado Rodríguez, C. Loidi López, J. Casanova Viúdez *Thoracic Surgery, Cruces University Hospital, Barakaldo, Spain*

Objectives:

A woman, 78 years old, was diagnosed of carcinoma of the faryngo-esophageal junction 22 years ago, treated with radical chemo-radiotherapy. After that time she started suffering from progressive dyspnea and she was diagnosed of tracheal stenosis affecting the cricoid cartilage. After initial surgery, she needed to be re-operated due to anastomotic dehiscence.

Video description:

After initial surgery that included resection of anterior arch of the cricoid cartilage and the first three tracheal cartilages were resected, the patient was decannulated after 48 hours with normal breathing and phonation. Nevertheless, we realized a lack of cicatrization at the stoma level, and a few days later, a partial dehiscence of the anterior tracheal suture line. Finally the patient was reoperated together with the plastic surgery service, performing a left supraclavicular flap of 15 x 7 cm and 180° rotated to cover the defect. The patient was discharged cannulated after the second intervention but she was asymptomatic for respiratory distress. Pathologic results showed only inespecific inflammatory changes. The patient was posteriorly decannulated and up to now remains asymptomatic

Conclusions:

Surgical treatment of a subglottic tracheal stenosis can be performed safely in high-selected patients. When complications appear, the work of a multidisciplinary team is essential.

Disclosure: No significant relationships.

Keywords: airway, tracheal surgery, complications

V-087

ANATOMICAL PULMONARY SEGMENTECTOMY OF LEFT DORSOBASAL SEGMENT BY DIVIDING SEGMENTAL PLANE WITH VIDEO-ASSISTED THO-RACIC SURGERY

<u>Yasuji Terada</u>, T. Gomyoda, S. Ota, S. Tamari, T. Yoshimura Respratory Disease Center, Kyoto Katura Hospital, Kyoto, Japan

Objectives:

The pulmonary segmental plane running between two adjacent pulmonary segments consists of a very thin layer of connective tissue through which the pulmonary vein also runs. To perform anatomical segmentectomy, the segmental plane needs to be divided. We present the operation of anatomical pulmonary segmentectomy of left dorsobasal segment (S10) by VATS.

Video description:

Before the operation, the locations of vessels and bronchi are confirmed by three-dimensional CT. Four-cm mini-thoracotomy skin incision is made in the fifth intercostal space on the anteroaxillary line. After complete exposure of the pulmonary artery and bronchus, the dorsobasal artery (A10) is ligated and resected to reduce bleeding from the divided segmental plane. From the interlober space, the segmental plane is dissected from the point of divergence of the segmental bronchi to the visceral pleura using a dull-tipped forceps or suction tube. The dissection is performed bluntly with confirmation of the pulmonary vein, and the visceral pleura is divided using electrocautery. From the mediastinum, inferior border of superior vein (V6) and dorsal border of leterobasal vein (V9) is dissected, then the dissection of segmental plane of left dorsobasal segment (S10) is completed. Electrocautery is used for dividing the visceral pleura, and a stapler is used only for the pulmonary vein and bronchus. Major air leaks are closed by suturing, whereas minor leaks can be covered with coagulated blood and do not require closure.

Conclusions:

Anatomical segmentectomy with correct division of the segmental plane does not require hemostasis or closure of air leaks, and no fibrin glue or biomaterial sheets may be necessary.

Disclosure: No significant relationships. **Keywords:** VATS, segmentectomy, lung cancer



RIGHT SLEEVE PNEUMONECTOMY VIA UNIPORTAL VIDEO ASSISTED THO-RACOSCOPIC APPROACH

Chenlu Yang, F. Abu Akar, L. Jiang

Department of Thoracic Surgery, Shanghai Pulmonary Hospital, Medical School of Tongji University, Shanghai, China

Objectives:

Although well described throughout the literature, sleeve pneumonectomy and carinal surgery are rarely performed challenging procedures usually performed by highly experienced thoracic surgeons. The feasibility of this procedure is also limited by the difficulty of intraoperative airway management, patient's general condition and pulmonary functional status in addition to the extension of tumor growth. Tumors involving the carina or tracheobronchial angle were traditionally approached through thoracotomy, sternotomy or combined incision. In The era of video assisted thoracoscopic surgery's revolution and with the improvement of the surgical instruments and surgeon's experience, recent reports on multi-portal and uniportal carinal surgery were published in the literature.

Video description:

Here we present a video documented a case of squamous-cell carcinoma arising from the right main bronchus partially involving the carina. The video describes our technique to resect this tumor by performing a right sleeve pneumonectomy via uniportal video assisted thoracoscopic approach.

Conclusions:

Uniportal VATS is a feasible approach to perform complex operations as carinal resections and sleeve pneumonectomy. This type of procedures should be performed by experienced hands in high volume centers.

Disclosure: No significant relationships. **Keywords:** carinal, sleeve pneumonectomy, uniportal VATS

MONDAY, 29 MAY 2017 12:30 - 13:30 E-POSTERS 1 ROOM: E-POSTER AREA

P-101

BIOCHEMICAL PREDICTION OF EFFICIENCY OPERATION OBLITERATING THE PLEURAL CAVITY IN RECURRENT PNEUMOTHORAX

K. Gestkov¹, Kristina Piontkovskaya², Y. Chikinev²

¹Thoracic Surgery Chair, Russian Medical Academy of Postgraduate Education, Moscow, Russian Federation

²Surgery Chair, Novosibirsk Medical University, Novosibirsk, Russian Federation

Objectives:

High rates of pneumothorax recurrence (PR) after videothoracoscopy are still demanding alternative approaches in evidence based justification of the most effective and safe method between pleurectomy (PE) and mechanical pleurodesis (MP). Pathology model of idiopathic pulmonary fibrosis provides us measurable markers of fibrosis with localization in pleural cavity, which may help to choose optimal surgical method of PR prevention.

Methods:

We investigated II-8, ICAM-1, VEGF, TGF- β 1 levels and correlations between VEGF and TGF- β 1 in bronchoalveolar lavage (BAL) and plasma in patients with recurrent pneumothorax after videothoracoscopy and PE or MP. 88 patients with PR were included. All the tests were performed before surgery, on the 1st and 3rd days. Samples of blood plasma were taken under aseptic conditions from the radial artery and BAL via bronchoscopy, immediately after collection were transported to the laboratory at room temperature, centrifuged at 2800 rev/min. Plasma and BAL were measured both for VEGF and TGF- β 1 and its correlations. Plasma was measured additionally for II-8 and ICAM-1.

Results:

The data is presented as M±SD. The mean levels of VEGF and TGF- β 1 are significantly higher in PE vs MP group (1113.97±64.79 pg/mL vs 1028,55±34.15 pg/ml and 16.1±0.8 vs 8.3±0.7 ng/ml, p< 0.005) with r=-0.516 correlation between TGF- β 1 of blood plasma and TGF- β 1 of BAL in PE (p=0.18). There were observed strong correlation between blood plasma VEGF and BAL TGF- β 1 in MP group (r=0.772, p=0.05). The mean levels of ICAM-1 and II-8 are significantly higher in PE vs MP group (286.66±39.33 vs 236.66±26.33 ng/ml and 15.3±2.3 vs 14.8±1.8 pg/ml; p< 0.001). In the postoperative period, all the markers in blood plasma are elevated in both groups with higher levels in PE group. Risk ratio for pneumothorax recurrence pleurodesis vs pleurectomy was 3,0719 [CI 0,8998;10,4872], one-tiled test of Fisher, p=0,0496.



Conclusion:

Pleurectomy has less risk of PR, than mechanical pleurodesis, performed in patients with recurrent pneumothorax during videothoracoscopy. Higher levels of inflammatory and profibrotic cytokines and specific correlations of their concentrations in blood plasma and BAL indicate better pleural adhesion in postoperative period after pleurectomy, which may influence on the risk of PR diminishing.

Disclosure: No significant relationships.

Keywords: recurrent pneumothorax, biochemical predictors, quality of adhesions

HARMONIC TECHNOLOGY (ULTRACISION) FOR RESECTING ENDOTRA-CHEAL SUPRASTOMAL GRANULOMAS: A NEW ENDOSCOPIC TECHNIQUE

<u>Alfonso Fiorelli</u>¹, D. Di Natale¹, M. Pierdiluca¹, M. Accardo², R. Mastromarino¹, G. Messina¹, A. Reginelli³, S. Cappabianca³, R. Franco², M. Santini¹

¹Department of Cardio-thoracic Disease, Thoracic Surgery Unit, Second University of Naples, Naples, Italy

²Department of Pathology, Second University of Naples, Naples, Italy ³Radiology Unit, Second University of Naples, Naples, Italy

Objectives:

Endotracheal suprastomal granulation is a late complication of tracheostomy leading to bleeding and decannulation failure. Endoscopic resection with laser or cold instruments is the standard treatment. We proposed a new technique as the endoscopic resection of supraglottic granulomas using Harmonic Technology (Ultracision).

Methods:

The feasibility of the procedure was firstly tested in an experimental ex-vivo model. A standard tracheostomy was performed in a pig trachea; 2-3 ml of silicon was inserted into the tracheal mucosa above the stoma to mimick endolumen granulation; the lesion was then resected using Nd: YAG laser or ultracision. The damage of laser and ultracision resection was graded according radiologic (ranging from score 1-hypointense to score 3-hyperintense T2-signal at MRI) and histologic (ranging from score 1-coagulative to score 3-necrotic tissue) criteria and statistically compared. Then, the procedure was applied in five consecutive patients with suprastomal granulations to control recurrent bleeding (n=2) or to allow decannulation (n=3). Ultracision was inserted in standard tracheoscopy; the jaws of the instrument grasped the granulation; the energy was applied with resection of lesions.

Results:

In ex-vivo model, 25 samples for each groups were evaluated. Ultracision compared to laser showed no significant differences in radiological (1.4 ± 0.65 versus 1.6 ± 0.69 ; p=0.788) and histological damage (1.28 ± 0.54 versus 1.56 ± 0.69 ; p=0.375). In all cases, a restore of tracheal patency was obtained. Decannulation was succesfully performed in all three cases while in the other two the hemostasis was assured. No recurrence of granulations were seen (median follow-up: 11 months).





Conclusion:

Ultracision may be a valuable strategy for resecting suprastomal granulomas. It needs no-special training or measures to protect against the laser beam. Larger series studies should corroborate our results.

Disclosure: No significant relationships.

Keywords: endoscopic treatment, harmonic technology (Ultracision), endotracheal suprastomal granulomas

MOVING TOWARDS AN ULTRA-FAST TRACK MINIMALLY INVASIVE LOBEC-TOMY PATHWAY: A FEASIBILITY ANALYSIS

Juan Carlos Molina Franjola¹, T. Dumitra¹, J. Mouhana¹, I. Nicolau¹, D. Mulder¹, L. Ferri¹, J. Spicer²

¹Thoracic Surgery, McGill University Health Centre, Montreal, QC, Canada ²Department of Surgery, Division of Thoracic Surgery, 1650 Cedar Avenue, Rm L9-520, Montreal, QC, Canada

Objectives:

Video-assisted thoracoscopic (VATS) lobectomy has demonstrated several benefits over open surgery. The purpose of this study was to assess the feasibility and safety of short admissions for VATS lobectomy prior to implementation of an ultra-fast track pathway.

Methods:

All patients who underwent VATS lobectomy at our institution from 2006 to 2016 were retrospectively reviewed(n=205). Clinicopathologic variables were collected along with peri-operative outcomes. Patients discharged within 24 hours (LOS1) were compared to those discharged on day two or later (LOS2+). Statistical analysis was done using Chi-square and t-test. Multivariate logistic regression was performed to identify predictors of LOS.

Results:

Peri-operative 30-day mortality for our cohort was 0% and the major complication rate (Clavien-Dindo III-IV) was 8.3%. The median LOS was 3 days(IQR=2). 102(48.9%) patients were discharged within 48 hours, and 34 within 24 hrs (LOS1=16.6%). None of these patients required re-admission (5.3% for LOS2+, p=0.17). LOS1 proportion increased in 2016 compared with previous years (25.8% vs. 12.05%, p=0.05). Few differences existed between LOS1 and LOS2+ patients (Table 1). Univariate analysis demonstrated that LOS2+ was associated with longer chest tube duration(OR=4.9, 95%CI 0.2-11.2, p<0.001), higher clinical(OR=13.5, 95%IC 1.8-101, p=0.011) and pathological stage(OR=3.9, 95%CI 1.1-13.5, p=0.035), presence of surgical complications(OR=25.2, 95%IC 3.4-188, p=0.002), operative time > 120min(OR=2.4, 95%IC 1.05-5.4, p=0.04), and air leak(OR=26, 95%IC 1.6-438, p=0.02). Age, pulmonary function, smoking status and distance from the treatment center were not associated with LOS. On multivariate analysis, longer chest tube duration (OR=2.9, 95%IC1.1-8.1, p=0.04), clinical stage (OR=7.7, 95%IC 1.3-45, p=0.02), and surgical complications (OR=17.9, 95%IC 1-327, p=0.05) were significant predictors of LOS2+.

Conclusion:

A significant proportion of patients can be discharged safely within 24 hours after VATS lobectomy. The only preoperative factor that predicts shorter LOS in our cohort is clinical stage. Thus, an ultra-fast track VATS lobectomy pathway is feasible and safe.

Disclosure: No significant relationships.

Keywords: fast-track, minimally invasive surgery, VATS, lobectomy



SINGLE-PORT THORACOSCOPIC MINIMALLY INVASIVE ESOPHAGECTOMY FOR ESOPHAGEAL CANCER: BETTER FOR PATIENTS AND MORE COMFORT-ABLE FOR SURGEONS

Yong Yuan, L. Liu, L. Chen

Department of Thoracic Surgery, West China Hospital of Sichuan University, Chengdu City, China

Objectives:

To explore the feasibility and the potential advantages of single-port thoracoscopic esophagectomy over multi-port minimally invasive approach.

Methods:

For single-port thoracoscopic esophagectomy, the patient was placed in left lateral-prone position and a 4-cm incision through the 4th-5th intercostal space was taken on the postaxillary line. The 10-mm camera and two or three surgical instruments were used for the VATS esophagectomy and radical mediastinal lymph node dissection. The camera position was different for the upper and lower mediastinal regions. Mobilization of stomach was conducted via multipleport laparoscopic approach. Cervical end-to-side anastomosis was completed by hand-sewn procedures. A propensity-matched comparison was made between the single-port and four-port thoracoscopic esophagectomy groups.

Results:

From 2014 to 2016, 56 matched patients were analyzed. There was no conversion to open surgery or operative mortality. The use of single-port thoracoscopic esophagectomy increased the length of operation time in comparison with using multiple-port minimally invasive technique (mean, 257 vs. 216 min, p = 0.026). The time taken for thoracic procedure in the single-port group was significant longer that in the multi-port group (mean, 126 vs. 84 min, p < 0.001). There were no significant differences between groups in the number of lymph nodes dissected, blood loss, \complications or hospital stay (p > 0.05). In single-port thoracoscopic group, the pain in the abdomen was more severe than that in the chest (p = 0.042). The pain scores for postoperative day one and day seven were significantly lower in the single-port group as compared with multiple-port group (p=0.038 and p < 0.001), a similar trend could be seen for the pain score on postoperative day three (p=0.058).

Conclusion:

Single-port thoracoscopic esophagectomy contributes to reducing postoperative pain with an acceptable increase of operation time, which does not compromise surgical radicality and has similar short-term postoperative outcomes when compared with multiple-port minimally invasive approach.

Disclosure: No significant relationships.

Keywords: single-port, minimally invasive esophagectomy, esophageal cancer

SHORT-TERM INPATIENT-BASED HIGH-INTENSIVE PULMONARY REHABILI-TATION FOR LUNG CANCER PATIENTS: IS IT FEASIBLE AND EFFECTIVE?

Kun Zhou, Y. Lai

Thoracic Surgery Department, West China Hospital of Sichuan University, Chengdu, China

Objectives:

This study was conducted to develop a preoperative in-hospital short-term rehabilitation program for surgical lung cancer patients, and investigate its feasibility, potential cost benefit and effectiveness on outcome measures including reduction of postoperative pulmonary complications (PPCs) and postoperative length of stay.

Methods:

A seven-day inpatient-based high-intensive rehabilitation regimen was performed between March 1, 2014 and June 30, 2015. It was combined with inspiratory muscles training (IMT) and aerobic endurance training and was tested in an enriched cohort study with 939 lung cancer patients undergoing lobectomy in a regional thoracic unit.

Results:

Finally, 939 patients were stratified into pulmonary rehabilitation (PR) group (n=197) and non-PR group (n=742), according to whether they performed the 7-day preoperative in-hospital systematic rehabilitation. Lower incidences of total PPCs (17.3%, 34/197 vs. 24.8%, 184/742, P=0.026), pneumonia (11.2%, 22/197 vs. 17.3%, 128/742, P=0.024) and atelectasis (6.6%, 13/197 vs. 12.3%, 91/742, P=0.038) were found in the PR group, compared with in NPR group. Also, a multivariable analysis of risk to PPCs, atelectasis and pneumonia, revealed the PR intervention was the independent risk factor of the occurrence of the PPCs (OR=0.64, 95%CI: 0.42 to 0.98, P=0.038) and atelectasis (OR=0.49, 95%CI: 0.26 to 0.91, P=0.024).

Conclusion:

The study showed the effectiveness of this systematic and high-intensive pulmonary rehabilitation combining IMT and aerobic exercise in reductions of the length of stay and occurrence of PPCs without increase in in-hospital cost, suggesting the potential of this rehabilitation pattern as a practicable strategy performed preoperatively in the patients receiving lung cancer lobectomy.

Disclosure: No significant relationships.

Keywords: short-term rehabilitation program, lung cancer, postoperative pulmonary complications



SURVIVAL ANALYSIS IN PATIENTS WITH CSTAGE-I SUSPECTED NON SMALL CELL LUNG CANCER (NSCLC) REFERRED TO SURGERY BUT ALSO CANDI-DATE FOR STEREOTACTIC BODY RADIATION THERAPY (SBRT)

<u>Herbert Decaluwe¹</u>, J. Moons¹, M. Lambrecht², W. De Wever³, J. Coolen³, C. Deroose⁴, L. Depypere¹, D. Van Raemdonck¹, P. De Leyn¹, C. Dooms¹

¹Thoracic Surgery, University Hospitals Leuven, Leuven, Belgium ²Radiation Oncology, University Hospitals Leuven, Leuven, Belgium ³Radiology, University Hospitals Leuven, Leuven, Belgium ⁴Nuclear Medicine, University Hospitals Leuven, Leuven, Belgium

Objectives:

Tissue confirmation prior to Stereotactic Body Radiation Therapy (SBRT) is recommended in current guidelines, but is incomplete in many studies. Survival is often compared with surgery in Non-Small Cell Lung Cancer (NSCLC) confirmed surgical series. Our objective is to evaluate the difference in overall survival (OS) if patients with other diagnosis than NSCLC or upstaging are included in an intention-to-treat (ITT) fashion.

Methods:

This is a retrospective analysis of a single institution, prospectively handled database from 2005-2015. Patients with cT1-2aN0M0(TNM8) suspected NSCLC (cStage-I NSCLC) after PET-CT and referred to surgery after multidisciplinary discussion based on high-risk probability were included. Central lesions 0-2cm from main/lobar bronchi were excluded (n=34), as they are not standard SBRT candidates.

Results:

Three hundred and eighty one patients were included. Median preoperative risk probability for malignancy based on Herder's risk model was 92% (Q1:81%, Q3:96%; IQR 15). Tissue confirmation was not available prior to surgery in 77% (n=295/381). The 5-year overall survival rate (5Y-OS) was 71.7% in ITT. OS was significantly better in the preoperative unconfirmed vs. tissue confirmed group (Fig1A; HR 1.52; 95%CI 1.03-2.26, p=0.04) with 5Y-OS 74.1% vs 62.8%, respectively. Multivariable analysis showed that lesions without preoperative tissue confirmation were smaller (>2cm:OR2.56, 95%CI 1.52-4.32, p<0.0001), more located in outer 1/3 (OR0.49, 95%CI 0.29-0.85, p=0.011), non-squamous (OR0.44, 95%CI 0.26-0.74, p=0.002), not-NSCLC (OR 3.44, 95%CI 0.79-15.01, p=0.1) and had lower pTNM stage (OR0.56, 95%CI 0.31-0.99, p=0.047) compared to preoperative tissue confirmed lesions. In 9% of the patients (n=34/381) the pulmonary lesion was other than NSCLC at final pathology (20 benign;11 carcinoid;2 SCLC;1 MALT), while in 17% of the patients (n=64/381) cStage-I changed to a higher pathologic stage (pStage-I+). The 5Y-OS rate was 97.1%, 72.1%, and 55.1% for not-NSCLC (n=34), cStage-I/pStage-I (n=283) and cStage-I/pStage-I+ (n=64), respectively (Fig1B).

Conclusion:

Survival analyses of cStage-I NSCLC patients potentially treatable by SBRT should account for the impact of absent tissue confirmation (including 9% other pathology) and pTNM upstaging.



Disclosure: No significant relationships.

Keywords: NSCLC, cStage-I, surgery, SBRT, intention to treat, benign



PATHOLOGICAL INVASIVE COMPONENT SIZE IS ASSOCIATED WITH LYMPH NODE METASTASIS AND PROGNOSIS IN LUNG ADENOCARCINOMA

<u>Kento Fukumoto</u>¹, H. Matsui¹, Y. Taniguchi¹, T. Saito¹, Y. Uemura², K. Tsuta², T. Murakawa¹ ¹Thoracic Surgery, Kansai Medical University Hospital, Hirakata, Japan ²Surgical Pathology, Kansai Medical University Hospital, Hirakata, Japan

Objectives:

The T descriptor of resected Non-Small Cell Lung Cancer (NSCLC) will be defined by invasive component size in the forthcoming eighth edition of the TNM classification. We aimed to identify whether pathological invasive component size and/or total tumour size are associated with lymph node metastasis.

Methods:

Since 2011, we started to assess invasive component size, as well as total tumour size, at the time of pathological evaluation for resected NSCLC. We retrospectively reviewed our institutional database and 204 cases of completely resected pathological stage I-IIIA NSCLC were analysed. Patients who underwent neoadjuvant chemotherapy were excluded. We analysed receiver operating characteristic curves and area under the curve (AUC) values for pathological invasive component size and total tumour size for predicting lymph node metastasis. The AUC values were compared using DeLong's test. The recurrence-free survival curves were estimated according to the Kaplan–Meier method, and the differences between groups were compared using the log-rank test.

Results:

The AUC values for pathological invasive component size and total tumour size were 0.744 and 0.708, respectively (p = 0.0678). In the 134 adenocarcinoma cases, the AUC values for pathological invasive component size and total tumour size were 0.816 and 0.752, respectively (p = 0.0158), and pathological invasive component size showed a better correlation with lymph node metastasis than total tumour size. Stratification according to pathological invasive component size showed good discrimination of recurrence-free survival curves.

Conclusion:

In patients with lung adenocarcinoma, pathological invasive component size, rather than total tumour size, is more strongly associated with lymph node metastasis. This result supports the validity of using pathological invasive component size for the T descriptor in the TNM classification.

Disclosure: No significant relationships.

Keywords: lymph node metastasis, lung adenocarcinoma, pathological invasive component size, non-small cell lung cancer

THE VALUE OF DUAL-ENERGY COMPUTED TOMOGRAPHY (CT) DERIVED IODINE MAPS FOR THE ASSESSMENT OF REGIONAL LUNG PERFUSION IN CHRONIC THROMBOEMBOLIC HYPERTENSION (CTEPH) COMPARED TO LUNG PERFUSION SCINTIGRAPHY (V/Q SCAN) USING COMPUTED TOMO-GRAPHIC PULMONARY ANGIOGRAPHY AS A STANDARD OF REFERENCE

M. Eberhard¹, <u>Isabelle Opitz</u>², M. Zaatar², W. Weder², S. Ulrich³, T. Frauenfelder¹ ¹Department of Diagnostic Radiology, University Hospital Zurich, Zurich, Switzerland ²Thoracic Surgery, UniversitätsSpital Zürich, Zürich, Switzerland ³Division of Pulmonology, University Hospital Zurich, Zurich, Switzerland

Objectives:

To assess the usability of dual-energy CT pulmonary angiography (DECT) derived iodine maps for assessment of regional perfusion in patients with chronic thromboembolic hypertension (CTEPH) compared to lung perfusion scintigraphy (V/Q Scan) using CT pulmonary angiography as standard of reference.

Methods:

From September 2013 to July 2016 12 patients (female n=6, median age = 71 years) with known CTEPH underwent DECT and lung perfusion scintigraphy for preoperative evaluation. Iodine maps were derived from DECT and axial and coronal reformations were interpreted. Lung scintigraphy and DECT were assessed segment-wise by two radiologists independently using a 4 point Likert scale (0=normal; 3=no perfusion). Vascular involvement assessed on CT pulmonary angiography served as standard of reference, using a 3 point Likert score (0=normal vessels; 3=occlusion of major segmental vessels). Interobserver agreement between readers (Cohen's kappa) and diagnostic accuracy were calculated. Correlations of scores were compared using Spearman's rho. P<.05 was considered statistically significant.

Results:

Inter-observer agreement was higher for DECT compared to scintigraphy (kDECT=.65 vs. kScinti=.45). Analysis of ROC curves showed that AUC for detection of perfusion deficiency were .727 and .711, respectively for DECT with p<.001 for both and .581 and .576 for scintigraphy with p=.037 and .044, respectively. DECT showed higher sensitivity and specificity compared to lung perfusion scintigraphy for the detection of low perfused lung segments (sensitivity: 74% vs. 69%; specificity: 69% vs. 44%). Ratings of DECT and CT pulmonary angiography showed moderate (r=.46; p<.001) and ratings of scintigraphy and CT pulmonary angiography showed weak correlation (r=.23; p=.038).



Conclusion:

In our study lung perfusion, assessed with DECT shows higher accuracy and is more robust compared to lung scintigraphy for assessment of regional lung perfusion defects in patients with CTEPH. Double- energy CT pulmonary angiography holds promise to replace lung perfusion scintigraphy for the future.

Disclosure: No significant relationships.

Keywords: CTEPH, dual-energy CT, V/Q scan, iodine maps

HOW LONG SHOULD WE FOLLOW-UP PATIENTS WITH STAGE I NON-SMALL CELL LUNG CANCER AFTER CURATIVE RESECTION? AN ANALYSIS OF 300 CASES USING FLEXIBLE PARAMETRIC MODELING OF TUMOR RECURRENCE AND MORTALITY RATES

Jörg Lindenmann¹, N. Fink-Neuboeck¹, M. Fediuk¹, E. Gschwandtner¹, A. Strießnig¹, P. Swatek¹, M. Pichler², F. Posch², E. Stacher-Priehse³, U. Anegg¹, A. Maier¹, F. Smolle-Jüttner¹ ¹Division of Thoracic and Hyperbaric Surgery, Medical University of Graz, Graz, Austria ²Division of Oncology, Department of Internal Medicine, Medical University of Graz, Graz, Austria ³Institute of Pathology, Medical University of Graz, Graz, Austria

Objectives:

Among patients with Non-Small Cell Lung Cancer (NSCLC), those with stage I disease have a comparably favorable prognosis. However, there exists no uniform consensus about the ideal duration of routine follow-up for early detection of postoperative tumor recurrence. The aim of this observational historical cohort study was to obtain guidance on a reasonable duration of aftercare in this patient population.

Methods:

The complete data of 300 consecutive patients with pathologic stage I NSCLC, resected curatively between 2005 and 2015, were evaluated retrospectively.

Results:





Among these patients, the median age was 66 years (60.1-72.2), the majority was male (n=187; 62%). Lobectomy was performed in 284 cases (95%), stage IB disease was detected in 106 cases (35%), adenocarcinoma was evident in 191 patients (64%). During a median follow-up of 3.2 years there were 59 recurrences (19.7%) and 38 patients died from cancer (12.7%), 35 died from other causes (11.7%). In competing risk analysis, the cumulative incidences of recurrence at 1, 5, and 10 years after surgery were 7% (95%CI: 4-10), 27% (20-34), and 36% (26-47). Corresponding risks of death-from-cancer were 2% (1-4), 16% (11-21), and 30% (19-41), and of death-from-other-causes were 3% (2-6), 12% (8-18), and 42% (24-59, Fig. 1A). Flexible parametric modeling revealed that the rates of recurrence and death-from-cancer peaked after around one and three years after surgery, respectively, but remained constantly elevated well beyond 5 years (Fig. 1B). After five postoperative years, the rate of death-from-other-causes exceeded the rates of recurrence.

Conclusion:

In patients with stage I NSCLC, rates of recurrence and death-from-cancer are persistently elevated beyond five years after surgery. This supports the concept that these patients may benefit from structured long-term aftercare. The absolute risk of death-from-other-causes was similarly high as the risk-of-death-from-cancer, highlighting the importance of appropriate management of co-morbidity in these patients.

Disclosure: No significant relationships.

Keywords: non-small cell lung cancer, survival, follow-up

NON-INTUBATED VERSUS INTUBATED VIDEO-ASSISTED THORACOSCOPIC THYMECTOMY FOR MYASTHENIA GRAVIS: IMPACT ON SHORT-TERM PATIENT OUTCOMES

Long Jiang¹, L. Depypere², J. Liu¹, Z. Lan¹, D. Xiao¹, J. Liu¹, H. Yang³, G. Rocco⁴, J. He¹ ¹Thoracic Surgery, The First Affiliated Hospital of Guangzhou Medical University, Guangzhou, China,

²Thoracic Surgery, University Hospital Leuven, Leuven, Belgium ³Anesthesiology, The First Affiliated Hospital of Guangzhou Medical University, Guangzhou, China ⁴Thoracic Surgery, National Cancer Institute, Naples, Italy

Objectives:

Myasthenia gravis (MG), an autoimmune disease, has been confirmed to gain beneficial effects of thymectomy. However, its unpredictable response to muscle relaxants and volatile anesthetic agents may result in muscle weakness and subsequently in myastenic crisis postoperatively. The aim of this study was to determine the differences of surgical outcomes after non-intubated video-assisted thoracoscopic thymectomy (NIVATT) compared with intubated video-assisted thoracoscopic thymectomy (IVATT) in patients with MG

Methods:

Data from all minimally invasive thymectomy procedures performed at our institute between January 2009 and June 2016 were collected. Patient characteristics, perioperative results and treatment outcomes between NIVATT and IVATT groups were compared.

Results:

Using the same inclusion/exclusion criteria, thirty-six patients underwent NIVATT and sixtyeight underwent IVATT. Patient characteristics between the two groups were comparable, with the exception of more hypertension in the IVATT group (p=0.04). Operating time (NIVATT: 143.1±42.6min vs. IVATT: 150±58.7min, p=0.53) and lowest oxygen saturation (NIVATT: 96.8±2.4% vs. IVATT: 98±2.8%, p=0.1) during the procedure did not differ significantly, but peak CO2 level at the end of expiration was significantly higher in the NIVATT group (NIVATT: 41.4±3.5mmHg vs. IVATT: 37±4.3mmHg, p<0.01). Furthermore, postoperative complications (NIVATT: 3 vs. IVATT: 34, p<0.01), incidence of postoperative myasthenic crisis (NIVATT: 1 vs. IVATT: 14, p=0.02) and postoperative prolonged tracheal intubation (NIVATT: 1 vs. IVATT: 18, p<0.01) were significantly lower in the NIVATT group. The length of hospital stay was also significantly shorter in the NIVATT group (NIVATT: 6.8 ± 2.7 day vs. 8.8 ± 4.7 day, p=0.02).

Conclusion:

According to our single institution retrospective data, NIVATT is a feasibale and safe procedure in MG patients. The procedure might be beneficial by reducing postoperative myasthenic crisis and postoperative prolonged tracheal intubation. Further prospective research is needed.

Disclosure: No significant relationships.

Keywords: video assisted thoracoscopic thymectomy, myasthenia gravis, non-intubated surgery



HIGHER-THAN-EXPECTED RESIDUAL LUNG VOLUME CHANGES AMONG PATIENTS WHO UNDERWENT ANATOMICAL LUNG RESECTIONS

<u>Nobuyuki Yoshiyasu</u>¹, F. Kojima¹, E. Hoshino², Y. Ishikawa¹, T. Bando¹ ¹Thoracic Surgery, St. Luke's International Hospital, Tokyo, Japan ²Center for Clinical Epidemiology, St. Luke's International University Graduate School of Public Health, Tokyo, Japan

Objectives:

Predicted postoperative pulmonary function has been used as a reference to determine surgical indications using a segment method. However, recent studies have reported that actual measured lung function values after operation exceeded the predicted values, which might reflect the changes in residual lung volume. This study aimed to examine the difference between actual measured postoperative total lung volumes (apoTLV) and predicted postoperative total lung volumes (ppoTLV) on the basis of three-dimensional (3-D) computed tomography (CT) volumetry.

Methods:

We retrospectively evaluated 66 patients who underwent segmentectomy (38) or lobectomy (28) for lung cancer over the past two years for whom thin-slice CT scans were performed within three months preoperatively and 6–12 months postoperatively. The patients were categorized into 5 groups by the number of resected segments. Preoperative and postoperative total lung volumes were measured semi-automatically using image analysis software with reconstructed 3-D images. PpoTLV was also calculated according to the following equations: preoperative total lung volume× (19–N [the number of resected pulmonary segments])/19. We used the Kruskal-Wallis test to assess the differences between apoTLV and ppoTLV in the five categories.

Results:

We found no significant differences in the patient characteristics among the five groups; preoperative pulmonary function, medical conditions (COPD, UIP, CPFE, and asthma), smoking history (pack·years), and postoperative complications. ApoTLV was higher than ppoTLV regardless of the number of resected segmentations (Table 1). The difference increases with the increase in the number of resected segmentations, particularly in the patients with four or five segments resected. A statistically significant difference was observed only between the 1- and 5-segment groups (p<0.05).

A resected segments.					
the number of resected segments	1	2	3	4	5
the numberof patients	25	11	13	4	13
pre TLV (ml)	4322	3948	4685	4746	4565
apoTLV (ml)	4360	3732	4348	4625	4083
ppoTLV (ml)	4094	3532	3956	3747	3384
the difference (ml)	265	200	392	878	700

Table 1) Mean total lung volume in three dimensional volumetric analysis by the number of resected segments.

Abbreviations : pre TLV: preoperative total lung volumes, apoTLV: actual measured postoperative total lung volumes, ppoTLV: predicted postoperative total lung volumes.

Conclusion:

On the basis of 3-D CT volumetry, postoperative residual lung volumes became larger than predicted by calculation regardless of the number of resected lung segments. The difference between actual measured and predicted values may increase as resected segmentations grow in number.

Disclosure: No significant relationships.

Keywords: postoperative residual lung volume, three-dimensional volumetry, anatomic resection



NATIONWIDE SURVEY ON THE DEVELOPMENT OF ROBOT-ASSISTED THO-RACIC SURGERY IN FRANCE

Jean-Marc Baste¹, M. Durand², N. Santelmo³, R. Vidal⁴, H. Portes⁵, M. Grigoroiu⁶, C. Pricopi⁷, A. Loundou⁸, C. Doddoli⁹ ¹General and Thoracic Surgery Unit, Rouen University Hospital, Rouen, France ²Thoracic Unit, Private Hospital of Antony, Antony, France ³Thoracic Department, Nouvel Hopital Civil, University Hospital of Strasbourg, Strasbourg, France ⁴Thoracic and Vascular Unit, Hôpital Européen, Marseille, France ⁵Department of Thoracic and Cardio-vascular Surgery, Hôpital Cardiologique, Lille, France ⁶Thoracic Surgery, IMM, Paris, France ⁷HEGP, Paris, France ⁸Ea 3279 Methodology Unit, Aix-Marseille Université, Marseille, France ⁹Thoracic Department, Hopital Nord, Marseille, France

Objectives:

Robotic technology is increasingly reported as a valuable tool in minimally invasive surgery. To date, there are no nationwide data available regarding its development in thoracic surgery. Our objective was to report the development of robot-assisted thoracic surgery and peri-operative outcomes in France.

Methods:

Retrospective analysis of data extracted from the French national thoracic surgery database (EPITHOR) from 2008 to 2016.

Results:

An overall 1,481 procedures using Da Vinci® robots were reported by 41 thoracic surgeons in 22 public or private hospitals, including 12 procedures in 2008-2010, 68 in 2011-2012, 337 in 2013-2014 and 1064 in 2015-2016. Mean [range] age of patients was 59.7 [11-100] years; male to female ratio was 1.2; mean ASA score was 2.1 [1-4]. Procedures included 1,080 lung resections (73.6%), 183 thymectomies (12.5%), 157 mediastinal resections (10.7%) and 47 miscellaneous (3.2%). Median [Q1-Q3] operating times were 140 [110-180] minutes for lung resections, 110 [70-140] minutes for thymectomies and 110 [70-150] minutes for mediastinal resection. Conversion to thoracotomy was reported in 102 patients (6.7%) including 2 patients who died of uncontrolled hemorrhage. Thirty-one patients (2.1%) had to be re-operated. Post-operative complications developed in 409 patients (28.3%). Most frequent complications were Clavien-Dindo category 1 or 2, with air leakage (n=93, 6.3%), urinary retention (n=44, 3%), pulmonary infection (n=43, 2.9%), arythmia (n=41, 2.8%), atelectasis (n=39, 2.6%), pleural effusion (n=11, 0.7%), recurrent paralysis (n=10, 0.7%) and chylothorax (n=10, 0.7%). Mean post-operative hospital stay was 6.3 [0-91] days. A total of 40 patients died within 3 months of surgery (2.7%).

Conclusion:

Robotic technology is increasingly reported in thoracic surgery in France. It appears to be safe and efficient with few severe post-operative complications. In the near future, a comparison between robotic-assisted and conventional video-assisted thoracic surgery is warranted in terms of patient benefits, logistics and costs.

Disclosure: J. Baste: Proctor for Intuitive Surgery, Medtronic and Ethicon

M. Durand: Proctor for Intuitive Surgery

N. Santelmo: Proctor for Intuitive Surgery

C. Doddoli: Proctor for intuitive Surgery

Keywords: peri-operative outcomes, thoracic surgery, robotic, lung resection, mediastinal resection, national survey



THE IMPACT OF EARLY ORAL FEEDING ON HIGH-MOBILITY GROUP BOX CHROMOSOMAL PROTEIN 1 AFTER MCKEOWN MINIMALLY INVASIVE ESOPHAGECTOMY FOR CANCER

<u>Yin Li</u>, H. Sun, X. Liu, R. Zhang, Z. Wang, S. Liu, Y. Zheng, X. Chen *Thoracic Surgery, Henan Cancer Hospital (The Affiliated Cancer Hospital of Zhengzhou University), Zhengzhou, China*

Objectives:

The aim of current study was to investigate the impact of early oral feeding (EOF) on highmobility group box chromosomal protein 1 (HMGB-1) after McKeown minimally invasive esophagectomy (MIE) for cancer.

Methods:

This study was based on a single centre randomized controlled trial in Henan Cancer Hospital (NCT01998230). Patients with esophageal cancer who received McKeown MIE were randomly allocated to a group starting EOF on postoperative day (POD) one and another group that remained nil by mouth until seven days after surgery (late oral feeding, LOF group). A total of 280 patients were included in this study. We chose 46 patients including 25 patients in EOF group and 21 patients in LOF group to test HMGB-1. Serum HMGB-1 concentrations were measured by enzyme-linked immunosorbent assay. Blood samples were obtained before, and at POD1, POD3 and POD5. HMGB-1 changes between the two groups and within groups were evaluated.

Results:

EOF group and LOF group exhibited similar preoperative HMGB-1 level. The level of HMGB-1 increased significantly at POD1 and POD3 compared with preoperative level (all P < 0.01). At POD5 the level of HMGB-1 decreased compared with POD1 and POD3. At PODs 3 and 5, the level of HMGB-1 in the EOF group was significantly lower than those in the LOF group (all P < 0.05).

Conclusion:

Compared to conventional rehabilitation program, EOF could decrease HMGB-1 after McKeown MIE.

Disclosure: No significant relationships.

Keywords: esophageal cancer, high-mobility group box chromosomal protein 1, early oral feeding

NODAL STATUS IN PERIPHERAL CT1N0 LUNG CANCER IN THE UICC $8^{\rm TH}$ STAGING SYSTEM

Yuichi Sakairi, T. Iwata, K. Tanaka, T. Fujiwara, H. Wada, H. Suzuki, T. Nakajima, M. Chiyo, I. Yoshino

Department of General Thoracic Surgery, Chiba University Graduate School of Medicine, Chiba, Chuo-ku, Japan

Objectives:

In peripheral small lung cancer, several clinical trials of radical sublobar resection are now on going in Japan and the eligibility was decided by the ratio of total tumor diameter including ground glass area and consolidation area in computed tomography. In the new staging system of ver.8, ground glass opacity (GGO) implies non-invasiveness. In this study, the relationship between the new tumor T- and N-factor in peripheral type 3cm or less Non-Small Cell Lung Cancer (NSCLC) was examined to considering the condition of candidates for sublobar resection.

Methods:

From January 2013 to July 2016, 389 patients were diagnosed as cT1 NSCLC. From them, nonperipheral type, patients with induction treatments, cN1/2, and those without nodal dissection were excluded and finally 256 patients were enrolled in this study. All the clinical parameters were collected prospectively, and analyzed retrospectively.

Results:

Nodal metastases were found in 32 (12.5%) patients. In cT0/1is/1mi/1a/1b/1c (N=0/12/8/39/113/84) under UICC 8th edition, pN1 and pN2 were observed in 0/0/1/1/8/7 and 0/0/0/0/6/9, respectively. No nodal metastases were detected in T1is, and only one nodal metastasis was revealed in each T1mi (#11s) and T1a (#12l). T1is/mi/a cases showed significantly less frequent nodal metastasis than T1b/c cases (3.4% vs. 15.2%, p=0.0068). Regardless the size, tumors with GGO (n=146) showed significantly less frequent nodal metastasis (5.7% vs. 17.2%, p=0.0042).

Conclusion:

In UICC 8th edition, a sublobar resection would be a therapeutic option for cT1is/mi/a N0 NSCLC. Lobectomy and nodal dissection are still indicated for cT1b/c, however, sublobar resection may be applicable for cT1b/c with GGO if an additional condition is identified.

Disclosure: No significant relationships.

Keywords: sublobar resection, nodal metastasis, lung cancer, UICC8



CIRCULATING ENDOMETRIAL CELLS – NEW TOOLS FOR DIAGNOSIS OF PNEUMOTHORAX IN PATIENTS WITH INAPPARENT ENDOMETRIOSIS

V. Bobek¹, I. Kiss², V. Maly³, R. Lischke¹, <u>Jan Schutzner¹</u>, I. Stanek³, K. Kolostova² ¹Department of Surgery, University Hospital Motol, Prague, Czech Republic ²Department of Lab Genetics, FNKV, Prague, Czech Republic ³Department of Thoracic Surgery, MN UL, Usti nad Labem, Czech Republic

Objectives:

Catamenial pneumothorax (CP) is a rare condition when lung collapse occurs due to endometrial lesions of the pleura in the period of 72 hours before or after menstruation. The etiology is still not known and besides anatomical hypothesis (endometrial tissue travel via fenestrations in the diaphragm), hormonal (ruptures of alveoli due to prostaglandin), coelomic metaplasia or transformation of pleural epithelium is an additional theory of endometrial transportation through lymphatic/vascular embolization. This hypothesis could be studied by detection and further analyzation of circulating endometrial cells (CECs) in patients with spontaneous pneumothorax. In research we first present association among CP, endometriosis and possibility of diagnosis from peripheral blood.

Methods:

Thirteen reproductive age women were examined and treated at the thoracic unit of our hospital in the last nine months with spontaneous pneumothorax and histologically proven endometriosis of the pleura. The objective of this study was to isolate and cultivate CECs from peripheral blood of these patients by size based separation method (MetaCell). These cultures were later investigated under fluorescent microscope

Results:

CECs were detected in all the 13 patients with CP. Part of the patients underwent the surgery with recession of bullae with histopathological detection endometriosis.

Conclusion:

Positive isolation of CECs in patients with CP could bring more evidence to the microembolization theory and also to the pathophysiology of endometriosis itself. Differential diagnosis of CP should be associated with the endometriosis and request the cooperation with gynecologist for treatment of primary disease (Endometriosis) not only symptoms and complications (CP). In vitro diagnosis of CECs should be used as noninvasive diagnosis of catamenial pneumothorax.

Disclosure: No significant relationships.

Keywords: pneumotorax, endometriosis, circulating cell

DOES THE MODIFIED FRAILTY INDEX SCORE PREDICT OUTCOME IN PATIENTS UNDERGOING VIDEO-ASSISTED THORACIC SURGERY (VATS) PLEURODESIS FOR MALIGNANT PLEURAL EFFUSION?

<u>Aleksander Mani</u>, M. Petko, S. Mitsos, D. Patrini, M. Scarci, N. Panagiotopoulos, D. Lawrence, M. Hayward, R. George

Thoracic Surgery, University College London Hospitals, London, United Kingdom

Objectives:

The majority of patients with malignant pleural effusion (MPE) are symptomatic and require VATS pleurodesis. It is recognised that the evaluation of pre-operative frailty predicts the post-operative clinical course in surgical patients. However, the role of pre-operative frailty assessment remains undetermined in thoracic patients undergoing surgery for MPE.

Methods:

All patient who underwent VATS talc pleurodesis from January 2016 to December 2016 were included in this study. Eleven co-morbidity variables were analysed and were used to calculate the modified Frailty Index (mFI) score. The presence of one variable equals one point, and total points for each patient were divided by 11 for the patient's mFI score (range 0-1.0). Data analysed using X2-test and independent sample t-test.

Results:

A total of 81 patients with proven MPE were identified (42 males; average age 71.7 \pm 10.9 years). The average intra-operative drainage was 1582 \pm 900 mls. The average duration of intercostal drains and POLS were 3.8 \pm 1.7 days and 6.1 \pm 4.7 days, respectively. Twenty-two patients (27%) developed post-operative complications (Clavien Grade I, n=2; Grade II, n=4; Grade III, n=5; Grade IV, n=8, Grade V, n=3). Overall, 30 patients died (37%) and their mFI score was higher compared to the survival group (0.26 \pm 0.1 vs 0.18 \pm 0.1, p=0.01). Within the deceased group, patients with 30-day mortality (n=6 including three inpatient deaths) had a higher mFI score (0.38 \pm 0.2 vs 0.23 \pm 0.1, p=0.01). An mFI score greater than 0.25 (i.e. 3 co-morbid variables and above) was strongly associated with 30-day and overall post-operative mortality (X2=5, p=0.02 and X2=7.32, p<0.01, respectively). The mFI score did not predict the rate of complications, POLS or transfer to other caring facility.

Conclusion:

Although a high mFI score is associated with increased risk of 30-day and overall mortality, it should not be a limiting factor to proceed with VATS talc pleurodesis in high risk patients with MPE to help alleviating their symptoms.

Disclosure: No significant relationships.

Keywords: modified frailty index, malignant pleural effusion, VATS, talc pleurodesis



EXTRA-NODAL EXTENSION IN N1 AND N2 LYMPH NODE REGIONS MAY BE A PREDICTOR OF SURVIVAL IN RESECTED NON-SMALL CELL LUNG CANCER

G. Singh¹, D. Lambert¹, J. Vandenberge¹, A. Borczuk², <u>Joshua Sonett¹</u> ¹Cardiothoracic Surgery, Columbia University Medical Center, New York, NY, United States of America

²Anatomic Pathology, Weill Cornell Medical College, New York, NY, United States of America

Objectives:

Regional lymph node (LN) involvement affects the prognosis of patients with surgically resected Non-Small Cell Lung Cancer (NSCLC) and represents the most frequent metastatic site in lung cancer. The aim of this study was to determine the significance of extra-nodal extension in N1 and N2 lymph node regions after surgical resection of NSCLC and its influence on patient survival.

Methods:

This is a retrospective study in which data from 376 patients with NSCLC was analyzed. These patients had pathologically proven regional LN involvement after resection for lung cancer. N1 and N2 patients were included in this study. These groups were further classified into 241 patient's that had intracapsular invasion and 120 patients that had extracapsular invasion. Histologic examinations including tumor cell type, grade of differentiation, regional LN metastasis emphasizing the number and station of LN involvement and the presence or absence of intranodal and extra-nodal extension. Cox regression was used to analyze these parameters and survival. Relationships between regional nodal stations, multi-station N1, nodal extension with patient survival were analyzed using Kaplan Meier analysis and log rank statistic (SPSS V 23 IBM).

Results:

By Cox regression extranodal extension in N1 and N2 regions, high T stage, N2 nodal status and squamous histology were adverse predictors of survival. Patients with N1 had a higher median survival (1547 days) than patients with N2 disease (1179 days). Multi-station N1 (1682 days) as a subset showed similar survival to N1 (1455 days). Presence of extra-nodal extension showed a significantly poorer overall survival (log rank< 0.0001) which also was significant within N1 and N2 strata (log rank< .0001). Survival function for N1/N2 regions, extra-nodal extension in N1/N2 regions, and intra and extra-nodal extension in N1 and N2 nodal regions are demonstrated in the Kaplan Meier survival curves (Figure 1 A,B,C and D).

Conclusion:

Our data shows that extranodal extension in N1 and N2 lymph node regions may be an important predictor of survival after surgical resection for NSCLC. Multistation N1 metastasis did not have a survival impact within the N1 category. Further prospective studies are needed to evaluate the prognostic value of regional extranodal extension after surgical resection.



Disclosure: No significant relationships. **Keywords:** lung cancer, extranodal extension, outcomes



EARLY DETECTION OF NON-SMALL CELL LUNG CANCER THROUGH ESTI-MATED GLOMERULAR FILTRATION RATE (EGFR) MUTATION ANALYSIS OF CIRCULATING DNA

Yang Yang¹, A. Sihoe², G. Jiang¹

¹Department of Thoracic Surgery, Tongji University Affiliated Shanghai Pulmonary Hospital, Shanghai, China ²Department of Surgery, The University of Hong Kong, Hong Kong, China

Objectives:

Tumor DNA in the circulation (ctDNA) of patients with Non-Small Cell Lung Cancer (NSCLC) provides a new potential source for early diagnosis. This study aims to test the efficacy of this strategy in detecting epidermal growth factor receptor (EGFR)-driven NSCLC.

Methods:

Plasma samples and matching tissue from the primary lung tumor were collected from 61 consecutive patients with suspected early-stage NSCLC (with primary tumor diameter \leq 2.0 cm). Cell free DNA (cfDNA) was extracted from plasma samples using the the QIAamp Circulating Nucleic Acid kit (Qiagen) and the genomic DNA which originated from corresponding tissue samples was extracted from the QIAamp DNA Mini Kit (Qiagen). Mutation analysis of the EGFR gene in all samples was analyzed by the amplification refractory mutation system (ARMS).

Results:

On postoperative histology, 51 patients were confirmed to have malignant tumors - including 5, 40, 3 and 3 patients in stages 0, I, II and III, respectively. cfDNA was enriched from all plasma samples. EGFR mutation was detected in 9 plasma samples and 13 tissues samples. The sensitivity and specificity of plasma testing for EGFR mutation was 69.2% (9/13) and 100% (48/48) compared to analysis of primary lung tumor tissue. Results of EGFR mutation analysis in plasma samples have a high rate of concordance (93.4%, 57/61) with those in matched primary lung tumor tissues. The sensitivity of plasma testing in stage 0, stage II and stage III patients was 100%. Subgroup analysis demonstrated that the sensitivity of plasma testing in smaller tumors (diameter ≤ 1.0 cm) was similar to larger ones (diameter 1.1-2.0cm), but the specificity was higher for the smaller ones (100% and 50% respectively, P<0.05).

Conclusion:

EGFR mutation analysis of ctDNA has a high sensitivity and specificity in patients with even early stages of NSCLC. This may potentially be a means of diagnosis and/or screening in future.

Disclosure: No significant relationships.

Keywords: sensitivity, circulating tumor DNA, EGFR gene, non-small cell lung cancer, mutation

YPT0N+: THE OUTCASTS IN PATHOLOGICAL COMPLETE TUMOR RESPONSE AFTER NEOADJUVANT CHEMORADIATION FOR ESOPHAGEAL CANCER. HOW DO THEY FARE?

Lieven Depypere, G. Vervloet, J. Moons, T. Lerut, H. Van Veer, W. Coosemans, P. Nafteux *Thoracic Surgery, University Hospital Leuven, Leuven, Belgium*

Objectives:

Little is known about the prognostic significance of residual nodal disease in complete pathologic responders (ypT0N+) after neoadjuvant chemoradiation (nCRT) for esophageal cancer (EC). The purpose is to analyze the long-term outcomes of EC patients with ypT0N+ following nCRT and esophagectomy.

Methods:

From a single institution database, 466 consecutive EC patients undergoing esophagectomy after nCRT were collected (1996-2016). ypT0N+ responders were compared to pathological complete responders (ypT0N0) and to pathological non-complete responders (ypT+N0 and ypT+N+).

Results:

There were 149 ypT0N0, 31 ypT0N+, 141 ypT+N0 and 145 ypT+N+. Median overall survival (OS) was worse in ypT0N+ (21.7 months) and ypT+N+ (16.8 months) compared to ypT0N0 (55.2 months) and ypT+N0 (42.0 months). Stratification by histology revealed a significant difference in prevalence of ypT0: 62.5% in 184 squamous cell carcinomas (SCC) compared to 23.0% in 282 adenocarcinomas (ADC) (p< 0.0001) but not in ypT0N+ (15% vs 22% respectively, p=0.25). In ADC, locoregional recurrence in ypT0N+ (43%) was comparable to ypT+N+ (31%) and more common compared to ypT0N0 (7%) and ypT+N0 (10%), reflected in median OS rates of 20.6, 17.5, 53.0 and 36.6 months respectively. Median OS in ADC is significantly determined by number of positive lymph nodes, being 21.7 months for pN1 and 2.7 months for pN2/3(p= 0.005) in ypT0N+ and 33.7 months for pN1 and 16.2 months for pN2/3 (p= 0.031) in ypT+N+. In SCC, locoregional recurrences were found in 17% of ypT0N+, 33% of ypT+N+, 11% of ypT0N0 and 22% in ypT+N0 and median OS was 26.6, 15.6, 55.2 and 43.8 months respectively. In SCC ypN+ number of affected lymph nodes showed no difference

Conclusion:

ypT0N+ in EC patients following nCRT has a poor prognosis and behaves similar to ypT+N+. However stratification by histology shows that this is especially true in ADC but seems determined by the number of involved lymph nodes.

Disclosure: No significant relationships.

Keywords: survival, esophageal cancer, neoadjuvant chemoradiation, pathological tumor response




INHIBITION OF CELL-ADHESION PROTEIN DPYSL3 PROMOTES METASTASIS OF LUNG CANCER

Xinnan Xu¹, Y. Yang¹, A. Sihoe², G. Jiang¹

¹Department of Thoracic Surgery, Tongji University Affiliated Shanghai Pulmonary Hospital, Shanghai, China ²Department of Surgery, The University of Hong Kong, Hong Kong, China

Objectives:

Our previous screening study suggested that the cell-adhesions protein Dihydropyrimidinaselike 3 (DPYSL3) is a candidate metastatic lung cancer related molecule. This study aimed to explore any possible correlation between DPYSL3 and metastatic lung cancer.

Methods:

Stable DPYSL3 knockdown Lewis lung carcinoma (LLC) cells were constructed with a retroviral system. Cell migration and invasion assays were performed to determine the role of DPYSL3 in migration and invasion changes of LLC cells. To evaluate the effect of DPYSL3 in transforming growth factor-b (TGFb)-induced epithelial-mesenchymal transition (EMT) which promoted the migratory and invasive properties of cells, the LLC cells were treated with 2 ng /mL TGFb for 48 h. A metastatic lung tumor model in which the stable DPYSL3 knockdown LLC cells were injected through tail vein was used to analyze the role of DPYSL3 in tumor metastasis in vivo. The correlation between DPYSL3 expression and the survival time of lung cancer patients were analyzed in KMPLOT database.

Results:

Knockdown of DPYSL3 promoted the migratory and invasive of LLC cells by 90.1% and 86.5% compared to the control group (P<0.01). Meanwhile, the motility of LLC cells was increased by 99.1% with the inhibition of DPYSL3 (P<0.01). The TGF β -induced EMT also increased by 102.3% when DPYSL3 was inhibited (P<0.01). The expression of EMT marker, Twist1 and N-cadherin, significantly increased to almost two times with the knockdown of DPYSL3 (P<0.01). Furthermore, knockdown of DPYSL3 potentiates metastasis in the mouse xenograft model which emerged at 12 days post injection while the control group had the metastasis since day 20 post injection. Furthermore, the expression level of DPYSL3 was positively correlated with the survival time in lung adenocarcinoma patients.

Conclusion:

Knockdown of DPYSL3 promoted the metastatic ability of LLC cells in vitro and in vivo.

Disclosure: No significant relationships.

Keywords: DPYSL3, metastasis, lung cancer, epithelial-mesenchymal transition

EFFICACY OF LOWER LOBE LUNG VOLUME REDUCTION SURGERY BY VIDEO ASSISTED THORACOSCOPY FOR PATIENTS WITH SEVERE LUNG EMPHY-SEMA: A SINGLE CENTER STUDY OF 59 PATIENTS

<u>Ali Akil</u>, J. Reichelt, M. Semik, S. Fischer *Thoracic Surgery and Lung Support, Klinikum Ibbenbueren, Ibbenbueren, Germany*

Objectives:

Lung volume reduction surgery (LVRS) is an important treatment option for end-stage lung emphysema in carefully selected patients. Functional benefits and improve of the lung function were reported in patients with predominantly upper lobe emphysema. Here we present our experience with patients undergoing anatomical lower lobe LVRS.

Methods:

Between 01/2012 and 05/2016, n = 59 patients with severe, non-upper lobe predominant emphysema underwent lower lobe minimally invasive LVRS in our department. Data was documented prospectively and analyzed in a retrospectively. Pre- and postoperative lungfunction, blood gas analysis (BGA) and six-minute-walk-trial (6MWT) were documented.

Results:

Thirty five patients undewent a bilateral LVRS. In 24 patients aditionally to the lower lobe, anatomical resection or partial resection of the upper lobe was performed. Veno-venose perioperative extra corporal life support was applied for n= 4 patients. Postopeativelly lungfunction was seen to improve compared to the preoperative values. We observed a significant improve regaurding the lung function compraing the parameter preoperative and postoperative FEV1(p=0.04) and TLC (0.005). Concerning the BGA we couldn't show any significant results in the early postoperative course in comparison to the preoperative BGA. The mean postoperative 6 MWT was 260.7 ± 17 meters compared to the preoperative 6 MWT with 228.6 ± 21 meters. This also didn't differ significantly (p=0,2). Two Patients died due to right heart failure during the postoperative course.

Conclusion:

Contrary to the previous reports favorising the upper lobe resection, we achieved an effective therapy in carefully selected patients undergoing lower lobe resection for LVRS. Further follow up is necessary to proove the long term benefit of those patients.

Disclosure: No significant relationships.

Keywords: lung volume reduction surgery, emphysema, thoracoscopy



REAL TIME IMAGING OF THORACIC SYMPATHETIC GANGLIONS USING INDOCYANINE GREEN NEAR-INFRARED FLUORESCENCE

Jian Zhou, F. Yang, H. Li, R. Xiao, F. Yang, W. Jun Thoracic Surgery, Beijing University People's Hospital, Beijing, China

Objectives:

During sympathectomy, the thoracic sympathetic ganglion is indirectly and roughly identified by the ribs. However, the exact spatial relationship between sympathetic ganglions and ribs remains inconstant due to the anatomical variations, and this may result in the unstable curative effect of sympathectomy. We report a novel technique to image the ganglions.

Methods:

Sixty five patients diagnosed as pulmonary nodules or mediastinum masses were included. All patients were confirmed to have no allergy to iodine or Indocyanine Green (ICG), and have negative results for ICG skin test. All the patients were injected with 4 or 5mg/kg indocyanine green (ICG) 18-26 hours prior to surgery. D-light P thoracoscope (KARL STORZ GmbH & Co, Germany) were used to detect near-infrared fluorescent light during surgery. Images and videos were retrieved. All patients underwent thoracoscopic explorations under "Standard" white light mode, then "Standard" near infrared light mode, and "Spectra A" near infrared light mode at last.

Results:

Thirty one males and 34 females were included. The median age was 51.6(median, 28-74). After surgery, 27 patients were diagnosed as primary lung cancer, 10 were diagnosed as metastasis nodules, 27 were diagnosed as mediastinum tumors,1 was palmar hyperhydrosis.

During surgery, the sympathetic ganglions of all patients were fluorescent. After surgery, the signal intensity and the signal to background ratio(SBR) was measured by ImageJ, a software by National Institutes of Health. The mean SBR of the 3rd ganglions to background were 1.33.

The average intraoperative blood loss was 75(mean, 10-150) ml. And the average operation duration was 154.3(mean, 60-220) minutes. No drug related adverse events were observed. Mean chest tube duration was 104 (mean, 24-180) hours.

Conclusion:

The thoracic sympathetic ganglions were fluorescent in all patients. The method of preoperatively injection of ICG is reliable and safe in the imaging of thoracic sympathetic ganglions.

Disclosure: No significant relationships.

Keywords: fluorescence guided surgery, sympathetic ganglion, indocyanine green

PREDICTIVE FACTORS FOR SURVIVAL IN PULMONARY CARCINOIDS: THE ROLE OF LYMPH-NODE RATIO

Marco Chiappetta¹, G. Leuzzi², D. Forcella³, I. Sperduti⁴, D. Nachira¹, L. Petracca Ciavarella¹, F. Mucilli⁵, F. Lococo⁶, G. Ratto⁷, P.L. Filosso⁸, L. Spaggiari⁹, F. Facciolo³, S. Margaritora¹
¹Thoracic Surgery, Catholic University of Sacred Heart, Rome, Italy
²Thoracic Surgery Unit, Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy
³Department of Surgical Oncology, Thoracic Surgery Unit, Regina Elena National Cancer Institute
- IFO, Rome, Rome, Italy
⁴Department of Biostatistics, Regina Elena National Cancer Institute - IFO, Rome, Rome, Italy
⁵Department of General and Thoracic Surgery, University Hospital "SS. Annunziata", Chieti, Italy
⁶Unit of Thoracic Surgery, Arcispedale Santa Maria Nuova-IRCCS, Reggio Emilia, Italy, Reggio Emilia, Italy
⁷Division of Thoracic Surgery, IRCCS AOU "San Martino" IST, Genoa, Genoa, Italy
⁸Thoracic Surgery Division, European Institute of Oncology University of Milan, Milan, Italy

Objectives:

Lymph-node metastases in Pulmonary Carcinoid(PC) are relatively uncommon, and which is the optimal lymph-node assessment is not clear. The aim of this study is to evaluate the impact of lymphadenectomy and lymph-node metastasis pattern in addition to already validated variables in the setting of carcinoid patient's survival.

Methods:

From 01/2002 to12/2014, data on 293 patients undergoing lung resection and hilo-mediastinal lymphadenectomy for PC in seven Institutions were retrospectively analyzed. A panel of established prognostic factors in addition to pattern of lymph node metastasis(IASLC lymph-node map, single/multiple N1 station,skip metastasis, single/multiple N2 station, lobe specific metastasis), number of resected lymph-nodes(#RNs) and the ratio between the metastatic lymphnodes(#MNs) and #RNs(Node Ratio,NR) were correlated to overall(OS) and disease-free survival(DFS) by using the Multivariate Cox Regression model.Outcomes were calculated by the Kaplan–Meier product-limit method and the log-rank test was used to assess differences between subgroups.



Results:

Variables	Multivariate DFS		Multivariate OS		
	HR (CI95%)	р	HR (CI95%)	р	
Sex Male vs Female	-	ns	5.39 (1.10-28.26)	0.04	
Age >61 yrs vs <61yrs	3.16 (1.32-7.59)	0.01	5.40 (1.05-27.65)	0.04	
Lymph-node Ratio >10% vs ≤10%	3.30 (1.43-7.62)	0.005	5.18 (1.53-17.48)	0.008	
Histology Atypical vs Typical Carcinoid	2.28 (1.10-4.73)	0.03		ns	
pT 3/4 vs 1 2 vs 1	- 3.03 (1.32-6.95) 2.88 (1.05-7.85)	0.01 0.009 0.04	- 10.05 (2.09-48.43) 6.14 (0.92-41.24)	0.02 0.004 0.06	

Pathology showed typical carcinoid (TC) in 223(76.1) and Atypical Carcinoid (AC) in 70(23, 9%) patients while TNM classification was stage I in 72,4%, II in 18,1%, III in 9,5, % and IV in 0.03%cases. The median #RNs was 12(range 0-53), hilar(N1) and mediastinal(N2) node metastasis were identified in 14% and 6.8% of cases, respectively. Overall,5-years OS and DFS were 90,6% and 76,7% respectively. At multivariate analysis, sex, age, pathological T stage and NR were significantly related to a better OS; while age, histology, pathological T stage and NR were related to DFS(Table1). In particular, analysing the lymph-node metastasis pattern, only the NR<10% was significantly correlated with better outcome: 5yOS 93, 5%vs82, 5%, p<0,04; 5yDFS 81, 1%vs59, 5%, p<0,001).

Conclusion:

Our study confirms the good outcome and the rarity of lymph-node metastasis in pulmonary carcinoids. In particular, we found that a NR cut-off value of 10% is a strong prognosticator of both OS and DFS in such tumors. Further prospective studies are needed to validate these data

Disclosure: No significant relationships.

Keywords: pulmonary carcinoid, lymphnodes, lymphnode ratio

LAPAROSCOPIC TRANSGASTRIC ESOPHAGEAL MUCOSECTOMY (LTEM) IN A PORCINE ANIMAL MODEL

O. Alsaied¹, N. Rueth², Rafael Andrade¹

¹Department of Surgery, University of Minnesota, Minneapolis, MN, United States of America ²Surgical Oncology, Surgical Specialists of Minnesota, Minneapolis, MN, United States of America

Objectives:

Therapies for Barrett's Esophagus with high-grade dysplasia (BE-HGD) are endoscopic mucosal resection (EMR) with ablation or esophagectomy. We describe Laparoscopic Transgastric Esophageal Mucosectomy (LTEM) with stent placement for circumferential, long-segment (> 5cm) esophageal mucosectomy, including the z-line and proximal gastric mucosa.

Methods:

Procedural steps:

- Laparoscopy: under general-endotracheal anesthesia, we place a supraumbilical port, three 12mm-balloon-tipped ports in the upper abdomen. (Figure 1)
- · Intragastric access: we place three gastric purse-strings, place ports through them and insufflate the stomach to 10-mmHg.
- Mucosectomy: we elevate the gastric mucosa 1cm distal to the Z-line with saline injection and incise the mucosa circumferentially. We dissect submucosal plane 5-7cm cephalically, then transect and remove the mucosa en-bloc.
- We place an 18mm x 120mm covered nitinol stent.
- Pharyngostomy: we secure the proximal end of the stent with umbilical tape at the neck through a pharyngostomy. Postoperative care: We use prophylactic antibiotics for 10 days, proton pump inhibitors throughout, and gradually advance diet from clear liquids to chow. We record weight weekly. We perform endoscopy with fluoroscopy as needed if animals have eating problems. At 60 days, we perform terminal esophagogastrectomy for gross and microscopic examination.

Results:

We performed LTEM on five animals, one died intraoperatively, four completed the study. We verified complete mucosal resection with microscopy. Three animals vomited from stent migration, two required fluoroscopic stent repositioning, two developed pharyngostomy site infection requiring antibiotics and debridement. All animals gained weight (38 ± 1.4 to 57.3 ± 6.8 kg) over (59.3 ± 6.8 days), three had complete re-epithelialization without stenosis (Figure 1), one developed ulceration with ~ 30-40% stenosis.





Conclusion:

Our data suggest that LTEM is effective for long-segment (>5cm) circumferential esophageal mucosectomy. LTEM yields a large en-bloc area of mucosa for precise microscopic examination and potential cure. Esophageal stent allowed neo-epithelium, while minimizing stricture formation. Notably, LTEM utilizes conventional instruments and is probably reproducible. We are planning human application.

Disclosure: No significant relationships.

Keywords: esophageal mucosectomy, high-grade dysplasia, Barrett's esophagus

THREE-DIMENSIONAL (3D) PRINTED MODEL FOR PLANNING ENDOSCOPIC TREATMENT OF UPPER AIR-WAY STENOSIS

Alfonso Fiorelli¹, A. Reginelli², T. Califano², R. Cascone¹, M. Pierdiluca¹, A. Carlucci¹, A. Maraschi¹, E. Di Costanzo³, S. Cappabianca², R. Grassi², M. Santini¹ ¹Department of Cardio-thoracic Disease, Thoracic Surgery Unit, Second University of Naples, Naples, Italy ²Radiology Unit, Second University of Naples, Naples, Italy ³Anesthesiology Unit, Monaldi Hospital, Naples, Italy

Objectives:

3D printing is increasingly used to replicate patient-specific anatomy for pre-operative planning in several surgical specialties but its benefit has underevaluated for endoscopic treatment of upper airway-stenosis. We suppose that if a complete 3D replica of the stenosis can be generated before the treatment, it could aid to prepare the operation in minute detail and then perform it as efficiently and safely as possible. Yet, we also describe our strategy for producing 3D upper airway model so that other can replicate it.

Methods:

To create the model, a 3D reconstruction and segmentation of upper airway was made using DICOM imaging (1.0 mm slice thickness) of the patients' neck and chest; it was exported as stereolithography (STL) file compatible with 3D printing; a 1:1 ratio airway stenosis prototype (same size as the actual stenosis) was then produced. Almost 5-7 hours was needed to prepare the model that was white and sufficient supply, meeting our eeds (Figure).





Results:

The 3D model was used for planning the endoscopic treatment in seven consecutive patients with subglottic (n=3) and tracheal stenosis (n=4). It allowed (i) predicting anatomic landmarks as the distance of stenosis from vocal folds; the diameter and length of the stenosis and the involvement of tracheal wall; and (ii) practicing all endoscopic maneuvers as intubation with rigid bronchoscopy; radial incisions; mechanical dilatation; and silicon stent placement. In all cases the stenosis was successfully treated and no recurrences were seen (median follow-up: nine months). The 3D printing had an effective impact on surgical operation reducing the operational difficulty and the learning curve.

Conclusion:

Our successful outcome supported the feasibility of the procedure and more widespread is encouraged. Our 3D printed model allowed planning a precise pre-operative strategy, facilitating teaching and communication between physician and patient. Our preliminary results should be corroborated by future blind studies.

Disclosure: No significant relationships.

Keywords: three-dimensional printed model, endoscopic treatment, upper airway stenosis

LYMPH-NODE RATIO PREDICTS SURVIVAL IN NON-SMALL-CELL LUNG CANCER: A MULTICENTER ANALYSIS

Marco Chiappetta¹, G. Leuzzi², G. Alessandrini¹, I. Sperduti³, E. Bria⁴, F. Mucilli⁵, D. Forcella¹, F. Lococo⁶, P.L. Filosso⁷, G. Ratto⁸, L. Spaggiari⁹, F. Facciolo¹
¹Department of Surgical Oncology, Thoracic Surgery Unit, Regina Elena National Cancer Institute - IFO, Rome, Rome, Italy
²Thoracic Surgery Unit, Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy
³Department of Biostatistics, Regina Elena National Cancer Institute - IFO, Rome, Italy
⁴Medical Oncology, Department of Medicine, University Hospital of Verona, Verona, Italy
⁵Department of General and Thoracic Surgery, University Hospital "SS. Annunziata", Chieti, Italy
⁶Unit of Thoracic Surgery, Arcispedale Santa Maria Nuova-IRCCS, Reggio Emilia, Italy, Reggio Emilia, Italy
⁷Thoracic Surgery, University of Torino, Torino, Italy
⁸Division of Thoracic Surgery, IRCCS AOU "San Martino" IST, Genoa, Genoa, Italy

⁹Thoracic Surgery Division, European Institute of Oncology University of Milan, Milan, Italy

Objectives:

Actually, the prognostic role of the number of resected (#RNs) and metastatic lymph-nodes (#MNs) in Non-Small-Cell Lung Cancer (NSCLC) is yet debated. The aim of this study is to evaluate the impact of lymphadenectomy in addition to already validated variables in the setting of NSCLC survival.

Methods:

From 01/2002 to12/2012, data on 4858 NSCLC patients undergoing anatomical lung resection and hilo-mediastinal lymphadenectomy in six Institutions were retrospectively analyzed. A panel of established prognostic factors in addition to #RNs and the ratio between the #MNs and #RNs(Node Ratio,NR)were correlated to overall(OS) and disease-free survival(DFS) by using the Multivariate Cox Regression model. To evaluate the discriminative ability of the model, the Harrell C- statistics with95%CI was determined. Analysis by means of maximally selected logrank statistics was performed to find optimal cut-offs capable of splitting patients into groups with different outcome probabilities.



Results:

Variables	Multivariate DFS*		Multivariate OS*		
	HR (CI95%)	р	HR (CI95%)	р	
Gender male vs female	1.18 (1.03-1.35)	0.02	1.41 (1.21-1.63)	<0.0001	
Age (years) >66 vs ≤66yrs	1.52 (1.35-1.73)	<0.0001	1.74 (1.53-1.99)	<0.0001	
Lymphnode Ratio >40% vs ≤40%	1.90 (1.53-2.36)	<0.0001	1.87 (1.51-2.32)	<0.0001	
R0 resection no vs yes	1.66 (1.30-2.10)	<0.0001	1.70 (1.32-2.18)	<0.0001	
Grading 3 vs 1/2	1.28 (1.12-1.47)	<0.0001	-	ns	
Pathological Stage II/I vs I III/IV vs I	- 1.83 (1.56-2.14) 2.60 (2.22-3.04)	<0.0001 <0.0001 <0.0001	- 1.72 (1.45-2.04) 2.53 (2.15 (2.98)	<0.0001 <0.0001 <0.0001	
Kind of Surgery Pneum onectomy vs Lobectomy	1.32 (1.09-1.59)	0.004	1.38 (1.13-1.68)	0.001	
*C-statistics 66.0 (CI95% 62,7-69.4)					

The median #RNs and #MNs were 17(range 1-85) and 2(range 1-36) respectively. Pathological TNM classification was stage I in 46,5%, II in 24,1%, III in 27,8% and IV in 1,6% cases. Hilar(N1) and mediastinal(N2) node metastases were identified in 21,3% and 20% of cases, respectively. Overall,5-years OS and DFS were 54,6% and 44,8% respectively. At multivariate analysis, age, gender, pathological stage, R0 resection,kind of surgery and NR were related to a better OS;the same variables associated with tumor grading were further related to DFS(Table1). The C-statistics was 66.0(CI95%62,7-69.4). A NR<40% significantly correlated with better outcome in the total sample (5yOS 57,6% vs23,8%, p<0,0001;5yDFS 48,2% vs11,4, p<0,0001). Stratifying the patients by nodal involvement, a NRcut-off value of 40% strongly predicted 5yOS and 5yDFS both in N1 (47,9% vs36,1%,p=0,03; 39% vs24,2%, p=0,02) and N2 patients(36,9% vs21,8%,p<0,0001; 23,9% vs9,1%,p<0,0001).

Conclusion:

Our study confirms that NR is a strong prognosticator in NSCLC. In particular, a NR cut-off value of 40% could help in predicting both OS and DFS in such tumors. Further prospective studies are needed to validate these data

Disclosure: No significant relationships. **Keywords:** NSCLC, lymphnode ratio, lymph node metastasis

PLEURAL THICKNESS AFTER INDUCTION CHEMOTHERAPY IS SIGNIFI-CANTLY CORRELATED WITH PROGNOSIS IN PATIENTS UNDERGOING SURGERY FOR MALIGNANT PLEURAL MESOTHELIOMA

<u>Masaki Hashimoto</u>¹, T. Takuwa¹, A. Kuroda¹, T. Nakamichi¹, S. Matsumoto¹, N. Kondo¹, Y. Okumura², F. Tanaka³, S. Hasegawa¹

¹Thoracic Surgery, Hyogo College of Medicine, Nishinomiya, Japan ²Thoracic Surgery, Itami City Hospital, Itami, Japan ³2nd Department of Surgery, University of Occupational and Environmental Health. Kitakyushu, Japan

Objectives:

To investigate the correlation between pleural thickness and prognosis in patients undergoing induction chemotherapy followed by curative-intent surgery for malignant pleural mesothelioma (MPM).

Methods:

A retrospective analysis was conducted in patients who underwent curative-intent surgery after induction chemotherapy from March 2004 to June 2016. Definition and measurement of pleural thickness were derived from IASLC Staging Project. Single linear measurement of pleural thickness at three levels was performed by using axial computed tomography (CT) images. Maximum pleural thickness and sum of 3-level pleural thickness were measured before and after induction chemotherapy. Correlation between pleural thickness and survival was evaluated using log-rank test.

Results:

A total of 111 patients were enrolled to this study: 94 males (84.7%) and 17 females (15.3%); age ranged from 37 to 77 years with a median age of 64 years; histological subtypes of 104 epithelioid (93.7%), 6 biphasic (5.4%), and 1 sarcomatoid (0.9%); 56 EPP (50.5%) and 55 P/D (49.5%). Overall median survival time (MST) after diagnosis for all 111 patients was 42.3 months. Neither maximum pleural thickness nor sums of 3-level pleural thickness before induction chemotherapy were significantly correlated with survival. Maximum pleural thickness after induction chemotherapy was significantly correlated with survival (MST: 47.1 months for <5.1mm vs 26.2 months for >-5.1mm, p=0.0123). Sum of 3-level pleural thickness after induction chemotherapy was also significantly correlated with survival (MST: 56 months for <13mm, 28.6 months for 13-60mm, and 10.9 months for >-60mm, p<0.0001).

Conclusion:

Both maximum pleural thickness and sum of 3-level pleural thickness after induction chemotherapy could be useful prognostic markers in patients undergoing surgery for MPM.



Overall survival for maximum pleural thickness after induction chemotherapy



Disclosure: No significant relationships.

Keywords: mesothelioma, pleural thickness, induction chemotherapy

OUTCOMES AND RISK FACTORS IDENTIFICATION IN URGENT LUNG TRANS-PLANTATION: A MULTICENTRIC STUDY

<u>Marco Schiavon</u>¹, G. Faggi², L. Rosso³, L. Luzzi⁴, G. Marulli¹, G. Di Gregorio², D. Gregori¹, M. Nosotti³, F. Damarco³, D. Bennet⁴, A. Fossi⁴, P. Paladini⁴, L. Santambrogio³, F. Rea¹ ¹Cardiac, Thoracic and Vascular Sciences Department, University of Padua, Padova, Italy ²UOC Anesthesiology Department, Azienda Ospedaliera di Padova, Padova, Italy ³Thoracic Surgery and Lung Transplantation Unit, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy ⁴Thoracic Surgery and Lung Transplantation, Azienza Ospedaliera Universitaria Senese, Siena,

⁴Thoracic Surgery and Lung Transplantation, Azienza Ospedaliera Universitaria Senese, Siena, Italy

Objectives:

In rapidly deteriorating patients awaiting lung transplantation (LTx), supportive strategies are only temporary, and urgent LTx remains the definitive therapy. Few publications on this topic report conflicting results, putting a word of caution about these urgent transplant programs.

Methods:

Since November 2010, a national urgent LTx program was introduced: patients on mechanical support may be transplanted with the first available graft in the country. We reviewed the application of this program in three national centers from March 2011 to July 2016, including 57 patients, focusing on post-operative outcomes. The analysis of risk factors for in-hospital mortality, including donor and recipient characteristics, was performed using Forest Tree analysis and GLMM models.

Results:

Ten patients (17.5%) died awaiting transplantation, while 47 (34 females, median age 30 years) underwent LTx (46 bilateral) with a median waiting list time of six days. Pre-operatively, two patients (4.3%) were supported by mechanical ventilation (MV), 25 (53.2%) by veno-venous extracorporeal membrane oxygenation (ECMO) and 20 (42.5%) by MV plus ECMO (15 veno-venous and five veno-arterial). The main indications was cystic fibrosis (64%). Median recipient LAS score was 72.80. Intra-operative and in-hospital mortality were 2.1 and 19.1%, respectively. ECMO weaning was feasible in 45 patients (95.7%) with MV and ECMO median duration of seven and three days, respectively. Intensive care unit and hospital stay were 20 and 46 days, respectively. 6 (13%) patients experienced in-hospital acute rejection. 12-months expected FEV1 was 70% while 1- and 3-year survival rate were 74.2 and 69.9%, respectively. According to our analysis, the highly impact risk factors for in-hospital mortality were both presence and duration of pre-operative veno-arterial ECMO and pre-transplant C-reactive protein level (see figure below).





Conclusion:

In our experience, the urgent program allows LTx in a significant percentage of patients with acceptable post-operative results. A pre-operative accurate selection of recipients seems mandatory to improve outcomes for high-risk patients.

Disclosure: No significant relationships.

Keywords: emergency program, ECMO, C reactive protein, lung transplantation

THE ARISING DIAGNOSTIC VALUE OF S100A2 AND S100A6 LEVELS IN NON-SMALL CELL LUNG CANCER PATIENTS

<u>Athanasios Stamatelopoulos</u>¹, E. Tsiambas², I. Gakidis¹, C. Chatziantoniou¹, P. Michos¹, T. Michos³, D. Bouros⁴

¹Thoracic Surgery, "KAT" General Hospital of Athens, Athens-Kifisia, Greece ²Cytology and Biomolecular Laboratory, 401 General Military Hospital of Athens, Athens, Greece ³Medical School, University of Patras, Patras, Greece ⁴Respiratory Diseases, University of Athens Medical School, Athens, Greece

Objectives:

Biochemical markers have a significant role in the diagnosis of lung cancer. Recent studies have demonstrated a link involving S100 Calcium Binding Proteins (S100A2, S100A6) and Non-Small Cell Lung Cancer (NSCLC), but the expediency of their serum levels in NSCLC has not been established since now.

Methods:

In this study, we evaluate the potential of serum S100A2 and S100A6 levels as diagnostic markers for NSCLC. Enzyme-linked immunosorbent assay (ELISA) was performed to detect the levels of S100A2 and S100A6 in 141 NSCLC patients compared with the levels of 150 healthy subjects.

Results:

Serum levels of the two proteins in patients with NSCLC were higher compared to healthy controls (P=0.0002 for S100A2 and P<0.0001 for S100A6). Moreover, the levels of S100A2 and S100A6 were higher in the sera of stage I/II NSCLC patients compared to healthy controls with P=0.01 and <0.0001, respectively. Receiver operating characteristic (ROC) analysis showed that S100A2 could distinguish NSCLC patients from healthy controls (AUC=0.646), and S100A6 could also identify NSCLC (AUC=0.668). Meanwhile, these two proteins showed notable capabilities for distinguishing stage I/II NSCLC from healthy controls (AUC=0.708 for S100A2 and AUC=0.702 for S100A6).

Conclusion:

Our results indicate that serum levels of S100A2 and S100A6 are significantly elevated in early stage NSCLC and may have the potential for NSCLC biomarker. Further studies with large sample population would help validate our findings.

Disclosure: No significant relationships. **Keywords:** non-small cell lung cancer, S100A6, S100A2



PROGNOSTIC SIGNIFICANCE OF POSTOPERATIVE ADJUVANT CHEMOTHER-APY FOR PATIENTS WITH T1-3N0M0 ESOPHAGEAL SQUAMOUS CELL CARCI-NOMA

Jun Feng Liu, J.Z. Zhang

Department of Thoracic Surgery, Fourth Hospital, Hebei Medical University, Shijiazhuang, China

Objectives:

Esophageal squamous cell carcinoma (ESCC) is the major pathological type of esophageal cancer in China. NCCN guidelines suggest that no adjuvant therapy is needed for N0 stage patients after surgery. This study was conducted to investigate prognostic significance of post-operative adjuvant chemotherapy for the subgroup of ESCC, to verify whether the NCCN principle is fit for Chinese patients.

Methods:

Two hundred and thirty eight consecutive patients who underwent esophagectomy for N0 stage intra-thoracic ESCC in the Department of Thoracic Surgery, Fourth Hospital of Hebei Medical University from January 2008 to February 2011 were analyzed. There were 160 males (67.2%) and 78 females (32.8%), ages ranging from 38 to 84 years with a median age of 62 years. These included 120 patients who underwent operation only and 118 patients who received three to four cycles of adjuvant chemotherapy with platinum based two-drug regimen. The clinic-pathological features and comparability of the two groups were listed in table 1. Follow-up study was carried out by contacting patients every six months to death of patients or until 31 of Mach, 2015. SPSS17.0 software was used for statistical analysis, and the survival rate was analyzed by Kaplan-Meier method. Univariate analysis of survival was assessed with Log-Rank test, and multivariate analysis by Cox proportional hazard model.

Factors	Adjuvant chemotherapy	Surgery only	c ² /t	Р
M/F	82/78	78/42	3.213	0.073
Age (median)	60.5	61.2	1.229	0.22
Smoker/None	52/66	47/73	2.143	0.157
Drinker/None	41/77	31/89	2.441	0.149
Location of tumor Upper Middle Lower	12 57 49	16 54 59	3.228	0.072
Length of Tumor <5cm ≥5cm	69 49	67 53	1.024	0.312
pTNM stage Ib IIa IIb	19 36 63	23 42 55	1.041	0.308
T stage T1 T2 T3	21 38 59	24 20 76	0.567	0.452
Differentiation Moderate Poor	25 93	21 99	0.106	0.745
Number of LN dissection <12 ≥12	73 45	88 32	2.790	0.119

Table 1. The clinicopathological features and comparability of patients undergoing surgery only and postoperative adjuvant chemotherapy

Results:

Two hundred and twenty four patients had complete follow-up record; the follow-up rate was 94%. The three year and five year survival rate was 55.5% and 45.0%, with a median survival time of 46 months. With univariate analysis, tumor location, pTNM stage, T stage, the number of lymph node dissection (<12 *vs.* \geq 12), postoperative chemotherapy were related with OS (all P values<0.05). Age, sex, the history of smoking and drinking, tumor length (<5 vs. \geq 5cm) were not related with OS (all P values>0.05). Multivariate analysis revealed that T stage (P = 0.000), the number of lymph node dissection (P = 0.000) and chemotherapy (P=0.000) were all independently associated with OS. The long-term survival was better in patients with pT3N0M0 who received adjuvant chemotherapy than surgery only (P=0.000), but there were no significant differences between the two arms patients with pT1-2N0M0.

Conclusion:

Prognosis of patients with pT3N0M0 ESCC can benefit from postoperative adjuvant chemotherapy.

Disclosure: No significant relationships.

Keywords: prognosis, SCC, esophageal cancer, surgery, adjuvant chemotherapy



SERIES OF AUDITS HELP TO ENSURE THE SUSTAINABILITY OF THE BENE-FITS OBTAINED AFTER THE IMPLEMENTATION OF ENHANCED RECOVERY AFTER MAJOR THORACIC SURGERY (ERAS)

Laura Socci¹, A. Martin-Ucar², M. Rawashdeh¹, J. Rao¹, J. Edwards¹ ¹Cardiothoracic, Sheffield Teaching Hospitals, Sheffield, United Kingdom ²Cardiothoracic, University Hospital Coventry and Warwickshire, Coventry, United Kingdom

Objectives:

The Enhanced Recovery After Surgery (ERAS) pathway was implemented in 2014 in our thoracic unit. The results were audited showing the benefits for patients and use of resources. We aimed to re-audit the pathway to determine if interventions and outcomes are maintained.

Methods:

Three periods were included in these serial audits: A-Prior to ERAS implementation (n=54 patients); B-1 year after ERAS implementation (n=54 patients); and C-2 years after implementation (n=50 patients). All patients admitted in our unit for pulmonary surgery are included into the ERAS pathway, regardless of co-morbidities and social circumstances. Data was collected retrospectively from a prospectively completed departmental database. Pre- and peri-operative measures and Post-operative outcomes were analysed.

Results:

Indications and type of procedures were similar. Preoperative measures such as day of surgery admission, avoidance of pre-medication, and documentation of an expected date for hospital discharge improved after implementation and have been maintained on time. TABLE 1. Intraoperatively the use of VATS increased from 41% to 67% to 86% of cases (p<0.001). TABLE 1. The implementation of ERAS initially included the use of Paravertebral analgesia supported by intravenous opioids. Currently the use of intravenous opioids is reduced from 94% in Group B to 4% in Group C (p<0.001) Postoperatively the improvements on complications has been maintained in time with a significant reduction on hospital stay (median of 6, 5 and 4 days in the cohorts, p=0.007).

	Group A	Group B	Group C	P value
	(n=54)	(n=54)	(n=50)	%
Day of Surgery admission	0	68%	64%	< 0.001
Carbohydrate drinks	41%	28%	32%	0.35
Estimated length of stay	2%	28%	32%	0.01
Premedication	35%	6%	18%	0.001
Epidural	76%	11%	4%	0.009
Digital drain	28%	94%	100%	< 0.001
Temp>36°C	81%	91%	100%	< 0.001
Chest infection	20 (37%)	14 (26%)	7 (14%)	0.03
Cardiovascular complications	13 (24%)	4 (7%)	6 (12%)	0.04
Constipation	18 (33%)	7 (13%)	1 (2%)	< 0.001
Readmission to Hospital	4 (7.4%)	5 (9%)	3 (6%)	0.820

Conclusion:

ERAS in thoracic surgery is feasible and achieves positive outcomes if supported by all disciplines. These benefits can be sustained with the help of audits and service evaluations. These have pointed out areas for possible improvement in our Unit. These changes were achieved without any funding or increase in resources or staff. The patient's experience is improved during the perioperative journey with ERAS protocols even in an all-included unselected population.

Disclosure: No significant relationships.

Keywords: ERAS, Lung resection, VATS, audit



PROGNOSTIC SIGNIFICANCE OF PD-L1 EXPRESSION IN PULMONARY METAS-TASIS FROM HEAD AND NECK SQUAMOUS CELL CARCINOMA

<u>Satoru Okada</u>, J. Shimada, D. Kato, H. Tsunezuka, T. Furuya, M. Inoue Division of Thoracic Surgery, Department of Surgery, Kyoto Prefectural University of Medicine, Kyoto, Japan

Objectives:

The mechanism by which tumours escape the immune system has been becoming increasingly clear and is partly explained by the programmed death-1 (PD-1) and its ligand (PD-L1) pathway. This study aimed to investigate the prognostic significance of PD-L1 expression in patients with surgically resected pulmonary metastases from head and neck squamous cell carcinoma (HNSCC).

Methods:

A retrospective review was conducted of 28 patients who underwent surgical resection for pulmonary metastasis from HNSCC between January 2000 and December 2016. PD-L1 expression in the tumour cells was evaluated using immunohistochemistry (anti-PD-L1 antibody, clone SP263). High PD-L1 expression was defined as \geq 50% of tumour cells with positive staining for PD-L1. Survival was calculated using the Kaplan-Meier method. Univariate and multivariate analysis were performed to assess the prognostic value of relevant clinicopathological variables.

Results:

The median follow-up period was 41 months. The patients were 23 men and five women with a median age of 66 years. The site of the primary tumour was the hypopharynx (12 cases), larynx (10), oral cavity (four), and others (two). Incomplete resection occurred in 2 cases (7%). High PD-L1 expression was detected in 6 cases (21%), and in these cases, PD-L1 expression was low in the primary HNSCC. The five year overall survival (OS) rate after pulmonary metastasectomy was 53.0% (Fig. A). The 5-year OS rates were 65.3% and 16.7% in the low and high PD-L1 expression groups, respectively (p = 0.003) (Fig. B). Univariate analysis showed that high PD-L1 expression, older age (\geq 65 years), and incomplete resection were significantly correlated with a shorter OS. Multivariate analysis demonstrated that high PD-L1 expression was independently correlated with a shorter OS (p < 0.001).



Conclusion:

High PD-L1 expression in pulmonary metastases is an independent predictor of poor outcome in patients undergoing pulmonary metastasectomy of metastatic HNSCC.

Disclosure: No significant relationships.

Keywords: pulmonary metastasectomy, biomarker, survival, pulmonary metastasis, PD-L1, head and neck squamous cell carcinoma



DETAIL MEDICAL INTERVIEW MIGHT FIND RISK FACTORS FOR ATRIAL FIBRILLATION FOLLOWING PULMONARY LOBECTOMY

Hironori Ishibashi, C. Takasaki, S. Kumazawa, A. Ui, M. Kobayashi, K. Okubo *Thoracic Surgery, Tokyo Medical and Dental University, Tokyo, Japan*

Objectives:

Atrial fibrillation (AF) after pulmonary lobectomy can be associated with increased morbidity and mortality as well as increased costs. The aim of this study is to identify risk factors for atrial fibrillation (AF) following lobectomy.

Methods:

A retrospective study of 883 patients who underwent lobectomy at our institute between April 2010 and November 2016 was performed. The following variables were considered in the analysis: age, sex, body mass index, comorbidities (interstitial pneumonia, emphysema, ischemic heart disease, cerebral infarction, diabetes mellitus, renal dysfunction, presence of mental disorder), administration of steroid or anticoagulants, respiratory functions, arterial gas analysis, smoking index, ASA performance status, arrhythmia episodes, type of lobectomy, surgical procedure (open thoracotomy vs. thoracoscopic surgery), operating time, and blood loss. We divided our patients into AF group and non-AF group. Univariate and multivariate analyses were performed to identify whether any of the recorded parameters served as prognostic variables in the development of AF.

Results:

Of 883 lobectomies performed, 50 (5.7%) developed AF. Male (6.9 % vs. 3.5 %; p = 0.024), preoperative renal dysfunction (16.7 % vs. 5.2 %; p = 0.015), emphysema (7.9 % vs. 4.5 %; p = 0.038), high smoking index (975.2±92.7 vs. 701.6±23.4; p = 0.006), open thoracotomy (9.0 % vs. 4.4 %; p = 0.011), operating time (219.7±14.4 vs. 190.6±2.46; p = 0.007), and intraoperative blood loss (476.6±107.8 vs. 256.9±14.6; p = 0.001) were significantly higher in AF group. Multivariate analysis revealed that preoperative renal dysfunction (odds ratio (OR) = 2.68, 95% CI 1.02-7.34, p = 0.0453), blood loss (2.39 (1.01-6.16), p = 0.0423) and arrhythmia episodes (3.35 (1.37-8.19), p = 0.008) are independent risk factors.

Conclusion:

Preoperative renal dysfunction, blood loss and arrhythmia episodes are independent risk factors and detail medical interview is important.

Disclosure: No significant relationships.

Keywords: atrial fibrillation, pulmonary lobectomy, arrhythmia episodes

SEARCH FOR THE CAUSE OF SPONTANEOUS PNEUMOTHORAX. PHYSICS OF AN UNRESOLVED ENIGMA

Peter Zsoldos¹, S. Gábor², G. Élő³, T. Molnar¹ ¹Saint Sebastian Thoracic Surgery Unit, Aladár Pets Teaching County Hospital, Győr, Hungary ²Forensic Medicine, University of Pécs, Pécs, Hungary ³Marketing and Management Department, Széchenyi University Győr, Győr, Hungary

Objectives:

Received wisdom dictates that rupture of (sub)pleural blebs are responsible for spontaneous pneumothorax. Wide spectrum of supposed triggering mechanisms ranges from sudden alteration of atmospheric pressure thorough mechanical trauma till the hypothesis of airvawes generated by loudspeaker. No data on mechatronic properties of the pleural surface are available so far, therefore a biomechanical study was performed in order to solve the enigma of the cause of spontaneous pneumothorax.

Methods:

Free walls of apical lung blebs, removed during lung resection were exposed to focused air pressure up to 3 bars. Three pressure increase settings were studied: inverse parabolic (IP), linear (L) and parabolic (P) patterns with an upper limit of 5.0 secundum. The breaking points on the curves were registered by PC-pressure valve interface. Five consenting patients' specimen were tested, within 30 mins after removal.

Results:

Fail to resist pressure(FRP) values were registered: IP: 2.2 SD: 0.2 bar under 0.22-1.1 secs L: 2.8 SD: 1.3 under 0.5-1.7 secs P: 2.5 SD:0.3 bar under 1.9-4.2 secs. Pressure increase pattern did not influence FRP significantly, while extended increase pressure (P) required significantly longer exposure (t-test: p: 0.05).

Conclusion:

No wall of pleural bleb was ruptured below 1.9 bar (1900 water cm), an exceptionally high value in the context of the pleural space. Pressure-resistance of the bleb is independent of the time of the exposure. Our very basic approach confutes all existing mechanical explanation of pneumothorax etiology. These negative findings leave open the room for a focal necrosis theory.

Disclosure: No significant relationships. **Keywords:** pressure, PTX, focal necrosis





"TYPE C" EXTENDED BRONCHOPLASTY FOR LOCALLY-ADVANCED LUNG CANCER

Tomoyuki Hishida, K. Aokage, J. Yoshida, T. Miyoshi, M. Tsuboi Thoracic Surgery, National Cancer Center Hospital East, Chiba, Japan

Objectives:

Extended bronchoplasty associated with combined resection of one lobe and adjacent segment is a demanding procedure requiring adjustment of different calibers, but it is useful to avoid pneumonectomy for locally advanced lung cancer in which complete R0 resection is deemed to be difficult by lobectomy. Although several modes of procedures are considered, left lower lobectomy plus lingular segmentectomy using an extended bronchoplastic technique is so-called "Type C".

Methods:

Since 2008 when we introduced extended bronchoplasty, we performed 10 "Type C" bronchoplasties. We retrospectively reviewed the medical record of the patients and analyzed surgical outcomes.

Results:

The median age was 67 (range, 42 to 80). Squamous cell carcinoma was the most common histology observed in five patients. The clinical \bigcirc N status included 8 cN1. The indication for "Type C" was interlobar (#11) node suspecting of extranodal invasion in nine patients and tumor invasion to lingular segment in one patient. One patient underwent "Type C" as salvage surgery for local recurrence in the primary lesion after definitive concurrent chemoradiotherapy. Bronchoplasty was performed by sleeve (n = 7) or wedge-shaped (n = 3) resection of left main and superior segmental bronchus according to the tumor characteristics using a 4-0 monofilament absorbable material. One case (sleeve) developed anastomotic kinking, and was converted to left pneumonectomy. In all patients, postoperative courses were uneventful, and 9 patients who completed "Type C" extended bronchoplasty had well-healed bronchial anastomosis and well-expanded left superior segment postoperatively. There is no locoregional recurrence with a median follow-up period of 26 months (range, 7 to 76).

Conclusion:

Type C bronchoplasty can be an alternative procedure to avoid left pneumonectomy for locally advanced lung cancer in which R0 resection is difficult through a left lower lobectomy. Long-term outcome with a large number of patients should be evaluated in future.

Disclosure: No significant relationships.

Keywords: segmentectomy, lung cancer, locally advanced lung cancer, bronchoplasty

ANALYSIS OF CYTOKINES IN EPITHELIAL LINING FLUID SERIALLY COL-LECTED USING BRONCHOSCOPIC MICROSAMPLING TECHNIQUE IN A CANINE LUNG TRANSPLANT MODEL

<u>Ryo Hashimoto</u>¹, M. Kohno¹, T. Tsuboi¹, T. Matsuzaki¹, K. Oiwa², A. Hamamoto¹, T. Nakagawa¹, R. Masuda¹, M. Iwazaki¹

¹General Thoracic Surgery, Tokai University School of Medicine, Isehara, Kanagawa, Japan ²Division of Thoracic Surgery, Department of Surgery, Tokai University School of Medicine, Isehara, Kanagawa, Japan

Objectives:

Bronchoscopic microsampling (BMS) method has been developed to evaluate molecules present in epithelial lining fluid (ELF) on distal airways as a less invasive alternative of boron-choalvelolar lavage (BAL). We indicated BMS to collect ELF serially, and analysed chronological changes of cytokines in a canine lung transplantation model.

Methods:

ELF was collected hourly with BMS up to 5 hours after reperfusion in a canine model of left single lung transplantation. Levels of interleukin (IL)-1b, IL-6, and interferon (IFN)- γ in ELF were measured by enzyme-linked immunosorbent assay. The data are presented as means \pm standard deviations. Cytokine concentrations were compared between groups using repeated-measures analysis of variance (ANOVA).

Results:

Serial collection of ELF by BMS in graft lungs was possible without apparent adverse effects, while PaO2 was markedly decreased due to ischemia-reperfusion lung injury. Amount of ELF absorbed in probes distributed 1 to 20 ml. Means of IL-1b levels were 931 ± 2819 pg/ml in graft lungs (n = 6) and 824 ± 1500 pg/ml in the sham group (n = 2), and there was no significant differences between the groups. Means of IL-6 levels were 71.3 ± 116.2 pg/ml in graft lungs, and tended to be higher than that in the sham group (19.6 ± 36.0 pg/ml, p = 0.16). Means of IFN- γ levels were 306 ± 441 pg/ml in the graft lungs and 1246 ± 957 pg/ml in the sham group, and there was significant difference between the groups (p< 0.001).

Conclusion:

BMS method could be used to collect ELF serially on graft lungs minimally invasively on a canine lung transplantation model and chronological change of IL-1b, IL-6, and IFN- γ were shown corresponding to ischemia-reperfusion lung injury.

Disclosure: No significant relationships.

Keywords: bronchoscopic microsampling, epithelial lining fluid, ischemia reperfusion injury, lung transplantation, cytokine



STEM CELL EXTRACELLULAR VESICLES IN LUNG ISCHEMIA REPERFUSION INJURY: A NEW THERAPEUTIC APPROACH?

Lorenzo Rosso¹, L. Lazzari², M. Montoli¹, F. Damarco¹, M. Barilani², V. Vaira³, L. Santambrogio¹, S. Gatti⁴, S. Ferrero³

¹Thoracic Surgery and Lung Transplantation Unit, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy

²Cell Factory, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy ³Pathology, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy ⁴Center for Surgical Research, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy

Objectives:

Lung transplantation is currently the only effective therapeutic option to prolong survival in patients suffering from several end-stage respiratory diseases. The ischemia-reperfusion (I/R) injury is among the main causes of graft dysfunction and mortality after lung transplantation. In several animal models of damage, MSC have proved capable of repairing tissue damage by restoring the function. What is the MSC mechanism of action is not yet clear, but MSC may act by delivering biologically active signals to the cells around the injury and these paracrine functions could be mediated by extracellular vesicles (EVs). In this context, we hypothesized that the MSC-EVs could play a beneficial role in the ischemia-reperfusion injury.

Methods:

MSC-EVs were extensively characterized by electron microscopy, by nanoparticle tracking analysis, by flow citometry and by WB. The content of these microvesicles was assessed and we showed the presence of multiple anti-inflammatory and angiogenic transcripts including interleukin-10 and interleukin-6. In addition we developed an animal model of I/R injury. The institutional review board approved the study. After being anesthetized and intubated, Wistar rats underwent posterolateral thoracotomy with subsequent clamping pulmonary hilum for 45 minutes. After this damage, followed by reperfusion, MSC-EVs were administered endotracheally at 0-24-48 hours. At 72 hours the animals were sacrificed. The animals were divided into different groups: sham rats (n=6), I/R injury rats (n=7), I/R injury + MSC-EV (n=8).

Results:

Some experiments are still ongoing but by microscopy we have already demonstrated that interestingly the MSC-EVs have fully reached the site of the damage and they are integrated with resident cells where presumably MSC-EVs have released their anti-inflammatory contents.

Conclusion:

Further experiments will have to be performed before considering the MSC-EV as a new therapeutic approach for the lung I/R damage but these preliminary results open new research perspectives on the EV use in the field of lung repair.

Disclosure: No significant relationships.

Keywords: mesenchymal stem cells, stem cell extracellular vesicles, ischemia reperfusion injury, lung transplantation

LEARNING CURVE FOR VIDEO-ASSISTED THORACIC SURGERY SEGMENTEC-TOMY

<u>Akira Hamada</u>, K. Nakahashi, H. Watarai, J. Suzuki, H. Kato, H. Oizumi, M. Sadahiro Faculty of Medicine Yamagata University, Yamagata, Japan, Second Department of Surgery, Yamagata-shi, Yamagata, Japan

Objectives:

Data regarding the benefits for the video-assisted thoracic surgery (VATS) segmentectomy are limited. However, the indications of VATS segmentectomy has been widely spread recently, because of the curability and minimally invasiveness. The aim of the present study is to analyze the learning curve for VATS segmentectomy in our institution.

Methods:

We prospectively collected the data of patients receiving this surgery and retrospectively reviewed the data from 252 patients who underwent VATS segmentectomy from 2004 to 2015. Operative time (OT), estimated blood loss (EBL) and complication were analyzed. The learning curve was evaluated using OT and the cumulative sum value of OT(CUSUMOT) in all cases and regarding the leading surgeon of our institution. The required cases were calculated from the inflection point of the curve of the line representing the best fit for the plot.

Results:

In our series of patients, median OT was 178.5 (147.8-220.3) min, and EBL was 50 (5-128.5) g. Once we applied CUSUM method in all cases, we obtained a graph for CUSUMOT (the curve of best fit for the plot = $0.09 \times$ case nuber2 – 15.14 case number – 1087.26), showing three well-differentiated: phase 1 (n=61); initial learning, phase 2 (n=23); increased competence and phase 3 (n=168); highest skill or mastery. As we compared phase 1 and 2 combined with phase 3, we observed significant differences in relation to OT (p < 0.0001), which was shorter in phase 3 and EBL (p=0.0006), which was smaller in phase 3. As the leading surgeon, we observed a significant reduction in OT and EBL after 53 cases.





Conclusion:

The data suggest that the learning phase was achieved after 84 cases in our institution and 53 cases as the leading surgeon.

Disclosure: No significant relationships.

Keywords: segmentectomy, cumulative sum (CUSUM) method, learning curve, video-assisted thoracic surgery (VATS)

REAL TIME HAPTIC FEEDBACK IN ENDOSCOPIC SURGERY RE-EQUIPS THE SURGEON WITH A SENSE OF TOUCH

Michel Vleugels, C. Alleblas, B. Nieboer *O/g, UMCN Nijmegen, Malden, Netherlands*

Objectives:

Laparoscopic instruments, conventional and robotic, lack real time haptic feedback due to high friction and low accuracy; the surgeon has inadequate tissue information and no control of the gripping forces is delivered. Our goal was to develop laparoscopic instruments with haptic feedback which are affordable and applicable in all endoscopic operations.

Methods:

The Force Reflective Operation Instrument (FROI) was developed. Forces applied by tissue resistance on the tip of graspers are registered by optical sensors and processed outside the body through optical electronic units. The real time information is provided to the surgeon by means of a control system giving input to the actuator in the hand piece of the instrument. Additionally, excessive grip forces applied by the surgeon are restricted by an in-built limitation to prevent unexpected or unintended high forces.

Results:

An-organic material with different stiffness and animal cadaver tissue were manipulated with a conventional instrument and with the FROI. Stiffness's of an-organic material as well as animal cadaveric tissue were differentiated better and quicker with significantly lower grip forces.

Conclusion:

The new instrument, equipped with real time haptic feedback, improved both tissue assessment and force control. Real time haptic feedback will restore the lost sense of touch in endoscopic surgery, reducing the risk of tissue damage and creating possibilities to perform more delicate procedures

Disclosure: M. Vleugels: founder patent holder

Keywords: feeling, touch, haptics, hapticfeedback, realtimehaptics



WHICH IS THE BEST MINIMAL INVASIVE APPROACH FOR THE TREATMENT OF SPONTANEOUS PNEUMOTHORAX? UNIPORT, TWO OR THREE PORTS; A PROSPECTIVE RANDOMIZED TRAIL

<u>Ali C. Kutluk</u>, C.I. Kocaturk, H. Akin, S. Erdogan, S. Bılen, O. Saydam, K. Karapınar, C.B. Sezen

Thoracic Surgery, Yedikule Chest Disease and Thoracic Surgery Training Hospital, Istanbul, Turkey

Objectives:

Video-assisted thoracoscopic surgery has become the standard treatment method for primary spontaneous pneumothorax. Concerns about lesser pain and better cosmesis led the evolution of uniportal access. This study prospectively compared the results of the uniportal, two port, and three port thoracoscopic surgery.

Methods:

Hundred and thirty-five patients were randomized into three groups according to the port numbers. The operation technique for all groups was wedge resection and partial apical pleurectomy. The groups were compared regarding the operation time, hospital stay, amount of drainage, area of pleurectomy, number of staplers used, complications, recurrences, and pain scores.

Results:

Except for amount of drainage (p=0.03) no factors were found statistically significant. The overall recurrence rate was 5%. The 4 hour, 24 hour, and 72 hour pain scores were statistically less in the uniportal groups than the other two groups however the first and second week pain scores were not statistically significant (p<0.05).

1	Single port	Two ports	Three ports	p value
Age	27.73±9.49	26.87±8.36	28.12±9.80	0.532
Gender				
Male	41	39	36	0.255
Female	4	6	9	
Side				
Right	23	22	24	0.968
Left	22	23	21	
Operation time (min)	\$2.41±12.04	49.78±11.59	55.92±12.43	0.605
Number of staplers/wedge	2.28±0.10	2.07±0.88	2.20±0.10	0.316
Leakage on postop first day				
Yes	13	17	20	0.378
50	32	28	25	
Presence or absence of bullae at operation	29	26	30	0.520
Drain removal (days)	3.07±0.16	2.73±0.13	2.73±0.27	0.771
Hospital stay (days)	3.73±0.22	3.78±0.20	4.48±0.36	0.09
Amount of drainage	137.80±12.80	164.63±17.13	211.46±28.24	0.03
Area of pleurectomy (cm ²)	46.12±5.02	47.21±10.18	51.91±10.53	0.357
Complications	4	5	7	0.885
Recurrence	2	2	3	0.769

Conclusion:

The study indicated that uniportal VATS approach is less painful and has better cosmetic results due to lesser incision than two or three ports, besides it is as efficient as two or three port VATS approach.

Disclosure: No significant relationships.

Keywords: uniportal, VATS, pneumothorax



IMPACT OF NARROW GASTRIC CONDUIT ON SHORT-TERM OUTCOME FOL-LOWING THORACO-LAPAROSCOPIC ESOPHAGECTOMY

Rong Hua, T. Mao, Z. Li

Department of Thoracic Surgery, Shanghai Chest Hospital, Shanghai, China

Objectives:

To investigate the impact of narrow gastric conduit in thoracolaparoscopic esophagectomy in patients with squamous carcinoma of esophagus.

Methods:

Clinical data of 198 consecutive patients who underwent thoracolaparoscopic esophagectomy with gastric conduit grafting in our department from July 2015 to October 2016 were retrospectively analyzed. All the cases were divided into 2 groups according to the width of gastric conduit: width \leq 3.0 cm as narrow group (n=111); width>3.0 cm as broad group (n=87). All cases were treated with stapling cervical anastomosis and the gastric conduits were completely positioned the esophageal bed. The intraoperative blood losses, the amount of postoperative gastrointestinal decompression, hospital stays and incidences of complications after surgery in the two groups were observed and compared.

Results:

The baseline data among the two groups were comparable in terms of age, gender, location, tumor TNM staging and serum albumin level. No patients died in perioperative peried. In the comparison of the amount of gastrointestinal decompression, the narrow group was less than the broad group [(608 ± 127) ml vs.(1321 ± 146) ml], with a significant difference (P=0.016). There were not significant differences in blood losses [(235.08 ± 63.30) ml vs.(253.63 ± 48.72) ml, P=0.152] and the numbers of hospital stays [(16.32 ± 3.59) d vs.(17.45 ± 3.90) d, P=0.230] in the two groups. The incidence of gastroesophageal reflux in the narrow group was significantly less than that in the broad group, with a significant difference (1.96% vs.10.22%, P =0.023). The occurrence of the complications like anastomotic leakage (10.88% vs.12.87%, P =0.381), postoperative pulmonary complications (13.73% vs.20.91%, P=0.283) and anastomotic stenosis (7.84% vs.11.04%, P=0.480) had no statistical difference in the two groups.

Conclusion:

Minimally invasive esophagectomy with narrow gastric conduit is worthy of clinical promotion. It can improve the life quality of postoperative patients and does not increase morbidity and mortality.

Disclosure: No significant relationships.

Keywords: minimally invasive esophagectomy, esophageal carcinoma, gastric conduit

PREDICTION OF CLINICAL OUTCOMES IN STAGE I NON-SMALL CELL LUNG CANCER AFTER CURATIVE SURGERY FOCUSING ON THE PREOPERATIVE GLASGOW PROGNOSTIC SCORE AND INFLAMMATORY BIOMARKERS

Jörg Lindenmann¹, N. Fink-Neuboeck¹, M. Fediuk¹, E. Gschwandtner¹, P. Swatek¹, A. Strießnig¹, M. Pichler², F. Posch², E. Stacher-Priehse³, U. Anegg¹, A. Maier¹, F. Smolle-Jüttner¹ ¹Division of Thoracic and Hyperbaric Surgery, Medical University of Graz, Graz, Austria ²Division of Oncology, Department of Internal Medicine, Medical University of Graz, Graz, Austria ³Institute of Pathology, Medical University of Graz, Graz, Austria

Objectives:

The Glasgow Prognostic Score (GPS), an "inflammatory" prognostic index incorporating low serum albumin and elevated C-reactive protein, predicts overall survival (OS) in patients with Non-Small Cell Lung Cancer (NSCLC). The aim of this study was to validate this preoperative score in a large population of patients with resected NSCLC stage I.

Methods:

Three hundred consecutive patients with pathologic stage I NSCLC, who had undergone curative surgery between 2005 and 2015, were followed-up.

Results:

Two hundred and twenty nine patients (76%) had a preoperative GPS of 0, and 71 (24%) a GPS ≥ 1 . During a median follow-up of 3.2 years, there were 59 recurrences (19.7%), and 73 patients died (24.3%). 38 deaths (52%) were related to cancer, and 35 (48%) to other causes. The 3-year probabilities of OS, recurrence-free survival (RFS), recurrence, death-from-cancer, and death-from-other-causes were 83%, 78%, 18%, 12%, and 5% in patients with GPS=0, and 74%, 64%, 19%, 8%, and 18% in patients with a GPS ≥ 1 , respectively. Patients with a GPS ≥ 1 had worse OS (p=0.05), worse RFS (p=0.03), and a higher risk of death-from-other-causes (p=0.002, Fig. 1A). GPS did neither emerge to be associated with risk of recurrence (p=0.96), nor with risk-of-death-from-cancer (p=0.60, Fig. 1B). Multivariable analysis adjusted for performance score, age, and gamma-GT levels confirmed the GPS as an independent predictor of worse OS (p=0.04) and death-from-other-causes (p=0.002). The association between a GPS ≥ 1 and worse OS was highly time-dependent (p for "weakening" over time=0.05), with hazard ratios for predicting 1-, 2-, 3-, and 5-year OS of 2.27 (p=0.01), 1.79 (p=0.03), 1.42 (p=0.18), and 0.88 (p=0.74), respectively.



Conclusion:

The preoperative GPS predicts adverse survival outcomes. However, the GPS is only relevant for predicting "background" mortality rather than recurrence and death-from-cancer. Further, its prognostic impact weakens over time, so that it can reasonably be used only for predicting outcomes up to three years after surgery.

Disclosure: No significant relationships.

Keywords: non-small cell lung cancer, Glasgow Prognostic Score, survival

LONG-TERM OUTCOMES AFTER SURGERY FOR NON-SMALL CELL LUNG CANCER DEPENDING ON FEATURES OF N STAGING

Andrei Petrov¹, I. Zemtsova¹, M. Atyukov³ P. Yablonskii³

¹Faculty of Medicine, Saint-Petersburg University, St. Petersburg, Russian Federation ²Thoracic Surgery, City Multi-Field Hospital №2, St. Petersburg, Russian Federation ³Thoracic Surgery, St.Petersburg State Research Institute of Phtisiopulmonology, St.Petersburg, Russian Federation

Objectives:

The aim of this study was to identify the prognostic role of peculiarities of N status and N-staging procedures on long term outcomes after surgery for non-small cell lung caner (NSCLC).

Methods:

A prospective analysis from October 2003 to December 2014 enrolled 505 patients with potentially operable NSCLC and 455 of them underwent curative intent surgery (anatomic lung resection + mediastinal LN dissection). There were 405 males and 100 females; median age was 62.0 years. Patients were divided into two groups: in group I (n=299) preoperative Nstaging was performed according to modified ESTS algorithm (based on videomediastinoscopy and PET-CT); where as in group II (n=206) the staging algorithm was not fulfilled. Features of intraoperative N-staging were analyzed in both groups. Overall survival (OS) was estimated by Kaplan-Meier from the date of the operation until death of any cause or the date of last followup. All statistics was carried out using SPSS version 21.

Results:

Five-year survival for patients with N0, N1 and N2 NSCLC was 50%, 34% and 13%, respectively (p<0,05). Median survival and 5-year survival was significantly better in group I, than in group II (67 months, 52% vs 36 months, 27%; p<0,01). In multivariate Cox proportional hazards analysis, deviation from the algorithm of preoperative N-staging was a significant independent predictor of inferior survival (p<0,05; OR=2,8). For patients with pN0-N1 we found strong correlation between number of investigated LN stations (mediastinoscopy + intraoperative LN dissection) and long-term survival: assessment of £3 stations resulted in 35% 5-year survival; 4-5 stations – 54%; ³6 stations – 66% (p<0,05).

Conclusion:

Incorrect preoperative and intraoperative N-staging is associated with poor long-term outcomes after surgery for NSCLC.

Disclosure: No significant relationships.

Keywords: surgery treatment, mediastinoscopy, long-term outcomes, lung cancer


LIMITED RESECTION FOR SMALL-SIZED NON-SMALL CELL LUNG CANCER WITH GROUND GLASS OPACITIES: A JAPAN NORTH-EAST THORACIC SURGI-CAL STUDY GROUP (JNETS) PHASE II STUDY

<u>Hirohisa Kato</u>, H. Oizumi, M. Sagawa, H. Suzuki, A. Sakurada, M. Chida, H. Uramoto, S. Shiono, J. Abe, T. Hasumi, Y. Nakamura, N. Sato, J. Shibuya, H. Deguchi, H. Oura, Y. Matsumura, M. Minowa, S. Ota, Y. Okada

Japan North-East Thoracic Surgical Study Group (JNETS), Yamagata City, Japan

Objectives:

Small-sized pulmonary nodules with ground glass opacities (GGOs) have recently increased in frequency. Limited resection of such nodules has been deemed acceptable based on some retrospective studies. We prospectively evaluated the pre-operative assessment and prognosis of small-sized pulmonary nodules with GGOs following limited resection.

Methods:

The inclusion criteria were as follows: (1) tumor size, 8-20 mm; (2) > 80% GGO ratio on high-resolution computed tomography (HR-CT); (3) negative 18F-fluorodeoxyglucose accumulation in the tumor on positron emission tomography (PET)-CT; (4) patients with expected intentional cure with wedge resection (segmentectomy was tolerated in the tumor location); (5) Noguchi type A/B diagnosed via frozen section; and (6) no cancer cells on intra-operative stump cytology. Between November 2006 and April 2012, a total of 73 patients with suspected lung cancer were prospectively enrolled from 16 institutions. The overall survival and recurrence-free survival were analyzed.

Results:

Fifty-three patients were eligible for this study by the intraoperative evaluations. The mean age was 61.7 ± 10.8 years (range, 26-79 years). The mean tumor size was 14 ± 3.4 mm (8-9 mm, n=4; 10-14 mm, n=26; 15-20 mm, n=23) and the mean GGO ratio was $95.9 \pm 7.2\%$ (80-89%, n=12; 90-99%, n=2; 100%, n=39). Thirty-nine and 14 patients underwent wedge resections and segmentectomies, respectively. Five open thoracotomies and 48 thoracoscopic surgeries were performed. Forty-seven patients were diagnosed with Noguchi type A/B (88.7%) and 6 patients had Noguchi type C (11.3%). All patients were staged as pT1aN0M0-IA. No completion lobectomies were performed. One patient died due to another malignant disease. The 5-year overall survival and recurrence-free survival rates were 98.1% and 100%, respectively, during a mean follow-up period of 64.8 ± 17.6 months (range, 22-107 months).

Conclusion:

Pre-operative assessment using HR-CT and PET-CT for small-sized lung cancer with GGOs is feasible. The outcomes of limited resection for small-sized lung cancer with GGOs were satisfactory.

Disclosure: No significant relationships. **Keywords:** limited resection, GGO, prospective study

INTER-INSTITUTIONAL REPRODUCIBILITY OF NONINTUBATED THORACO-SCOPIC SURGERY WITH ADOPTION OF A TECHNICAL EQUIPOISE STRATEGY

E. Pompeo¹, M. Peer², <u>Marina Kolodii</u>², M. Dauri³, V. Gofman⁴, C. Becucci¹, P. Rogliani⁵, N. Nativ⁶

¹Thoracic Surgery, Tor Vergata University, Rome Italy ²Thoracic Surgery, Assaf Harofeh Medical Center, Zerifin, Israel ³Anesthesia and Intensive Care, Tor Vergata University, Rome, Italy ⁴Anesthesia, Assaf Harofeh Medical Center, Zerifin, Israel ⁵Pulmonology, Tor Vergata University, Rome, Italy ⁶Pulmonology, Assaf Harofeh Medical Center, Zerifin, Israel

Objectives:

Aim of this study was to investigate reproducibility of nonintubated video-assisted thoracic surgery (NIVATS) performed under spontaneous ventilation in experienced (Center A) and nonexperienced (Center B) University Institutions following adoption of a strategy aimed at achieving technical equipoise standards.

Methods:

Between April and December 2016 a joint NIVATS program was started between two university institutions, one in Italy (Center A) and one in Israel (Center B) according to the following strategy: 1) Theoretical and practical multidisciplinary tutoring performed on-site with recognized experts in the field to pursue technical equipoise standards. 2) Real-time exchange of data and images by web and smartphone facilities to optimize management of controversial issues. 3) Prospective collection of standardized data in a common dbase. 4) Comparative assessment of results including a propensity score matching analysis to test the inter-Institutional reproducibility of outcomes.

Results:

Overall, 60 NIVATS procedures have been included in the analysis, 26 from Center B operated on during the study period, and 34 from center A drawn through propensity score matching. Type of surgical procedures included pleural biopsy with or without talc pleurodesis (N=22), pulmonary wedge resection (N=20), lung volume reduction for severe emphysema (N=14), pleural decortication (N=2), pericardial window (N=2). The 2 cohorts were well matched for age, type of anesthesia, type of surgical procedure and associated comorbidity. At comparative (Center A vs B) analysis, mean operative time differed significantly (33 ± 10 min vs 45 ± 15 min, P<0.001) whereas there was no difference in technical feasibility (1.97 ± 0.2 vs 1.96 ± 0.2 , P=0.85), mortality (0), morbidity (2 vs 3, P=0.64), patient's satisfaction with the anesthesia (0.97 ± 0.2 vs 0.92 ± 0.3 , P=0.41), and hospital stay (4.1 ± 4 days vs 5.4 ± 8 days, P=0.45).



Conclusion:

The current study suggests that satisfactory and comparable results with no mortality and low morbidity can be achieved by NIVATS both in experienced and non-experienced Institutions following adoption of a multidisciplinary technical equipoise strategy.

Disclosure: No significant relationships.

Keywords: Nonintubated VATS, spontaneous ventilation, regional anestheisa, morbidity, propensity score matching, multi-institutional study

THE ABDOMINAL PHASE WITH ROBOTIC ASSISTANCE HAS NO ADVANTAGE ON THE SHORT-TERM OUTCOMES IN ROBOTIC ASSISTED MINIMALLY INVA-SIVE ESOPHAGECTOMY

X. Zhang, <u>Zhigang Li</u> Thoracic Surgery, Shanghai Chest Hospital, Shanghai, China

Objectives:

This study aims to compare the short-term outcomes of total robotic esophagectomy (TRE) and hybrid thoracic robotic esophagectomy (HTRE) with open abdominal phase for resectable esophageal squamous cell carcinoma (ESCC).

Methods:

A total of 110 patients with ESCC, received robotic assisted Mckeown esophagectomy and extensive thoraco-abdominal two-field lymph node dissection, were consecutively recruited between November 2015 and November 2016 at our institution. Sixty four patients received TRE, and 46 patients received HTRE.

Results:

There was no statistic difference between two groups with regard to age, gender, body mass index, American Society of Anaesthesiologists score, tumor location, Charlson Comorbidity Index, neoadjuvant therapy, clinical and pathological stage. No significant difference was noted between TRE and HTRE in the terms of total operative duration $(273.3\pm53.4 \text{ vs. } 267.9\pm60.1, P=0.551)$ and thoracic phase operative duration $(95.2\pm26.0 \text{ vs. } 99.3\pm30.2, P=0.639)$. However, the abdominal phase operative duration was longer in the TRE group $(112.8\pm36.0 \text{ vs. } 90.0\pm24.4, P=0.025)$. There was no difference between the TRE and HTRE in total number of the retrieved lymph nodes $(17.2\pm10.3 \text{ vs. } 18.7\pm9.9, P=0.455)$ or the number of dissected abdominal lymph nodes $(6.1\pm4.4 \text{ vs. } 7.4\pm7.7, P=0.511)$. No difference was observed between TRE and HTRE in the rate of overall complications (42.2% vs. 45.7%, P=0.718) or the length of postoperative hospital stay $(17.8\pm13.5 \text{ vs. } 17.9\pm11.5, P=0.971)$.

Conclusion:

The abdominal phase with robotic assistance had no advantage on the short-term outcomes in robotic assisted minimally invasive esophagectomy. Hybrid thoracic robotic esophgaectomy with abdominal open was feasible with shorter operative time.

Disclosure: No significant relationships.

Keywords: esophageal cancer, robotic surgery, short-term outcomes



IMPACT OF HUMAN LEUCOCYTE ANTIGEN MISMATCH ON LUNG TRANS-PLANT OUTCOME

<u>Yoshito Yamada</u>¹, T. Langner¹, I. Inci¹, C. Benden², M. Schuurmans², W. Weder¹, W. Jungraithmayr¹

¹Division of Thoracic Surgery, University Hospital Zurich, Zurich, Switzerland ²Department of Pulmonary Medicine, University Hospital Zurich, Zurich, Switzerland

Objectives:

Human Leucocyte Antigen (HLA) mismatch between donor (D) and recipient is likely to impact on the outcome after transplantation (Tx) of solid organs based on different immunological risk profiles for allograft dysfunction. Although the lung is considered particularly highly antigenic, the impact of HLA matching between D and R has been shown to be heterogeneous on lung Tx outcome. This is a single cohort analysis of the outcome of D/R HLA-mismatch after lung Tx.

Methods:

All patients who underwent lung Tx were analyzed in this retrospective study between 1994 and 2013 for their matches of HLA (-A, -B, DR) antigens between D and R, and their association with the incidence of acute cellular rejection (ACR), chronic lung allograft dysfunction (CLAD) and overall survival (OS).

Results:

Three hundred and eighty five patients (204 males, 181 females) were included. From these, 189 patients had no HLA match (0/6), 130 had 1/6 match, 54 had 2/6 matches and 12 had 3/6 matches. 128 patients (33.2%) experienced at least one episode of ACR and 54 (14%) developed CLAD. Univariate analyses did not show a significant correlation between HLA mismatch and the incidence of ACR, CLAD, or OS. However, a trend was seen towards improved survival in patients having 3/6 matches compared to others. Also, multivariate analysis revealed that the number of HLA mismatches (HR 1.48; p=0.036), the incidence of ACR (HR 1.81; p=0.032) and the age of donors (HR 1.02; =0.018) were independent risk factors for CLAD development.



Conclusion:

Although highly antigenic, the number of HLA mismatches between D and R after lung Tx did not correlate with a higher incidence of ACR or OS. In this single center cohort analysis, the number of HLA mismatches correlated with the incidence of CLAD. HLA mismatch should therefore be evaluated as a risk factor for CLAD in larger cohorts and prospective studies.

Disclosure: No significant relationships.

Keywords: lung transplantation, human leucocyte antigen, chronic lung allograft dysfunction



COMPARISON STUDY OF PD-L1 IMMUNOHISTOCHEMISTRY ASSAYS WITH 22C3 AND 28-8 FOR NON-SMALL CELL LUNG CANCERS: HOW CAN THE RESULTS BE TRANSLATED BETWEEN THE TWO?

Tomohito Saito¹, K. Tsuta², Y. Kinoshita³, H. Ryota⁴, N. Miyata², Y. Takeyasu⁵, K. Fukumoto¹, H. Matsui¹, Y. Taniguchi¹, H. Yanagimoto⁴, T. Yokoi⁵, T. Kurata⁵, T. Murakawa¹

¹Thoracic Surgery, Kansai Medical University Hospital, Hirakata, Japan

²Pathology, Kansai Medical University Hospital, Hirakata, Japan

³Pathology, Kansai Medical University Medical Center, Moriguchi, Japan

⁴Surgery, Kansai Medical University Hospital, Hirakata, Japan

⁵Thoracic Oncology, Kansai Medical University Hospital, Hirakata, Japan

Objectives:

The checkpoint inhibitors programmed cell death (PD-1) and its ligand (PD-L1) antibodies are promising treatment agents for patients with advanced Non-Small Cell Lung Cancer (NSCLC). Their clinical efficacy is predicted by drug-tailored PD-L1 immunohistochemistry (IHC) test systems. We aimed to identify the similarity and distinction of 22C3 and 28-8 IHC tests.

Methods:

Forty-seven consecutive cases of completely resected NSCLC between January 2010 and October 2010 that had adequate tissue samples were investigated. From the archived samples, 5-µm thick sections were cut and stained with PD-L1 IHC 22C3 PharmDx and 28-8 PharmDx (Dako, Santa Clara, CA). The percentages of tumor cells stained in each test were measured. Positivity for and high expression levels of PD-L1 were defined as \geq 1% and \geq 50% of tumor cells stained, respectively. Statistical significance was defined as a p-value of <0.05.

Results:

The study population included 42 patients with adenocarcinomas, three with large cell neuroendocrine carcinomas, and two with squamous cell carcinomas. Thirty-eight patients had pStage I; 5, pStage II; and 4, p Stage IIIA tumors. Positivity for 22C3 and 28-8 was detected in 18 (38.3%) and 15 cases (31.9%), respectively. The detection rate of high PD-L1 expression was 12.8% (6 cases) with 22C3 and 2.1% (1 case) with 28-8 (p = 0.111). The Spearman correlation coefficient between the two IHC tests was 0.836 (95% confidence interval, 0.722–0.909; p < 0.0001). No PD-L1 expression was detected with 28-8 in 5 specimens with low PD-L1 expresssion levels (1% to 10% tumor cells stained), demonstrated with 22C3. No PD-L1 expression was detected with 22C3 in two specimens showing 1% tumor cells staining for 28-8.



Conclusion:

Overall, 22C3 and 28-8 showed similar trends, but some results were conflicting. Further investigation is necessary for a more accurate interpretation of PD-L1 expressions in NSCLCs assessed with the two antibodies.

Disclosure: T. Saito: This research is supported by Ono Pharmaceutical Corporation Limited and Brystol-Myers Squibb Company.

K. Tsuta: This research is supported by Ono Pharmaceutical Corporation Limited and Brystol-Myers Squibb Company.

Y. Kinoshita: This research is supported by Ono Pharmaceutical Corporation Limited and Brystol-Myers Squibb Company.

H. Ryota: This research is supported by Ono Pharmaceutical Corporation Limited and Brystol-Myers Squibb Company.

N. Miyata: This research is supported by Ono Pharmaceutical Corporation Limited and Brystol-Myers Squibb Company.

Y. Takeyasu: This research is supported by Ono Pharmaceutical Corporation Limited and Brystol-Myers Squibb Company.

K. Fukumoto: This research is supported by Ono Pharmaceutical Corporation Limited and Brystol-Myers Squibb Company.

H. Matsui: This research is supported by Ono Pharmaceutical Corporation Limited and Brystol-Myers Squibb Company.

Y. Taniguchi: This research is supported by Ono Pharmaceutical Corporation Limited and Brystol-Myers Squibb Company.

H. Yanagimoto: This research is supported by Ono Pharmaceutical Corporation Limited and Brystol-Myers Squibb Company.

T. Yokoi: This research is supported by Ono Pharmaceutical Corporation Limited and Brystol-Myers Squibb Company.

T. Kurata: This research is supported by Ono Pharmaceutical Corporation Limited and Brystol-Myers Squibb Company.

T. Murakawa: This research is supported by Ono Pharmaceutical Corporation Limited and Brystol-Myers Squibb Company.

Keywords: non-small cell lung cancer, PD-L1, immunohistochemistry, 22C3, 28-8



MANAGEMENT OF PATIENTS WITH BILATERAL VOCAL CORD PARALYSIS FOLLOWING ESOPHAGECTOMY

Hong Kyu Lee, D.W. Yoon, J.H. Cho, H.K. Kim, Y.S. Choi, J.I. Zo, K. Kim, Y.M. Shim Thoracic and Cardiovascular Surgery, Samsung Medical Center, Seoul, Republic of Korea

Objectives:

Vocal cord paralysis (VCP) after esophagectomy is a common complication and it is frequently associated with pneumonia. However, it has been reported in rare series of esophagectomy patients in regard to bilateral VCP. The aim of our study was to investigate the clinical significance of patients who had bilateral VCP following esophagectomy.

Methods:

Retrospectively, we reviewed the patients who underwent esophagectomy at the single center institute from 1994 to 2014. Among these, patients who had bilateral VCP were included in this study.

Results:

A total of 2347 patients who underwent esophagectomy were reviewed and VCP occurred in 209 (8.9%) patients. Among these, 6.8% (25/209) were found as bilateral VCP by using laryngoscopy after esophagectomy. The surgical procedures were 3-field operation (N=11), 3-hole operation (n=6), Ivor Lewis operation (n=5), and others (n=3). During the postoperative managements, only 7 patients (28%) required tracheostomy. Two had in-hospital mortality due to pneumonia and ARDS. The other 23 patients were able to discharge from hospital. The median postoperative hospital staying was 20 days (range, 13-157), and the median ICU staying period was 3 days (range, 1-46). Four patients (16%) discharged with enteral feeding using jejunos-tomy with N.P.O., and 19 patients (76%) were able to discharge home with oral feeding after aggressive rehabilitation and education.

Conclusion:

Bilateral VCP following esophagectomy was rare, but it required great attention to prevent severe respiratory complications. However, only several patients required tracheostomy and the majority of patients were able to be discharged home with oral feeding after aggressive training, even though patients suffered from bilateral VCP. Feeding education and respiratory rehabilitation are critical for the management of these patients.

Disclosure: No significant relationships.

Keywords: esophageal cancer, recurrent laryngeal nerve, vocal cord paralysis

RISK FACTORS FOR QUALITY OF LIFE FOLLOWING LUNG RESECTION SURGERY

<u>Nagarjun Konda</u>¹, A. Kerr², J. Webb², P. Rajesh², R. Steyn², M. Kalkat², E. Bishay², B. Naidu² ¹University of Birmingham, Birmingham, United Kingdom ²Thoracic Surgery, Heartlands Hospital, Birmingham, United Kingdom

Objectives:

The number of patients undergoing curative surgery for lung cancer is increasing. Whilst it is important to look at crude measures such as mortality, a quality of life questionnaire provides a holistic comparison of a patient's global and physical functioning measures. Therefore, a quality of life tool may identify preventable risk factors to predict and reduce complication and comorbidity rates from pulmonary resection.

Methods:

A prospective study of 235 patients, undergoing lung resection, was conducted over a period of five years at a regional thoracic surgery unit. Demographic data was collected as well as pre-operative and post-operative clinical outcomes such as length of stay, mortality, pulmonary complications and readmission to hospital. The EORTC QLQ-C30 quality of life (QOL) tool was used in this study and questionnaires were administered pre-operatively (n=235), post-operatively at five weeks (n=122) and then at five months (n=90).

Results:

Mean age was 68 (\pm 9.4), mean pre-operative FEV1 was 83 (\pm 21) % predicted and predicted post-operative FEV1 was 66 (\pm 18) %. The clinical characteristics are summarised in a table. Thoracotomy, pneumonectomy, pre-operative QOL, age over 80, current/recent smoking, not attending pre-op rehabilitation classes and poor exercise capacity were all associated with poorer QOL within specific domains. Only thoracotomy, pneumonectomy and pre-operative QOL score were significantly associated with a drop in global QOL after surgery. There was a significant drop in global QOL from 69 (\pm 22) pre-operatively to 60 (\pm 23) five weeks following surgery with a partial recovery to 65(\pm 22) five months post-op.



Pre-Operative Statistics		Frequency	Percentage (%)
	Current & stopped <6weeks	74	31.4
Smoking History	Ex-smoker & >6weeks	125	53.1
	Never	23	9.8
COPD (Golds Criteria)	Severe (Golds 3&4)	12	5.1
Pre operative Spirometer	<40	5	2.1
FEV1 (% Predicted)	41-60	28	11.9
revi (#rreueeeu)	>60	200	85.1
Post Onesative Predicted	<40	11	4.7
FEV1 (%)	41-60	71	30.2
	>60	144	61.3
Pre-Operative Activity Level	<400m	72	30.7
The operative Activity Level	>1km	158	67.2
Attended Rehabilitation			
Classes	Yes	54	23.0
	Epidural	98	41.7
Analgesia	Paravertebral	83	35.3
	Other	54	23.0
Incision	Thoracotomy	188	80.0
incision	VATS	47	20.0
	Lobectomy	188	80.0
Surgery Type	Pneumonectomy	11	4.7
	Other	36	15.3
	Early (IA-IIB)	163	69.4
Lung Cancer Stage	Late (IIIA-IV)	47	20.0
Lung Cancer Stage	Metastatic	6	2.6
	Benign	19	8.1
Post-Operative Outcomes		Frequency	Percentage (%)
Postoperative Pulmonary	None	198	84.3
Complication Rate	Yes	34	14.5
ITLL Admission Rate	Var	0	2.0

Conclusion:

The EORTC QLQ-C30 QOL tool in this study seems to capture the dynamic changes in patientfocused outcomes after lung surgery and picks up expected differences based on well-established risk factors. The poor response rate of post-operative questionnaires could be a barrier for clinical use as an audit tool of quality. Further work is required to understand how we can improve this and determine modifiable risk factors which could affect QOL.

Disclosure: No significant relationships.

Keywords: thoracic surgery, postoperative pulmonary complications, lung cancer, pulmonary resection, quality of life, EORTC QLQ-C30

TOTAL PLEURAL COVERING (TPC) FOR DIFFUSED CYSTIC LUNG DISEASES WITH INTRACTABLE RECURRENT PNEUMOTHORAX

Masatoshi Kurihara, T. Mizobuchi

Pneumothorax Research Center, Nissan Tamagawa Hospital, Tokyo, Japan

Objectives:

We already reported the results of the technique of Total Pleural Covering (TPC) for Lymphangioleiomyomatosis (LAM) patients with recurrent pneumothorax required lung transplantation (PLOS ONE DOI:10.1371 September 22, 2016) TPC could successfully prevent the recurrence of pneumothorax for LAM and never caused restrictive respiratory impairment. We applied TPC to other diffused cystic lung diseases with recurrent pneumothorax.

Methods:

For 51 LAM patients, five COPD patients and 61 BHDS patients, underwent TPC. The whole visceral pleura was covered with about 12 regenerated oxidized cellulose meshes. TPC is a method to cover the whole visceral pleura including apex of lung, interlobular pleura, mediastinal pleura, and basal pleura with a lot of meshes under VATS. This method is to reinforce the whole visceral pleura without adhesion to thoracic wall.

Results:

There are five recurrence in 51 cases of LAM, no recurrence in five cases of COPD and five cases of 61 cases of BHDS for 102 months at the maximum. Talc causes severe adhesion to the thoracic wall to prevent recurrent pneumothorax but the recurrence rate was not always excellent. The side effects are serious because talc causes restrictive respiratory impairment and causes severe adhesion to thoracic wall. This phenomenon makes it difficult to perform lung transplant in future. Talc should be avoided to prevent recurrent pneumothorax. Regenerated cellulose mesh is the material with adhesion preventing and pleural thickening. Total Pleural Covering causes thickness of just visceral pleura without raising adhesion, and it is surgical method to reasonably and ultimately prevent recurrent pneumothorax.

Conclusion:

TPC can be expected as a innovative and superior method to prevent recurrent secondary spontaneous pneumothorax for diffused cystic lung diseases as well as LAM.

Disclosure: No significant relationships.

Keywords: pneumothorax, total pleural covering, diffused cystic lung diseases, thoracoscopic surgery, innovative surgery



THE VALUE OF VIDEO-ASSISTED MEDIASTINOSCOPIC LYMPHADENECTOMY (VAMLA) IN CLINICAL STAGE I NON-SMALL CELL LUNG CANCER

Akif Turna, H.V. Kara, B. Kilic, E. Ersen, K. Kaynak

Department of Thoracic Surgery, Istanbul University Cerrahpasa Medical School, Istanbul, Turkey

Objectives:

The rate of mediastinal lymph node metastasis is controversial for patients with clinical stage I non-small cell lung cancer(NSCLC). The primary advantage of video-assisted mediastinoscopic lymphadenectomy(VAMLA) over conventional mediastinoscopy or videomediastinoscopy is to reduce the false-negative rate. We aimed to analyze to evaluate the value of routine VAMLA for patients with clinical T1a-T2aN0 tumor

Methods:

From March 2010-December 2016, 220 patients with cT1-T2a non-small cell lung cancer underwent invasive mediastinal staging. Of those, 142 patients (64.5%) had VAMLA whereas 78 (35.5%) had standard mediastinoscopy. Stations #2L, 2R, #4R, #4L, 7 were dissected in almost all patients. In some patients, #10R and #8 lymph nodes were biopsied. The patients who had negative VAMLA/mediastinoscopy results underwent anatomic pulmonary resection and systematic lymph node dissection.

Results:

The median and mean numbers of resected lymph node stations were 5 and 4.9 in the VAMLA group and 4 and 4.5 in the mediastinoscopy group (P =0.9). The mean number of lymph nodes per biopsy specimen using standard mediastinoscopy was 11.1, whereas it was 27.0 using VAMLA (P<0.001). VAMLA disclosed N2 or N3 disease in 34 (23.9%) and in 1 (0.7%) of patients, respectively. In patients who underwent standard mediastinoscopy, 10 patients (12.8%) were found to have N2, 1 patient (1.3%) had N3 involvement. The negative predictive value(p=0.01), sensitivity(p=0.03) and accuracy of VAMLA(p=0.04) were statistically higher in the VAMLA groups compared with those of standard mediastinoscopy. The unveiled N2 disease was higher in subcarinal and right paratracheal lymph nodes compared to those of standard mediastinoscopy (p=0.02, p=0.04 respectively).

Conclusion:

VAMLA seems to disclose considerable number of mediastinal lymph node metastasis patients with c T1a-T2aN0 NSCLC. Routine use of VAMLA in clinical stage I patients can be recommended.

Disclosure: No significant relationships.

Keywords: mediastinal staging, mediastinoscopy, VAMLA, stage 1, non-small cell lung cancer

PROGNOSTIC IMPACT ON LUNG CANCER SURGERY IN OCTOGENARIAN: JAP-ANESE MULTICENTER RETROSPECTIVE ANALYSIS

Haruaki Hino¹, T. Nishimura¹, A. Sano², Y. Yoshida³, T. Fukami⁴, Y. Furuhata⁵, M. Tanaka⁶, T. Karasaki⁷, T. Takahashi⁷, M. Kawashima⁷, H. Kuwano⁷, K. Nagayama⁷, J. Nitadori⁷, M. Anraku⁷, M. Sato⁷, J. Nakajima⁷

 ¹Department of Thoracic Surgery, Tokyo Metropolitan Geriatric Hospital and Institute of Gerontology, Tokyo, Japan
 ²Department of Thoracic Surgery, Chigasaki Municipal Hospital, Chigasaki, Japan
 ³Department of Thoracic Surgery, Asahi General Hospital, Asahi, Japan
 ⁴Thoracic Surgery, National Hospital Organization Tokyo National Hospital, Kiyose, Japan
 ⁵Thoracic Surgery, Japanese Red Cross Medical Center, Tokyo, Japan
 ⁶Thoracic Surgery, The University of Tokyo Graduate School of Medicine, Tokyo, Japan

Objectives:

The aim of this study is to analyse the preoperative comorbidity and the survival time of lung cancer for octogenarians and investigate reasonable prognostic factors from multicenter retrospective analysis.

Methods:

We performed a retrospective multicenter analysis and clinical data was collected from medical files. All patients, who were 80-years-old or more, were underwent radical surgery for primary lung cancer from January 1998 to December 2015 in seven hospitals. Preoperative clinical date, surgical results and survival time were evaluated. As prognostic factors, Charlson Comorbidity Index (CCI) and Glasgow Prognostic Score (GPS) were used.

Results:

Three hundred and thirty seven cases were included and analysed in this study. Median age was 82 (range 80-92), and male predominance was 68.1% (216 cases). Preoperative comorbidity was complicated in 61.4% (207 cases). CCI 0/1/2/3- were 130/67/85/55, and GPS 0/1/2 were 240/60/20 respectively. GPS and CCI did not have any significant relationship by Pearson's correlation analysis (p=0.16). Operations included 237 (70.3%) lobectomies, 66 (19.6%) partial resections, 28 (8.3%) segmentectomies, 5 (1.5%) bilobectomies, and 1 (0.3%) pneumonectomy. Postoperative complication and mortality were 119 (35.3%) and 7 (2.1%) respectively. Pathological staging I/II/III were 239/60/38. Die of cancer and die of non-cancer were 52 and 50 respectively. On univariative and multivariative analysis, pathological staging (p<0.01, hazard ratio 2.28), CCI over 2 (p=0.01, hazard ratio 2.25), and GPS 1 and 2 (p=0.04, hazard ratio 2.12) were significant prognostic factors for overall survival. The 5-year overall survival rate combined with CCI and GPS revealed that 77.8%, 57.1% and 36.6% with CCI (0, 1) and GPS (0), CCI (2-) or GPS (1, 2), and CCI (2-) and GPS (1, 2) respectively (p<0.01). The survival curves were shown in the figure.





Conclusion:

Both CCI and GPS as well as pathological staging were useful prognostic factors for an octogenarian lung cancer who underwent radical surgery in Japanese cohort study.

Disclosure: No significant relationships.

Keywords: lung cancer, octogenarian, prognostic factor, co-morbidity, database

INDOCYANINE GREEN FLUORESCENCE NAVIGATION THORACOSCOPIC METASTASECTOMY FOR DIFFERENT PULMONARY METASTASIS TUMORS

Jian Zhou, F. Yang, H. Li, R. Xiao, F. Yang, W. Jun Thoracic Surgery, Beijing University People's Hospital, Beijing, China

Objectives:

To achieve longer survival and lower tumor burden, thoracoscopic metastasectomy is performed in the treatment of various pulmonary metastatic diseases. However, due to lack of thorough palpation, surgeons may neglect micro metastasis nodules. This study clarifies the feasibility and safety of Indocyanine Green (ICG) fluorescence navigation thoracoscopic metastasectomy.

Methods:

Eleven patients diagnosed as pulmonary metastasis of extra-pulmonary malignancies were included. All patients were confirmed to have no allergy to iodine or Indocyanine Green (ICG), and have negative results for ICG skin test. All the patients were injected with 4 or 5mg/kg indocyanine green (ICG) 18-26 hours prior to surgery. D-light P thoracoscope (KARL STORZ GmbH & Co, Germany) were used to detect near-infrared fluorescent light during surgery. Images and videos were retrieved. All patients underwent thoracoscopic explorations under "Standard" white light mode, then "Standard" near infrared light mode, and "Spectra A" near infrared light mode at last.

Results:

Three females and eight males were included in the study. The mean age is 43 (ranging from 20 to 70). The primary malignancy included three colorectal cancer, two hepatocellular carcinoma, two osteosarcoma, three chondrosarcoma, and one renal cell carcinoma. Preoperative examination and intraoperative inspection and palpation revealed 24 nodules. ICG fluorescence navigation thoracoscopic detected 36 nodules. The final pathology confirmed 33 malignant nodules. The sensitivities and positive predictive values of ICG-fluorescence imaging were 82.9% (34 fluorescing lesions of the 41 malignant nodules) and 73.7% (28 cancers of the 38 fluorescing lesions). No ICG-related adverse event was observed.

Conclusion:

This study demonstrates the feasibility and safety of ICG-fluorescent imaging for metastatic pulmonary nodules identification in VATS pulmonary resection.

Disclosure: No significant relationships.

Keywords: indocyanine green, fluorescence navigation, thoracoscopic metastasectomy



SURGICAL SAMPLING IS AN EMERGING ISSUE IN THE ASSESSMENT OF THE IMMUNE CONTEXTURE IN NON SMALL CELL LUNG CANCER (NSCLC)

F. Quaini¹, Giovanni Bocchialini², G. Mazzaschi¹, D. Madeddu¹, L. Gnetti³, P. Carbognani²,

E. Quaini⁴, E.M. Silini³, S. Cavalli¹, L. Ventura², L. Ampollini²

¹Clinical and Experimental Medicine, University of Parma, Parma, Italy

²*Thoracic Surgery Unit, University Hospital of Parma, Parma, Italy*

³Pathology, University Hospital of Parma, Parma, Italy

⁴San Donato Hospital, Clinical Institute Sant'Ambrogio, Milan, Italy

Objectives:

The attractive era of liquid biopsy may obfuscate the growing need to define the basic cellular and microenvironmental events responsible for the immune surveillance against cancer. The success of Immune Checkpoint Inhibitors targeting PD-1/PD-L1 rises the question whether tissue sampling is critical to assess the predictive/prognostic value of NSCLC immune contexture.

Methods:

The immune contexture was defined by the measurement of PD-L1 and different subpopulations of TILs in consecutive samples from 54 ADC and 70 SCC. PD-L1 levels were determined by Histo-score and quantitative immunofluorescence using clones 28-8 and SP142 antibodies. The magnitude of sampling for each parameter was established considering the fundamental principles regulating the morphometric quantification of biological processes.

Results:

Eighteen pneumonectomies, 72 lobectomies, 21 atypical pulmonary resections and 13 transbronchial biopsy (TB) were analysed. Neoplastic cells represented only $49\pm4\%$ of the tissue and expressed variable inter and intra-patient degree of PD-L1 intensity, requiring the analysis of an average $1,580\pm148$ cells, which involves a minimum tissue area of 5 mm2 (1.2 gr). At variance with surgical procedures, such sampling was available in only in 15% TBs. The average n/mm2 of CD3pos and CD8pos lymphocytes was 979.8 ± 105 and 114 ± 17 , respectively, while corresponding number of CD4pos cells was 52 ± 10 . PD-1pos cells varied from 3.5/mm2 to 135.9/mm2 and Treg and NK had a density of 3.5 ± 1.4 and $0.37\pm0.2/mm2$, respectively. A high discrepancy was observed comparing small and large specimens. Applying stereologic principles, the minimum sampling area for PD-1, Treg and NK evaluation was 20mm2 (4.8gr). This sampling size was possible in 95% pneumonectomies, 93% lobectomies, 85% atypical resections and only in 8% TBs. Finally, extended sampling allowed the detection of tertiary lymphoid structures in 38.6% of NSCLC.

Conclusion:

Adequate surgical sampling is fundamental to assess the biological and clinical significance of the immune contexture in NSCLC.

Disclosure: No significant relationships. **Keywords:** NSCLC, surgical sampling, PD-1/PD-L1 immune checkpoint

THE USE OF AMPLATZER DEVICE FOR CLOSURE OF POST-PNEUMONEC-TOMY BRONCHOPLEURAL FISTULA: A SINGLE-CENTRE EXPERIENCE. SOLU-TION FOUND?

Igor Motus¹, A. Bazhenov¹, A. Tsvirenko¹, R. Basyrov²

¹Thoracic Surgery, Urals Research Institute for Phthisiopulmonology, Ekaterinburg, Russian Federation ²Endoscopy, Urals Research Institute for Phthisiopulmonology, Ekaterinburg, Russian Federation

Objectives:

Radical surgical interventions for post-pneumonectomy bronchopleural fistulas (PP-BPF) closure are often technically difficult, not always successful and suitable for compromised patients. Endoscopic techniques are very promising in this field. The aim of this study was to assess our initial experience in PP-BPF treatment by means of endoscopic insertion of Amplatzer plug which is designed for closure of atrial septal defects.

Methods:

The study included eight patients with PP-BPF. Male/female ratio was 6/2. Right sided fistulas were in seven patients, left sided – in one. Underlying disease was lung cancer in three patients, pulmonary tuberculosis in five. Chest tube drainage or open window thoracostomy were used for empyema treatment in two and six cases respectively. Unsuccessful surgical attempts to close BPF were undertaken in four cases. Measurement under C-arm was carried out by balloon insertion into the fistula to measure its size. The procedure was performed by flexible bronchoscope under local anesthesia. The guide was inserted into the pleural cavity via the fistula. Two thoracoscopic ports were performed, and the guide was pulled out of the pleural space through the port. The plug was fixed to the guide and inserted into the fistula. The outcome of the treatment was followed up from two months to two years.

Results:

No complications followed the procedures. Repeated insertion of the plug became necessary in one case. Granulomatous tissue growth and scarring around the plug provided reliable occlusion. Successful PP-BPF closure was achieved in seven cases. In one patient the PP-BPF enlarged and the plug was dropped out on the progression of tuberculosis.

Conclusion:

Endoscopic PP-BPF closure is a safe, well tolerated and promising technique with good results. Stabilization of the underlying disease is an important prerequisite for the success of the treatment.

Disclosure: No significant relationships.

Keywords: pneumonectomy, bronchopleural fistula, endoscopy, treatment



LUNG CANCER SURGERY IN WOMEN: DIFFERENTIAL CHARACTERISTICS AND POSTOPERATIVE COMPLICATIONS IN A PROSPECTIVE MULTICENTER STUDY

Laureano Molins¹, J.J. Fibla¹, C. Izquierdo², J. Hernandez¹, D. Sanchez-Lorente², A. Guirao Montes², G. Sanchez², F. Quero³, A. Cueto³

¹Thoracic Surgery, Hospital Clinic and Sagrat Cor University Hospital, University of Barcelona, Barcelona, Spain

²Thoracic Surgery, Hospital Clinic, Barcelona, Spain ³Thoracic Surgery, Hospital Universitario Virgen de Las Nieves, Granada,Spain

Objectives:

To analyse the current incidence of lung cancer in women operated in Spain, the differential characteristics of their postoperative complications and their possible causal factors.

Methods:

Prospective observational study in 24 Spanish Hospitals between June 2012 and November 2014. We studied the proportion of women, age, histological types, smoking factor, associated comorbidity, TNM stage, surgical approach, type of lung resection, postoperative complications, postoperative hospital stay and perioperative mortality. Statistical analysis: SS v. 20.0 (SPSS Inc, Chicago, IL). Level of significance: $p \le 0.05$. Categorical variables analysed by Chi 2 test. Predictors of morbidity & mortality by multivariant regression analysis.

Results:

Seven hundred and forty one women of 3.307 total cases (22.4 %). Mean age: 61.96 years vs 66.40 in men (p < 0.05). Histological types: 519 Adenoca (70.4 %) vs 1.233 (46.18 %) in male (p<0.001); Smoking: Never smoked 260 (35.1%) compared to 5.30% in males (p<0.001). If smokers 201 (27.12 %) Number of packages/year: 36.6 vs 52.9 in male (p< 0.001). Associated comorbidity: Less than in male (p < 0.05): Ischemic heart disease, myocardial infarction, diabetes and COPD. TNM STAGE, Surgical approach: VATS/OPEN: No differences. Type of resection: Pneumonectomies: 38 (5.1%) vs 278 (10.8%) in males (p<0.001). Severity of complications: Lesser extent than in males (p<0.001). Mean postoperative stay: 6.3days vs 7.7days in men (p<0.01). Operative mortality: 2 pat. (0.27%) vs 64 pat (2.5%) in males (p<0.001).

Conclusion:

Lung cancer surgery in women has differential characteristics than in man. Younger age, adenocarcinoma more prevalent, if smokers, lower number of packages/year. Associate comorbidity is less frequent in women, especially angina, myocardial infarction, COPD and diabetes. Fewer pneumonectomies and lower hospital stay. Perioperative mortality is significantly lower, possibly influenced by the lower incidence of pneumonectomies, associated comorbidity, and to lower severity of postoperative complications.

Disclosure: No significant relationships.

Keywords: postoperative complications, lung cancer surgery, women

PROGNOSTIC SIGNIFICANCE OF THE NUMBER OF RESECTED MEDIASTINAL LYMPH NODES IN STAGE IIIA-PN2 NON-SMALL CELL LUNG CANCER

<u>Lunxu Liu</u>

Department of Thoracic Surgery, West China Hospital, Sichuan University, Chengdu, China

Objectives:

The relationship between the number of resected mediastinal lymph nodes and prognosis had not been specifically demonstrated in stage IIIA-pN2 non-small cell lung cancer.

Methods:

Three hundred and fifty nine patients from January 2008 to September 2013 confirmed as stage IIIA-pN2 non-small cell lung cancer and received complete resection and systematic lymph node dissection were retrospectively evaluated. Patients were classified into three groups according to the number of resected mediastinal lymph nodes (N2a: 3-5 [n = 93], N2b: 6-14 [n = 191], N2c \geq 15[n = 75]). The clinical and pathological data were analyzed.

Results:

The mean number of resected mediastinal lymph nodes was 10.3 ± 6.6 . With the median followup period was 38.4 months, 3-year disease-free survival rate and 5-year survival rate were 42% and 38%, respectively. The 3-year disease-free survival rate of N2a, N2b and N2c were 27%, 40% and 46%, respectively (p=0.004). The 5-year survival rate in three groups were 21%, 44% and 44%, respectively (p=0.019). In multivariate analysis, the number of resected mediastinal lymph nodes was an independent prognostic factor (p<0.001). When compared 3 groups stratified with 1, 2-4 and more than 5 metastatic mediastinal lymph nodes, the number of resected mediastinal lymph nodes was associated with survival in patients with 2-4 metastatic mediastinal lymph nodes (p=0.001), but not with 1 (p=0.326) or more than five metastatic mediastinal lymph nodes (p=0.360).

Conclusion:

The number of resected mediastinal lymph nodes was a prognostic factor of stage IIIA-pN2 patients. Based on our study, we recommended a complete systematic mediastinal lymphadenectomy, and at least six unbroken mediastinal lymph nodes should be harvested during the surgery.

Disclosure: No significant relationships.

Keywords: lung neoplasms, mediastinal lymph node, N2



POROUS ALUMINA CERAMIC STERNUM AS AN OPTION FOR STERNAL REPLACEMENT. A REPORT OF 7 CASES.

<u>François Bertin</u>¹, J. Tricard¹, C. Eveno¹, E. Denes², A. Piccardo¹ ¹Cardiothoracic Surgery, CHU Dupuytren, Limoges, France, ²R&D, I.Ceram, Limoges, France

Objectives:

There is to date no satisfactory technique for sternal replacement in a context of neoplastic disease or for deep sternal wound infection. A prosthetic sternum made of porous alumina ceramic was produced thanks to the collaboration between a medical ceramic devices manufacturer and cardiothoracic surgeons. This material has mechanical resistance exceeding bone's one, is bio-inert, biocompatible, non-resorbable and radiotransparent. There is no need for osteosynthesis devices. The objective of this abstract is to describe characteristics and follow up of the patients who undergone this procedure.

Methods:

We describe the patients who were prospectively included in the cohort while being operated with this new therapeutic option.

Results:

Seven patients underwent this procedure. Sternal replacement was decided for oncologic diagnosis in four cases and for infection in three cases. Five patients received a complete sternum and two a half-sternum (manubrium part). Two patients received a prosthesis loaded with antibiotics (gentamicin) in order to protect implantation from prosthesis infection. Characteristics are summarized in table. Implantation was simple thanks to trial implants ancillary and the ready-to-use prosthesis. Skin and wound healing was obtained quickly after surgery. One complication (hematoma) occurred for the second patient with a need for surgical revision but with retention of the prosthesis. The mean follow-up is 10.6 months (1.8 - 21.8 months). During the follow-up no major complication occurred. There was an improvement of FEV1 values during the follow-up without difficulty in breathing. All the patients recovered their previous life and activities. There was no complaining about scar or residual pain. CTscan follow-up did not show local abnormal reaction, no abscess or collection.

25th European Conference on General Thoracic Surgery ABSTRACTS

	Sex	Age (year)	Indication	Risk factors	Body mass Index	ASA	Type of surgery	Anti- biotic loaded	Ope- ration time (Hours)	Compli- cations	Delay to dis- charge after surgery (Days)	Follow up (Months)
1	F	55.1	Radio-in- duced sarcoma	Malignancy	22.5	3	Complete replace- ment	No	4	None	41	21,80
2	F	53.9	Breast cancer metastasis & skin lo- calization following biopsy	Malignancy Diabetes mellitus	24.6	3	Complete replace- ment	No	6	Hemat- oma	36	14,86
3	М	61.5	Sternal disunion after aortic valve re- placement and deep sternal wound infection	Lung cancer with ra- diotherapy including sternal area (2007) Dia- betes melli- tus Smoking COPB	26.3	4	Complete replace- ment	No	4	Surgi- cal site infection without prosthe- sis infec- tion	132	17,19
4	F	37.9	Manubrial breast cancer metastasis	Malignancy Smoking	19.3	3	Half-ster- num replace- ment	No	2.5	None	19	10,03
5	М	68.1	Sternal dis- union after coronary bypass and deep sternal wound infection	Diabetes mellitus Obesity COPB	29.8	3	Complete replace- ment	Yes	4	None	20	6,41
6	М	77.8	Sternal dis- union after coronary bypass and deep sternal wound infection		22.8	3	Complete replace- ment	Yes	3	None		2,43
7	F	41.9	Clavicle and ma- nubirum neoplasia	Malignancy	21.9	3	Half-ster- num replace- ment	No	2	None	5	1,78



Conclusion:

Even if it is too early to draw conclusions, this new bioceramic prosthesis seems to be a simple and reliable technique for the replacement of tumoral or infected sternum even for patients with multiple comorbidities.

Disclosure: F. Bertin: Member of the scientific committee of I.Ceram

F. Bertin: Porous Ceramic Sternum - I.Ceram - France

J. Tricard: POROUS ALUMINA CERAMIC STERNUM - I.Ceram

E. Denes: Scientific director of I.Ceram

E. Denes: Porous alumina sternum, I.Ceram - France

All other authors have declared no conflicts of interest.

Keywords: sternum, ceramic, deep sternal wound infection, tumor, chest wall

PREDICTION OF LESS INVASIVE LESIONS WITH POSITRON EMISSION TOMOGRAPHY AND HIGH-RESOLUTION COMPUTED TOMOGRAPHY IN PATIENTS WITH PATHOLOGICAL STAGE IA LUNG ADENOCARCINOMA

<u>Yuya Ishikawa</u>¹, F. Kojima¹, N. Yoshiyasu¹, S. Ohde², T. Bando¹ ¹Thoracic Surgery, St. Luke's International Hospital, Tokyo, Japan ²Center for Clinical Epidemiology, St. Luke's International University, Tokyo, Japan

Objectives:

The purpose of this study was to examine if less-invasive lesions could be predicted preoperatively among pathological stage IA adenocarcinomas by using high-resolution computed tomography (HRCT) in combination with fluorodeoxyglucose positron emission tomography (FDG-PET).

Methods:

We retrospectively evaluated 121 lesions in 114 patients with p-Stage IA adenocarcinoma who underwent radical resection after FDG-PET and HRCT. We defined less-invasive lesion as an adenocarcinoma *in situ* (AIS) and minimally invasive adenocarcinoma (MIA). We also defined the volume ratio of solid-part to whole tumor as solid tumor ratio (STR). Consolidation to Tumor Ratio (CTR), maximum standardized uptake value (SUVmax), and STR were measured and calculated by using a three-dimensional image analysis system. The cutoff values were 0.5, 1.0, and 0.125, respectively. Multivariate logistic regression analysis was used to determine the relationship between the three radiological parameters and pathological invasiveness. A statistical predictive score was generated from results of multivariate logistic regression.

Results:

Thirty-four lesions (28.1%) were AIS and MIA. The adjusted odds ratio (95% confidence interval [CI]) was 14.3 (4.9-42.1) for STR (p<0.001), 5.9 (1.9-18.4) for SUVmax (p=0.002). No significant difference in CTR was observed. The area under the receiver-operating characteristic curve to predict less-invasive lesion was 0.86 (95%CI, 0.78-0.94). In the predictive model with a total score of 3 points was constructed as follows: 1 point for SUVmax of <1.0; 2 points for STR of <0.125. The total score predicted less-invasive lesions with 89.5% probability.

Conclusion:

The combination of HRCT and FDG-PET in a volumetric analysis program enabled us to predict less-invasive lesions in patients with early-stage lung adenocarcinoma.

Disclosure: No significant relationships.

Keywords: radiological evaluation, three-dimensional image analysis, predictive model, lung adenocarcinoma, histological invasiveness



A PROPENSITY-ADJUSTED COST AND OUTCOME COMPARISON OF PER-ORAL ENDOSCOPIC MYOTOMY TO LAPAROSCOPIC HELLER MYOTOMY

A. Wirsching¹, S. Kaplan¹, A. Ross², R. El-Moslimany³, Donald Low¹

¹General, Thoracic and Vascular Surgery, Virginia Mason Medical Center, Seattle, WA, United States of America

²Gastroenterology and Hepatology, Virginia Mason Medical Center, Seattle, WA, United States of America

³Analytics, Virginia Mason Medical Center, Seattle, WA, United States of America

Objectives:

Per-oral endoscopic myotomy (POEM) has gained increasing popularity as a treatment-option for achalasia. As a natural-orifice surgical procedure it follows similar principles compared to the established laparoscopic Heller myotomy (LHM). Since POEM is a new procedure, patient selection might be conservative and direct comparison of the two procedures thereby biased. The aim of the present study was to compare perioperative outcomes, short-term outcomes, and costs between the two procedures after propensity score matching.

Methods:

A prospective IRB approved database documented all patients undergoing LHM (since 2001) and POEM (since 2015). Propensity matching yielded 13 patients in each group adjusted for 18 preoperative variables. Perioperative data was compared. Pre- and postoperative Eckardt Scores and esophagogram results were compared after 3 months. Cost analysis compared total costs after normalizing for the yearly cost progression.

Results:

In the matched cohort, for POEM vs. LHM, operative time $(152\pm52\text{min vs. }160\pm12\text{min}, p=0.7)$ and myotomy length $(7.2\pm2\text{cm vs. }7.5\pm1\text{cm}, p=0.7)$ was comparable, while POEM was associated with a reduced hospital stay $(1.3\pm0.5\text{days vs. }2\pm0.7\text{days}, p=0.01)$. Complications grade 1 and 2 according to the Clavien-Dindo classification occured in 1 and 4 patients after POEM and LHM, respectively. One patient was readmitted within 30 days in each group with no 30-day mortality. Median Eckardt scores improved significantly after POEM (4 to 0) and LHM (4 to 0.5). Post procedure esophagograms demonstrated similar improvement in esophageal diameter and emptying. Normalized costs were comparable but showed an increased variability for POEM (POEM: 16477±4515USD vs. LHM: 16302±1911USD, p=0.7).

Conclusion:

POEM showed comparable outcomes to LHM, even after adjusting for preoperative variables. The increased cost variability might indicate that cost efficiency can potentially be improved with POEM.

Disclosure: No significant relationships.

Keywords: comparison,laparoscopic Heller myotomy, per-oral endoscopic myotomy, achalasia, cost, outcomes

ROBOTIC APPROACH IN THE TREATMENT OF STAGE III LUNG CANCER: A RETROSPECTIVE MULTICENTER ANALYSIS OF PERIOPERATIVE AND ONCO-LOGICAL RESULTS

<u>Giulia Veronesi</u>¹, B. Park², R. Cerfolio³, M. Dylewski⁴, A. Toker⁵, W. Hanna⁶, E. Morenghi⁷, P. Novellis¹, F. Velez-Cubian⁸, E. Dieci¹, M. Montorsi¹, M. Alloisio¹, E. Toloza⁸
¹Thoracic Surgery, Humanitas Research Hospital, Rozzano, Italy
²Thoracic Surgery Service, Memorial Sloan Kettering Cancer Center, New York City, NY, United States of America
³Section of Thoracic Surgery, University of Alabama at Birmingham, Birmingham, AL, United States of America
⁴Institute of Thoracic Surgery, Baptist Health of South Florida, South Miami, FL, United States of America
⁵Department of General Thoracic Surgery, Instanbul Bilim University, Istanbul, Turkey,
⁶Hamilton, McMaster University, Hamilton, ON, Canada
⁷Statistical Service, Humanitas Research Hospital, Rozzano - Milan, Italy
⁸Division of Thoracic Surgery, University of South Florida, Morsani College of Medicine, Tampa, FL, United States of America

Objectives:

The use of video assisted thoracoscopic surgery (VATS) approach for Stage III Lung Cancer (LC) is controversial due to doubts on oncological radicality, with no data available on the results of Robotic Assisted Thoracic Surgery (RATS). This study wants to assess the safety and effectiveness of RATS for major lung resections in Stage III LC patients.

Methods:

Retrospective multicenter study of patients with clinical or pathological N2 LC who underwent RATS lung resection. Perioperative outcomes, recurrence patterns, and overall survival were assessed.

Results:

From 2007 to 2016, 194 patients underwent RATS major lung resection for Stage IIIA LC at 7 high volume robotic centers. Preoperative N2 disease was diagnosed in 64 cases (33.3%), and occult N2 in 128 cases (66.7%). Neoadjuvant treatment (Group A) was given in 32 cases (16.5%); adjuvant treatment (Group B) in 109 (56.2%), and no treatment (Group C) in 51 (26%). Mean duration of surgery was 199 +/- 83 min. The rate of conversion was 14%, with no difference among groups (p=0,8). R0 resection was achieved in 96.6%. Postoperative morbidity grade III-V (Clavien-Dindo) occurred in 13%, 6% and 18% in groups A, B, and C respectively, with no difference between groups (p=0.11). 30 days postoperative mortality was 2.2%. The median length of stay was four days (P=0.98). The 3-year Overall Survival (OS) was 56%



with no differences between clinical and occult N2 (p=0.57) and between Group A, B and C (p=0.574). However, 3-yr OS was 59% for patients with <2 positive lymph nodes and 49% for more than 2 (p=0.001). Local recurrence was observed in 11 cases (5.7%).

Conclusion:

Even with the limit of a retrospective analysis, RATS major lung resection for Stage-III N2 LC patients was safe and feasible, with low conversion and complication rates. Oncological outcomes appear to be comparable to those reported after open approach.

Disclosure: G. Veronesi: Giulia Veronesi is a consultant for ABI Medica SpA, Italy

B. Park: Speaker's Bureau (honorarium), Bard

R. Cerfolio: proctor of robotic surgery by ABI medica

M. Dylewski: proctor of robotic surgery by ABI medica

Keywords: robotic surgery, locally advanced lung cancer, N2

A PRELIMINARY STUDY ON RETROSPECTIVE EVALUATION OF PULMONARY EMBOLISM RISK ASSESSMENT, THROMBOPROPHYLAXIS AND PULMONARY EMBOLISM INCIDENCE AFTER THORACIC SURGERY

Lei Shen

Thoracic ICU, Shanghai Pulmonary Hospital, Shanghai, China

Objectives:

Venous thromboembolism (VTE) can be a devastating postoperative complication. Pulmonary embolism (PE) always occurs alone and does not accompany with deep venous thrombosis (DVT) after thoracic surgery. Appropriate risk stratification for PE is essential to providing appropriate thromboprophylaxis and avoiding morbidity and mortality. Our hospital has a huge thoracic surgical population of 8,000-10,000 cases every year, while is a high outlier for post-operative PE. This study was designed to retrospectively evaluate the Caprini VTE risk assessment model and the changing awareness of surgeons on inpatient PE incidence.

Methods:

We investigated total 1,000 patients including 500 who performed surgical operations in June 2015 and 500 in June 2016. We recorded the Caprini score when the patients were transferred out from intensive care unit (ICU) after surgical operation. The baseline characteristics, the pharmacologic prophylaxis and the inpatient PE incidence were also studied.

Results:

Forty-two patients scored low risk (4.2%), 634 were moderate risk (63.4%), and 324 scored high risk (32.4%). There was no significant difference in the distribution of Caprini risk categories between 2015 and 2016. There was also no statistical difference in the baseline characteristics, including age, gender, body mass index (BMI), surgical procedures, length of stay in ICU, early ambulation and pathologic diagnosis, when compared 2015 with 2016 patients. However, only 19% of 2015 patients received pharmacologic prophylaxis, while the rate reached 65.4% in 2016 (P<0.01). In 2015, out of 500 patients, there were total 4 cases (0.8%) occurred PE during their inpatient time. While in 2016, there was only one case (0.2%).

Conclusion:

Implementation of a PE risk assessment protocol with appropriate thromboprophylaxis was efficient and feasible for providers and thoracic surgical patients.

Disclosure: No significant relationships.

Keywords: thoracic surgery, pulmonary embolism, Caprini risk assessment model





THE EVOLUTION OF TUBELESS IN "NON-TUBE NO FASTING" FAST TRACK PROGRAM FOR RESECTABLE ESOPHAGEAL CARCINOMA

Y. Li, <u>Yan Zheng</u>, X. Liu, R. Zhang, H. Sun, Z. Wang, S. Liu *Thoracic Surgery Department, Henan Cancer Hospital/The Affiliated Cancer Hospital of ZhengZhou University, ZhengZhou, China*

Objectives:

The aim of this study was to evaluate the safety and effectiveness of one single mediastinal drainage tube in thoracic and abdominal cavity after minimally invasive oesophagectomy. We also tried to comfirm it could be included in our "non-tube no fasting" fast track program for resectable esophageal carcinoma.

Methods:

From June 17, 2015-November 30, 2015, the clinical data of 78 eligible patients who underwent "non-tube no fasting" minimally invasive oesophagectomy in our team were retrospectively collected and analyzed. From June 17 to August 11, twenty-eight patients were put with thoracic cavity drainage tube and mediastinal drainage tube together. They were named as group A. From August 19 to October 9, thirty-four patients in group B had one mediastinal drainage tube through intercostal space. The last 16 patients had only one single mediastinal drainage tube in thoracic and abdominal cavity through abdominal wall and named as group C. The complication rate, post operative days, air leak days and leakage rate were compared. To perform statistical calculations, SPSS 17.0 for Windows (SPSS Inc., Chicago, IL) was used. The quantitative data among the groups were compared using one-way ANOVA. Both a chisquare test, a Mann-Whitney U test and Fisher's exact test were used for qualitative data. A two-sided P value of 0.05 was considered to be statistically significant.

Results:

The baseline of three groups was comparable. The rates of anastomotic leak (A, [0 of 28]; B, [1 of 43]; C, [0 of 16], P>0.05) and post operative days (A, 7[7-8]; B, 7[6-9]; C, 7[7-8], P>0.05) didn't have significant difference. The total complication rates were not significant different (14.3%, 14.7%, 12.5%, P=0.983).

Conclusion:

Single mediastinal drainage tube in thoracic and abdominal cavity after minimally invasive oesophagectomy is safe, feasible and efficient. It is a part of "non-tube no fasting" fast track program.

Disclosure: No significant relationships.

Keywords: minimally invasive oesophagectomy, esophageal carcinoma, "non-tube no fasting" fast track program

HEMOTHORAX SECONDARY TO CHEST WALL ARTERIAL LESION. OUR EXPE-RIENCE WITH TRANSCATHETER ARTERIAL EMBOLIZATION

Nicole Carriel, D. González, R. Guzman, D. Sanchez-Lorente, A. Guirao Montes, M. Boada, J.M. Gimferrer, A. Gómez-Caro, L. Molins *Thoracic Surgery, Hospital Clinic and Sagrat Cor University Hospital, University of Barcelona, Barcelona, Spain*

Objectives:

Since 2010 transcatheter arterial embolization (TAE) was introduced in the Trauma Protocol of our institution like an alternative to thoracotomy in patients with hemothorax. This study describes the management and outcomes of our experience with TAE in patients with hemothorax secondary to chest wall arterial injuries.

Methods:

Retrospective descriptive study from January 2010 to December 2016. Data was obtained from hospital database of the patients with hemothorax secondary to arterial lesion of the chest wall that were managed with TAE. They were classified in two groups according the cause of lesion: trauma (group A) or iatrogenic (group B), in order to make the descriptive statistic of the results. To evaluate the learning curve, they were divided in two periods from 2010-2012 and 2013-2016.

Results:

TAE was performed in 12 patients, 58.3% (7) for group A and 41.7% (5) for group B. In both groups the age and gender were similar. ASA Physical Status Classification was III-IV in 28.6% (2) of group A; and a 100% (5) of group B. Primary technical success (PTS) was 66.7% (8); divided in two periods, the first one (n=5) has a PTS of 20% (1) versus a 100% (7) in the second. A 41.7% (5) of the patients needed surgery; but only in 33.3% (1) of the group A the reason was persisting bleeding; instead, in group B these was the reason in all of them (2). Surgery was avoided in a 58.3% (7) of the patients. Overall 30-days mortality was 41.6% (5); and due to persistent hemothorax was 16.7% (2), one from each group. Distribution according to group is available in table 1. Table 1.

	$DTS \theta/(n)$	Surgery need	Persisting bleeding	30-days Mortality %
	P15 % (II)	% (n)	% (n)	(n)
Group A	71.4% (5)	42.9% (3)	33% (1)	28.6% (2)
Group B	60% (3)	40% (2)	100% (2)	60% (3)
Total	66.7% (8)	41.7% (5)	60% (3)	41.6% (5)

Conclusion:

TAE is an effective technique to solve active arterial chest wall bleeding, and may be an alternative treatment to avoid surgery. The learning curve should be considered.

Disclosure: No significant relationships.

Keywords: hemothorax, chest wall, transcatheter arterial embolization





EVALUATION OF THE METABOLIC RESPONSE TO OPEN AND MINIMALLY INVASIVE RESECTION OF ESOPHAGUS.

Jaroslaw Pierog¹, M. Bielewicz¹, J. Wojcik¹, B. Kubisa¹, K. Kaseja¹, K. Safranow², B. Dołęgowska³, P. Waloszczyk¹, T. Grodzki¹

¹Thoracic Surgery and Lung Transplantation Department, Pomeranian Medical University, Szczecin, Poland

²Department of Biochemistry and Medical Chemistry, Pomeranian Medical University, Szczecin, Poland

³Physiology and Stem Cell Department, Pomeranian Medical University, Szczecin, Poland

Objectives:

The purpose of this study was to compare the metabolic response of an organism in the early postoperative period after radical resection of stage I and II esophagus cancer applying minimally invasive procedure and open procedure involving classical laparotomy and thoracotomy.

Methods:

Serum concentration of interleukin 6 (IL-6), procalcitonin (PCT), C-reactive protein (CRP), tumor necrosis factor- α (TNF- α), total serum protein (TP) and leukocytes count (WBC) in blood collected on the day of surgery prior to the procedure (day 0) and on day 1, 2 and 7 post the surgery was tested in two groups of patients undergoing esophagus resection due to cancer: applying minimally invasive procedure involving laparoscopy and videothoracoscopy (group A) and applying classical procedure involving full opening of the chest and abdominal cavity (group B). The study involved a total of 24 patients divided in two groups of 12 patients each.

Results:

No statistically significant differences with respect to the leukocytes count, concentration of CRP, IL-6 and total plasma protein concentration were observed in the studied groups on day 0 and on day one, two and seven post surgery. TNF- α concentration was lower in group A compared to group B on day 0, procalcitonin concentration was lower in group A compared to group B on day two post surgery, and on the remaining days TNF- α and procalcitonin concentration was not statistically different in both groups.

Conclusion:

Resection of stage I and II esophagus cancer applying minimally invasive procedure does not result in a fewer metabolic disorders with respect to plasma total protein, leukocytes count, IL-6 and CRP concentration compared to esophagus resection involving full opening of the chest and abdominal cavity. Lower concentration of procalcitonin on day two post surgery in the group of patients undergoing minimally invasive esophagus resection seems to be related to a smaller perioperative injury.

Disclosure: No significant relationships.

Keywords: esophageal cancer, metabolic disorder, minimally invasive esophagectomy.

THE USE OF EUROLUNG TO EVALUATE AND BENCHMARK ANATOMIC LUNG RESECTIONS OUTCOMES OF BRAZILIAN SOCIETY OF THORACIC SURGERY DATABASE CONTRIBUTORS

<u>Ricardo Terra</u>¹, M. Salati², A. Brunelli³, G. Fortunato⁴, L. Lauricella¹, D. Pinto-Filho⁵ ¹Thoracic Surgery, University of Sao Paulo Medical School, Sao Paulo, Brazil ²Thoracic Surgery, AOU Ospedali Riuniti, Ancona, Italy ³Department of Thoracic Surgery and Thoracic Endoscopy, St. James's University Hospital, Leeds, United Kingdom ⁴Thoracic Surgery, Santa Casa de Misericordia da Bahia, Salvador, Brazil ⁵Thoracic Surgery, Universidade de Caxias do Sul, Caxias do Sul, Brazil

Objectives:

The Brazilian Society of Thoracic Surgery (BSTS) database was created in July 2015 with the purpose of working as a quality improvement resource. So far, no aggregate results analysis has been done in Brazil. Our objective was to evaluate the performance of Brazilian thoracic surgery units contributing to the BSTS-database using the Eurolung 1 and 2 models.

Methods:

From July/2015 until October/2016, five units contributed to the BSTS-database collecting 3500 cases. We included in this analysis all patients who underwent anatomic lung resections. We applied the Eurolung models, calculated predicted mortality/morbidity and compared them to observed numbers graphically and using chi-square. We also calculated the area under the ROC curves (AUC) to evaluate discrimination in our dataset. Finally, logistic regression was used to find mortality/morbidity predictors in our dataset.

Results:







1232 patients (51.4% females, mean age 60.7 years-old) underwent anatomic lung resections (7.5% of pneumonectomies) in the analyzed period. The most frequent primary diagnosis was lung cancer (76%) followed by congenital/inflammatory conditions (13.4%). Patients had a mean ppoFEV1% of 61 and 29.1% of them were ASA 3 or 4. Overall, 45.7% of the patients underwent VATS resection and 5% extended resection. Graph 1 depicts predicted risk and observed values for mortality and morbidity. The observed/expected ratio for mortality was 0.44 in lower risk (<2.5%) patients (p=0.09) and 0.67 in higher risk (>2.5%) patients (p=0.04). O/E ratio for morbidity was 0.52 in lower risk (<22%) patients (p=0.001) and 0.57 in higher risk (>22%) patients (p=0.001). The AUC for the Eurolung mortality model was 0.80 and for morbidity was 0.67. Logistic regression validated several outcome predictors included in Eurolung as age, ppoFEV%, and pneumonectomy.

Conclusion:

Brazilian units registered in the BSTS-database had a lower incidence of mortality and morbidity than predicted by Eurolung, which proved a valid instrument to audit external performance.

Disclosure: R. Terra: Advisory Board/Preceptorships: Johnson&Johnson, H.Strattner/Intuitive Lectures: Pfizer, Boehringer

Keywords: database, lobectomy, outcomes, risk prediction

QUALITY EVALUATION OF PREVIOUS GUIDELINES ABOUT THE MANAGE-MENT OF MALIGNANT PLEURAL EFFUSION FROM THE EUROPEAN SOCIETY OF THORACIC SURGEONS (ESTS) PLEURAL DISEASES WORKING GROUP

Luca Bertolaccini¹, B. Bedetti², K. Marinova³, F. Raveglia⁴, Y. Shargall⁵, P. Solli⁶, A. Brunelli⁷, G. Rocco⁸, K. Papagiannopoulos⁷, J. Kuzdzal⁹, G. Massard¹⁰, E. Ruffini¹¹, P. Falcoz¹⁰, I. Opitz¹², M. Scarci¹³, and Members of the ESTS Pleural Diseases Working Group¹³ ¹Thoracic Surgery, Ravenna Teaching Hospital, Ravenna, Italy ²Thoracic Surgery, Malteser Hospital, Bonn, Germany ³Thoracic Surgery, UMHAT – St Marina Varna, Varna, Bulgaria ⁴Thoracic Surgery, AO San Paolo, Milan, Italy ⁵Thoracic Surgery, McMaster University, Hamilton, Canada ⁶Thoracic Surgery, AUSL Romagna - Forlì Teaching Hospital, Forlì, Italy ⁷Department of Thoracic Surgery and Thoracic Endoscopy, St. James's University Hospital, Leeds, United Kingdom ⁸Division of Thoracic Surgery, Department of Thoracic Surgical And Medical Oncology, Istituto Nazionale Tumori, Fondazione Pascale, IRCSS, Naples, Italv ⁹Thoracic Surgery, Jagiellonian University Collegium Medicum, John Paul II Hospital, Krakow, Poland ¹⁰Department of Thoracic Surgery and Thoracic Endoscopy, University Hospital of Strasbourg, Strasbourg, France ¹¹Thoracic Surgery, University of Torino, Torino, Italy ¹²Thoracic Surgery, University Hospital Zurich, Zurich, Switzerland ¹³Thoracic Surgery, University College London, London, United Kingdom

Objectives:

In ESTS survey about management of malignant pleural effusions (MPE), 56% of respondents is not informed of any relevant clinical guidelines, 52% declared the need of updating or revision of guidelines. The ESTS Pleural Diseases Working Group developed a project quality analysis of previous guidelines on MPE management.

Methods:

Appraisal-of-Guidelines-for-Research-and-Evaluation (AGREE-II) instrument was used to assess each guideline. The purpose of the AGREE II is to provide a framework to evaluate quality of guidelines, methodological strategy for development of guidelines, guidance on content and best reporting strategy. Each item was scored on a seven-point scale.



Results:

Five out of six guidelines (83%) were produced by multinational collaboration (29 countries). A governmental organisation was involved in two (33%) guidelines and a scientific society in five (83%). Two areas that received best score were clarity of presentation and scope and purpose. Applicability of guideline had lowest score. Involvement of stakeholders was strongly correlated with the rigour of development (rho=0.92) and clarity of presentation (rho=0.96). Rigour of development was strongly correlated with clarity of presentation (rho=0.93). The scores for two domains, rigour of development and clarity of presentation, were influenced by two factors: international guidelines for the rigour of development and international guidelines for clarity of presentation. International guidelines also had a positive influence on scope and purpose. Univariate analysis was in Table 1b. Multivariate analysis showed that for the clarity of presentation, the international guidelines and the publication hrough scientific journal were related to improved scores.

Factor	AGREE II domains					
	D1	D2	D3	D4	D5	D6
Level of the guidelines						
International	66	56	59	80	48	66
National	87	69	85	94	53	61
p-value	0.106	0.394	0.127	0.245	0.572	0.739
Involvement of a scientific society						
Yes	73	65	63	82	49	67
No	58	57	65	85	48	57
p-value	0.356	0.628	0.918	0.799	0.949	0.480
Publication in a scientific journal						
Yes	68	54	58	78	47	68
Νο	73	67	75	89	51	59
p-value	0.697	0.268	0.217	0.257	0.696	0.400
Publication year						
Before 2012	70	54	60	81	47	67
2012 – 2016	69	66	70	86	51	62
p-value	0.912	0.300	0.511	0.580	0.696	0.662

Conclusion:

Quality of guidelines assessed by AGREE-II was extremely variable with relatively low average scores. Guidelines achieving higher AGREE II scores were from European Union with direct involvement of scientific societies in development. It was recognised that fundamental unanswered questions remain about MPE management.

Disclosure: No significant relationships.

Keywords: malignant pleural effusion, quality, lung cancer

INSIGHTS FROM A FAILURE TO RESCUE ANALYSIS AFTER VIDEO ASSISTED THORACOSCOPIC SURGERY (VATS) ANATOMIC LUNG RESECTIONS

<u>Magdalena Sacher</u>¹, H. Maier¹, C. Ng¹, F. Kocher², G. Laimer¹, P. Lucciarini¹, T. Schmid¹, F. Augustin¹ ¹Department of Visceral, Transplant and Thoracic Surgery, Medical University Innsbruck,

Innsbruck, Austria ²Internal Medicine V, Medical University Innsbruck, Innsbruck, Austria

Objectives:

Failure to Rescue (FtR) measures the ability of treating postoperative complications to prevent death and is an important indicator of patient safety. While variability in postoperative mortality is well documented in patients undergoing VATS anatomic lung resection, FtR is poorly researched. This analysis aims to evaluate FtR and its risk factors in a single center experience.

Methods:

All patients undergoing VATS anatomic lung resection between 2009 and 2016 were included. FtR was analysed for different groups of complications: (i) any complication, (ii) pulmonary complications (airleak >5 days, pneumonia, atelectasis requiring bronchoscopy, reintubation, ARDS, pneumothorax, respiratory failure), (iii) major complications (reintubation, ARDS, pulmonary embolism, myocardial infarction, pneumonia, bronchopleural fistula), (iv) pneumonia and (v) atrial arrhythmia.

Results:

In total, 508 consecutive patients were included. 30.9% (157 patients) developed postoperative complications: pneumonia in 5.1% (26/508), pulmonary complications in 18.3% (93/508), major complications in 5.3% (27/508), atrial arrhythmia in 3.3% (17/508). Six patients (1.2%) died postoperatively, accounting for a FtR rate of 3.8%. Complications occurring in these patients were pneumonia in 4, pulmonary complications in 5 (ARDS in 4), major complications in 5 and atrial fibrillation in two, with correlating FtR rates of 15.4%, 5.3%, 18.5% and 5.9%, respectively. Of note, 3/6 (50%) patients who died were patients after solid organ transplantation.

Conclusion:

Perioperative complications do occur irrespective of the extent of surgery. When compared to the scarce literature available, our complication rate seems acceptable, but even with low mortality rates, FtR rates appear to be increased. Therefore, FtR has to be interpreted with care when matched with other institutions. However, analyzing the ability of a hospital to treat complications is important to align efforts to improve patient safety. As a direct effect of this study, we are currently restructuring treatment algorithms for NSCLC patients after solid organ transplantations and patients with early signs of respiratory failure.

Disclosure: No significant relationships.

Keywords: VATS, anatomic lung resection, failure to rescue, patient safety


RESPIRATORY FAILURE AFTER PNEUMONECTOMY: THE PRICE OF POST-OPERATIVE TRANSFUSIONS

Biniam Kidane¹, Y. Shen², N. Jacob², S. Keshavjee², M. De Perrot², A. Pierre², K. Yasufuku², M. Cypel², T. Waddell², G. Darling² ¹Surgery, University of Manitoba, Winnipeg, MB, Canad ²Surgery, University of Toronto, Toronto, ON, Canada

Objectives:

Transfusion of blood products has been associated with increased risk of post-pneumonectomy respiratory failure. It is unclear whether intra- or post-operative transfusions confer higher risk of respiratory failure. Our objective was to assess the role of transfusions in developing post-pneumonectomy respiratory failure.

Methods:

We performed a retrospective cohort study using prospectively-collected data on consecutive pneumonectomies (2005-2015). Patient records were reviewed for intra-/post-operative exposures. Univariable & multivariable analyses were performed.

Results:

Of the 251 pneumonectomies performed during the study period, 24 (9.6%) patients suffered respiratory failure. Ninety-day mortality was 5.6% (n=14) and was more likely in patients with respiratory failure (7/24 versus 7/227, p<0.001). Intra-operative and post-operative transfusions occurred in 42.2% (n=106) and 44.6% (n=112) of patients respectively and were predominantly red blood cells. On univariable analysis, both intra-operative (p=0.03) and post-operative transfusion (p=0.004) were associated with higher risk for respiratory failure. The multivariable model significantly predicted respiratory failure with an AUC=0.88 (p=0.001). On multivariable analysis, the only independent predictors of respiratory failure were post-operative transfusions (adjusted odds ratio [aOR]=6.54, 95%CI:1.74-24.59, p=0.005) and lower pre-operative FEV1 (aOR=0.96, 95%CI:0.93-0.99, p=0.03). Estimated Blood Loss (EBL) was not significantly different (p=0.91) between those with (median=800ml, interquartile range: 300ml-2000ml) and without respiratory failure (median=800ml, nterquartile range: 300ml-2000ml).

	Unadjusted Odds Ratio (95% CI) Univariable Analysis	p	Adjusted Odds Ratio (95% CI) Multivariable Analysis	р
Age at OR	1.01 (0.97 - 1.04)	0.73	Not included in model	
Male	0.67 (0.28 - 1.60)	0.37	Not included in model	
Year of Surgery	1.15 (0.99 - 1.34)	0.08	1.09 (0.86 - 1.38)	0.46
Pre-operative %predicted FEV1	0.98 (0.95 - 1.00)	0.07	0.96 (0.93-0.99)	0.03
Pre-operative %predicted DLCO	1.00 (0.97 - 1.02)	0.96	Not included in model	
Charlson Comorbidity index	0.99 (0.78 - 1.25)	0.92	Not included in model	
Body Mass Index	0.92 (0.84 - 1.02)	0.11	0.98 (0.87 - 1.10)	0.78
Current Smoker	0.58 (0.25 - 1.38)	0.22		
Left pneumonectomy	0.50 (0.21 - 1.22)	0.13	0.80 (0.27 - 2.39)	0.69
Completion pneumonectomy	1.70 (0.53 - 5.36)	0.37	Not included in model	
Intrapericardial pneumonectomy	0.95 (0.40 - 2.26)	0.90	Not included in model	
Extrapleural pneumonectomy	0.62 (0.26 - 1.46)	0.27	Not included in model	
Non-cancer indication for resection	0.30 (0.06 - 1.57)	0.15	0.33 (0.05 - 2.14)	0.24
Pre-operative radiation therapy	0.85 (0.34 - 2.14)	0.73	Not included in model	
Pre-operative chemotherapy	1.64 (0.67 - 4.05)	0.28	Not included in model	
Intra-operative steroid use	2.02 (0.82 - 5.02)	0.13	2.28 (0.78 - 6.66)	0.13
Intra-operative Transfusion	2.93 (1.10 - 7.82)	0.03	1.83 (0.62 - 5.38)	0.27
Post-operative Transfusion	6.38 (1.84 - 22.19)	0.004	6.54 (1.74 - 24.59)	0.005
Intra-operative Peak Airway Pressure	0.97 (0.89 - 1.06)	0.50	Not included in model	
Intra-operative Mean Tidal Volume	1.00 (0.99 - 1.01)	0.70	Not included in model	
Estimated Blood Loss	1.00 (1.00 - 1.00)	0.91	Not included in model	
Fluid Balance at End of Surgery	1.00 (1.00 - 1.00)	0.92	Not included in model	
Mean Daily Post-operative Fluid Balance	1.00 (0.99 - 1.01)	0.23	Not included in model	

Conclusion:

Respiratory failure occurred in 9.6% of patients post-pneumonectomy and confers higher risk of 90-day mortality. Post-operative (but not intra-operative) transfusion was the strongest independent predictor of respiratory failure. EBL is not significantly different between those with and without respiratory failure, thus our findings are not likely due to confounding relationships between increased intra-operative bleeding complications, reactionary transfusions and respiratory failure. Intra-operative transfusion may be in reaction to active/unpredictable blood loss and may not be easily modifiable. However, post-operative transfusion may be modifiable and potentially avoidable. Transfusion thresholds should be assessed in light of potential costbenefit trade-offs.

Disclosure: No significant relationships.

Keywords: lung surgery, transfusion, pneumonectomy, respiratory failure, perioperative care



ORGANIZATIONAL CLIMATE AND QUALITY OF WORK IN A THORACIC SURGERY UNIT AND OPERATING THEATRE

<u>Majed Refai</u>¹, G. Pelusi², M. Tiberi¹, A. Sabbatini¹ ¹Thoracic Surgery, Ospedali Riuniti Ancona, Ancona, Italy ²Professione Sanitari, Ospedali Riuniti Ancona, Ancona, Italy

Objectives:

The objective of our study was to evaluate the organizational climate and the quality of work in our thoracic surgery unit and operating theatre and to find the correcting measures to improve the organizational climate

Methods:

The study was conducted in 2016, by administering a validated questionnaire (by the Italian national public administration) to all health care professionals (doctors, nurses and socio-sanitary auxiliaries) working in the thoracic surgery unit and the operating theatre. The survey explored several items: working safety, working stress, discrimination, equity, career and professional development, relationship with colleagues and sense of belonging. The questionnaires were administered anonymously. For answers Likert scale was adopted from one to six, encouraging answers polarization

Results:

Eighty one professionals were involved with reponse rate 88%, 66% females and 34% males and 38% of the population had working experience between 11 and 20 years. And 18% were physicians. More than 25% of the personnel of the Operating theatre consider place of work not safe. Both Thoracic surgery unit and OT lack sufficient spaces at work and consider the environment noisy. At the OT 38% declare that they underwent mobbing. No discrimination was reported. Less equity in the OT. With respect to career and professional development most of the place of work. These results helped us to find the right actions to adopt inorder to improve the organizational climate. Educational courses must be adopted to improve knowledge of all professionals about safety at work. Daily supportive management is required. Implementation of empowerment

Conclusion:

Our findings point to the importance of the survey in finding the negative aspects of the organizational climate and implement the corrective methods

Disclosure: No significant relationships.

Keywords: organizational, climate, empowerment

INTRA-OPERATIVE REMOVAL OF CHEST TUBE IN VIDEO-ASSISTED THORA-COSCOPIC PROCEDURES

<u>Moustafa El-Badry</u>¹, H. Elkhayat¹, G. A. Makhlouf², A. Ghoniem¹ ¹Cardiothoracic Surgery Department, Assiut University Heart Hospital, Assiut, Egypt ²General Surgery Department, Assiut University Hospital, Assiut, Egypt

Objectives:

Thoracic Surgery has witnessed a massive revolution in the last 25 years with the standardization of VATS (video-assisted thoracoscopic surgery) as the best approach for most of the thoracic operations. Earlier when thoracic surgery was done through huge thoracotomy incisions and rib spreading retractors, the chest tube pain was masked by the excruciating pain of the thoracotomy, but with using VATS, with its benefits of decreased pain and earlier mobility, has caused surgeons seeking early removal of chest tubes. With advancement of stapling devices, the time needed for chest tube drainage significantly diminished. We explored the possibility of intraoperative chest tube removal in patients undergoing VATS procedures, identifying the safety, criteria for selecting patients and analysing the sequels.

Methods:

Prospective study, from May 2014 to December 2016, included 29 patients with different clinical presentations that were admitted to the service. Undergoing VATS procedures (uni-portal VATS in all except one), they were divided into two groups: study group, those with intraoperative removal of chest tube, (16 patients) and control group (13 patients). Patients would undergo an air-leak test to determine whether they were eligible to be included in the study.

Results:

The two groups had significant differences in the postoperative pain score (study group 4.9 & control group 7.8), hospital stay (study group 1.4 & control group 4). Both groups were similar in postoperative pneumothorax (study group 25% & control group 23.1%), with only 2 patients (12.5%) in the study group requiring re-insertion of chest tube.

Conclusion:

Intraoperative removal of chest tube during VATS procedures is a safe technique in well-selected patients with an intraoperative successful air-leak test with clinical and radiological followup. This technique provides lesser postoperative pain with shorter hospital stay, converting procedures into a one-day procedures. More studies are needed to be conducted regarding each of the clinical presentations alone

Disclosure: No significant relationships.

Keywords: Intraoperative removal of chest tube, uniportal VATS, air-leak test



PERSISTENT AIR LEAK IN THORACIC SURGERY: A NEW POST-OPERATIVE TECHNIQUE TO REDUCE THE PLEURAL SPACE AFTER LUNG RESECTION

Miriam Patella, R. Pini, A. Saporito, R. Inderbitzi, S. Cafarotti *Thoracic Surgery, EOC, ORBV, Bellinzona, Switzerland*

Objectives:

Residual pleural space after lung resection in presence of air leak is a common and challenging issue, potentially causing serious complications and extending hospital stay. We report a new, simple and effective technique to reduce the pleural space, inducing a controlled and reversible paralysis of the diaphragm.

Methods:

We selected six patients with prolonged air leak after lung resection (four lobectomies, one bilobectomy, one wedge resection). Inclusion criteria were: digitally detected air flow>1000ml/ min at post-op day three, presence of empty pleural space at chest x-ray, absence of restrictive lung disease, absence of known arrhythmias. A 22G nerve-block catheter was place under USS guidance in proximity to the phrenic nerve, between the sternocleidomastoid muscle and the anterior scalene muscle at the level of C6. A continuous infusion of ropivacaine 0.2% 3 ml/h is started. Fluoroscopy was used to confirm significant reduction in hemidiaphragm movements, resulting in a contraction of the hemithorax and obliteration of the pleural space. Close monitoring of vital signs and intense respiratory physiotherapy were implemented. The infusion was stopped at air leak cessation and the catheter was removed along with the chest drain.

Results:

No peri- and post-precudeural complications occurred. In all patients we observed an immediate reduction of the empty pleural space and a resolution of the air leak within few days (4 ± 1.78 days). After suspension of local anaesthetic a complete restoration of the hemidiaphragm function has been documented.

Conclusion:

This is an effective, safe and minimally invasive method to reduce the volume of residual pleural space after lung resections. Narrowing of the pleural space facilitates the contact between the lung and the chest wall promoting the resolution of the air leak. Diaphragm paralysis is controlled and temporary with no residual disabilities.

Disclosure: No significant relationships. **Keywords:** air leak, lung resection, residual pleural space

PLEURAL DISEASES WORKING GROUP OF EUROPEAN SOCIETY OF THO-RACIC SURGEONS (ESTS): UPDATE OF PROJECT AND ONGOING RESULTS

Luca Bertolaccini¹, B. Bedetti², G. Rocco³, A. Brunelli⁴, K. Papagiannopoulos⁴, P. Solli⁵, Y. Shargall⁶, K. Marinova⁷, F. Raveglia⁸, J. Kuzdzal⁹, G. Massard¹⁰, P. Falcoz¹⁰, E. Ruffini¹¹, I. Opitz¹², A. Toker¹³, H. Batirel¹⁴, M. Scarci¹⁵, and Members of the ESTS Pleural Diseases Working Group¹⁵ ¹Thoracic Surgery, Ravenna Teaching Hospital, Ravenna, Italy ²Thoracic Surgery, Malteser Hospital, Bonn, Germany ³Division of Thoracic Surgery, Department of Thoracic Surgical and Medical Oncology, Istituto Nazionale Tumori, Fondazione Pascale, IRCSS, Naples, Italy ⁴Department of Thoracic Surgery and Thoracic Endoscopy, St. James's University Hospital, Leeds, United Kingdom ⁵Thoracic Surgery, AUSL Romagna - Forlì Teaching Hospital, Forlì, Italy ⁶Thoracic Surgery, McMaster University, Hamilton, Canada ⁷Thoracic Surgery, UMHAT – St Marina Varna, Varna, Bulgaria ⁸Thoracic Surgery, AO San Paolo, Milan, Italy ⁹Thoracic Surgery, Jagiellonian University Collegium Medicum, John Paul II Hospital, Krakow, Poland ¹⁰Department of Thoracic Surgery and Thoracic Endoscopy, University Hospital of Strasbourg, Strasbourg, France ¹¹Thoracic Surgery, University of Torino, Torino, Italy ¹²Thoracic Surgery, University Hospital Zurich, Zurich, Switzerland ¹³Thoracic Surgery, Florence Nightingale Hospital, Istanbul, Turkey ¹⁴Thoracic Surgery, Marmara University Faculty of Medicine, Istanbul, Turkey ¹⁵Thoracic Surgery, University College London, London, United Kingdom

Objectives:

The last pleural disease guidelines were published in 2010. Despite large number of papers published on malignant pleural effusion (MPE), there are still many doubts and controversies on diagnosis and management. Pleural Disease Working Group of ESTS is an ambitious initiative for quality improvement of care in MPE. We present an update of the project and the available ongoing results.

Methods:

Working Group undertook four projects: analysis of baseline survey of MPE management (analysis of systems of care in different countries); benchmarking project on quality of previous guidelines with Appraisal-of-Guidelines-for-Research-and-Evaluation-II (AGREE-II) instrument; systematic review/meta-analysis of literature according to PRISMA (Preferred-Reporting-Items-for-Systematic-Reviews-and-Meta-Analysis) system; development of updated ESTS Recommendations on MPE management.



Results:

Survey demonstrate poor adoption of existing clinical guidance, as well as the need for more contemporary and up-to-date guidelines for a better-informed practice. Quality of guidelines assessed by AGREE-II criteria was found to be extremely variable; guidelines achieving higher scores were more likely to come from European Union with direct involvement of scientific societies in development (Table). Systematic review/meta-analysis found that talc poudrage is a more efficient pleurodesis method in MPE than many other frequently used methods. Development of updated ESTS Recommendations has been done using Population-Intervention-Comparison-Outcome (PICO) questions formulated on epidemiology, diagnosis, treatment of MPE; we employ Grading-of-Recommendations-Assessment-Development to help organize discussion around each recommendation; recommendations and their strength are ongoing and will be decided by consensus, according to GRADE approach. Working Group writing committee had draft two different papers for these projects submitted to EJCTS/ICVTS.

Table. Appraisal of Guidelines for Research and Evaluation (AGREE-II) scores by domain with the inter-rater reliability between observers. SD = Standard Deviation; CI = Confidence

interval.					
Domain	Mean ± SD	95% CI for the	Median	Min	Max
	%	mean %	%	%	%
Scope and purpose	70 ± 12	57 - 83	68	57	88
Stakeholder involvment	58 ± 13	45 - 72	63	37	69
Rigour of development	64 ± 15	48 - 79	63	44	85
Clarity of presentation	83 ± 10	73 - 93	86	69	94
Applicability	48 ± 8	40 - 57	51	33	86
Editorial independence	65 ± 11	54 - 77	62	57	86
Overall assessment	72 ± 11	61 - 83	83	53	75

Conclusion:

Although there are many guidelines published in literature, quality was extremely variable. It was recognised that some fundamental unanswered questions remain about MPE management. ESTS Pleural Diseases Working Group is still developing updated recommendations with aim to improve the quality of care for people with MPE across Europe.

Disclosure: No significant relationships.

Keywords: malignant pleural effusion, lung cancer, guidelines

INDOCYANINE GREEN FLUORESCENCE-NAVIGATED THORACOSCOPIC SEG-MENTECTOMY IN LUNG CANCER PATIENTS

Vadim Pischik, A. Kovalenko

Faculty of Medicine, Federal State Budgetary Educational Institution of Higher Education Saint Petersburg State University, Saint Petersburg, Russian Federation

Objectives:

Clinical evidence is emerging to show that thoracoscopic segmentectomy could be an oncologically valid procedure in selected lung cancer patients. At the same time surgical success is highly dependent on intraoperative interpretation of segmental anatomy. Modern technologies allow to facilitate the operation. The study aims at a new technique of identifying the lung intersegmental planes with near-infrared (NIR) fluorescence imaging after intravenous injection of indocyanine green (ICG).

Methods:

The study covered 18 lung cancer patients who underwent thoracoscopic segmentectomy with NIR-ICG imaging system. We use three dimensional (3D) reconstructed computed tomography images to identify the dominant pulmonary arteries supplying the target segment. ICG was intravenously injected in dose of 0,15 mg/kg body weight after arteries ligation.

Results:

Fluorescence immediately appears and have been persisting for an average of 100 sec, that was enough to mark intersegmental plane. Well-defined fluorescence borders were observed in 17 of 18 patients (94,4%). One patient has unconvincing result due to technical reasons. No complications of ICG administration were observed.

Conclusion:

ICG-fluorescence facilitates intersegmental planes identifying during thoracoscopic segmentectomy. NIR fluorescence imaging system permits using lower dose of ICG with similar results.

Disclosure: No significant relationships.

Keywords: thoracoscopic segmentectomy, Indocyanine green ICG, lung cancer, near-infrared (NIR), fluorescence





PULMONARY REHABILITATION IMPROVES FUNCTIONAL PARAMETERS BEFORE AND AFTER THORACIC SURGERY

<u>Attila Vagvolgyi</u>¹, Z. Rozgonyi², M. Kerti³, C. Feher¹, M. Molnar¹, P. Vadasz¹, J.T. Varga³ ¹Department of Thoracic Surgery, National Koranyi Institute for Pulmonology and Semmelweis University, Budapest, Hungary

²Central Department of Anaesthesiology and Intensive Care, National Koranyi Institute for Pulmonology and Semmelweis University, Budapest, Hungary ³Department of Pulmonary Rehabilitation, National KoranyI Institute for Pulmonology and Semmelweis University, Budapest, Hungary

Objectives:

A complex pulmonary rehabilitation program provides improvement in functional parameters with higher exercise capacity and functional reserves before thoracic surgery. Rehabilitation in the postoperative healing period can be safer and risk of pulmonological complications might be reduced.

Methods:

Lung functions, chest kinematics, six minutes walking distance, exercise capacity and quality of life tests were measured in 208 COPD patients who underwent thoracic surgery. The pulmonary rehabilitation program takes three weeks and includes 30 minutes of morning respiratory training, chest wall mobilisation and learning controlled breathing techniques with additional 15-30 minutes cycle training 2-3 times a day, smoking cessation and inhalation therapy. The most common indication of the operations was lung cancer (72%). The average age was 63 ± 9 years. 1/3 of the patients had pre-and postoperative rehabilitation (PPO), 1/3 had preoperative (PRE), and 1/3 had postoperative rehabilitation only (POS). Results were compared by paired t-test, non-parametric sign test and Wilcoxon test. Significance was accepted at the P<0.05 level. Distributions were tested for normality by the Kolmogorov-Smirnov test.

Results:

There was a significant improvement in FEV1 (PRE: 64 ± 16 vs. 67 ± 16 %pred*; PPO: 60 ± 13 vs. 66 ± 13 %pred* preoperatively, 48 ± 13 vs. 52 ± 13 %pred* postoperatively; POS: 56 ± 16 vs. 61 ± 14 %pred*, p<0.05) and in 6MWD (PRE: 403 ± 87 vs. 452 ± 86 m; PPO: 388 ± 86 vs. 439 ± 83 m* before, 337 ± 111 vs. 397 ± 105 m* after the operation; POS: 362 ± 89 vs. 434 ± 94 m*, p<0.0001). Chest wall expansion improved significantly (PRE: 4.4 ± 2.3 vs. 5.9 ± 2.2 cm; PPO: 4.2 ± 2.3 vs. 5.7 ± 2.8 cm before*, 2.8 ± 1.6 vs. 4.5 ± 2.3 cm* after the operation; POS: 2.8 ± 1.4 vs. 4.8 ± 2.0 cm*; *p<0.0001). Significant improvement of the FVC, grip strength, mMRC and CAT questionnaires were also detected.

Conclusion:

Perioperative pulmonary rehabilitation improved exercise capacity and functional reserves significantly and reduced the symptoms (dyspnoea, fatigue and depression). Functional operability was promoted by improvement of cardiovascular function, metabolism, muscle-function and lung mechanics.

Disclosure: No significant relationships.

Keywords: perioperative pulmonary rehabilitation, thoracic surgery, lung cancer surgery, chest physiotherapy, endurance training, chronic obstructive pulmonary disease



RESCUE TREATMENT WITH IMMEDIATE PHRENIC NERVE RECONSTRUC-TION WITH SURAL NERVE GRAFT TRANSPOSITION

Zsolt Sziklavari, K. Sun, A. Sawant, V. Haas Clinic for Thoracic Surgery, Klinikum Ansbach, Ansbach, Germany

Objectives:

Frequently, it is necessary to sacrifice the phrenic nerve to achieve radical resection for nonsmall cell lung cancer. Unilateral phrenic injury after thoracic surgery may result additional respiratory deficits. In critical ill patients, loss of diaphragmatic function has to be avoided. The immediate rescue technique for phrenic nerve reconstruction with graft interponat may be a therapeutic option.

Methods:

A 70-year-old man with overweight and central lung carcinoma (cT4, cN0) was referred for radical lung resection. The patient demonstrated absence of diaphragmatic motion on preoperative sniff testing. Through a right axilloanterior thoracotomy the tumor was identified and anatomical resected via extended upper bilobectomy. As was suspected, the right phrenic nerve was infiltrated by the tumor. A 10-cm long piece had to be resected in the middle region. In order to minimize the functional loss, immediate phrenic nerve reconstruction with a sural nerve graft (longer than the defect) from the right calf was considered. The polus was thrown and end-to-end nerve anastomosis was performed with magnifying loupes. We preferred an epineural microsurgical 8-0 interrupted suture at both graft ends. The nerve suture was secured with 1 mL of topically applied fibrin glue.

Results:

The length of surgery was 372 min and no intraoperative complications occured. The patient was extubated in the operating theater. Length of stay in hospital was 10 days. At 2 months the patient had completely recovered from the operation and, although in good physical condition, still had dyspnea. At 2 months the x-ray film still showed an elevated right hemidiaphragm but the fluoroscopy demonstrated a maintained diaphragmatic mobility.

Conclusion:

This report proves for the first time to our knowledge the feasibility of immediate phrenic nerve reconstruction after extended bilobectomy. Microsurgical reconstruction with sural nerve transposition can be applied safely with nearly negligible donor-site morbidity.

Disclosure: No significant relationships.

Keywords: reconstruction, complication, diaphragma, paralysis, nerve

THE RISK FACTOR OF COMPLICATIONS CAUSED BY MICROCOIL LOCALIZA-TION OF PULMONARY NODULES

Xizhao Sui, H. Zhao, W. Jun Department of Thoracic Surgery, Beijing University People's Hospital, Beijing, China

Objectives:

To investigate the factors related with the complications caused by microcoil localization procedure of pulmonary small nodules prior to thoracoscopic resection

Methods:

We retrospectively reviewed the medical data of patients with pulmonary solid nodules and ground-glass opacity who underwent CT-guided microcoil localization prior to thoracoscopic surgery between Dec 2013 and Oct 2015 in our institution. Factors included clinical data, imaging data, surgical data, and technical data of microcoil localization were collected for stepwise logistic regression.

Results:

A total of 223 patients with 239 nodules were included in this study. Localization related complications were observed in 51 localizations (21.3%) prior to operation. Pneumothorax was observed in 36 localizations (15.1%), including 35 asymptomatic pneumothorax. One patient required further thoracentesis on the subsequent day after localization. Pulmonary hematoma or hemoptysis was observed in 15 localizations (6.3%). On logistic regression, age, Insertion depth of Chiba needle and microcoil dislocation were identified as the independent factors related with Localization related complications. Respectively, pneumothorax was related with age and microcoil dislocation, and pulmonary hematoma or hemoptysis was related with age and Insertion depth of Chiba needle.

Conclusion:

Age, insertion depth of Chiba needle and microcoil dislocation were the independent factors related with the complications caused by microcoil localization procedure for subsequent thoracoscopic resection. Special care should be taken on the appropriate depth of Chiba needle to reduce the morbidity rate of microcoil localization.

Disclosure: X. Sui: A platinum microcoil with an entire length of 7cm (Cook incorporated, Bloomington, IN 47404, USA) and a 21G Chiba needle (Argon Medical Devices Inc., Athens, TX75751, USA) were used for the localization.

H. Zhao: A platinum microcoil with an entire length of 7cm (Cook incorporated, Bloomington, IN 47404, USA) and a 21G Chiba needle (Argon Medical Devices Inc., Athens, TX75751, USA) were used for the localization.

W. Jun: A platinum microcoil with an entire length of 7cm (Cook incorporated, Bloomington, IN 47404, USA) and a 21G Chiba needle (Argon Medical Devices Inc., Athens, TX75751, USA) were used for the localization.

Keywords: microcoil localization, pulmonary nodule, thoracoscopy, VATS



ENDOMETRIOSIS-ASSOCIATED PNEUMOTHORAX: UNDERESTIMATED DESEASE

<u>Aleksandr Obornev</u>¹, V. Pischik¹, M. Atyukov², A. Petrov², P. Yablonsky³ ¹Thoracic Surgery, Clinical hospital №122, St-Petersburg, Russian Federation ²Thoracic Surgery, Municipal Hospital №2, St-Petersburg, Russian Federation ³Hospital Surgery, St-Petersburg State University, St-Petersburg, Russian Federation

Objectives:

To study the differencies of the endometriosis-associated pneumothorax (EAP) from primary spontaneous pneumothorax. To evaluate best treatment option for the EAP.

Methods:

Retrospectively analyzed data of 179 women in reproductive age with spontaneous pneumothorax who underwent visual inspection of the pleural cavity, lung and diaphragm from 2004 to 2016. Patients were divided into two groups: 30 women in EAP-group, and 149 women – control group.

Parametres	EAP	Control	р
Age (yrs.)	40.3±7.0	31.8±9.1	p<0.01
Side of pneumothorax (left/right)	6.7% /93.3%	34.9% /64.4%	p<0.01
Tension pneumothorax	43,3%	42,9%	p>0.05
Rate of recurrent pneumothorax	70.0%	26.9%	p<0.01
Number of episodes (mean)	1.47±0.7	1.42±1.0	p>0.05
Mean time of admission (days)	8.8 ±7.8	6.1±7.6	p>0.05
No. dama dama na tana	46.4% / 39.3% /	3.2% / 6.4% /	m<0.05
vanderschueren type	14.3% /0%	54.2% / 36.2%	p<0.03
History of endometriosis	50%	2%	p<0.01
Menstrual cycle length (days)	27.0±2.4	27.1±3.0	p>0.05
Concomitance with menses	66.7%	37.6%	p<0.01

Results:

After visual exploration of the pleural cavity bullae were found in only 14,3% of cases in the EAP group. At the same time, bullous desease in the control group was diagnosed in 90,4% of cases. Specific findings in EAP group were: diaphragmatic fenestrations in 39,3% (11 cases), pleural implants in 14,3% (4 cases), implants and fenestrations in 46,4% (13 cases) Surgery was performed in 94 pts of the control group and in 28 of 30 pts in the EAP group. Complication rate in EAP-group was 30% and only 12,7% in the control group. Most effective operative treatments for EAP were diaphragmatic resection, reinforcement of the suture line with a polypropylene mesh and hormonal treatment with GNRG-agonists or combined oral contraceptives under supervision of the gynecologist for 3-6 months.

Conclusion:

Endometriosis-associated pneumothorax is an important cause of secondary spontaneous pneumothorax. It usually affects right hemithorax in elderly patients of 40-50 years with endometriosis in anamnesis. Diaphragmatic fenestrations are specific sign of EAP. Direct visual examination of the pleural cavity is inevitable for early diagnosis. Surgical treatment of EAP is still characterized by more complications and more frequent recurrences than other forms of spontaneous pneumothorax. Postoperative hormonal treatment significantly improves the results of operative treatment, providing time for pleurodesis.

Disclosure: No significant relationships.

Keywords: pneumothorax, diaphragm, endometriosis, videothoracoscopy



VIDEO ASSISTED THORACOSCOPIC SURGERY (VATS) THORACOPLASTY IN DRUG-RESISTANT DESTRUCTIVE LUNG TUBERCULOSIS MANAGEMENT

D. Giller, V. Namazova, I. Martel, G. Vishnevskaya, <u>Boris Giller</u>, I. Enilenis *M.I.Perelman Phthisiopulmonology and Thoracic Surgery Department, I.M.Sechenov First Moscow State Medical University, Moscow, Russian Federation*

Objectives:

We present a new minimally invasive way of performing an extrapleural thoracoplasty from a section of 4-8 cm under control of a video thoracoscope with using a dedicated instrumentation. In total we performed 636 operations for drug resistant destructive pulmonary tuberculosis.

Methods:

Skin, subcutaneous fat, a portion of the trapezius muscle, the latisimus dorsi and rhomboid major are dissected. The partially dissected muscles and scapula are stripped from an external surface of ribs in a projection of following decostation, and taken aside and outside with wide hooks thereby creating a cavity between the greater skeletal muscles and rib cage for big skeletal muscles and a costal framework for surgical manipulations. A Thoracoport is fixed in this cavity through a separate puncture 2 cm above an upper angle of a

wound; a video thoracoscope is introduced to inspect the manipulations.

Results:

We carried out 124 VATS thoracoplasties for the only one lung focal damage after previously pneumonectomy, 301 thoracoplasties after lung resection for pleural space volume reduction and 211 thoracoplasties as surgical treatment method without lung resection. Intraoperative complications arose in 7 (1,1%) cases - opening of a pleural cavity that demanded its additional drainage. Postoperative complications arose in 9 (1,5%) cases. All complications were successfully managed. There was no postoperative mortality.

Conclusion:

This way of thoracoplasty is less traumatic, than the standard extrapleural thoracoplasty, because of the minimum section of thorax muscles; and allows to achieve considerable reduction of the hemithorax volume. Less expressed pain syndrome, earlier and full functional rehabilitation, lack of thorax deformation and full preservation of shoulder girdle function are observed at all patients.

Disclosure: No significant relationships.

Keywords: drug-resistant tuberculosis, thoracic surgery, thoracoplasty, VATS

SURVIVAL FOLLOWING MULTIMODALITY TREATMENT INCLUDING SURGERY FOR LIMITED DISEASE SMALL-CELL LUNG CANCER

Barbara Weckler, N. Baldes, S. Trainer, C. Von Voigt, F. Kirschner, C. Heesen, J. Schirren *Thoracic Surgery, Helios, Dr. Horst-Schmidt Klinik Wiesbaden, Wiesbaden, Germany*

Objectives:

The treatment of choice for limited disease small-cell lung cancer is concurrent chemoradiotherapy with median survival of 23 months and 5-year survival rate of 26%. Despite improved median survival of 68 months and 5-year survival rate of 63% after R0 resection, chemotherapy, and thoracic radiotherapy, surgery is usually not part of the management of small-cell lung cancer. Therefore, this study investigated survival in limited disease small-cell lung cancer following multimodality treatment including surgery.

Methods:

Between January 1999 and August 2016, 47 small-cell lung cancer patients from stage IA to IIIB without supraclavicular lymph node involvement received multimodality treatment with curative intent. This comprised surgery consisting of primary tumour resection and systematic lymph node dissection combined with chemotherapy, chemoradiotherapy, or thoracic radio-therapy. Kaplan-Meier analyses and log-rank tests were used to estimate overall survival and determine the impact of stage, T and N status, treatment modality, and R0 resection on survival. The risk of locoregional relapse was also investigated.

Results:

Multimodality treatment including surgery resulted in an overall median survival of 54 months and 2-, 3-, and 5-year survival rate of 69%, 54%, and 46%, respectively. The only statistically significant prognostic factor was R0 resection with subsequent increase in median survival to 64 months versus 17 months after R1/2 resection (p<0.0001). The risk of locoregional relapse was 2.5% after R0 resection.

Conclusion:

Multimodality treatment including surgery leads to improved survival and should consequently be offered to limited disease small-cell lung cancer patients. The main focus of surgery should be on R0 resection. Furthermore, it has become clear that there is a demand for a prospective multicentre study comparing multimodality treatment including surgery to concurrent chemoradiotherapy.

Disclosure: No significant relationships.

Keywords: small-cell lung cancer, small-cell lung cancer treatment, limited disease SCLC, surgery in SCLC



CN0 SUBMUCOSAL SQUAMOUS CELL ESOPHAGEAL CANCER: IS IT INDI-CATED FOR ENDOSCOPIC RESECTION?

Bo Ye, Z. Li, X. Zhang

Thoracic Surgery, Shanghai Chest Hospital, Shanghai, China

Objectives:

This study aims to clarify the feasibility of endoscopic treatment for cN0pT1b esophageal cancer and classify their risk levels by analyzing pathology, recurrence pattern, and long-term survival after esophagectomy.

Methods:

From January 1, 2012 to May 31, 2015, a retrospective analysis was included 126 patients with esophageal squamous carcinoma undergoing esophagectomy and diagnosed as cN0pT1b. All patients received right-approach transthoracic esophagectomy and extended thoracic/abdominal 2-field lymphadenectomy. The risk factors influencing on lymphatic metastasis, long-term recurrence of high-risk patients were identified by univariate and multivariate analyses.

Results:

Of all patients, lymph node metastasis occurred in 31 patients (24.6%). Differentiation, invasion depth and tumor size in lymph node metastasis group (pN+) was significant different from non-metastasis group (pN0) (p<0.05). Lymph node metastasis in sm1, sm2, sm3 was 7.7%, 16.3%, and 32.8%(p<0.05). In the patients with well differentiation and <2cm in size(G1S<20), the rate of LN metastasis was 7.1%, but 24.7% in the others(Non- G1S<20), p<0.01. Lympha-vascular invasion (LVI) occurred in 10 patients with 5 lymph nodes metastasis. No significant difference of LVI was found between pN+ and pN0 group (p=0.065). The overall 3-year survival rate was 89.68% (94.7% in pN0 group, 74.2% in pN+ group). The recurrence rate was 15.8% and the median time interval of recurrence was 23 months. More recurrence happened in the upper mediastinal-neck area compared to the cardiac-coeliac area (45% vs. 15%, p<0.01). Multivariate analyses showed that the following factors significantly predicted low risk level (negative lymph node metastasis and recurrence free survival): sm1, high differentiation and <2cm in diameter. Three-year survival in the low-risk group was significantly higher than in high-risk group (95.1% vs. 56.6%, p<0.01).

Conclusion:

The patients with cN0 esophageal submucosal squamous cell cancer are recommended to undergo endoscopic resection along if the lesion is diagnosed as sm1, high differentiation and <2cm in diameter.

Disclosure: No significant relationships.

Keywords: esophageal cancer, esophagectomy, submucosal

LONG-TERM AND SURGICAL OUTCOMES OF ENDOSCOPIC SUBMUCOSAL DISSECTION VERSUS MINIMALLY INVASIVE ESOPHAGECTOMY FOR SUPER-FICIAL ESOPHAGEAL SQUAMOUS CELL CARCINOMA

Kongjia Luo¹, H. Shan², Y. Hu¹, X. Lin¹, J. Fu³

¹Thoracic Surgery, Sun Yat-Sen University Cancer Center, Guangzhou, China ²Endoscopy Center, Sun Yat-Sen University Cancer Center, Guangzhou, China ³General Thoracic Surgery, Sun Yat-sen University Cancer Center, Guangdong Esophageal Cancer Institute, Guangzhou, China

Objectives:

Endoscopic submucosal dissection (ESD) was developed as a potentially curative treatment with less invasiveness for superficial esophageal squamous cell carcinoma (SESCC) with node-negative. However, outcomes of ESD is inadequately studied compared with minimally invasive esophagectomy (MIE). The purpose of this study was to compare outcomes of the endoscopic management with MIE for SESCC.

Methods:

From January 2008 to December 2014, a total of 2252 patients with esophageal squamous cell carcinoma underwent ESD or MIE in the department of thoracic oncology. Selection criteria were: histologic proof of thoracic ESCC, staging as pT1N0M0 (the 7th edition of the AJCC), and no neo-adjuvant or adjuvant therapy. Patients who underwent ESD were chosen as study group (Group E). The control group (Group M) comprised patients who underwent MIE with lymph node dissection. Short-term and long-term outcomes were analyzed between these two groups.

Results:

In the study, 42 patients received ESD and 61 patients underwent TTE treatment. More severe complications were observed in the Group M, such as pneumonia and leakage. The patterns of recurrence including local relapse and lymph node metastasis were observed in 9 patients after ESD. 6 patients had achieved the release of disease after second-line treatment. Disease-free survival was significantly longer in the Group M (P =0.019), but overall survival was not different between two groups (P =0.987). (The data will be renewed.)

Conclusion:

This comparison study revealed that ESD is at a lower risk of complications and similar success of disease control compared with MIE. Moreover, patients who had recurrence may still achieve the release of disease after second-line treatment.

Disclosure: No significant relationships.

Keywords: endoscopic submucosal dissection, minimally invasive esophagectomy, superficial esophageal squamous cell carcinoma, long-term outcomes



PERSISTENCE OF GENETIC MUTATIONS IN THE NEOSQUAMOUS EPITHE-LIUM AFTER ABLATION THERAPY FOR BARRETT'S ESOPHAGUS AND ESOPH-AGEAL DYSPLASIA

J. Munoz¹, T. Godfrey², I. Kalatskaya³, W. Jiao³, M. O'Brien⁴, L. Stein³, <u>Virginia Litle¹</u> ¹Surgery, Division of Thoracic Surgery, Boston University School of Medicine, Boston, MA, United States of America

²Surgery, Boston University School of Medicine, Boston, MA, United States of America
 ³Mars Centre, Ontario Institute for Cancer Research, Toronto, ON, Canada
 ⁴Pathology, Boston University School of Medicine, Boston, MA, United States of America

Objectives:

The incidence of Barrett's Esophagus (BE) and dysplastic esophageal mucosal changes has increased over the last few decades and is associated with development of esophageal adenocarcinoma. Novel therapies that destroy (ablate) the epithelium can eradicate BE and dysplastic mucosal changes, resulting in regeneration of a neosquamous epithelium. However, recent literature suggests that both BE and squamous epithelium may be derived from the same progenitor stem cell. If this is true then neosquamous epithelium that develops following ablation may still harbor genetic changes that were present in the original BE. Persistence of genetic mutations in the neo-squamous epithelium may impose a higher risk for disease recurrence and progression. Thus, we aimed to determine if mutations present in BE and dysplasia are present in neo-squamous epithelium that develops following ablation therapy.

Methods:

Archived biopsy specimens were retrieved from five patients with BE and or dysplasia, before and after ablation therapy. Biopsies were cut for DNA isolation and a new H&E stained slide was generated for pathology review. DNA was sequenced using a targeted esophageal adenocarcinoma panel and potential somatic variants were identified. Neosquamous biopsy samples were examined for presence of variants found at similar esophageal locations in BE and dysplasia samples prior to ablation.

Results:

Fourteen samples have been assessed from two patients. In both cases, the neosquamous epithelia harbor a subset of variants found in one or more BE/dysplasia biopsies prior to ablation. The remaining samples are currently being analyzed and validation of variants in neosquamous epithelium is being performed.

Conclusion:

Mutations present in BE/dysplasia samples may persist in neosquamous epithelium following ablative therapy. If validated, this may have implications for future cancer risk in this patient population.

Disclosure: No significant relationships.

Keywords: Barrett's Esophagus, dysplasia, ablation therapy, neosquamous epithelium, genetic mutations

IS SUBLOBAR RESECTION FOR STAGE I INVASIVE ADENOCARCINOMA (<2-CM) WITH SOLID HISTOLOGICAL SUBTYPE ENOUGH FOR CURE?

<u>Tsuyoshi Takahashi</u>¹, J. Nitadori¹, S. Morita², M. Kawashima³, H. Kuwano¹, K. Nagayama¹, M. Anraku¹, A. Shinozaki-Ushiku², M. Sato¹, M. Fukayama⁴, J. Nakajima¹ ¹Department of Thoracic Surgery, The University of Tokyo, Tokyo, Japan ²Department of Pathology, The University of Tokyo, Tokyo, Japan ³Department of Thoracic Surgery, The University of Tokyo Graduate School of Medicine, Tokyo, Japan

⁴Department of Pathology, The University of Tokyo, Tokyo, Japan

Objectives:

Recent studies have reported that sublobar resection is not inferior to lobectomy for small-sized non-invasive adenocarcinoma (ADC); however, the adequacy for small-sized invasive ADC (IAD) remains unclear. The objective of this study was to identify and validate prognostic factors of sublobar resection for small-sized IAD.Recent studies have reported that sublobar resection is not inferior to lobectomy for small-sized non-invasive adenocarcinoma (ADC); however, the adequacy for small-sized invasive ADC (IAD) remains unclear. The objective of small-sized non-invasive adenocarcinoma (ADC); however, the adequacy for small-sized invasive ADC (IAD) remains unclear. The objective of this study was to identify and validate prognostic factors of sublobar resection for small-sized IAD.

Methods:

We retrospectively reviewed 351 patients with therapy-naïve, pathological stage I (\leq 2-cm) IAD, who had undergone complete resection from 1998-2015. Each tumor was evaluated by comprehensive histologic subtyping according to the 2015 World Health Organization classification. Recurrence-free probability was estimated using the Kaplan-Meier method.

Results:

The histological subtypes were ADC in situ in 62 (18%) patients, minimally invasive ADC in 110 (31%), and IAD in 179 (51%). Of 179 IAD patients, 104 were male and 75 were female, with a median age of 68 years; wedge resection was performed in 28, segmentectomy in 7, and lobectomy or pneumonectomy in 144. Median pathological tumor size was 1.5 cm, with a median invasive component size of 0.9 cm, and pleural, lymphatic, or vascular invasion in 27 (15%), 25 (14%), and 49 (23%) patients, respectively. The presence of \geq 5% solid component (SOL) was identified in 81 patients (45%). In IAD, \geq 5% SOL was associated with increased risk of recurrence compared with that for SOL <5% (*P*=0.002). Patients with \geq 5% SOL undergoing sublobar resection for IAD had significantly increased risk of local recurrence (*P*<0.0001). Although there was no significant difference in recurrence risk between patients with SOL <5% undergoing sublobar resection and lobectomy or pneumonectomy, those undergoing sublobar resection with \geq 5% SOL showed increased risk of recurrence (*P*=0.001).



Conclusion:

The presence of \geq 5% SOL is a significant predictor of local recurrence in patients undergoing sublobar resection for stage I IAD. Patients with SOL IAD might be candidates for lobectomy rather than sublobar resection.

Disclosure: No significant relationships.

Keywords: invasive adenocarcinoma, solid histological subtype, surgery

H-TYPE TRACHEOESOPHAGEAL FISTULA; A CONGENITAL DEFORMITY FIRSTLY DIAGNOSED 59 YEARS POSTNATALLY

Nikolaos Papakonstantinou¹, C. Zisis¹, E. Balis², A. Papanikolaou², D. Bouros³ ¹Cardiothoracic Surgery Department, General Hospital of Athens "Evangelismos", Athens, Greece ²Pulmonary Medicine Department, General Hospital of Athens "Evangelismos", Athens, Greece ³Ist Pulmonary Medicine Department of National and Kapodistrian University of Athens, General Hospital of Thoracic Diseases of Athens "Sotiria", Athens, Greece

Objectives:

The majority of congenital tracheoesophageal fistulas are diagnosed during the neonatal period or infancy, because more than 98% of them are associated with atresia of the esophagus that may be lethal. Congenital tracheoesophageal fistula without esophageal atresia is known as H-type which represents less than 5% of all congenital tracheoesophageal malformations.

Case description:

A 59-year-old woman with a history of recurrent respiratory infections, gastroesophageal reflux disease and Barrett's oesophagus was diagnosed with a previously undetected H-type congenital tracheoesophageal fistula. The tracheoesophageal fistula without esophageal atresia was confirmed by esophagoscopy and bronchoscopy (figure 1a). An anomalous communication between the membranous wall of the middle trachea and the anterior wall of the esophagus was revealed. Its wide diameter permitted the entrance of the bronchoscope in the fistula. The patient was submitted to surgery via a left oblique cervical approach. The tracheoesophageal fistula, located 3cm caudally to the cricoid cartilage, was divided by an endostapler and a pedicled strap muscle flap was buttressed between the trachea and the esophagus. Feeding started on the 4th postoperative day after esophagogram and subsequent bronchoscopy noticed successful occlusion of the fistula.(figure 1b) **FIGURE 1**





Bronchoscopic images from behind the patient: **a.** The dotted circle shows the orifice of the fistula on the membranous wall of the trachea; **b.** Successful total occlusion of the fistula (arrow)

Conclusions:

Although there is a delay in the diagnosis due to minimal symptoms, there should be a high suspicion of this malformation when recurrent respiratory symptoms are present. Surgical treatment should be performed once diagnosed. Preoperative esophagoscopy can confirm the diagnosis and bronchoscopy is valuable to localize the lesion. Surgical repair through a cervical incision or thoracotomy is the treatment of choice.

Disclosure: No significant relationships.

Keywords: tracheoesophageal fistula, recurrent respiratory infections, congenital, trachea, oesophagus

SUCCESSFUL PERIOPERATIVE MANAGEMENT OF DONOR-ACQUIRED FAT EMBOLISM AFTER DOUBLE LUNG TRANSPLANTATION

<u>Thomas Schweiger</u>, S. Schwarz, A. Benazzo, F. Augustin, G. Lang, W. Klepetko *Thoracic Surgery, Medical University of Vienna, Vienna, Austria*

Objectives:

Donor-acquired fat embolism (DAFE) is a rare but severe complication occurring after transplantation of lungs from donors with trauma history. Herein we describe the perioperative course and management of a recipient with DAFE.

Case description:

Donor lungs from a 21 year-old male donor two days after polytrauma were allocated to a 21-year-old recipient with cystic fibrosis. A contrast-enhanced CT scan at admission revealed severe parenchymal brain injury and a fracture of the scapula. The blood gases during organ procurement were 555 mmHg pO2 and 43 mmHg pC02 at 100%FiO2. The procurement was uneventful. However, during retrograde flushing massive fat embolism became evident at the back-table. The lungs were flushed extensively, which resulted in good retrograde backflow. There was no significant edema. Considering the excellent blood gases, a good organ quality and a good backflow during the retrograde flushing, the lungs were accepted for lung transplantation. Sequential double lung transplantation was performed with central veno-arterial ECMO support. At the end of the procedure, the lungs became increasingly edematous with rising respiratory effort. Therefore an inguinal VA-ECMO was implanted. After transfer to the ICU, the patient was put in prone-position, received –additionally to the standard medication – levosimendan, nitrogen inhalation and 500mg prednisolone for 3 days. The first X-ray showed bilateral, patchy infiltrates, which gradually resolved during the early postoperative course. The VA-ECMO could be removed on the 3rd postoperative day (POD). The patient was extubated at the 6th POD.

Conclusions:

Donor lungs with evidence for fat embolism may harbor excessive tissue injury, despite excellent functional parameters during organ procurement. Acceptance for transplantation should be carefully re-considered if fat-embolism becomes evident during retrograde flushing. Aggressive therapeutic management with levosimendan, nitrogen inhalation, cortisone, ECMOsupport and prone- positioning led to rapid restoration of organ function in our case.

Disclosure: No significant relationships.

Keywords: primary graft dysfunction, transplantation, ECMO, donor-acquired fat embolism



TUESDAY, 30 MAY 2017 12:30 - 13:30 E-POSTERS 2 ROOM: E-POSTER AREA

P-188

PATTERNS OF N1 RECURRENCE IN PATIENTS WHO UNDERWENT PLASTIC PROCEDURE FOR LUNG CANCER: BRONCHIAL SLEEVE VERSUS DOUBLE SLEEVE VERSUS PULMONARY ARTERIOPLASTY

Kenji Suzuki, S. Hirayama, T. Matsunaga, A. Hattori, M. Fukui, K. Takamochi, S. Oh *General Thoracic Surgery, Juntendo University School of Medicine, Tokyo, Japan*

Objectives:

Plastic procedure for lung cancer, such as bronchial and/or vascular sleeve, has been established as one of the options fto prevent pneumonectomy. However reports on hilar recurrence remains limited, and we investigated those mode of surgery in terms of patterns of failure.

Methods:

Between February 2008 and December 2015, 2060 patients with lung cancer underwent surgical resection and 113 bronchoplasty and/or 101 pulmonary arterioplasty were performed at out institute. We investigated clinicopathological features and patterns of failure by mode of surgery: 61 with only bronchoplasty (BR), 52 with bronchovascular sleeve (BV), 49 with pulmonary arterioplasty only (PA). Patterns of recurrence was especially evaluated on N1 nodal failure and compared among those procedures.

Results:

Men were dominant for every group. Median age was 67 and every group included 80 years or more. Right side was dominant for BR, and left was for BV or PA. Clinical stage I was dominant for PA. Squamous cell carcinoma was around 50%. Local failure was BR 21%, BV 23%, PA 16%. However failure in the hilar nodes were 7%, 2%, 2% for BR, BV, PA, respectively.

Characteristics by mode of surgery			
Characteristics	Bronchial sleeve	Double sleeve	Pulmonary arterioplasty
Number of patients	61	52	49
Men	46 (75%)	41 (79%)	35 (71%)
Age	30-83	44-84	44-88
Right side	44 (72%)	16 (31%)	13 (27%)
Upper lobe	18 (62%)	44 (85%)	27 (55%)
clinical stage I	15 (25%)	9 (17%)	27 (55%)
Pathological N1	37 (61%)	41 (79%)	25 (51%)
30 day mortality	1 (2%)	0 (0%)	0 (0%)
90 day mortality	2 (3%)	1 (2%)	1 (2%)
Local recurrence	13 (21%)	12 (23%)	8 (16%)
N1 recurrence	4 (7%)	1 (2%)	1 (2%)
Preoperative chemoradiation	5 (8%)	3 (6%)	3 (6%)

Conclusion:

Bronchial and/or vascular plasty were feasible for lung cancer to prevent pneumonectomy, though N1 recurrence were more frequent in patients who underwent bronchial sleeve alone.

Disclosure: No significant relationships.

Keywords: failure, sleeve, bronchovascular, prognosis



VALIDATION OF A PROGNOSTIC MODEL INCLUDING THE NUMBER OF HARVESTED LYMPH-NODES IN THE SETTING OF NON-SMALL-CELL LUNG CANCER PATIENTS UNDERGOING CURATIVE RESECTION: A MULTICENTER ANALYSIS

Marco Chiappetta¹, G. Leuzzi², G. Alessandrini¹, I. Sperduti³, E. Bria⁴, F. Mucilli⁵, G. Ratto⁶, D. Forcella¹, F. Lococo⁷, P.L. Filosso⁸, L. Spaggiari⁹, F. Facciolo¹

¹Department of Surgical Oncology, Thoracic Surgery Unit, Regina Elena National Cancer Institute - IFO, Rome, Rome, Italy

²Thoracic Surgery Unit, Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy
³Department of Biostatistics, Regina Elena National Cancer Institute - IFO, Rome, Rome, Italy
⁴Medical Oncology, Department of Medicine, University Hospital of Verona, Verona, Italy
⁵Department of General and Thoracic Surgery, University Hospital "SS. Annunziata", Chieti, Italy
⁶Division of Thoracic Surgery, IRCCS AOU "San Martino" IST, Genoa, Genoa, Italy
⁷Unit of Thoracic Surgery, Arcispedale Santa Maria Nuova-IRCCS, Reggio Emilia, Italy, Reggio Emilia, Italy
⁸Thoracic Surgery, University of Torino, Torino, Italy
⁹Thoracic Surgery Division, European Institute of Oncology University of Milan, Milan, Italy

Objectives:

The aim of this study is to validate a prognostic score previously reported including the number of resected lymph-nodes(#RNs) in a large cohort of Non-Small Cell Lung Cancer (NSCLC) patients.

Methods:

From 01/2002 to 12/2012, data on 4858 NSCLC patients undergoing curative-intent surgery in six Institutions were retrospectively reviewed. The previous reported prognostic model, including #RNs and other clinico-pathological factors, was verified in our series. The model includes a panel of high-risk (HRFs: pathologic stage, nodal status, age, #RNs>10) and intermediate risk factors (IRFs: gender, grading, histology). Patients were divided as follow: High risk(HR): >1 HRFs, regardless of any IRFs; Intermediate Risk(IR): 1 HRF regardless of any IRF, or no HRFs and >1 IRFs; Low Risk (LR): \leq 1 IRFs. To test the discriminative ability of the model, the Harrell C-statistic with 95%CI was determined. The Kaplan-Meier product-limit method was used to estimate Overall(OS), Cancer-Specific(CSS) and Disease-free Survival(DFS) curves, and the log rank test was adopted to evaluate the differences between groups.

Results:

Pathological stages were I in 46,5%, II in 24,1%, III in 27,8% and IV in 1,6% cases. Overall, 5-years OS, CSS and DFS were54,6%, 76,7% and 44,8%, respectively. The prognostic model was validated in a dataset of 3948 patients having complete data. Stratifying the sample into Low-risk (LR, #107), Intermediate-risk (IR, #1268) and High-Risk (HR, #2496) groups, the optimal prognostic discrimination power of this score was confirmed (C-statistics: 71, 95%CI 69-73). Specifically, in LR, IR and HR, 5-years OS was 83,5%, 66,4% and 46,2% (p<0.0001), 5y-CSS was 95,8%, 89% and 69% (p<0.0001), and 5y-DFS was 74,7%, 59.1% and 35,5% (p<0.0001), respectively(figure1).



Conclusion:

Our study confirms the optimal prognostic discrimination power of the previous prognostic model including the number of harvested nodes in NSCLC patients. Furthermore, this score may be used to better stratify OS, CSS and DFS and, eventually, can help physicians to tailor post-surgical treatment

Disclosure: No significant relationships.

Keywords: NSCLC, Lymph node metastasis, prognostic score





THE APPLICATION OF NEODYM-YAG LASER ON THE VISCERAL PLEURA IN AN EX-VIVO PORCINE LUNG MODEL

Christian Biancosino¹, B. Redwan¹, T. Greve¹, S. Schumacher², S. Stoerkel², M. Eberlein³, S. Boeluekbas¹ ¹Department of Thoracic Surgery, Helios University Hospital of Wuppertal - University Witten/ Herdecke, Wuppertal, Germany ²Institute of Pathology, Helios University Hospital of Wuppertal - University Witten/Herdecke, Wuppertal, Germany ³Division of Pulmonary, Critical Care and Occupational Medicine, University of Iowa Hospitals and Clinics, Iowa City, IA, United States of America

Objectives:

Resection of tumor spread on a very thin visceral pleura (e.g. malignant pleural mesothelioma) might be challenging and collateral damage to the lung parenchyma might occur. We aimed to develop an operative technique, which might facilitate the parenchyma-sparing destruction of the visceral pleura. In the current experimental work, effects of a neodym-YAG laser on the visceral pleura in an ex-vivo porcine lung model were investigated.

Methods:

We investigated the pleural effects of a neodym-YAG-Laser (Limax® 120, KLS Martin, Tuttlingen, Germany) on 20 lungs of European pigs with a mean weight of 196 kg (range 170-230). The laser was applied on a standardized length of 5 cm in 4 different settings: group I (80W, 6sec), group II (80W, 12sec), group III (120W, 6sec) and group IV (120W, 12sec). All treated areas were removed for histological examination.

Results:

In all lungs, macroscopic laser effects were observed. Mean pleural thickness of the native lungs was $81.02\pm9.58 \mu m$. Increasing power level and longer application duration resulted in significantly enhanced laser destruction effects (p<0.001, ANOVA) (Fig. 1). To quantify the thermal effect with regard to pleural thickness, ratio of carbonization zone to pleura thickness was measured for each section (C/P ratio). The most prominent effect was reached in group IV with a 17.35 fold carbonization zone compared to the pleura thickness (p<0.001, ANOVA) (Fig. 1).



1.4 ST	Mean depth of carbonization (µm)	C/P ratio
Group I (80W, 6sec)	138.40 ± 43.47	1.71±0.12
Group II (80W, 12sec)	378.12 ± 133.31	4.98 ± 0.44
Group III (120W, 6sec)	602.00 ± 151.88	7.11±0.36
Group IV (120W, 12sec)	1377.10 ± 265.04	17.35 ± 0.99

Conclusion:

Our study shows that increasing power levels and longer application of the laser lead to a significantly increased carbonization and destruction zone. Further in-vivo human studies should evaluate the feasibility of laser in the surgical treatment of MPM.

Disclosure: No significant relationships.

Keywords: neodym-YAG laser, ex-vivo porcine lung model, visceral pleura





SURGICAL TREATMENT OF LOCALLY ADVANCED (T4) NON-SMALL CELL LUNG CANCER REQUIRING LEFT ATRIUM RESECTION

V. Zharkov¹, Sergey Yeskov²

¹Thoracic Surgery, N.N. Alexandrovs Cancer Research Center, Minsk, Belarus ²Thoracic Surgery, Republican Scientific and Practical Center for Organ and Tissue Transplantation, Minsk, Belarus

Objectives:

The data related to the treatment of locally advanced (T4) Non-Small Cell Lung Cancer (NSCLC) requiring resection of cardiac structures are rather scarce. The purpose of the study was to evaluate the benefit of surgery in such patients.

Methods:

We retrospectively reviewed our database of all 98 patients who underwent en bloc lung and heart resection for NSCLC between January 1996 and December 2015.

Results:

Age ranged from 34 to 73 with a mean age of 59 years. The disease was staged as pT4N0-1M0 in 36 cases, as pT4N2M0 – in 62 cases. Left atrium (LA) was resected in 80 cases by using stapling device or a vascular clamp. In 18 cases LA was resected by using cardiopulmonary bypass. Both right and left atria were resected in 6 patients. Additional vascular structures such as vena cava superior, truncus pulmonalis or aorta were resected in 18 cases. Carinal wedge or sleeve resection was performed in 27 cases. Postoperative morbidity and mortality rates were 40.8 % and 12.2 %, respectively. The five-year OS for all (pT4N0-2M0) patients was 20.0 %. Patients with pT4N0-1M0 had higher survival rate (21.7%) as compared with pT4N2M0 patients (16.7%). However, the difference was not statistically significant (p>0.05).

Conclusion:

Our results suggest that long term survival achievable in patients with locally advanced (pT4) NSCLC requiring LA resection even in presence of N2 disease.

Disclosure: No significant relationships.

Keywords: locally advanced non-small cell lung cancer, surgery, left atrium resection

IMPACT OF PULMONARY VEIN ORIFICE SIZE ON ARTERIAL THOROMBOEM-BOLISM FOLLOWING LEFT UPPER LOBECTOMY

Shuichi Shinohara, T. Yamada, S. Kumata, R. Wakejima, R. Watanabe, T. Matsuoka, S. Nagai, K. Matsuoka, M. Ueda, Y. Miyamoto

Department of Thoracic Surgery, National Hospital Organization Himeji Medical Center, Himeji, Japan

Objectives:

Arterial thromboembolisms, including cerebral infarction, mesenteric arterial infarction, and renal infarction, are fatal complications following anatomical lung resections for malignancies, especially left upper lobectomy (LUL) (Ohtaka K, et al. Ann Thorac Surg 2013;95:1924). We hypothesized that the anatomical characteristics of the left superior pulmonary vein (LSPV) influence the incidence of arterial thromboembolism. The objective of this study was to evaluate the risk factors of arterial thromboembolisms following LUL for malignancies.

Methods:

Between January 2013 and September 2016, 1179 consecutive anatomical lung resections for malignancies were performed at our institution, six of which were complicated with arterial thromboembolism within 30 days after surgery. Of the six patients (0.51%), five had a cerebral infarction, and one had a renal thromboembolism. Of 213 LUL patients, five patients experienced arterial thromboembolisms (2.3%). In the 54 patients of LUL who we could followed up with perioperative imaging tests, we measured the cross-sectional area of the LSPV orifice and the length of LSPV stump using thin-slice CT preoperatively.

Results:

The incidence of postoperative atrial thromboembolism was significantly higher in LUL than in non-LUL (83.3% vs. 17.7%, OR=23.1; P<0.001). In LUL, the cross-sectional area (mm2) of orifice of LSPV was larger in those complicated by arterial thromboembolism (250 ± 52.7 vs. 166 ± 45.1 , P<0.001). There was no significantly different in the length of LSPV stump after LUL between two groups (20.5 ± 5.6 vs 16.5 ± 4.4 , P=0.097). Additional analyses revealed the cut-off point for the prediction of arterial thromboembolism was the LSVP cross-sectional area of 220 mm2 with a sensitivity of 80% and specificity of 85.7%. The area under the curve was 0.88 (95% CI= 0.70-1).

Conclusion:

LUL was a risk for arterial thromboembolism. In LUL cases, a cross-sectional area of the LSPV orifice higher than 220 mm2 may predict the incidence of arterial thromboembolism after lobectomy.

Disclosure: No significant relationships.

Keywords: Lung cancer, thromboembolism, complication, left upper lobectomy, cerebral infarction





SUSTAINED PRESERVATION OF PULMONARY FUNCTION AFTER PLEUREC-TOMY/DECORTICATION: SHOULD IT BE THE MAIN REASON TO PERFORM SURGERY IN MALIGNANT PLEURAL MESOTHELIOMA PATIENTS?

Simge Ozer, S. Ince, T.S. Koyi, A. Cikmazkara, S.G. Ozeren, H. Batirel *Thoracic Surgery, Marmara University Faculty of Medicine, Istanbul, Turkey*

Objectives:

Pleurectomy/decortication (PD) for malignant pleural mesothelioma (MPM) is performed to improve survival and to result in a better pulmonary function. Our aim was to analyze spirometric outcomes following PD.

Methods:

Ninety five patients underwent PD between 2005-2016. 30 were alive. 3 were undergoing chemotherapy and not fit to perform spirometry, 3 could not be reached. In 24, spirometry was performed and compared with preoperative values. Demographic data, side, surgical technique (extended/total vs partial PD), histology, T stage, adjuvant radiation, survival longer than two years, recurrence, FEV1 (% and L), FVC (% and L), change in FEV1 and FVC between preoperative and recent values were recorded and analyzed. Student t-test and Chi square were performed for statistics.

Results:

Average age was 56 ± 10 (26-75, 10 females, 17 right). 13 extended and 11 partial PD were performed. Average hospital stay was 6.9 ± 3.4 days. 21 had epithelioid and 13 had T3-4 tumors. 23 had adjuvant chemotherapy, while 7 had adjuvant high dose radiation. 13 were alive beyond two years. Median follow-up/survival was 28.7 months (6.4-83). Average preoperative and recent FEV1 (L) were 2.18 ± 0.82 and 1.84 ± 0.61 respectively (p=0.004). Average decrease in FEV1 was 12% (-46 to +48). In 6, recent FEV1 (L) was increased compared with preoperative (Figure 1). Average preoperative and recent FVC (L) were 2.77 ± 0.99 and 2.29 ± 0.7 respectively (p=0.014). Although preoperative values were similar between genders, recent FEV1 and FVC (L) were better in males (p=0.015 and p=0.002). Preoperative FVC was significantly lower in patients with T3-4 tumors. In six who had improved recent FEV1 (L), preoperative FEV1 (L) values were significantly lower (1.53 ± 0.41 vs 2.39 ± 0.81 , p=0.003).



Conclusion:

P/D results in good pulmonary function independent of survival time. In 25% of patients, pulmonary function improved postoperatively. Preservation or improvement in pulmonary function justifies P/D in resectable MPM patients regardless of survival expectations.

Disclosure: H. Batirel: Johnson and Johnson

Keywords: pleurectomy, decortication, malignant pleural mesothelioma, lung spirometry



OCCULT N2 DISEASE IDENTIFIED AFTER LUNG CANCER SURGERY HAS A POOR OUTCOME AND IS NOT SIMILAR TO PN0-N1 DISEASE

<u>Sara Volpi</u>¹, B. Kirmani², T. Win³, G. Aresu¹, A. Peryt¹, A. Coonar¹ ¹Cardiothoracic Surgery, Papworth Hospital, Papworth Everard, United Kingdom ²Cardiothoracic Surgery, Liverpool Heart and Chest Hospital, Liverpool, United Kingdom ³Respiratory Medicine and Thoracic Oncology, Lister Hospital, Stevenage, United Kingdom

Objectives:

In our unit prior to potentially curative treatment patients systematically undergo staging CT, PET-CT and brain imaging. Enlarged and/or PET positive nodes undergo invasive evaluation as appropriate (with EBUS/EUS, mediastinoscopy, mediastinotomy, video-assisted or open sampling) to establish N status. Despite these investigations, 9% of patients will be found to have N2 disease at the time of surgical resection that was not identified pre-operatively. It has been claimed that 'occult' pN2 disease when identified only after surgery has a better prognosis than that identified pre-operatively. It is also claimed that the prognosis of this group is similar to N0 and N1 disease. We therefore hypothesised that patients who were nodal up-staged only after surgical resection (stage-migration) to pN2 would have no difference in long-term survival to those with N0 or N1 disease.

Methods:

We retrospectively analysed a prospectively captured database on all patients assessed and treated for lung cancer between January 2006 and August 2010. Pre-operative clinical staging was compared with histological findings after lung resection and lymph node dissection. 5-10 year mortality was reviewed depending on date of surgery.

Results:

Of 312 pathologically confirmed lung cancer resections, 81 (26.9%) were found to have change in N-status following resection, with 28 (9%) newly identified with N2 disease. Patients with occult N2 disease (blue line, Figure 1) had a median survival of 34 months compared to 84 months in pN0 and pN1 disease. Five year survival was 35.8% vs 62.5%, p=0.0013.



Figure1: Survival of occult N2 disease compared to pN0-pN1

Conclusion:

Occult N2 disease confers a substantial survival disadvantage over N0-1 disease. The hypothesis that pN2 disease not identified by modern pre-operative work-up is of 'better prognosis' is not supported.

Disclosure: No significant relationships.

Keywords: occult n2 disease, non-small cell lung cancer, lymph node staging


A STUDY INTO THE EVOLVING CAUSES OF DEATH IN ELECTIVE LUNG RESEC-TIONS FOR MALIGNANCY

J. Smelt¹, M. Al-Sahaf¹, F. Martin², J. Pilling¹, T. Routledge¹, L. Veres¹, J. King¹, <u>Andrea Bille¹</u>, K. Harrison-Phipps¹ ¹Thoracic Surgery, Guy's Hospital London, London, United Kingdom

²Geriatric and Pops Medicine, Guy's Hospital London, London, United Kingdom

Objectives:

Respiratory failure, which includes hospital acquired pneumonia and acute respiratory distress (ARDS), has historically been the major cause of mortality after elective lung resections. With improved intubation using fibre-optic scopes, better ventilator technology, more thorough preoperative respiratory risk assessment and advanced anaesthetic and surgical experience, this may not be the case. Our objective was to assess the main causes of mortality over the last 10 years in patients undergoing elective lung surgery in a major UK centre.

Methods:

A retrospective unit data search was made for all deaths during the 10 year period between January 2007 and December 2016. All inpatient deaths within 30 days of an elective anatomical lung resection were included. Segmentectomies, wedge resection and chest wall excisions were excluded. Cause of death was determined from the death certificate, post-mortem or contemporaneous patient records. Demographics, co-morbidities and laboratory results were collected using electronic patient records.

Results:

Three thousand three hundred and sixteen elective lung resections for malignancy were carried out in the 10 year period including 1989 open lobectomies (60%), 940 VATS lobectomies (28.3%), 234 (7%) pneumonectomies and 153 open sleeve lobectomies (4.6%). There were 44 (1.3%) deaths during this period, of these four (9%) were from pneumonectomies, five (11.4%) sleeve lobectomies, 8 (18.2%) VATS lobectomies and 27(61.4%) open lobectomies. The mean age was 70. Causes of death included 27 (61.4%) respiratory failure, 10 (22.7%) ischaemic bowel, four (9%) coronary events, two (4.5%) CVAs, one (2.3%) bowel perforation, one (2.3%) massive pulmonary embolus and one (2.3%) on table bleed.

Conclusion:

Although respiratory failure is still a major cause of mortality in the post operative patient, gut ischemia has been found to be the second greatest cause of death. This study highlights the need to change consenting practises to include discussion regarding this risk as well as preoperative assessment to identify it as a risk in certain patient groups.

Disclosure: No significant relationships.

Keywords: complications, mortality, pulmonary surgical procedures, bowel ischemia

MONITORING FOR INTRA-ABDOMINAL HYPERTENSION AFTER DIAPHRAG-MATIC REPAIR

Leire Azcarate¹, H. Raubenheimer¹, M.E. Cufari¹, S. Buderi¹, A. Khan², S. Jordan¹ ¹Thoracic Surgery, Royal Brompton Hospital, London, United Kingdom ²General Surgery, Royal Marsden, London, United Kingdom

Objectives:

Intra-abdominal hypertension (IAH) and abdominal compartment syndrome (ACS) are now recognised complications associated with abdominal surgery and trauma, and may well result in haemodynamic compromise, multi-organ failure and death. Since our department first reported a case of abdominal compartment syndrome following diaphragmatic plication we have remained vigilant for this condition. We report our experience with routine, peri-operative measurement of intra-vesical pressure following major diaphragmatic surgery.

Methods:

We reviewed all patients who underwent diaphragmatic plication (DP) or hernia repair (HR) from 2008 to 2016 and identified the group whose intra-abdominal pressure (IAP) was monitored. Measurements were performed following the World Society of the Abdominal Compartment Syndrome (WSACS) recommendations, measuring intermittent intra-vesical pressure via the urinary catheter.

Results:

Twenty five patients underwent diaphragmatic surgery, 14 in DP group, 10 HR group and one DP+HR. In 9(36%) of these patients a large volume of abdominal viscera was reduced back into the abdomen and IAP monitoring was therefore carried out. Four patients (44.5%) had IAP< 15mmHg, two patients (22.22%) had IAP of 15-20 mmHg and three patients (33.3%) developed IAH with IAP>20mmHg. None of these patients required surgical re-intervention.

Conclusion:

ACS can be a devastating complication of thoracic surgery, but if detected early can often be reversed, either with the help of medical manoeuvres (as recommended by the WSACS) or by surgical re-intervention. In our cases, we have observed patients who did indeed develop raised IAP, but after careful continued monitoring, none progressed to ACS. Our study highlights the importance of monitoring IAP after diaphragmatic repair that raises the entire team's awareness of this easily missed condition and describes the trans-vesical pressure measurement as an easy, cheap and reproducible technique.

Disclosure: No significant relationships.

Keywords: abdominal compartment syndrome, intra-abdominal hypertension, diaphragmatic repair





VIDEO-THORACOSCOPIC PULMONARY RESECTION AVOIDS DELAY AND INCREASE ADJUVANT CHEMOTHERAPY COMPLIANCE FOR NON-SMALL CELL LUNG CARCINOMA

<u>Cagatay Tezel</u>, A. Öztürk, S. Evman, I. Kolbas, V. Baysungur, H. Kiral, L. Alpay, İ. Yalçınkaya *Thoracic Surgery, Sureyyapasa Thoracic Diseases and Surgery Training and Research Hospital, Istanbul, Turkey*

Objectives:

Adjuvant chemotherapy compliance and the full dose delivery of agents are believed to be superior after video-thoracoscopic lobectomy (VATS-L) for operable Non-Small Cell Lung Cancer(NSCLC), compared with thoracotomy. The purpose of this study was to determine the role of minimally invasive lobectomy on when to start and the percentage of provided planned regimen.

Methods:

All patients undergoing pulmonary resection for NSCLC between January 2010 and May 2016 were reviewed retrospectively. For comparison, analyses were performed only on patients receiving sole adjuvant chemotherapy, after the final pathology. Chemotherapy was planned according to Adjuvant Navelbine International Trialist Association (ANITA) trial. The analyzed variables were the duration between the discharged day form surgical unit and the initial chemotherapy day, the planned and the received chemotherapy doses.

Results:

Total of 74 patients were subsequently underwent adjuvant chemotherapy for NSCLC either after thoracoscopic surgery (n=26) or thoracotomy (n=48). Patients undergoing VATS-L had a shorter median length of hospital stay (4.4 versus 7.3 days; P<0.001), that leads significantly reduced time delay on chemotherapy commencement (29.4 versus 37.0 days; P=0.002). VATS-L group received 83.0% of planned Cisplatin and 81.7% of Navelbine dose. In the thoracotomy group, the compliance to planned doses of Cisplatin and Navelbine was 77.6% and 75.0%, respectively. Both of the drug regime tolerance was significantly (Cisplatin P=0.005; Navelbine P=0.020) increased in the VATS-L group (Table 1).

		n	Median	SD	P*	
Hospital LOS	VATS	26	4.35	1.77	<0.001	
(days)	Т	48	7.33	3.00	\0.001	
%C	VATS	26	82.96	4.56	0.005	
	Т	48	77.63	8.64		
%N	VATS	26	81.65	7.85	0.020	
	Т	48	75.00	13.03		
Time to	VATS	26	29.38	9.41		
chemotherapy (days)	Т	48	36.98	9.74	0.002	

Table 1. Comparison of different variables between groups

C: Cisplatin, N: Navelbine, LOS: length of stay, SD: standard deviation, T: thoracotomy, VATS: video-assisted thoracoscopic surgery

* Independent samples t-test

Conclusion:

It is known that VATS-L has several advantages over conventional open surgery. Moreover, our data presented that it also allows more accurate and rapid adjuvant chemotherapy in terms of treatment initiation timing and compliance, by enabling quick postoperative recovery.

Disclosure: No significant relationships.

Keywords: pulmonary resection, non-small cell lung carcinoma, adjuvant chemotherapy, video-thoracoscopic surgery



STEREOTACTIC BODY RADIATION THERAPY (SBRT) AS SALVAGE THERAPY FOR OLIGOMETASTATIC PLEURAL MESOTHELIOMA AFTER CURATIVE INTENT MULTI-MODAL THERAPY

<u>Olivia Lauk</u>¹, M. Guckenberger², R. Stahel³, W. Weder¹, I. Opitz¹, N. Andratschke² ¹Department of Thoracic Surgery, University Hospital Zurich, Zurich, Switzerland ²Department of Radiation Oncology, University Hospital Zurich, Zurich, Switzerland ³Department of Oncology, University Hospital Zurich, Zurich, Switzerland

Objectives:

Therapy options for malignant pleural mesothelioma can be set up as a multi-modality approach. Local relapses are common and represent a palliative situation if not salvaged aggressively. Herein, we present feasibility of and time course after local ablative SBRT for oligometastatic.

Methods:

During the time period from 2005-2015, 12 patients after (e)P/D (n=11) with (n=6) or without (n=6) induction chemotherapy and intracavitary chemotherapy (n=3) were identified in our institutional mesothelioma database who received salvage SBRT for oligometastatic progression of a total 29 lesions. Five of these patients received a second course of SBRT for oligorecurrence before widespread progression. Overall survival (OS) was calculated from surgery until death or last follow-up, progression free survival (PFS) from SBRT until tumor relapse or last follow-up and local control from end of SBRT until last imaging follow-up.

Results:

The median number of lesions treated per patients was two (range 1-3). The respective volumes ranged from 0.4cc to 311cc (median 6.8cc). The median single fraction dose was 6.0 Gy (range 2.5Gy-12.5Gy) with a median number of fraction of five (range 3-15) and a median prescription isodose of 65 % (range 65-100%). The median EQD2Gy (2 Gy equivalent dose) was 53.6Gy (range 37.8Gy-105.8Gy). No toxicity level >3 was observed. Crude local failure was 7% with a 12 months actuarial local control of 94%. The median PFS after SBRT was 11 months (95%CI: 5.6-26.4) and the OS at 3 years 71.3%, while the median OS has not been reached at the time of analysis, as nine patients were still alive at last follow up.

Conclusion:

In selected patients with localized and low tumor burden, SBRT may be a promising local ablative therapy to provide effective local control in a short overall treatment time to delay systemic therapy until oligoprogression.

Disclosure: No significant relationships.

Keywords: salvage therapy, oligometastasised malignant pleural meosthelioma, mulit-modal therapy, SBRT

A NOVEL TECHNIQUE FACILITATING SEGMENTECTOMY IN PATIENTS WITH PULMONARY MALIGNANCIES

<u>Oleg Pikin</u>¹, A. Amiraliev¹, A. Ryabov², N. Rubtsova³, A. Khalimon³, K. Kolbanov¹, V. Glushko¹, V. Bagrov¹, V. Barmin¹, R. Rudakov¹, D. Vursol¹, N. Epifanov¹

¹Thoracic Surgery, Hertzen Research Institute of Oncology, Moscow, Russian Federation ²Thoracoabdominal Surgery, Hertzen Research Institute of Oncology, Moscow, Russian Federation ³Radiology, Herzen Research Institute of Oncology, Moscow, Russian Federation

Objectives:

Progress in diagnostics and surgery in thoracic oncology is associated with increasing number of patients-candidates for sublobar anatomic pulmonary resection. Vascular variability of pulmonary segments anatomy requires special tools for individual preoperative planning.

Methods:

We retrospectively analyzed 108 patients who underwent segmentectomy due to low pulmonary function, severe comorbidity or previous history of lung resection. Indications for surgery were clinical T1aN0M0 peripheral Non-Small Cell Lung Cancer (NSCLC) ≤ 2 cm (n=52), resectable pulmonary metastases not suitable for wedge resection due to deep parenchymal location (n=43) and benign lesions (n=13). Segmentectomies were divided into typical (where parenchymal division involves 2 planes) and atypical (more complex and technically demanding, when the segmental excision involves 3 planes). 36 patients underwent VATS segmentectomy. Three-dimensional computed tomography (3D-CT) with bronchovascular separation was used preoperatively in 52 patients from October 2014 to November 2016. Mortality, morbidity, proportion of typical versus atypical and VATS versus open segmentectomies in two groups: with or without 3D-CT bronchovascular reconstruction, were compared.

Results:

There was no mortality in whole group. Morbidity rate was 7,4% not exceeding grade 3a according thoracic mortality and morbidity (TMM) score. The difference in morbidity rate was not statistically significant between two groups (6,8% and 7,6%; p=0,83) The most common complication was prolonged air leak > 7 days (1,8%). 3D-CT powered by separation of arterial, venous and bronchial structures enabled surgeons to perform atypical segmentectomies and use VATS approach more often (31,3% vs 13,5%; p>0,05 and 50,0% vs 11,5%; p<0,05, respectively). Seven atypical segmentectomies were performed by VATS due to 3D-CT reconstruction with bronchovascular separation. 5-year survival was 86% and 21% in NSCLC and pulmonary metastases groups, respectively.

Conclusion:

3D-CT reconstruction with bronchovascular separation provides precise preoperative planning of individual pulmonary segments anatomy and allows to increase the proportion of atypical and VATS sublobar anatomic pulmonary resections.

Disclosure: No significant relationships.

Keywords: 3D-CT reconstruction, NSCLC, pulmonary metastases, sublobar resection, segmentectomy



PEDIATRIC RETRANSPLANTATION: A SINGLE CENTER EXPERIENCE:

<u>Alberto Benazzo</u>¹, S. Schwarz¹, K. Hoetzenecker¹, B. Moser¹, J. Matilla¹, G. Lang², S. Taghavi¹, W. Klepetko¹ ¹Thoracic Surgery, Medical University of Vienna, Vienna, Austria ²Thoracic Surgery, Medical University of Vienna / Vienna General Hospital, Vienna, Austria

Objectives:

We reviewed our experience of retransplantation in pediatric patients aiming at evaluating its feasibility, its limitations and possible future development

Methods:

We retrospectively reviewed medical records of 15 pediatric patients (younger than 18 years old), who received a lung retransplantation in our istitution. Overall survival was considered our primary outcome. Our secondary outcomes were perioperative factors, complications, incidence of acute cellular rejection and ling-term outcomes.

Results:

Fifteen patients younger than 18 years old have been included in our analysis. 13 patients received retransplantation, one patient received two retransplantations and one patient three retransplantations. Median primary graft survival was 1135 (39-2770). In twelve cases retransplantation indication was chronic lung allograft dysfunction (CLAD). This group presented a 30-days mortality of 0%. Three Patients underwent retransplatation for acute rejection or primary graft dysfunction. This group presented a 30 days mortality of 100%. Regarding long-term survival, 1-year survival was 91,7% and 5 years' survival 80,2%. The most common cause of death was infection, followed by CLAD. One Patient was bridged to lung transplantation with extracirculatory life support, 10 patients were transplanted on intraoperative ECMO, which in two cases was prolonged in the postoperative period. All patients received induction therapy, either ATG or Almetuzumab.

Conclusion:

As similarly described from our group about primary pediatric transplantation, from our retrospective analysis, it is possible to deduce that retransplantation is a feasible procedure in pediatric patients with good results if performed in highly selected patients. It is extremely interesting, in fact, to note that patients, who gained profit from this procedure, were transplanted in an elective status with a diagnosis of CLAD. Regarding other outcomes, retransplantation in pediatric patients presents very good results comparable to adult retransplantation.

Disclosure: No significant relationships.

Keywords: transplantation, pediatric, lung retransplantation

PROGNOSTIC SIGNIFICANCE AND ROLE IN TNM STAGE OF TUMOR DEPOSITS IN ESOPHAGEAL CANCER

Qi-xin Shang, L. Chen

Department of Thoracic Surgery, West China Hospital of Sichuan University, Chengdu, Sichuan, China

Objectives:

Tumor deposits (TDs), which were usually found in colorectal, are now observed in esophageal cancer and the role of tumor deposits (TDs) in TNM stage in esophageal carcinoma (EC) is seldom elucidated. This study was aimed to make a detailed investigation of the prognostic significance and the role in TNM stage of TDs in EC.

Methods:

The patients with primary EC, who had underwent esophagectomy with curative intention in West China Hospital from May 2005 to May 2011, were retrospectively enrolled. The prognosis and clinicopathological traits were compared between TDs positive (TDP) and negative (TDN) groups in all patients, TNM 0-I, II, III and IV stages, respectively. The significance of the number and the role in TNM stage of TDP were also assessed.

Results:

In our study, 1044 patients were enrolled, with 948 (90.8%) in TDN group and 96 (9.2%) in TDP group. TDP group had significantly more advanced EC and worse prognosis (all p<0.001) than TDN group in all patients, TNM II stages and TNM III stage. The number of 2 was an independent prognostic factor in TDP group (p=0.040). The prognosis of TDP group in TNM II stages was significantly worse than TDN patients in TNM III stage (P<0.001), what's more, there's no significant difference between the prognosis of TDP group in TNM II stages and TDN patients in TNM IV stage (P=0.886).

Conclusion:

In conclusion, the present results demonstrated the importance of tumor deposits in patients with esophageal cancer, which was confirmed as an independent prognostic factor in esophageal cancer. Additionally the patients in TDP subgroup had more advanced esophageal cancer and worse prognosis than those in TDN subgroup. And it might be more reasonable to categorize esophageal patients with TDs into TNM IV stage.

Disclosure: No significant relationships.

Keywords: tumor deposits, esophageal carcinoma, prognosis, TNM stage



A PRELIMINARY STUDY OF THE ROLE OF QUANTITATIVE INTRAVOXEL INCOHERENT MOTION IN THE PREOPERATIVE DIAGNOSIS OF MEDIASTINAL LYMPHY NODE METASTASIS IN PATIENTS WITH LUNG CANCER

X. Ye¹, Hui Li¹, Y. Tian², B. You¹, S. Chen¹, W. Zhang¹

¹Department of Thoracic Surgery, Beijing Chao-yang Hospital, Capital Medical University, Beijing, China

²Department of Radiology, Beijing Chao-yang Hospital, Capital Medical University, Beijing, China

Objectives:

Accurate Lymphnodal (LN) staging is essential for optimizing individual treatment regimens of Non-small Cell Lung Cancer (NSCLC). However, preoperative detection of LN involvement is always highly challenging. The aim of the study was to investigate the diagnostic value of intravoxel incoherent motion diffusion-weighted magnetic resonance imaging (IVIM DWI) for discriminating non-metastatic from metastatic mediastinal LN in lung cancer.

Methods:

IVIM-DWI exams were performed preoperatively on 66 patients with lung cancer. Preoperative examinations include chest MRI, enhanced chest CT, brain MRI, bone scanning and the cardiopulmonary function. None of the patients was under any kind of treatment before surgery. Measured the short axis diameter and the IVIM parameters of the mediastinal LNs, apparent diffusion coefficient (ADC), diffusion coefficient (D), pseudo-diffusion coefficient (D*), and perfusion fraction (f). All patients underwent lobectomy and LN dissection. By comparing the CT and MRI results, and the 50 patients'IVIM parameters of nonmetastatic and metastatic mediastinal LNs according to the pathological examination.

Results:

MRI measured 140 groups mediastinal LNs in 50 cases, the result showed that 19 groups LNs were metastatic and 121 non-metastatic. While the pathology showed that 20 groups LNs were metastatic and 120 non-metastatic. CT measured 273 groups mediastinal LNs, the result showed that 34 were metastatic and 239 non-metastatic. The pathology showed that 20 groups were metastatic and 253 non-metastatic. The ADC and D value of the nonmetastatic LNs were significantly higher than the metastatic LNs (P<0.01). While the other parameters (D*,f, and short axis diameter) between the two groups did not show significantly different. Took the cutoff value as the diagnostic criteria in the remained cases, comparing with the pathology result, the diagnostic performance was good.

Conclusion:

IVIM is useful to distinguish metastatic from nonmetastatic LNs in lung cancer. The ADC and D values are significant higher in metastatic LNs, which more sensitive than the other parameters (D*, f, and short axis diameter).

Disclosure: No significant relationships.

Keywords: MRI, quantitative Intravoxel Incoherent motion, lung cancer, mediastinal lymph node metastasis

TEN-YEAR FOLLOW-UP AFTER RESECTION FOR NON SMALL CELL LUNG CANCER (NSCLC): WHAT ACTUALLY HAPPENS TO OUR PATIENTS

Jörg Lindenmann¹, N. Fink-Neuboeck¹, C. Porubsky¹, M. Fediuk¹, E. Gschwandtner¹, A. Strießnig¹, P. Swatek¹, U. Anegg¹, A. Maier¹, J. Smolle², F. Smolle-Jüttner¹

¹Department of Surgery, Division of Thoracic and Hyperbaric Surgery, Medical University of Graz, Graz, Austria

²Institute of Medical Informatics, Statistics and Documentation, Medical University of Graz, Graz, Austria

Objectives:

Recurrence, second lung primaries, as well as other tumors and accompanying disease influence long-term survival.

Methods:

Retrospective analysis of 342 consecutive patients (225 m, 117 f; mean age: 63 y) with Nonsmall Cell Lung Cancer (NSCLC). Lobectomy (N=289), sleeve resection (N=26) or pneumonectomy (N=27) and lymh node dissection done with curative intent between 2003 and 2007. Palliative or minimal resections and tumors containing small-cell components were excluded. All patients were followed up to 12/2016 or until death.

Results:

Postoperative tumor stages were: Ia: 123, Ib: 45; IIa: 75; IIb: 9; IIIa: 61; IV: 29. 43 had induction therapy, 93 had postoperative chemo/or radiotherapy. 167 patients had single-site recurrence (locoregional [34], distant [80]). 53 had synchronous multiple sites of failure. If possible, systemic and/or local treatment of recurrence was done. Locoregional recurrence had a better prognosis than distant failure, of which cerebral or adrenal metastases did best. 21 patients developed a second primary of the lung after a median interval of 71 months (15 – 149), which was treated with curative intent if possible. 9 died of this disease. 94 patients had additional cancer other than NSCLC, whereof 46 had the tumor before lung cancer surgery while 48 developed it afterwards. Overall recurrence-free survival was 39% at 10 years. Overall 5-year survival after recurrence was 10% and 19% after second lung primary (p=0,007). Overall 10-year survival was 35.6% (median: 70,5 +/- 6.4 ms) with 120 patients surviving up to 12/2016. 156 died of primary or second primary lung cancer, 11 of another malignancy and 56 of non-malignant, predominantly cardio-pulmonary disease.

Conclusion:

In spite of an acceptable long-term prognosis lung cancer is still more deadly than many other malignancies. Considering both, the rate of and the therapeutic possibilities for second primaries or recurrences, respectively, a close-meshed, long term follow-up throughout 10 years is warranted.

Disclosure: No significant relationships.

Keywords: tumor recurrence, second primary, comorbidities, non-small cell lung cancer, surgery, postoperative survival



COMPARISON OF PULMONARY FUNCTION BETWEEN VIDEO ASSISTED THO-RACOSCOPIC SURGERY (VATS) LEFT UPPER DIVISION RESECTION AND VATS LEFT UPPER LOBE LOBECTOMY

Hassan Alqumber¹, G. Lee¹, S.M. Shin², Y.M. Shim³

¹Thoracic Surgery, Samsung Medical Center, Irwon-dong, Gangnam-gu, Seoul, Republic of Korea ²Thoracic and Cardiovascular Surgery, Samsung Medical Center, Seoul, Republic of Korea ³Department of Thoracic and Cardiovascular Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Republic of Korea

Objectives:

Although VATS left upper division (VATS LUD) resection preserve more lung parenchyma than VATS left upper lobe (VATS LUL) lobectomy, potential benefits of preserving pulmonary fuction is unknown. This study aims to compare postoperative pulmonary function after VATS LUD resection to those after VATS LUL lobectomy.

Methods:

This is a retrospective cohort study with 30 clinical stage I Non-small Cell Lung Cancer (NSCLC) patients with both pre- and post pulmonary function test from June 2013 to February 2016 by a sing surgeon at an university hospital in Seoul, Korea. Preoperative FVC(L), FVC (%), FEV1(L), FEV1(%), FEV1/FVC (%), DLCO, and DLCO (%) was compared to those at 6 months after surgery using Wilcoxon signed rank test and Fisher's exact test.

Results:

There were 16 and 14 patients with VATS LUL lobectomy and VATS left upper lobe division resection, respectively. Number of mediastinal lymph nodes (MLND), operative time, pulmonary complications, and length of hospital stay were not different between the groups. The preoperatively baseline pulmonary function of both groups was comparable. Patient with after VATS LUD resection (-12.54L) had slightly more reduced FVC than patients with VATS LUL lobectomy FVC (-10.17L) at 6 months after operation (P=0.459). There was minimum advantage in FEV1/FVC (%) in cases of VATS LUD resection than VATS LUL lobectomy although statically non-significant (P=0.0871). There was no significant difference in postoperative DLCO between the groups.

Conclusion:

Although VATS LUD resection anatomically reduces the extent of lung resection in comparison to VATS LUL lobectomy, there was no benefits of pulmonary fuction. Therefore, the decision to do VATS LUD resection or VATS LUL lobectomy is left to the availability of the expertise and the feasibility of the procedure.

Disclosure: No significant relationships.

Keywords: VATS left upper lobe lobectomy, NSCLC, VATS segmentectomy, Pulmonary function, VATS left upper division

CLINICAL OUTCOMES OF DOUBLE METASTASIS IN LUNG AND LIVER FROM COLORECTAL CANCER

Han Pil Lee, B.K. Chong, K.H. Lee, J.S. Bok, S.H. Choi, H.R. Kim, Y. Kim, S.I. Park, D.K. Kim *Thoracic and Cardiovascular Surgery, Asan Medical Center, Seoul, Republic of Korea*

Objectives:

This study aimed to investigate the clinical outcomes in patients with lung and liver metastasis from colorectal cancer (CRC).

Methods:

Between January, 2002 and December, 2012, a total of 79 patients with double metastasis in lung and liver from CRC underwent pulmonary metastasectomy. Among them, 58 patients underwent surgical liver resection (group LR) and others received alternative treatments (group AT; observation, chemotherapy, radio-frequency ablation, et al.)

Results:

Among 79 patients with double metastasis from CRC, no significant differences were observed with regard to their baseline and clinical characteristics. The median follow-up duration was 40.8 (range: 3.8-149.1) months. The median overall survival time and disease-free survival time were 46.7 (range: 8.1-150.5) and 16.8 (range : 0.7-132.1) months. The 5-year overall survival rate were 43.7% and There was no significant difference in 5-year overall survival rate between the group LR and group AT (49.4% vs 28.6%, p = 0.061). Group LR has longer disease-free survival time than group AT significantly (33.1 ± 30.0 vs 18.5 ± 21.7 months, p = 0.044) There was no independent factor for the overall survival. Surgical liver resection was prior to disease-free urvival significantly in multivariate analysis.



Conclusion:

Hepatic metastasectomy in CRC patients underwent pulmonary metastasectomy showed a better prognosis in disease-free survival and overall survival. Although 2 different organ metastasis occurred, relatively acceptable overall survival was showed. Complete resection of the primary and metastatic lesion influence the favorable survival. As possible, metastasectomy of all metastatic lesion is a viable treatment option for disease-free survival.

Disclosure: No significant relationships.

Keywords: colorectal cancer, pulmonary metastasis, hepatic metastasis, metastasectomy

COMPARISON OF LYMPH NODE SAMPLING VERSUS COMPLETE LYMPHAD-ENECTOMY IN DETECTING NODAL DISEASE IN PATIENTS TREATED WITH VIDEO ASSISTED THORACOSCOPIC SURGERY (VATS) ANATOMICAL LUNG RESECTION FOR CANCER

Styliani Maria Kolokotroni, D. Boctor, T. Routledge, L. Veres, A. Bille

Thoracic Surgery, Guy's Hospital, Guy's and St Thomas' NHS Foundation Trust, London, United Kingdom

Objectives:

Anatomical lung resection and lymphadenectomy are the gold standard treatment for early stage lung cancer. The impact of the type of lymphadenectomy on pathological staging and survival is still under evaluation. The aim of this study was to evaluate the impact of VATS complete lymphadenectomy versus sampling in upstaging patients with clinical early stage lung cancer.

Methods:

Prospective registry of 138 consecutive patients with early stage (I and II) non-small cell lung cancer who underwent VATS anatomical lung resection and lymph node sampling (n=72) or complete lymphadenectomy (n=66) according to ESTS guidelines between August 2015 and August 2016. Patients who underwent thoracotomy (n=38) and patients with clinical stage III were excluded. Patients with carcinoid tumours (n=12) or clinical N1 disease (n=13) were also excluded.

Results:

One hundred and thirty eight patients (male patients n=61) with median age of 72.3 years (range 32 - 87) underwent lobectomy (n=119) or segmentectomy (n=19) and lymphadenectomy. Ten (15.1%) patients in the complete lymphadenectomy group and 10 (13.9%) patients in the lymph node sampling group were upstaged (p=0.8). Side of the tumour, lobar tumour location and type of anatomical lung resection were not associated with pathological upstaging. Also, pathological tumour size and histology (adenocarcinoma vs. squamous cell carcinoma vs. others) were not related with pathological upstaging. Interestingly in the adenocarcinoma subgroup, patients with predominant micropapillary or solid component (n=45) compared to lepidic and acinar components (n=58) had a marginally significant higher risk of being pathologically upstaged (24% vs 12%, p=0.08).

Conclusion:

In clinical early stage lung cancer, lymph node sampling does not reduce the accuracy of the pathological staging compared to complete lymphadenectomy. In patients with adenocarcinoma with predominant micropapillary or solid subtype, due to the high risk of pathological N disease, a more aggressive lymphadenectomy is advised.

Disclosure: No significant relationships.

Keywords: lymph node sampling, cancer, complete lymphadenectomy, nodal disease, VATS, anatomical lung resection



PSYCHOSOCIAL QUESTIONNAIRES: PECTUS PATIENT PERSPECTIVE

Lakshmi Srinivasan, L. Kenyon, J. Cahill, A. Regan, B. Naidu Thoracic Surgery, Heart of England NHS Foundation Trust, Birmingham, United Kingdom

Objectives:

Pectus patients are largely referred to the surgeon for cosmesis. The altered psycho-social performance in these patients is poorly weighted in surgical decision making. Studies provide evidence of somatisation, health anxiety and impaired educational and occupational functioning as a consequence of the deformity. We aim to evaluate the assessment tools to measure the severity of psychological problems associated with pectus deformity from the patient perspective.

Methods:

The psychological impact of pectus deformity on patient's mental health, self-esteem, quality of life and body image were studied. Thirty five patients with pectus deformity in a tertiary thoracic referral hospital in the UK were approached with six questionnaires: GAD-7 anxiety, PHQ-9 depression, Rosenberg self-esteem (Rosenberg SE), the Multidimensional Body self-relations for appearance evaluation (MBSRQ-ae), appearance orientation (MBSRQ-ao) and the NUSS questionnaire modified for adults (NUSSmA). The appropriateness of the questionnaires to describe their psychosocial status was ranked by the patients.

Results:

Thirty of the 35 patients replied. The results showed that the Rosenberg self-esteem (Rosenberg SE), the Multidimensional Body Self-Relations (BSR) for appearance evaluation (MBSRQ ae), appearance orientation(MBSRQ ao) and the NUSS questionnaire modified for adults (NUSSmA) best reflected the psychosocial impact of the deformities from the patients' perspective. The results with median, range and interpretation of the individual questionnaires are summarised in Table 1.

Table 1	RESULIS						
Questionnaires	Median scores	Nanga	Min/Max acorea	Interpretation			
GAD-7	4	(0 -15)	0/21	10 - threshold for further	evaluation		
7HQ-9	5	(0 -19)	0/27	210 Severe depression			
Reservices St	16	(11-25)	10/40	\$15 low self-esteem			
M65RQ-eo	58	(25-60)	12/60	higher scores have 4ve 5	54		
M65RQ-ec	19	(10-23)	7/35	higher scores have 4ve 5	54		
NUSSIIIA	26.5	(16-45)	12/48	lower scores have we be	dy image		

DECLUTE





Conclusion:

Assessing dimensions of psychological health is feasible and the impact measurable for the pectus patients . These questionnaires will define threshold to trigger formal psychological evaluation and help identify those who might benefit from surgery.

Disclosure: No significant relationships.

Keywords: pectus excavatum, pectus, pectus carinatum, psychosocial questionnaires, Nuss questionnaire, patient perspective

THE CONSOLIDATION VOLUME ANALYSIS USING THREE DIMENSIONAL (3D) COMPUTED TOMOGRAPHY (CT) PREDICTS INVASIVENESS IN LUNG ADENO-CARCINOMA ≦20MM.

<u>Yusuke Saeki</u>, Y. Sato, S. Kitazawa, N. Kobayashi, S. Kikuchi, Y. Goto *General Thoracic Surgery, University of Tsukuba, Tsukuba, Japan*

Objectives:

According to the classification of lung adenocarcinoma was proposed by IASLC, ATS and ERS, lung adenocarcinoma is classified into 3 groups: preinvasive lesions (PL), minimally invasive adenocarcinoma (MIA), and invasive adenocarcinoma (IA). The prognosis of PL and MIA is superior to that of IA. Therefore, PL and MIA lesions could be indicated for sublobar or limited resection. We retrospectively reviewed the relationship between preoperative 2D and 3D computed tomography findings and pathological diagnosis.

Methods:

This retrospective analysis included 96 patients who underwent surgical resection of lung adenocarcinoma ≤ 20 mm in University of Tsukuba Hospital from April 2010 to September 2014. The diameter and the volume of consolidation were analyzed using thin slice CT and 3D-CT software (Volume Analyzer Synapse Vincent®, Fuji Film Co., Tokyo, Japan), and compared with pathological classification: PL plus MIA group and IA group. The statistical differences were assessed by the Mann-Whitney U test. Receiver operator characteristic (ROC) curves were constructed for analysis of the diagnostic values.

Results:

The tumors included 15 PLs, 24 MIAs, and 57 IAs. Both the consolidation diameter and volume of IA group were significantly greater than those of PL plus MIA group (p<0.001). The cut-off values of consolidation diameter and volume were obtained at 5mm and 75mm3 respectively using ROC curve analysis. The sensitivity, specificity and area under the curve (AUC) of consolidation diameter were 87.2%, 94.7% and 0.951 respectively. The sensitivity, specificity and AUC of consolidation volume were 92.3%, 96.5% and 0.967 respectively, which were higher than those of consolidation diameter.

Conclusion:

The analysis of consolidation diameter and especially volume could be a useful preoperative indicators to evaluate the invasiveness of lung adenocarcinomas ≤ 20 mm.

Disclosure: No significant relationships. **Keywords:** invasiveness, adenocarcinoma, 3D CT

ANATOMICAL VIDEO-ASSISTED THORACIC SURGERY (VATS) RESECTION AFTER INDUCTION THERAPY

<u>Herbert Maier</u>¹, F. Augustin¹, F. Kocher², J. Minar¹, C. Ng¹, P. Lucciarini¹, T. Schmid¹ ¹Department for Visceral, Transplant And Thoracic Surgery, Medical University Innsbruck, Innsbruck, Austria, ²Internal Medicine V, Medical University Innsbruck, Innsbruck, Austria

Objectives:

As expertise with a minimally invasive approach grows, indications for Video-assisted thoracoscopic surgery (VATS) are expanded. In recent years VATS has become a standard procedure in Non-Small Cell Lung Cancer (NSCLC) patients undergoing curative surgery. However, literature on a VATS approach in NSCLC patients after induction chemotherapy is rare. Aim of this study is to retrospectively analyze the perioperative outcome of anatomical VATS resections following induction chemotherapy. Characteristics and perioperative morbidity of this population are compared to chemotherapy-naïve NSCLC patients undergoing VATS.

Methods:

This is a retrospective study using a prospective consecutive cohort of NSCLC patients undergoing VATS between 2009 and 2016 at our facility. Our local ethics committee approved the study.

Results:

Four hundred and forty nine patients underwent anatomical VATS resection for lung cancer. Sixty one patients (13.6%) received induction therapy because of advanced tumor stage, including proven N2 disease in 40 patients. Patients with induction therapy were significantly younger (59.4 vs. 65.1, p<0.001). No differences were observed in gender and lung function tests. The number of pneumonectomies (11.5% vs. 3.1%, p<0.001) and sleeve resections (4.9% vs. 1.8%, p<0.001), operative time (207.8 vs. 168.4 min, p<0.001) and conversion rate (16.4 vs. 4.7%, p<0.001) were significantly higher after induction therapy. Number of dissected lymph nodes, duration of chest drain and length of hospital stay were comparable. No difference was found in postoperative morbidity (15/61 vs. 112/388, p=0.491) and mortality (0/61 vs. 6/388, p=1.0).

Conclusion:

According to our analysis, induction therapy does not influence postoperative morbidity and mortality after VATS anatomic lung resections. More complex dissections due to advanced tumors and higher rate of pneumonectomies and sleeve resections in the induction chemo-therapy group possibly explain a higher conversion rate and longer operative time.

Disclosure: No significant relationships. **Keywords:** VATS, induction, NSCLC



A COMPARISON OF QUANTITATIVE AND VISUAL INSPECTION CRITERIA OF THE FLOW-VOLUME CURVE FOR PREDICTING RECURRENCE AFTER TREAT-MENT OF TRACHEAL STENOSIS

<u>Alfonso Fiorelli</u>¹, D. Loizzi², N. Ardò², D. Di Natale¹, N. Serra³, F. Sollitto², M. Loizzi⁴, M. Santini¹

¹Department of Cardio-thoracic Disease, Thoracic Surgery Unit, Second University of Naples, Naples, Italy ²Thoracic Surgery Unit, University of Foggia, Foggia, Italy ³Radiology Unit, Second University of Naples, Naples, Italy

⁴Thoracic Surgery Unit, University of Bari, Bari, Italy

Objectives:

Flow-volume curve abnormalities have been reported to distinguish different air-way obstruction. We aimed to evaluate whether quantitative and visual inspection criteria of flow-volume curve could predict recurrence in patients undergoing treatment of benign tracheal stenosis, an issue not been reported before.

Methods:

The data of all consecutive patients undergoing treatment for benign tracheal stenosis in the last three years were retrospectively reviewed. Patients undergoing serial spirometric exams before and for at least 12 months after treatment were included. Inspiratory and expiratory flow rates as FEV1/FEV0.5>1.5; FEV1/MEF>10; and MEF50%/MIF50%<0.3 or > 1.0 (quantitative criteria) and abnormalities of flow-volume curve as flattened (visual criteria) were considered as predictive of re-stenosis. In all cases, the stenosis recurrence was confirmed by CT scan and/or bronchoscopy. The sensitivity, specificity, PPV and NPV of each criterion for predicting recurrence was calculated and compared.

Results:

Sixty one patients undergoing endoscopic (n=54) or surgical (n=7) treatments of benign tracheal stenosis were included; of these, 21/61 (35%) had a re-stenosis. Recurrence was found in 8/26 patients with FEV1/FEV0.5 > 1.5; in 3/11 patients with FEV1/MEF>10; in 10/29 patients with MEF50%/MIF50%<0.3 or > 1.0; and in 16/19 patients with flattened of flow-volume curve. Visual criterion had a better diagnostic yield than single quantitative criterion. The sensitivity of quantitative criteria increased if we considered an "aggregate quantitative criterion" but it remained lower than that of visual criterion (47.62% versus 76.19%; p=0.056).



Conclusion:

The flow-volume curve is a simple and non-invasive method to follow-up patients after treatment of tracheal stenosis. Abnormalities in spirometric indexes and in visual inspection should guide physician to perform further invasive exams to exclude re-stenosis.

Disclosure: No significant relationships.

Keywords: flow-volume curve, recurrence, tracheal stenosis



RECONSTRUCTION OF THE CHEST WALL WITH BIOLOGICAL MATERIALS

Volkan Kösek, V. Geleva, M. De Waele, S.L. Milea, A. Ibrahim, K. Wiebe Thoracic Surgery, University Hospital Muenster, Muenster, Germany

Objectives:

Reconstruction of the thoracic wall may require allogenic materials. Synthetic materials are not integrated and are associated with excessive scarring and wound healing problems. On the other hand, stability and durability are uncertain aspects in biological materials.

Methods:

In a retrospective study, we analysed 75 patients (mean age 47.7 years, 29 female), undergoing reconstruction with allogenic biological materials. Three different biological materials were applied: a crosslinked acellular collagen matrix from porcine skin (Permacoll®, n=30), a non-crosslinked acellular collagen matrix from bovine pericardium (Veritas®, n=26), and permanently fixated bovine pericardium (Peri-Guard®, n=19).

Results:

Indications for chest wall resection were sarcomas (n=40), carcinomas (n=25), or non-malignant conditions (n=10). The size of defects ranged from 4.5 - 23 cm in diameter. In most cases 3 ribs were removed. In 17 patients, the sternum was partially/completely resected as well. All patches were implanted as inlays under moderate tension with single, connected sutures. Soft tissue cover was accomplished by direct closure of fatty tissue and skin (n=57), or pendiculated muscle flaps (n=18). All procedures were finished as planned with good stability. An osteosynthesis of ribs was used in only one patient. The authors preferred to implant thick patches (Permacoll®) for larger defects. Non-cross-linked collagen (Veritas®) seemed to integrate best. Postoperatively, minor respiratory complications (n=4) and wound healing problems (n=4) were observed. The 30-day mortality rate was 1.3 % (n=1), and mean time in hospital was 14 days. Follow-up was 4 to 66 months. In standardized clinical tests and radiologic scans (CT or MRT) reliable stability and preserved appearance of the patch material was demonstrated.

Conclusion:

Biological materials were associated with a low morbidity, demonstrated very good and reliable long-term stability, and represent a valuable alternative to synthetic materials.

Disclosure: No significant relationships. **Keywords:** chest wall, reconstruction, biological materials

INITIAL EXPERIENCE WITH THE ABRAMSON PROCEDURE, A NEW TECHNIQUE FOR TREATMENT OF PECTUS CARINATUM

Ine Rochus, W. Coosemans, H. Van Veer Thoracic Surgery, University Hospital Leuven, Leuven, Belgium

Objectives:

Pectus Carinatum (PC) is a congenital deformity characterized by an anterior protrusion of the sternum and the ribs. The Abramson procedure is a relative new minimally invasive procedure for PC repair. This technique consists of a metal bar that is implanted in the presternal, extra-thoracic, region for two years aimed at reducing the PC. Half 2013 the Abramson procedure was introduced in our tertiary referral centre as alternative treatment for PC. Previously, patients wore braces or underwent a Ravitch procedure. The objective of this study was to evaluate the initial experience obtained three years after the implementation of the Abramson procedure in our institution.

Methods:

In this single centre retrospective study we analyzed the complications after the Abramson procedure, graded according to the Clavien-Dindo classification between August 2013 and December 2015.

Results:

All 20 patients, all male, were included in the study. Median age at time of surgery was 14,92 years. In all of the patients, low self-esteem was an indication for surgery. Other complaints were dyspnea (10%) and pain (30%). Clinical examination with compression of the chest was the most important investigation preoperatively. All patients received a patient-controlled epidural analgesia for five days. Median length of stay was 7 days. In 12/20 patients the bar is already removed after a median treatment duration of 1,95 years. Complications are divided into complications postoperatively and during the two-year treatment (table). Only one patient needed revisional surgery because of dislocation of the bar, which is considered to be an element in the learning curve of this procedure.



Postoperative complications (n=23 in 20 patients)	n complications (%)
0	4 patients
Ι	17 (74)
II	5 (22)
IIIa	0
IIIb	1 (4)
IVa	0
IVb	0
V	0
Complications during treatment (n=12 in 20 patients)	n complications (%)
0	9 patients
Ι	10 (83)
II	2 (17)
IIIa	0
IIIb	0
IVa	0
IVb	0

Table. Complications after Abramson procedure according to Clavien-Dindo

Conclusion:

Three years after the implementation of the Abramson procedure in our institution we reviewed indications and complications. The complication profile is comparable to those found in literature. Abramson procedure has therefore become a safe and valuable alternative for Ravitch procedure in selected patients with malleable PC.

Disclosure: No significant relationships.

Keywords: initial experience, complications, Abramson, pectus, carinatum

MORBIDITY AND MORTALITY FOLLOWING CONTROLATERAL ANATOMI-CAL SURGICAL RESECTION FOR SYNCHRONOUS OR METACHRONOUS LUNG CANCER

<u>Alex Fourdrain</u>¹, P. Bagan², J. Iquille¹, S. Lafitte¹, F. De Dominicis¹, G. Merlusca¹, A. Witte Pfister¹, P. Berna¹

¹Department of Thoracic Surgery, Amiens University Hospital, Amiens, France ²Department of Thoracic and Vascular Surgery, Victor Dupouy Hospital, Argenteuil, France

Objectives:

Patients treated surgically for lung cancer may present synchronous or metachronous lung cancer. The aim of this study is to evaluate the morbidity and mortality of a second and controlateral anatomical surgical resection for lung cancer.

Methods:

We performed a bi-centric and retrospective study, based on our prospective indexed data-base. Included patients were treated surgically with bilateral anatomical surgical resections for synchronous or metachronous lung cancer, including segmentectomy, lobectomy and bilobectomy. We excluded wedge resections, second surgical resection on the same operated side and benign lesions.

Results:

In our two institutions, 31 patients underwent a controlateral anatomical surgical resection for lung cancer between 2011 and 2016. First surgical resection was a segmentectomy in 5 cases (16.1%), lobectomy in 22 cases (71%) bilobectomy in 1 case (3.2%), and another anatomical resection in 3 cases (9.7%), with video-assisted thoracic surgery procedure (VATS) in 9 cases (29%). Patient functional assessment before second surgery showed a mean preoperative FEV1 of 1944ml (72.8%) and a mean postoperative predicted FEV1 of 1453ml (55.8%). The mean delay between the two surgeries was 40.7 months (min 1 month, max 158 months), and second surgical resection was a segmentectomy in 7 cases (22.6%), lobectomy in 23 cases (74.2%), and another anatomical resection in 1 case (3.2%), with VATS procedure in 19 cases (61.3%). Postoperative pneumonia occurred in 10 patients (32.3%), postoperative bronchial endoscopy was required in 10 patients (32.3%), reintubation occurred in 3 patients (9.7%), arrhythmia occurred in 4 patients (12.9%) and 90-days mortality was assessed in 5 patients (16.1%).

Conclusion:

A second and controlateral anatomical surgical resection for synchronous or metachronous lung cancer is possible, with a higher morbidity and mortality, and should be indicated on carefully selected patients.

Disclosure: No significant relationships.

Keywords: lung cancer, VATS, lobectomy, segmentectomy, synchronic, metachronic



OUTCOME OF PATIENTS WITH LUNG RE-TRANSPLANTATION REQUIRING PREOPERATIVE EXTRACORPOREAL MEMBRANE OXYGENATION

Etienne Abdelnour-Berchtold¹, M. Gonzalez¹, J. Bellier¹, D. Wurlod², H. Ris¹, L. Piquilloud-Imboden³, C. Marcucci⁴, F. Gronchi⁴, L. Nicod², J. Aubert², T. Krueger¹

¹Service of Thoracic Surgery, Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland

²Service of Pneumology, Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland

³Intensive Care Unit, Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland

⁴Anesthesiology, Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland

Objectives:

Lung re-transplantation has been shown to be a valid option in selected patients with chronic lung graft dysfunction. While being listed and due to pulmonary function deterioration, a sub-group of patients may require extracorporeal membrane oxygenation (ECMO) before re-transplantation. The outcome of these patients, compared to primary transplantations (TX) with and without ECMO and to re-transplantations (re-TX) without ECMO is the subject of this report.

Methods:

A retrospective, single institution experience based on a prospective data set of all patients undergoing lung transplantation between 1/2004 and 7/2016.

Results:

There were 212 patients, of them 117 women (0.55) and 111 men (0.45). Mean age was 47.4 years (range 12-66). We proceeded to 185 TX without preoperative ECMO (mean survival 118 months), 11 TX with preoperative ECMO (mean survival 67 months), 9 re-TX without preoperative ECMO (mean survival 87 months) and 7 re-TX with preoperative ECMO (mean survival 26 months). There was no significant difference in overall survival between patients undergoing TX with and without preoperative ECMO (p=0.7), and between patients undergoing TX or re-TX without preoperative ECMO (p=0.8). However, patients undergoing re-TX with preoperative ECMO had a significantly lower overall survival than patients with TX, with and without preoperative ECMO (p=0.026, p<0.0001). Re-TX with preoperative ECMO also had a lower overall survival than re-TX without preoperative ECMO, however, the difference was of borderline significance (p=0.05).

Conclusion:

Re-transplantations requiring preoperative ECMO were accompanied with a significantly lower overall survival rate than primary lung transplantations with and without preoperative ECMO and also revealed a lower survival rate than re-transplantations without preoperative ECMO.

Disclosure: No significant relationships.

Keywords: lung re-transplantation, extracorporeal membrane oxygenation, re-transplantation outcome

COMBINATION OF HEPATIC SURGERY AND MINIMALLY INVASIVE THORACIC SURGERY USING A SUBXIPHOID APPROACH THROUGH AN ABDOMINAL INCISION.

<u>Mihee Lim</u>, D. Kim Department of Cardiovascular and Thoracic Surgery, Pusan National University Yangsan Hospital, Yangsan, Republic of Korea

Objectives:

If an intrathoracic mass is found in a patient scheduled for open hepatic surgery, combined surgery is not recommended because of the high risk. If combined surgery is essential, the thoracic approach must be minimally invasive. We here introduce a subxyphoid approach through an abdominal incision to minimize the invasiveness of combined thoracic and hepatic surgery.

Methods:

From April 2012 to December 2016, 17 patients requiring combined hepatic and thoracic surgery were treated via the subxyphoid approach through an abdominal incision. We retrospectively analyzed the clinical data and evaluated the feasibility of the procedure.

Results:

The hepatic lesions included seven cases (41.2%) of colon cancer metastases and 10 cases (58.8%) of primary hepatocellular carcinoma. The types of liver resection performed included two wedge resections (11.8%), two multiple wedge resections (11.8%), eight segmentectomies (47.1%), three lobectomies (17.5%), and two other procedures (11.8%). Unilateral, mediastinal, and bilateral subxyphoid approaches toward thoracic surgery were employed in 11 (64.7%), 2 (11.8%), and 4 (23.5%) cases, respectively. The thoracic surgeries included six cases (35.3%) of wedge resection, five cases (29.4%) of multiple wedge resection, two (11.8%) segmentectomies, and four (23.5%) mediastinal mass excisions. The mean number of lung masses excised was 1.7 ± 1.0 (range, 1-5). No lung-related morbidities were noted; one patient died as a result of the abdominal procedure. The mean thoracic and total operation times were 79.7 \pm 63.0 min (range, 20–205 min) and 411.0 \pm 109.0 min (range, 255–635 min), respectively. Mean ICU and mean hospital stay did not differ between the patients described above and others who underwent open hepatic surgery during the same period.

Conclusion:

The subxiphoid approach through an abdominal incision allows aggressive treatment of intrathoracic masses in patients scheduled for open hepatic surgery. The approach is especially suitable for patients with bilateral lung lesions.

Disclosure: No significant relationships.

Keywords: combination surgery, subxiphoid approach, minimal invasive surgery



NEW TNM LUNG CANCER STAGING (8th EDITION): A STEP BEYOND CONTEM-PORARY IMAGING ACCURACY?

David Healy, A. Fabre, M. Murphy Thoracic Surgery, St Vincent's University Hospital, Dublin, Ireland

Objectives:

The 8th edition of the IASLC TNM staging system further subdivides the T stage to ever narrower size ranges. It is proposed to move from four up to six size groups in the 0-7cm range. We wanted to determine if contemporary clinical staging staging based on radiology would accurately predict the new pathology staging.

Methods:

A retrospective review of 150 primary lung cancers proceeding to surgical resection was performed. We compared the T (Tumour) size on the staging CT scan with the post-operative pathology T measurement. We also recorded the interval between the CT scan and surgery.

Results:

The pre-operative staging CT scan accurately predicted the T stage in the 7th edition in 66% of patients. Using the 8th edition T stage, only 54.6% were accurately classified in advance. The interval between the CT and surgery was not a factor as there was an even split between over estimation of size and under estimation.

Conclusion:

The 8th edition T stage size breakdown demonstrated predictive separation in a large international dataset. However in the clinical setting a standard CT scan will not accurately predict the T size and grade. Reasons for this may include delays between radiology imaging and surgery although that did not stand out in this series. Other factors may include difficulty in separating tumour from atelectasis, pathology processing and observer measurement factors which are not automated. Interest in pre-procedure staging is important in scenarios were neoadjuvant therapies are emerging and the finding here is that contemporary CT imaging is not strong enough to do that accurately. Novel approaches such as automated measurement or volumetric measurement may need to be added to overcome this.

Disclosure: No significant relationships.

Keywords: pulmonary, neoplasm, NSCLC, stage, radiology, pathology

THE POWER OF SENTINEL NODE IN NON SMALL CELL LUNG CANCER (NSCLC) UNIPORT VIDEO ASSISTED THORACOSCOPIC SURGERY (VATS)

Duje Oršulić, I. Šimundža

Thoracic Surgery, University Hospital Split, Split, Croatia

Objectives:

Incomplete lymph node dissection, skip metastases, and failure to verify microscopic disease in removed lymph nodes accounts for such a recurrence rate of early stage NSCLC. The power of sentinel lymph node (SLN) mapping is to divert attention toward SLNs and uncover micro-metastasis. In the era of VATS, we hypothesise that the use of SLN mapping in NSCLC promises to further reduce procedural trauma and facilitate early recovery while in turn not compromising patient safety and oncological outcome.

Methods:

Twenty-seven patients with stages IA to IC, according to TNM status were randomized. Technetium 99m labelled HAS (human serum albumin) was injected into the lung tissue surrounding the tumour. Sufficient time was allowed for particle migration after which radioactivity of mediastinal lymph nodes was measured by a gamma probe. Nodes with highest radioactivity were defined as sentinel nodes. Particular means of molecular diagnostic was applied to SLNs.

Results:

SLN was identified in 84%, yielding accuracy of 91.2%. In 65% cases increased radioactivitiy was recorded in several nodes. Hystological subtype also played a role in SLN mapping. Positive sentinel nodes occured more often in adenocarcinomas (p<0.05), whereas skip nodal metastases were more common in squamous cell carcinomas.

Conclusion:

Radical mediastinal lymph node dissection provides accurate pathological staging and is the cornerstone for further management of patients with early NSCLC. Uniportal VATS it is still surgically demanding to master and may compromise the oncological outcome of the procedure. Results indicate that SLN mapping assures an accurate pathological staging without compromising the oncological outcome. SLN identification and resection is manageable by Uniprtal VATS and could reduce the need for radical mediastinal lymph node dissection in early stage NSCLC whilst assuring an accurate pathological staging.

Disclosure: No significant relationships. **Keywords:** NSCLC, uniport VATS, sentinel lymph node



THE OUTCOME OF SLEEVE LOBECTOMY FOR LUNG MALIGNANCIES IN THE ELDERLY

Takeshi Matsunaga, K. Suzuki, K. Takamochi, S. Oh General Thoracic Surgery, Juntendo University School of Medicine, Tokyo, Japan

Objectives:

Reconstruction of bronchus was one of the established techniques to preserve pulmonary parenchyma. However, there have been no reports of sleeve lobectomy for elderly patients and that indication was controversial.

Methods:

A retrospective study was conducted on consecutive 2161 patients with resected malignant pulmonary tumors between February 2008 and May 2015. Sleeve lobectomy was performed in 111 patients. In this study, two groups were defined as elderly (\geq 75y, group A) and younger (<75y, group B). Among them, the elderly (group A) was observed in 27.0% (30/111). Comparing elderly (group A) with younger (group B), we investigated complication of anastomosis, morbidity, 30-day mortality, 90-day mortality and in-hospital death. Complication of anastomosis included fistula and stenosis. Furthermore, we analyzed the following predictors related to complication of anastomosis: gender, age (group A or B), pack-year, presence of preoperative therapy (chemotherapy, chemoradiotherapy or radiotherapy), pathological stage, location of sleeve resection (right upper lobectomy (RUL) or others), extended sleeve or not, ways of anastomosis (all intermediate or partial running sutures) and presence of covering anastomosis.

Results:

Between group A and B, the frequency was 10.0%(3/30) and 8.6%(7/81) in complication of anastomosis (p-value>0.99), 3.3%(1/30) and 2.5%(2/81) in 30-day mortality (p-value>0.99), 10.0%(3/30) and 2.5%(2/81) in 90-day mortality (p-value=0.121) and 0%(0/30) and 0%(0/81) in in-hospital death. In the multivariate analysis, the predictors for complication of anastomosis was the location of tumor (RUL or not) (HR; 6.28, p-value; 0.03) and other factors were not significant. Furthermore, 2- and 5-year overall survival were 47.0% and 23.5% in the elderly.

Conclusion:

Sleeve lobectomy for the elderly was feasible in mortality, morbidity and prognosis, although there should be enough discussion about the treatment strategy. Furthermore, we need to be careful for the findings of bronchial anastomosis in patients who underwent right upper sleeve lobectomy.

Disclosure: No significant relationships.

Keywords: pulmonary resection, lung cancer, sleeve lobectomy, elderly

THE INTRODUCTION OF MULTIDISCIPLINARY TEAM DISCUSSION IMPROVES SURVIVAL FOR LUNG CANCER PATIENTS UNDERGOING SURGERY

Nicola Tamburini¹, P. Maniscalco¹, S. Mazzara¹, E. Maietti², F. Nigim³, A. Santini⁴, N. Calia⁵, A. Stefanelli⁶, A. Frassoldati⁴, I. Santi⁷, R. Rinaldi⁸, F. Quarantotto¹, G. Cavallesco¹ ¹Department of Morfology, Experimental Medicine and Surgery, Section of General and Thoracic Surgery, Sant'Anna Hospital, University of Ferrara, Ferrara, Italy ²Center for Clinical Epidemiology of The School of Medicine, University of Ferrara, Ferrara, Italy ³Department of Surgery, Division of Neurosurgery, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, Boston, MA, United States of America ⁴Department of Clinical Oncology, Sant'Anna Hospital, Ferrara, Ferrara, Italy ⁵Department of Respiratory Diseases, University of Ferrara, Ferrara, Italy ⁶Department of Radiation Oncology, Sant'Anna Hospital, Ferrara, Ferrara, Italy ⁷Department of Diagnostic Imaging, Section of Nuclear Medicine, Sant'Anna Hospital, Ferrara, Ferrara, Italy ⁸Department of Experimental and Diagnostic Medicine, Section of Anatomic Pathology, University of Ferrara, Ferrara, Italy

Objectives:

Although the advantages of multidisciplinary team discussions (Multidisciplinary Tumour Board, MTB) seem obvious, there are limited studies on the impact of this approach on the post-treatment patient outcomes in Non-Small Cell Lung Cancer (NSCLC). The aim of the present study is to examine the impact of the multidisciplinary team approach on the survival of patients undergoing surgery for NSCLC, introduced in our clinical practice since 2012.

Methods:

A retrospective analysis was performed on patients who underwent surgery for NSCLC between January 2008 and December 2015. Patients' charts were reviewed for completeness of staging, TNM stages, multidisciplinary evaluation prior to the initiation of therapy, postoperative complications and 1-year survival rate. Data was compared between patients who were treated before the implementation of a MTB, and those receiving treatment within a MTB. In order to evaluate the significance of the "MTB discussion" as surrogate for the outcome one-year mortality after surgery treatment, simple and adjusted Cox regression models were applied.

Results:

A total of 246 patients were treated prior to the initiation of the MTB, and 231 patients after the MTB. Patients who were discussed at the MTB were noted to have better outcomes, in comparison to those who were not discussed at the MTB in different terms including complete staging evaluation (93,6% vs 63,8%, p<0.0001), early TNM stages (85,5% vs 75,2%, p=0.009) and 1-year survival (92,5% vs 80,5%, p<0.0001). Multivariate analysis showed that female



gender, age, completeness of staging, good performance status and few comorbidities, complete resection and MTB discussion were associated with good prognosis. Regression model showed that 1-year survival rate is significantly better in patients who were evaluated and discussed during our MTB.

Conclusion:

The findings of our study validate the impact of thoracic MTB. A multidisciplinary thoracic malignancy conference was demonstrated to increase 1-year survival rate of patients who underwent a surgical resection for NSCLC.

Disclosure: No significant relationships.

Keywords: patient outcomes, multidisciplinary approach, diagnosis, quality of care, non-small cell lung cancer, surgery

MEASURING DIFFUSING CAPACITY (DLCO) ON EXERCISE IN THE IMMEDI-ATE PERIOD AFTER LUNG RESECTION: A FEASIBILITY ANALYSIS

<u>Nuria M Novoa</u>, P. Esteban, M.T. Goméz Hernández, M.F. Jimenez, G. Varela *General Thoracic Surgery, University Hospital of Salamanca, Salamanca, Spain*

Objectives:

Increased DLCO after exercise indicates capillary recruitment during exercise. A lack of preoperative DLCO increase during exercise has been associated with higher rate of postoperative complications. We hypothesized that a significant decrease in postoperative exercise DLCO could be a valuable parameter as early marker of cardio-pulmonary complications. Unfortunately, we couldn't find any report on postoperative exercise DLCO measurement. This is a prospective study to evaluate the feasibility of reliably measuring DLCO in the immediate days after lobectomy.

Methods:

DLCO was measured on a series of 22 consecutive cases by the He single-breath method with a calibrated HypAir Medisoft equipment, before and after exercise on cycle ergometer using a standardized continuous incremental protocol. Measures were recorded the day before and three consecutive days after lobectomy. Surgical approach was VATS or mini-axillary thoracotomy in all cases. Postoperative analgesia was obtained by epidural/paravertebral catheter and NSAIDs if requested. During the postoperative period, chest pain was estimated by one to 10 on visual-analogic scale and air leak was graded 0-5 on non-digital systems. Cases undergoing induction chemotherapy were excluded from the study.

Results:

Mean postoperative pain remained under 4 along the studied postoperative period. Air leak up to two was recorded only in three cases. One patient had a nosocomial pneumonia. Mortality was nil in the series. In all cases, exercise DLCO could be measured. Capillary recruitment seemed lower during the first postoperative day and recovered thereafter (Figure 1). No complications occurred due to the respiratory maneuvers needed for measuring DLCO.



Figure 1. Recorded DLCO before and after exercise



Conclusion:

This study shows that measuring DLCO after exercise is feasible even in the early postoperative period after lobectomy. These data warrant a prospective analysis of its predictive value in the early detection and prevention of postoperative cardio-respiratory problems.

Disclosure: N.M. Novoa: This study has the following research grants: - Gerencia Regional de Salud Project: 1278/A/16 - SOCALPAR grant 2016

P. ESteban: This study has the following research grants: - Gerencia Regional de Salud Project: 1278/A/16 - SOCALPAR grant 2016

M..T. Goméz Hernández: This study has the following research grants: - Gerencia Regional de Salud Project: 1278/A/16 - SOCALPAR grant 2016

M.F. Jimenez: This study has the following research grants: - Gerencia Regional de Salud Project: 1278/A/16 - SOCALPAR grant 2016

G. Varela: This study has the following research grants: - Gerencia Regional de Salud Project: 1278/A/16 - SOCALPAR grant 2016

Keywords: postoperative cardio-pulmonary complications, risk assessment, anatomical lung resection, Postoperative exercise DLCO measurement

RIGHT MIDDLE LOBE ATELECTASISES FOLLOWING COMPLETE VIDEO-ASSISTED THORACOSCOPIC RIGHT UPPER LOBECTOMY

<u>Ryo Wakejima</u>¹, T. Yamada², S. Kumata², S. Shinohara², R. Watanabe¹, T. Matsuoka¹, S. Nagai¹, K. Matsuoka¹, M. Ueda¹, Y. Miyamoto¹

¹Thoracic Surgery, National Hospital Organization Himeji Medical Center, Himeji, Japan ²Department of Thoracic Surgery, National Hospital Organization Himeji Medical Center, Himeji, Japan

Objectives:

Lobar atelectasises are common complication following lobectomy. Previous studies claimed that right middle atelectasises (RMA) following right upper lobectomy (RUL) are most frequently observed lober atelectasises. The objectives of this study were to clarify the incidence of RMA following RUL for lung cancer using complete video assisted thoracic surgery (cVATS) and evaluated the risk factor of RMA.

Methods:

Medical records of 910 patients underwent anatomical lung resections for lung cancer at our institution between January 2014 and June 2016 were retrospectively reviewed. Postoperative computed tomography (CT) findings on 146 patients were available following cVATS RUL for lung cancer. RMA included complete atelectasis and partial atelectasis of right middle lobe. Sustained atelectasis was defined as no sign of recovery from RAM on follow-up CT from one to six months after discharge.

Results:

RMA following cVATS RUL were found on 13 cases (8.9%). Ten cases developed RMA in two weeks following surgery. Treatments for RMA included bronchoscopy on five cases, antibiotic therapy on two cases and observation on three cases. Seven cases were recovered from RMA on first followed-CT after discharge. The rate of sustained RMA was 4.1% (6/146) and three patient was found RMA only after follow-up CT without clinical complain. In RAM groups following cVATS RUL for lung cancer, operation time and the rate of mediastinum lymph node dissection were significantly higher than in non-RAM groups (131min vs 161min ,P=0.01, 72.9% vs. 100%, P=0.03). On the contrary, there were no significant differences in age, sex, body mass index (BMI) and smoking history between two groups.

Conclusion:

The rate of RMA following cVATS RUL was 8.9%. Operation time and mediastinum lymph node dissection were risk factor for RMA in this study.





Disclosure: No significant relationships.

Keywords: right upper lobectomy, lung cancer, video assisted thoracoscopic surgery, right middle lobe atelectasis

THE PROGNOSIS OF LUNG ADENOCARCINOMA WITH CLINICAL STAGE0-IA3 IN THE 8th EDITION OF THE TNM CLASSIFICATION

Shunki Hirayama, A. Hattori, M. Fukui, T. Matsunaga, K. Takamochi, S. Oh, K. Suzuki General Thoracic Surgery, Juntendo University School of Medicine, Tokyo, Japan

Objectives:

With the appearance of thin-section computed tomography (TSCT), the definition of the invasive component of the radiological image in the Non-Small Cell Lung Cancer (NSCLC) has been widely recognized as solid components. In the new T descriptor of the 8th TNM classification, the tumor size was newly defined from total tumor size to solid size, and it was subdivided into three types as pure GGO, part solid and pure solid nodule. We investigate the validity of the prognosis for patients with cTis-1cN0M0 in the 8th TNM classification.

Methods:

From 2009 to 2014, 748 lung adenocarcinoma patients in clinical stage 0-IA3 with complete resection were collected. We measured the solid size and tumor size in lung field on TSCT for all patients. We analyzed the overall survival curves for patients with clinical stage0-IA3 in the 8th TNM classification.

Results:

Median follow-up period was 4.0 year. Males were 322 cases and median age was 71 years. Lymph node metastasis was pathologically confirmed in 56 patients. The 5-year survival rate for patients with cstage0, IA1, IA2 and IA3 were 98.9%, 97.9%, 86.9% and 73.0%, respectively (p=0.385, p=0.001 and p=0.003). The 5-year survival rate for patients with clinical stage eT1A1 with or without GGO were 97.2 and 100%, respectively (p=0.642). 5-year survival rate for patients with clinical stageT1A2 with or without GGO were 88.5 and 83.5%, respectively (p=0.060). 5-year survival rate for patients with clinical stageT1A2 with clinical stageT1A3 with or without GGO were 78.5 and 68.4%, respectively (p=0. 621).

Conclusion:

The prognosis of lung adenocarcinoma with clinical stage 0-IA3 in the 8th TNM classification was evenly divided. Although there was no difference in prognosis for clinical T1A1-3 with or without GGO in this study, it might be necessary to divide patients with or without GGO if cases increased.

Disclosure: No significant relationships.

Keywords: lung adenocarcinoma, clinical stage 0-IA3, 8th TNM classification


ROBOTIC THYMECTOMY FOR MYASTHENIA GRAVIS WITH OR WITHOUT A THYMOMA—SURGICAL AND NEUROLOGICAL OUTCOMES

B.B. Asaf, <u>Arvind Kumar</u>

Department of Thoracic Surgery, Sir Ganga Ram Hospital, New Delhi, India, New Delhi, India

Objectives:

We report our experience with robotic thymectomy in patients with myasthenia gravis (MG) and provide data on the surgical results and neurologic outcomes, as per the Myasthenia Gravis Foundation of America (MGFA) recommendations for MG clinical research standards. The study aims at reporting the surgical and neurological outcomes of patients of Myasthenia gravis treated by robotic thymectomy.

Methods:

Prospective data was collected from 100 patients with myasthenia gravis (in the age range 15-67 years) with or without a thymoma, who had completed a minimum follow up of one year. All patients were treated with robotic radical thymectomy. The clinical classification, status of preoperative and postoperative therapy, evaluation of post-interventional clinical status, and descriptions of morbidity/mortality were done as per the MGFA recommendations. Univariate and multivariate analysis was done to assess the factors associated with achievement of complete stable remission(CSR).

Results:

A total of 100 patients were included in this study. Twenty-Nine out of 100 patients (29%) with myasthenia gravis had a thymoma. At the last follow up, 99 patients were alive. No evidence of tumour recurrence was found in patients with thymoma. The overall CSR rate was 38% with the median time to CSR of 17.5 months (range 11-48 months). The CSR rate for patient of MG with a thymoma was 19 %. Factor found to be significantly predicting CSR were young age, lesser severity of MG and non-thymomatous histology.

Conclusion:

Robotic thymectomy is a technically feasible and safe operation with a low morbidity and short hospitalization. It is associated with good neurological long-term results in terms of both CSR and clinical improvement.

Disclosure: No significant relationships.

Keywords: robotic thymectomy, outcomes of surgery for myasthenia gravis, myasthenia gravis, thymoma, surgery for myasthenia

VIDEO-ASSISTED THORACOSCOPIC SURGERY FOR THYMOMA: SINGLE CENTER EXPERIENCE OF 185 CASES AND LONG TERM FOLLOW UP RESULTS

<u>Xiao Li</u>

Department of Thoracic Surgery, Beijing University People's Hospital, Beijing, China

Objectives:

The aim of this study is to analysis the safety and effectiveness of Video-assisted Thoracic Surgery (VATS) in treating thymoma, and to analysis the long-term follow up of VATS surgery for thymoma, based on large sample sized, single center experience.

Methods:

General conditions, surgical procedures, perioperative data and follow up information of thymoma patients who underwent VATS surgery between 2001.4 and 2014.11 were retrospectively collected. SPSS 22.0 was used to do the data analysis. T-test and rank sum test were used for quantitative data analysis, chi-square test was used for categorical data analysis, and Kaplan-Meier method was used for survival analysis. $p\leq0.05$ was considered to be significant difference.

Results:

There were 185 cases who underwent VATS with 94 males (50.8%), and 91 females (49.2%). The average age was 52.6±13.6 yrs. The cases of Masaoka stage I, II, III, IV were 123(66.5%), 37(20%), 19(10.3%), and 6(3.2%) respectively. And cases of type A, AB, B1, B2, B3 were 20(10.8%), 55(29.8%), 57(30.8%), 38(20.5%), 15(8.1%) respectively. The average operation time was 136.5±51.6min, with mean blood loss of 116.9±220.4ml, post-operative stay of 5.8±2.9 days. R0 resection rate of Masaoka stage I, II, III, IV were 100%, 100%, 89.5%, and 66.7%. Post-operative complications happened in 10 cases (5.4%). No perioperative death occurred. Seven cases were converted to open procedure (3.8%), and main reason for conversion was tumor invading of great blood vessels (5 cases). There were 25 cases with late stage (Masaoka III/IV) diseases, 19 with Masaoka III and 6 with Masaoka IV. The average operation time of this group was 174.8±60.5min, with mean blood loss of 201.2±233.6ml, post-operative stay of 6.5 ± 2.3 days. 167 patients (90.3%) were fully followed up, with a middle follow-up time of 44 months (range 3-174 months). The 5-year and 10-year overall survival for the whole group were 94.6% and 89.3% respectively. There were 45 cases accompanied with mysasthenia gravis (MG), and 41 cases were fully followed up. Nine cases were complete response, and 23 cases were partial response. The overall response rate was 78%.

Conclusion:

VATS is safe and effective for early stage (Masaoka I/II) and selected late stage (Masaoka III/ IV) thymomas with satisfied prognosis. The overall response rate of MG with thymoma treated by VATS was relatively high.

Disclosure: No significant relationships.

Keywords: VATS, thymoma, long-time follow up, disease free survival





DOES OXYGEN THERAPY INCREASE THE RESOLUTION RATE OF SMALL PNEUMOTHORAX?

Si Young Choi¹, C.B. Park¹, M.H. Moon¹, H.W. Jeon¹, S.W. Song², Y.D. Won², Y.H. Kim¹, Y.D. Kim¹, D.G. Cho³, S.C. Jeong¹

¹Department of Thoracic and Cardiovascular Surgery, Uijeongbu St Mary's Hospital, College of Medicine, The Catholic University of Korea, Uijeongbu-si, Gyeonggi-do, Republic of Korea ²Department of Radiology, Uijeongbu St Mary's Hospital, College of Medicine, The Catholic University of Korea, Uijeongbu-si, Gyeonggi-do, Republic of Korea ³Department of Thoracic and Cardiovascular Surgery, St Vincent Hospital, College of Medicine, The Catholic University of Korea, Suwon-si, Gyeonggi-do, Republic of Korea

Objectives:

Oxygen supplement for small pneumothorax is a widely accepted treatment. However, evidence showing that oxygen therapy increases the resolution rate is based on small populations with secondary spontaneous pneumothorax. The purpose of this study was to confirm whether oxygen therapy increases the resolution rate of primary spontaneous pneumothorax.

Methods:

We retrospectively reviewed patients with primary spontaneous pneumothorax who had undergone outpatient observation (room air group) and those who were admitted to oxygen therapy (O2 group) between March 2005 and February 2016. The initial chest PA was compared with the last chest PA in which the pneumothorax remained. The size of pneumothorax was measured according to Collins' method.

Results:

One hundred and seventy five episodes were identified in 160 patients. One hundred and twenty eight episodes (73.1%) were O2 group. The mean age was 19.24 ± 4.74 years. Mean initial size of pneumothorax was smaller in room air group ($23.32 \pm 7.00\%$ vs. $20.26 \pm 6.78\%$). The resolution rate of was higher in the O2 group ($4.27 \pm 1.97\%$ /day vs. $2.06 \pm 0.97\%$ /day). However, the difference in resolution rate was not statistically significant in multivariate analysis (P = 0.463). There is a significant relationship between resolution rate and initial pneumothorax size (P < 0.001).

Conclusion:

In this study, it seems doubtful that oxygen therapy increases the resolution rate of the pneumothorax. Oxygen therapy for small pneumothorax should be considered more carefully. Wellcontrolled prospective studies are required to confirm the effect of oxygen therapy.

Disclosure: No significant relationships.

Keywords: oxygen, treatment, primary spontaneous pneumothorax

IMPACT OF ORIGINAL, MODIFIED AND ADJUSTED GLASGOW PROGNOSTIC SCORE ON SURVIVAL OF PATIENTS WITH COMPLETELY RESECTED NON-SMALL CELL LUNG CANCER

Tomohito Saito, K. Fukumoto, H. Matsui, Y. Taniguchi, T. Murakawa *Thoracic Surgery, Kansai Medical University Hospital, Hirakata, Japan*

Objectives:

The Glasgow prognostic score (GPS) is a systemic inflammation-based score. The original GPS (oGPS) and its modifications (modified GPS [mGPS] and adjusted GPS [aGPS]) may be prognostic factors for various types of cancers including Non-Small Cell Lung Cancer (NSCLC). Our aim was to investigate the correlation between oGPS, mGPS, and aGPS and long-term outcomes after complete resection of NSCLC.

Methods:

We retrospectively reviewed 813 cases of complete resection for NSCLC between January 2006 and December 2015 in order to investigate associations between clinicopathologic characteristics and overall survival. The log-rank test was used for univariate analysis and the Cox proportional hazard model was utilized for multivariate analysis including factors identified by univariate analysis. Statistical significance was defined as p < 0.05.

Results:

Mean patient age was 67.6 years and median follow-up was 2.8 years; 612, 109, and 92 patients had pStage I, pStage II, and pStage IIIA, respectively. There were 591 adenocarcinomas, 150 squamous cell carcinomas, and 72 other histological types. The 5-year overall survival rate was 75.8%. Univariate analysis identified oGPS, mGPS, and aGPS as potential prognostic factors (p < 0.0001 for all). Age \geq 75 years, male sex, ever-smokers, elevated serum carcinoembryonic antigen (>5.0 ng/mL), histologic type (squamous cell carcinoma), and advanced pStage were also associated with poor overall survival (p < 0.05). A multivariate Cox analysis identified oGPS (1–2 vs. 0), mGPS (1–2 vs. 0), and aGPS (2 vs. 0–1) as independent prognostic factors for overall survival (p = 0.0092, 0.0092, and 0.046, respectively) in addition to pStage, age, smoking history, and carcinoembryonic antigen level.

Conclusion:

Although further investigation is necessary to identify the optimal cutoff and the molecular pathophysiology defining the score, oGPS, mGPS, and aGPS are promising prognostic factors for patients undergoing complete resection of NSCLC.

Disclosure: No significant relationships.

Keywords: non-small cell lung cancer, Glasgow Prognostic Score, prognostic factor, complete resection



NON-OPERATIVE EXTERNAL FIXATION OF FLAIL CHEST USING VACUUM-ASSISTED THERAPY

Cristian Paleru¹, L. Marinescu², V. Popescu³

¹Thoracic Surgery, National Institute of Pneumology, Bucharest, Romania ²Thoracic Surgery, Floreasca Emergency Clinical Hospital, Bucharest, Romania ³Thoracic Surgery, "Marius Nasta" Institute of Pneumology, Bucharest, Romania

Objectives:

Vacuum-assisted therapy is well established in sternal dehiscence wound and stabilization treatment. We propose the extent of this method to chest wall stabilization, in flail chest post trauma cases, using a non-traumatic and easy to apply system, avoiding "internal fixation", intubation and ventilation.

Case description:

Patient after car crash, with mild contusions and associated trauma, is diagnosed with posttraumatic flail chest. Patient presented respiratory distress with SpO2 value of 85%, tachypnea and tachycardia with acute pain and no lung contusion. Blood gases values showed mild hypercapnia and EKG showed normal sinus rhythm, with no respiratory nor cardiovascular history. Four double rib fractures on a 7cm segment were described. Associated hemothorax necessitated emergency pleural drainage. External fixation with vacuum-assisted therapy was applied in day two post admission. Bronchoaspiration was performed repeatedly, with two episodes of intubation for acute respiratory distress. The system consists of applying pieces of open-cell foam externally, sandwich-secured with plastic bands and covering the entire area with a transparent adhesive membrane, firmly secured to the skin and connected to the vacuum source. The area becomes rigid and the system molds after the body shape. The therapy showed improvement in thoracic wall compliance and movement, thus avoiding external surgical fixation. After three weeks we considered safe to remove the vacuum-assisted therapy, with no skin injuries recorded.

Conclusions:

Our initial experience in external fixation showed improvement of the paradoxical chest movement. Following vacuum-assisted therapy in sternal wound dehiscence management, our limited experience in external fixation of extensive thoracotomies and vast experience in chest wall resection and reconstruction, we imagined an easy-to-control external application of the vacuum-assisted therapy used in post-traumatic flail chest emergency treatment. It is a versatile system, simple to apply to a cheap device, can also be used in emergencies, without direct medical supervision, during transportation, avoiding further costal movements.

Disclosure: No significant relationships. **Keywords:** versatile, vacuum, emergency, flail chest

TRANSCERVICAL MINIMAL INVASIVE RIGHT PULMONARY ARTERY LIGATION: NEW TECHNIQUE

<u>Cristian Paleru</u>¹, C. Bolca¹, V. Pavaloiu¹, I. Cordos¹, V. Popescu² ¹Thoracic Surgery, National Institute of Pneumology, Bucharest, Romania ²Thoracic Surgery, "Marius Nasta" Institute of Pneumology, Bucharest, Romania

Objectives:

Pulmonary artery ligature has been introduced since 1960 as a surgical option in cardiac surgery for management of the right-left pulmonary shunt. Destroyed lung implies a therapeutic solution is necessary. Low oxygen saturation and effort threshold translates into poor quality of treatment and low life expectation. We address the necessity of a minimal invasive approach for pulmonary artery ligation, in inoperable patients.

Case description:

In the past, the approach used for ligating the pulmonary artery was thoracotomy or sternotomy, involving more surgical trauma and complications. Using the same surgical technique as in thymectomy, the Cooper surgical retractor to elevate the sternum, after wide cervical incision and mediastinal lymphadenectomy, we created a large workspace, facilitating the right pulmonary artery exposure, ligation, thus avoiding entering the infected pleural cavity. The transcervical approach offers a good window and surgical field for the right pulmonary artery ligation. Extensive use of the Ligasure[®] sealing device, facilitates the sheet dissection of the right pulmonary artery, allowing the ligation with a non-resorbable suture. From the beginning, our case's biologic and oncological status excluded further surgery interventions. We also considered the bronchial and adherences arterial blood supply. An improvement in blood gases and O2 saturation and an increase in effort threshold was observed.

Conclusions:

Minimal invasive video-assisted transcervical technique is a new approach of pulmonary artery ligation in destroyed lung and inoperable patients, minimizing surgical trauma. The goal of this procedure is blocking the right-left pulmonary shunt, thus facilitating the patient recovery and admission for the appropriate oncological treatment. This procedure could be useful preparing challenging cases of pneumonectomy, when difficult dissection of the pulmonary artery is anticipated. We avoided vessel stapling, having no control for the distal closing end, and being an irreversible procedure. The left pulmonary artery transcervical approach is more difficult and still in debate.

Disclosure: No significant relationships.

Keywords: destroyed lung, minimal invasive, transcervical, artery ligation



OXIDIZED RESORBABLE CELLULOSE (GELITA-CEL) CAUSING FOREIGN BODY REACTION IN MEDIASTINUM: A REPORT OF 16 CASES

<u>Tamim Haidari</u>¹, R.H. Petersen², J. Ravn¹, B.G. Skov³ ¹Cardiothoracic Surgery, Rigshospitalet, Copenhagen, Denmark ²Department of Cardiothoracic Surgery, University Hospital of Copenhagen, Copenhagen, Denmark ³Patologi, Rigshospitalet, Copenhagen, Denmark

Objectives:

Different types of oxidized cellulose have been used for hemorrhage control in thoracic, abdominal and neurosurgery. Oxidized resorbable cellulose (Gelita-cel) is a new hemostatic agent. Once saturated with blood, it swells and makes a gelatinous mass that formats as a fibrin clot. It provides a strong matrix for platelet adhesion. We present 16 cases with formation of mediastinal foreign body reaction from Gelita-cel.

Case description:

Between October 2010 and April 2012, 477 patients were operated in our department for lung cancer. Gelita-cel was used in 200 patients due to minor intraoperative hemorrhage after lymph node dissection mainly in the area of lymph-node station two, four and seven. During follow up for lung cancer 16 patients showed enlarged, positron emission tomography positive lymph nodes in the mediastinum on computed tomography performed 6-60 months after the primary operation. Endoscopic bronchial ultra-sonographic biopsies of the lymph nodes showed foreign body material, with no sign of lung cancer recurrence or other malignancies. Gelita-cel was subsequently removed from the department due to high risk of false positive lymph node involvement.

Conclusions:

Conclusion Gelita-cel has a high risk of causing confusing lymph node enlargement, and should not be used as a hemostatic agent in thoracic surgery.



Disclosure: R.H. Petersen: Speaker for Medtronic, Ethicon and Medela

Keywords: oxidized cellulose, foreign body reaction, mediastinum, hemostasis, video-assisted thoracoscopic surgery, EBUS

LEFT ATRIAL ANASTOMOSIS DURING BILATERAL LUNG TRANSPLANTA-TION: A COMPLEX HILUM MADE EASY

<u>Davide Tosi</u>¹, A. Cannata², P. Properzi³, L. Rosso¹, A. Palleschi¹, P. Mendogni¹, I. Righi¹, M. Montoli¹, M. Nosotti¹, L. Santambrogio¹

¹Thoracic Surgery and Lung Transplantation Unit, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy

²Cardiac Surgery Department, Ospedale Niguarda Ca'Granda, Milan, Italy ³Anesthesiology Department, Fondazione IRCCS Ca'Granda Ospedale Maggiore Policlinico, Milan, Italy

Objectives:

To describe a technique of heart mobilization, able to improve the access to the left hilum, during lung transplantation (LTx).

Case description:

In a recent case of bilateral LTx for cystic fibrosis, left hilum exposure was very difficult to obtain. The maneuvers to displace medially the pericardial sac, in order to perform atrial anastomosis, were not tolerated hemodynamically because of severe systemic hypotension. A wide inverted T-shaped incision was performed on the pericardium, but hemodynamic parameters showed an unacceptable risk of sustained systemic hypoperfusion. A cardiopulmonary bypass seemed to be unavoilable. We decided to mobilize the heart with a pericardial stitch, usually performed during revascularization on a beating heart: two heavy sutures (0 polyester) were placed along the left pericardial border. The heart was temporarly lifted in order to expose the pericardial oblique sinus, where a deep pericardial traction stitch (2-0 polyester) was placed. The suture was passed through a long wet gauze and then snared down to the pericardium by means of a long rubber tourniquet. Upward traction was applied on the tourniquet, that was fixated to the surgical drapes. Such maneuver lifted the apex of the heart, that was placed in vertical position. The heart was secured by means of the two arms of the gauze, that were crossed and wrapped around the ventricles and fixated with clamps to the surgical draping. The sutures on the left pericardial border were pulled upwards. The exposure of the left hilum was excellent and hemodynamics remained stable and satisfactory during the atrial cuff anastomosis of the left lung. The traction on pericardium and the luxation of the heart avoided the need of venoarterial extracorporeal membrane oxygenation.

Conclusions:

This technique can provide a good exposure of the left hilum, avoiding in some cases cardiopulmonary bypass during lung transplantation.

Disclosure: No significant relationships.

Keywords: hilum exposure, lung transplantation, vascular anastomosis, cardiopulmonary bypass



VIDEOMEDIASTINOSCOPIC CLOSURE OF LEFT MAIN BRONCHIAL STUMP FOR POST LEFT PNEUMONECTOMY BRONCHOPLEURAL FISTULA WITH EMPYEMA

Belal Bin Asaf, A. Kumar

Department of Thoracic Surgery, Sir Ganga Ram Hospital, New Delhi, India, New Delhi, India

Objectives:

Development of post pneumonectomy bronchopleural fistula and empyema is a difficult to treat and life threatening complication after lung resection. The correct treatment protocol is matter of significant debate. By and large the aim of treatment is to achieve bronchial stump closure along with control of intra pleural sepsis. We herein report the use of transcervical video assisted mediastinoscopic closure of left main bronchus after a left pneumonectomy.

Case description:

A 45 year old man presented to our unit with left empyema thoracis after having undergone a left pneumonectomy for massive haemoptysis secondary to lung abscess. Flexible bronchoscopy revealed a 2.5 cm long bronchial stump with complete stump blow out. The patient came to us in a septic condition with fever and tachycardia and leucocytosis. A videomediastinoscopic closure of the left main bronchial stump followed by left thoracotomy with drainage and debridement of the infected left pleural cavity was done. The thoracotomy wound was kept open. In the post-operative period sepsis was controlled as evident by decreasing counts and leucocyte count with no fever. Patient required prolonged chest tube drainage through which irrigation of the pleural cavity was carried out daily. The thoracotomy wound was managed with daily cleaning and dressing. The patient responded well to treatment and was discharged after three weeks.

Conclusions:

Videomediastinoscopic closure of bronchial stump in experienced hands is a safe and feasible alternative to trans-sternal closure particularly in sick septic patients. It offers a minimally invasive approach with much lesser morbidity than transsternal or transthoracic approach. Simultaneous adequate toileting of the infected pleural cavity mandatory.

Disclosure: No significant relationships.

Keywords: transcervical videomediastinoscopic surgery, mediastinoscopic closure of main bronchial stump for post pneumonectomy bronchopleural fistula, post pnuemonectomy bronchopleural fistula, post pneumonectomy empyma

PLEURAL CARBON DIOXIDE INSUFFLATION DURING THORACOSCOPIC SURGERY HELPS TO OBTAIN CLEAR THORACOSCOPIC ULTRASONOGRAPHY IMAGES OF SMALL LUNG NODULES: REPORT OF TWO CASES.

<u>Hirofumi Uehara</u>¹, T. Shirai,¹, A. Yasuda², H. Kondo³, T. Nakayama¹, N. Matsutani¹, M. Kawamura¹

¹Surgery, Teikyo University School of Medicine, Tokyo, Japan ²Anesthesiology, Teikyo University School of Medicine, Tokyo, Japan ³Radiology, Teikyo University School of Medicine, Tokyo, Japan

Objectives:

Thoracic surgeons frequently encounter malignant small lung nodules. Thoracoscopic surgery (TS) wedge resection has been widely applied, but it cannot be easily located for surgical procedures, such as TS. Thoracoscopic ultrasonography (TU) is a real-time, convenient, and less invasive technique for localization of small lung lesions during TS and can even identify pure ground-glass nodule (PGGN). However, this technique has not been widely adopted because it requires complete deflation of the lung because residual air in the lung results in poor ultrasound images. To overcome the issue, we tried using carbon dioxide (CO2) insufflation into the thoracic cavity to remove residual air completely.

Case description:

Case 1: A 64-year-old woman was found to have a 15-mm PGGN in the right upper lobe. An intrathoracic pressure of 10 mmHg was maintained, and complete lung collapse was achieved without any hemodynamic complications. The diagnostic ultrasound system ARIETTA S70 (Hitachi, Ltd. Tokyo, Japan) was used in this study. It consists of a probe with a flexible tip (L43K) and has a linear array transducer with a frequency of 12-2 MHz. The probe is 12 mm in diameter and 26 mm in length. PGGN clearly showed a hyperechoic lesion by TU. We performed thoracoscopic wedge resection, and the pathological diagnosis was adenocarcinoma in situ. Caes2: A 72-year-old man with the past history of colon cancer was found to have a 7 mm small nodule in the right upper lobe of emphysematous lung. We regulated the intrathoracic pressure of 5-10mmHg, and complete lung collapse was achieved. The nodule clearly showed a hyperechoic lesion. We performed thoracoscopic wedge resection, and the pathological diagnosis was metastatic carcinoma.

Conclusions:

We hypothesized that CO2 insufflation into the thoracic cavity is effective for complete lung deflation, which is useful to detect of small lung nodules using TU

Disclosure: No significant relationships.

Keywords: Pure ground-glass nodule, Lung cancer, Thoracoscopic surgery, Thoracoscopic ultrasonography, carbon dioxide insufflation



AUTOLOGOUS PERICARDIUM TO RECONSTRUCT TRACHEOBRONCHIAL AIRWAY IN MALIGNANT DISEASES

<u>Antonio Francisco Honguero Martinez</u>¹, M.D. Garcia Jimenez¹, C.R. Rodriguez Ortega¹, M. Genoves Crespo¹, C.E. Almonte Garcia¹, M. Lazaro Sahuquillo², P. Leon Atance¹ ¹Thoracic Surgery, University General Hospital of Albacete, Albacete, Spain ²Mental Health, General Hospital La Mancha Centro, Alcazar de San Juan, Spain

Objectives:

We present two cases where autologous pericardium was used to reconstruct a large defect of the tracheobronchial tree after surgical resection for tumoral pathology and their posterior evolution.

Case description:

A 45-year-old female was diagnosed of a 6-cm long squamous esophageal carcinoma located at 24cm from dental arch. Induction chemo-radiotherapy was administered and a 18x80mm long endoesophageal stent was deployed due to dysphagia. A transthoracic esophagectomy was performed. By disection of the esophagus an esophagotracheal fistula was discovered. After detatchment of the esophagus from the trachea a 3x2cm size defect remained afecting carina and right main bronchus. The defect was repaired with a free patch of autologous pericardium and covered by a pedicled serratus anterior muscle flap. Postoperative recovery was complicated by a severe bilateral pneumonia and was discharged 92 days later without any complication at the tracheobronchial repair.

A 73-year-old man was diagnosed of two metastases of large intestine adenocarcinoma, one in the liver and another in the pulmonary right lower lobe(RLL). One month after hepatic surgery he was operated on the right lung. A posterolateral thoracotomy was performed and superior segmentectomy of the RLL extended to a 2x1cm size patch of the intermediate bronchus. The defect was closed with a free flap of autologous pericardium and covered by a pedicled parietal pleura flap. He was discharged six days later without any major complication. Six months after the surgery there was no complication related to the bronchial repair.

Conclusions:

In selected cases, autologous pericardium can be a useful, effective, and easy option to reconstruct the tracheobronchial tree in surgery for tumoral pathology.

Disclosure: No significant relationships.

Keywords: tracheobronchial tree reconstruction, autologous pericardium, tracheobronchial defect, lung tumor, esofagotracheal fistula, malignant disease

EXTENDED BILATERAL RESECTIONS OVER THREE-QUARTERS OF LUNG TISSUE IN COMPLICATED DESTRUCTIVE PULMONARY EXTENSIVELY DRUG RESISTANT TUBERCULOSIS (XDR TB) TREATMENT

D. Giller, V. Namazova, <u>Boris Giller</u>, I. Enilenis, G. Shcherbakova M.I.Perelman Phthisiopulmonology and Thoracic Surgery Department, I.M.Sechenov First Moscow State Medical University, Moscow, Russian Federation

Objectives:

Forty five year old female patient had pulmonary TB for 13 years. Despite numerous chemotherapy courses bilateral fibrous-cavernous pulmonary TB with right lung and left upper lobetotal destruction occured. It was complicated with total pleural empyema with bronchopleural fistula. XDR (H, R, S, E, K, Fgand Cap) was observed in sputum seeding. Pseudomonas aeruginosa was cultured from pleural cavity. Disorder was complicated with renal amyloidosis, cachexia and respiratory insufficiency. VC on admission was 41% of adequate, FEV1 – 25% of adequate. Six-minutes walking test was 270 meters.

Case description:

Three-staged surgical treatment was applied. Considering extremely low functional reserves transsternal right main bronchus occlusion and transthoracic empyema cavity draining were performed on 21 September 2015. Main infection site exclusion and pulmonary shunt elimination significantly improved patient's condition and increased exercise tolerance. Upper single functioning lung lobectomy with partial S6 resection on the left took place on 23 November 2015 and was the second stage. During that surgery total pneumolysis from dense bleeding adhesions required. Pleuropneumonectomy on the right was performed on 10 October 2016 as the third stage.

Conclusions:

Postoperative period after every surgery was uneventful. The patient had a complete recovery from TB 2.5 months past last surgery. Six-minutes walking test was 315 meters, VC – 33% of adequate, FEV1 – 26% of adequate. Extended resections for destructive pulmonary TB are possible even in patients with extremely low functional reserves when resected lung tissue is completely non-functioning. In such cases regardless functional indicators decreasing exercise tolerance often increases.

Disclosure: No significant relationships.

Keywords: tuberculosis, thoracic surgery, single lung resection, bilateral lung resection, pneumonectomy



VENO-VENOUS EXTRACORPOREAL MEMBRANE OXYGENATION (V-V ECMO) AS RESCUE FOR LIFE THREATENING TRACHEAL OBSTRUCTION

Navdeep Singh Nanda, B.B. Asaf, A. Kumar

Department of Thoracic Surgery, Sir Ganga Ram Hospital, New Delhi, India, New Delhi, India

Objectives:

Acute upper airway obstruction is life threatening and needs emergency airway access. Complete obstruction with inability at accessing the airway would lead to death. In such desperate situations, Extra corporeal membrane oxygenation (ECMO) can provide the time window to carry out proper surgical access. We describe a case of life threatening, malignant tracheal obstruction, managed successfully with ECMO rescue.

Case description:

A 48-year gentleman with squamous cell carcinoma of right buccal mucosa, had surgery and local radiotherapy in 2012 and commando resection with tracheostomy for local recurrence in 2015. He was decannulated 3 months later but had local re-recurrence and he was offered palliative chemotherapy. After three cycles of chemotherapy, he presented to emergency in acute respiratory distress with pulse 204/min, blood pressure 144/66 mm of Hg, respiration 45/ min, saturation 86% on polymask. CT scan of neck revealed 2 cm tumour at tracheostomy site with 90% luminal compromise (Fig 1). Fibreoptic bronchoscopic debulking was possible, but oxygenation during the procedure was a challenge for which Veno-Venous ECMO was considered as a bridge. Bedside bifemoral veno-venous ECMO was initiated. Oropharyngeal and vocal cord anatomy was completely distorted, the electrocautery and cryoprobe were just not negotiable through the bronchoscope. It was decided for low tracheostomy, while continuing ECMO. With skin incision below previous tracheostomy site, a wide tracheotomy was done 7.5 Fr tracheostomy tube introduced. The ECMO support was removed after one hour. He was discharged five days later for palliative chemotherapy. **Figure 1**



Conclusions:

V-V ECMO is a safe and effective available method of oxygenation in cases of life threatening acute airway obstruction where conventional methods of airway access are not immediately possible without completely jeopardizing the airway. It provides that critical time window, with patient adequately oxygenated, to be able to plan and secure airway access, as we did in our case successfully.

Disclosure: No significant relationships.

Keywords: airway obstruction, veno-venous ECMO, extra corporeal membrane oxygenation





SECONDARY LINGULAR SLEEVE RESECTION TO AVOID PNEUMONECTOMY FOLLOWING BRONCHIALANASTOMOTIC DEHISCENCE AFTER LEFT LOWER LOBE SLEEVE RESECTION FOR DESTROYED LUNG SYNDROME DUE TO ENDOBRONCHIAL PSEUDOTUMOR

Servet Boeluekbas¹, B. Redwan¹, R. Zanner², C. Biancosino¹, M. Eberlein³

¹Department of Thoracic Surgery, Helios University Hospital of Wuppertal - University Witten/ Herdecke, Wuppertal, Germany ²Department of Anesthesiology, Helios University Hospital of Wuppertal - University Witten/ Herdecke, Wuppertal, Germany ³Division of Pulmonary, Critical Care and Occupational Medicine, University of Iowa Hospitals

and Clinics, Iowa City, IA, United States of America

Objectives:

Bronchial sleeve resections are technically demanding procedures. In case of bronchial anastomotic dehiscence, secondary pneumonectomy is the treatment of choice. However, secondary pneumonectomy is usually associated with high morbidity and mortality as well as loss of pulmonary functional reserves.

Case description:

A 36-year old female patient was admitted to our hospital for recurrent pulmonary infections. CT-scan of the chest showed a total atelectasis of the left lower lobe (LLL) with the radiological signs of a destroyed lobe syndrome. Flexible bronchoscopy revealed an exophytic tumor completely occluding the left lower lobe bronchus (LLB). Histological examination of the biopsy was highly suspicious but not confirmatory for malignancy. Despite antibiotic therapy no improvement occurred. Due to the exophytic tumor in the LLB, a bronchial sleeve resection of the LLL was performed. Final pathohistological examination revealed destroyed lung syndrome due to endobronchial Pseudotumor and clear bronchial margins. Initial postoperative course was uneventful. The first routine postoperative bronchoscopy showed an intact bronchial anastomosis with slight fibrin deposits. On POD 11, a bronchial anastomotic dehiscence at the medial wall of the anastomosis was detected during second routine bronchoscopy. Surgical revision was indicated. Intraoperatively, a cartilage from the left main bronchus (LMB) and left upper bronchus (LUB) was resected. However, the distal LUB was still edematous and inflamed. Under these circumstances, re-anastomosis of the LUB was not favored. To avoid pneumonectomy, lingular sleeve resection with subsequent anastomosis of the apical trisegment (B1-3) with the LMB was performed (Figure). Flexible bronchoscopy revealed excellent healing without fibrin deposits and the patient was discharged on POD 22.







B. Anastomosis of the left upper lobe to the left main bronchus







C. Seperation of the apical trisegment (B1-B3) from the Lingula (B4-B5) and lingular sleeve resection

D. Anastomosis of the apical trisegment (B1-B3) to the left main bronchus

Conclusions:

To the best of our knowledge, this is the first report of secondary lingular sleeve resection following bronchial anastomotic dehiscence after left lower lobe sleeve resection. This approach enabled the avoidance of pneumonectomy, hence reducing the possible pneumonectomy-associated complications.

Disclosure: No significant relationships.

Keywords: secondary lingular sleeve resection, destroyed lung syndrome, bronchial anastomotic dehiscence, avoidance of pneunectomy



PERIOPERATIVE SINGLE-SITE VENO-VENOUS EXTRACORPOREAL CARBON DIOXIDE (CO2) REMOVAL FOR MINIMALLY INVASIVE GIANT BULLA RESEC-TION

<u>Servet Boeluekbas</u>¹, B. Redwan¹, C. Biancosino¹, G. Woebker², F. Giebel², M. Eberlein³ ¹Department of Thoracic Surgery, Helios University Hospital of Wuppertal - University Witten/ Herdecke, Wuppertal, Germany

²Department of Intensive Care Medicine, Helios University Hospital of Wuppertal - University Witten/Herdecke, Wuppertal, Germany

³Division of Pulmonary, Critical Care and Occupational Medicine, University of Iowa Hospitals and Clinics, Iowa City, IA, United States of America

Objectives:

Giant pulmonary bullae are rare and surgical management of patients with severe emphysema and advanced chronic obstructive lung disease (COPD) presenting with giant bullae can be very challenging. Previously, perioperative two-site high-flow veno-venous extracorporeal membrane oxygenation (ECMO) was successfully utilized during giant bulla resection. Here we first report of the perioperative application of single-site low-flow extracorporeal CO2 removal (ECCO2R) for minimally invasive bulla resection.

Case description:

A 48-year old male patient with a longstanding history of COPD GOLD Stage IV was admitted to our hospital for increasing dyspnea. Capillary BGA showed a pO2 of 59.6 and pCO2 of 45.7 mmHg on room air. Pulmonary function testing (PFT) revealed severe obstructive ventilator defect with a FEV-1 of 29.6 % of predicted and marked hyperinflation with a TLC of 132.3 % of predicted. Chest CT-scan showed severe bilateral lung emphysema with multiple right-sided giant bullae destructing the surrounding lung tissue. Moreover, a left-sided midline shift and a marked right-sided diaphragm flattening were present. Therefore, surgical bulla resection was indicated. Hypercapnia with respiratory acidosis occurred after intubation. Therefore, single-site low-flow ECCO2R using a 24 Fr. twin-port double-lumen cannula (NovaPort twin®, Novalung, Germany) was initiated and facilitated Lung-protective single-lung-ventilation. A VATS bullectomy was performed. Intraoperative BGA showed normocapnia throughout the entire procedure. At end of surgery, the patient was extubated in the OR and transferred to ICU. ECCO2R was removed 8h postoperatively. At first follow-up six weeks after discharge PFT revealed a FEV-1 of 45% of predicted and TLC of 113.1 of predicted. Capillary BGA showed a pO2 of 80.4 and pCO2 of 40.5 mmHg on room air.

Conclusions:

This approach of low-flow ECCO2R, which is less invasive than conventional ECLS approaches, has enabled safe performance of surgery and facilitated protective intraoperative single lung ventilation, while avoiding possible complications of aggressive mechanical ventilation.

Disclosure: No significant relationships. **Keywords:** ECCO2R, giant bulla resection, VATS

DEVELOPMENT OF A NOMOGRAM FOR ELDERLY PATIENTS (≥70 YEARS OLD) WITH RESECTED NON-SMALL-CELL LUNG CANCER ACCORDING TO THE EIGHTH EDITION TNM CLASSIFICATION

Xizhao Sui, Z. Li, C. Haiqing, W. Jun Department of Thoracic Surgery, Beijing University People's Hospital, Beijing, China

Objectives:

The 8th TNM classification of lung cancer has been used since 2017, which improves discriminatory performance for overall survival of non-small cell lung cancer. We develop a clinical nomogram for elderly patients (\geq 70years old) with resected non-small-cell lung cancer according to the new stage system.

Methods:

On the basis of data from 374 elderly patients with resected NSCLC in our clinical center, we identified and integrated significant prognostic factors for survival to build a nomogram. The model was subjected to bootstrap internal validation and to external validation with a separate cohort from another center. The predictive accuracy and discriminative ability were measured by concordance index (C-index).

Results:

Totally 361 paitients were included in Cox regression analysis. The median survival is 40.0 months(0-155months) for the test cohort. The 8th staging system and Charlson Comorbidity Index were identified as the prognostic factors and entered into the nomogram. The calibration curves for probability of 5-year overall survival (OS) showed optimal agreement between nomogram prediction and actual observation. The C-index of the nomogram was higher than that of the TNM staging system for predicting OS.

Conclusion:

We built a internally validated nomogram for the paticular patient group, the resected elderly patients with NSCLC. This practical prognostic model provided clinicians a convenient tool in decision making and design of clinical studies.

Disclosure: No significant relationships. **Keywords:** elderly, resected, lung cancer, nomogram





DISSEMINATION PATHWAY OF ODONTOGENIC DESCENDING NECROTIC MEDIASTINITIS INFLUENCES SURVIVAL AND AGGRESSIVENESS OF SURGI-CAL APPROACH

Ioan Petrache¹, V. Voiculescu¹, C. Tunea¹, G. Cozma¹, I. Miron¹, M. Butas², O. Burlacu¹ ¹Thoracic Surgery Clinic, Timisoara Municipal Hospital, Timisoara, Romania ²Intensive Care Unit, Timisoara Municipal Hospital, Timisoara, Romania

Objectives:

Descending necrotic mediastinitis (DNM) is the most dangerous and difficult to treat complication of neck and odontogenic infections and has a high mortality rate, mainly due to bacterial polymorphism and delayed diagnosis. Our objective was to evaluate the efficiency of surgical treatment related to the dissemination path.

Methods:

Twenty-six cases with odontogenic DNM treated between 2000 - 2016 were studied retrospectively. In all cases the diagnosis was established clinically and by CT scan. Other causes for mediastinitis were excluded from the study. We analyzed outcome and complications by neck dissemination path, as shown on CT: group A (14 cases) posterior plane dissemination and group B (12 cases) anterior disseminations. All patients underwent urgent cervicotomy and mediastinal drainage and repeated debridement and daily lavage. 8 patients in group A benefited from immediate thoracotomy and mediastinotomy, 2 had delayed thoracotomy after 2 days. No thoracotomy was performed in group B. Pleural drainage was performed in all cases in group A, and in 7 cases in group B.

Results:

For group A we recorded complications in 86% cases (ARDS, MSOF, hemorhage, empyema, purulent pericarditis, extended chest wall cellulitis, tracheal fistulas, cutaneous defects, vasculitis). Recorded mortality was 7 cases. Hospital stay was 4.7 weeks. For group B complication rate was 62%, one death by aspiration was recorded, thus unrelated to mediastinal infection. Hospital stay was similar. In group A mortality was higher in patients with late or no thoracotomy, even for cases with less apparent dissemination and aggressive antibiotherapy.

Conclusion:

Acute DNM with posterior dissemination is more aggressive and complications occur faster. Emergent thoracotomy and extended mediastinal drainage +/- pericardotomy associated with cervicotomy is mandatory to improve survival, antibiotherapy and cervicotomy alone are not sufficient.

Disclosure: No significant relationships.

Keywords: mediastinotomy, neck, infections, odontogenic, mediastinitis, cervicotomy

A CASE OF PRIMARY ADENOID CYSTIC CARCINOMA OF TRACHEA: A COMPLEX SURGICAL APPROACH WITH DISTAL TRACHEAL, CARINAL RESECTION, RIGHT UPPER LOBECTOMY AND CARINAL RECONSTRUCTION

M. Subasi, A. Yazicioglu, A. Gungor, A. Saylan, S. Turkkan, F. Basaran, <u>Erdal Yekeler</u> *Clinic of Thoracic Surgery and Lung Transplantation, Türkiye Yuksek Intisas Training and Research Hospital, Ankara, Turkey*

Objectives:

To present a complex surgical approach to a rare and low grade case of primary tracheal adenoid cystic carcinoma with distal tracheal, carinal resection, right upper lobectomy and carinal reconstruction.

Case description:

A 67 year old female with dyspnoea, dry cough and chest pain lasting for about two months had been evaluated by bronchoscopy at another centre. Tracheal tumour had been subtotally excised during rigid bronchoscopy to maintain distal ventilation and histopathology had showed adenoid cystic carcinoma. She was then referred to our clinic. On computed tomography there was a vegetative mass lesion involving distal trachea, carina, right main bronchus and right upper lobe bronchus. With these findings distal tracheal (4 cm) and carinal resection and right upper lobectomy were performed. The surgical procedure was assisted with bilateral cross-field ventilation. First the left main bronchus and intermediary bronchus were approximated in a side-to-side fashion, creating a neocarina, next neocarina was anastomosed to the distal trachea. Consequently carinal reconstruction was executed among intermediary bronchus, left main bronchus and trachea. Because a relatively longer airway segment was resected, flexion of the neck and suturing chin to the chest were applied to allow the trachea to move into the mediastinum and protect the anastomosis from tension. Postsurgical bronchoscopy revealed intact anastomoses. The patient was discharged at 10th day postoperatively.





Conclusions:

Even if a surgery with distal tracheal, carinal resection, right upper lobectomy and carinal reconstruction has high morbidity and mortality rates it can be a necessity to re-establish airway continuity and offer complete resection for such a rare and low grade malignancy.

Disclosure: No significant relationships.

Keywords: adenoid cystic carcinoma, carinal reconstruction, distal tracheal resection

MANAGEMENT OF GORHAM-STOUT DISEASE COMPLICATED BY CHYLO-THORAX, HEMOTHORAX AND CHYLOPERICARDIUM

Carlos Alberto Araujo, B. Carvalho, I. Carvalho, A. Dantas, J. Silva, E. Jales, J. Dantas Departamento de Medicina Integrada, UFRN, Natal, Brazil

Objectives:

To describe a clinical case of Kaposiform Gorham-Stout Disease (GSD).

Case description:

Male, five years old, admitted with lower thoracic and lumbar pain on left side with one week of evolution, presenting ipsilateral hemothorax. Past history of lesser trauma on lower thoracic region eight months before the start of this symptoms. A CT revealed osteolitic lesions on ribs and sternum and biliar litiasis. The hemothorax became bilateral after a month and a few days later the liquid changed to a milky aspect of chylothorax. A right thoracic duct ligation was performed with no decrease in the amount of liquid drained. Then diagnosis of GSD was suggested, based on the following aspects: presence of spontaneous bilateral chylothorax; lytic lesions on ribs and sternum; absence of response to ligation of right thoracic duct; biliar litiasis; past history of lower thoracic region trauma. It was then started a treatment with total parenteral nutrition using medium chain triglycerides as only lipidic source, octreotide 0,08mcg/kg/day, alpha 2b interferon 3.000.000UI once per day and sirolimus 1mg twice per day. After one week of treatment the patient presented clinical improvement, allowing the removal of the thoracic drains. After 42 days with the combined therapy the patient had no more breathlessness nor pain, was clinically stable was discharged. After eight months of treatment the patient is asymptomatic, having had only a soft tissues infection, probably due to the immunosuppressive effect of sirolimus, that was successfully treated with broad-spectrum antibiotics for 15 days. A new computerized tomography revealed no signs of recurrence of pleural effusion, the pulmonary parenchyma is normal and there was good bone remodeling. At last, the levels of VEGF went back to normal

Conclusions:

The Gorham-Stout syndrome is a rare disease and its kaposiform clinical presentation has challenging management and worst prognosis.

Disclosure: No significant relationships.

Keywords: hemothorax, Gorham-Stout Disease, massive osteolysis, chylothorax, chylopericardium



SUCCESSFUL SURGICAL REMOVAL OF A FOREIGN BODY IN THE PULMO-NARY ARTERY

<u>Takashi Sakai</u>¹, H. Uehara¹, S. Shirai¹, R. Kanaoka¹, T. Nakayama¹, N. Matsutani¹, M. Kawamura¹, H. Kondo² ¹Surgery, Teikyo University School of Medicine, Tokyo, Japan

²Radiology, Teikyo University School of Medicine, Tokyo, Japan

Objectives:

Foreign bodies, such as fragmented medical devices or other objects caused by natural disasters or human-derived disasters oddly enter the human body, which migrated to the pulmonary artery through major blood vessels and could become lethal when embedded over time. We report the uncommon case of a piece of a cracked iron hammer that had entered the femoral vein and migrated to the pulmonary artery through inferior vena cava and right ventricle without causing hemorrhage. We performed both non-surgical and surgical removal of the foreign body.

Case description:

A 19-year-old man accidentally smashed an iron hammer that broke into small pieces, one of which entered his femoral vein and lodged in the pulmonary artery. After unsuccessful non-surgical intravenous catheterization to remove this foreign body, we removed it surgically under video-assisted thoracoscopy. The removed fragment seized 5-6 mm in diameter, rounded, and very sharp at its edge, was located in a branch of pulmonary artery (A6c) and tightly embedded in the vessel wall without damaging vessel wall.

Conclusions:

Attempting to approach a foreign body non-surgically is challenging. Objects embedded in the vessel wall are at high risk of major hemorrhage. We must always concern less invasive treatment such as intervention radiology and have intensive care unit and surgical department as backup. There needed to be great judgment of radiologist, surgeon, or other medical assistances.

Disclosure: No significant relationships.

Keywords: foreign body, fragmented medical devices, surgical removal, non-surgical removal, iron hammer

PRIMARY CHONDROSARCOMA OF THE TRACHEA WITH EXTENSIVE EXTRALUMINAL GROWTH

Oleg Pikin¹, A. Ryabov², N. Volchenko³, V. Bagrov¹, V. Sokolov⁴

¹Thoracic Surgery, Hertzen Research Institute of Oncology, Moscow, Russian Federation ²Thoracoabdominal Surgery, Hertzen Research Institute of Oncology, Moscow, Russian Federation ³Department of Pathology, Hertzen Research Institute of Oncology, Moscow, Russian Federation ⁴Department of Endoscopy, Hertzen Research Institute of Oncology, Moscow, Russian Federation

Objectives:

The primary chondrosarcoma of the trachea is an extremely rare non-epithelial neoplasm with only few cases published in the literature. We present a clinical case of primary chondrosarcoma of the trachea with extensive extraluminal growth.

Case description:

A 55 years old male was referred to our clinic with obstructive tumor of the upper-third of the trachea. Thoracic CT showed intra- (13x9x13 mm) and predominantly extraluminal heterogeneous partially calcified mass at the level of Th1-Th2 43x33x43 mm in size. The tumors obstructed 2/3 of the tracheal lumen at the Th1 level (fig.1a). Bronchoscopy revealed obstructive tumor of the upper-third of the trachea (fig.1b), EBUS-TBNA was performed and at the end of the procedure due to the severe stenosis and respiratory failure Hanarostent (NTS-14-080-050) was inserted into the trachea, which was removed on the eve of surgery. Cytologic examination of the transtracheal aspiration biopsy showed chondrosarcoma cells. After stenting patient's respiratory function improved and three days later he was operated on via partial median sternotomy. Tracheal resection (five rings) and removal of bulky extratracheal tumor component was carried out (fig.1c). Tracheal anastomosis was performed by standard technique using PDS 3/0 (running suture on the membranous part, interrupted sutures – on the anterior wall). Postoperative period was uneventful. Pathologic examination proved low-grade (G1) chondrosarcoma of the trachea (fig.1d). Patient was discharged from the clinic at the postoperative day nine. He is well and free of the disease 24 months after surgery.

Conclusions:

This report demonstrates the unusual presentation of the primary chondrosarcoma of the trachea with extensive extraluminal component and the efficacy of multidisciplinary treatment approach.

Disclosure: No significant relationships. **Keywords:** trachea, chondrosarcoma, resection



LOCALLY ADVANCED LUNG CANCER WITH INVASION INTO THE LEFT ATRIUM: RESECTION WITH CARDIOPULMONARY BYPASS

Erin A Gillaspie¹, D. Wigle², S. Said³

¹Thoracic Surgery, Vanderbilt University Medical Center, Nasville, TN, United States of America ²Thoracic Surgery, Mayo Clinic, Rochester, MN, United States of America ³Cardiovascular Surgery, Mayo Clinic, Rochester, MN, United States of America

Objectives:

Historically, advanced stages of lung cancer have been relegated to definitive chemoradiation. However, there is a subset of patients with T4 tumors who demonstrate survival benefit with surgery added to a multi-modal regimen. We present a case of lung adenocarcinoma extending into the left ventricle.

Case description:

The patient is a 64-year-old male, never-smoker who presented with a four month history of cough. Symptoms did not resolve with antibiotics prompting a CT chest which demonstrated a 9.7 by 11.9 cm mass in the right upper lobe and extending through the right superior pulmonary vein into left heart. Echocardiogram and MRI were obtained to better delineate cardiac involvement and the tumor was noted to prolapse through the mitral valve into the left ventricle (Figure 1). Urgent operation was recommended.



Surgical approach was via median sternotomy. Dissection and manipulation were limited until cardiopulmonary bypass was initiated and aortic cross clamp was applied. A biatrial transseptal approach was performed, and the left atrial incision was carried around the base of the tumor which completely occupied the right superior pulmonary vein. A bovine pericardial patch was tailed to reconstruct portion of the left atrium thus excluding the tumor from the atrial cavity with the least possible manipulation. The right atrium was then closed, and the aortic cross-

clamp was removed. We then proceeded with pneumonectomy while on cardiopulmonary bypass. The patient was weaned successfully from bypass and chest was closed in the standard fashion. Patient progressed well, and was discharged from the hospital on POD#7.

Conclusions:

T4 lung cancers comprise a heterogeneous group of malignancies with no well-defined treatment algorithms in the literature. In the rare case of lung cancer with tumor extension through a pulmonary vein into the cardiac chambers, surgery should be considered to avoid catastrophic complications related to the tumor mass.

Disclosure: No significant relationships.

Keywords: lung cancer, T4, pulmonary vein, intra-cardiac extension



PULMONARY VEIN STENOSIS REQUIRING LOBECTOMY AFTER RADIOFRE-QUENCY CATHETER ABLATION FOR ATRIAL FIBRILATION

R. Janilionis, Zymantas Jagelavicius, V. Jovaisas

General Thoracic Surgery, Vilnius Univerity Hospital Santariskiu Clinics, Vilnius, Lithuania

Objectives:

Pulmonary vein stenosis is a potential complication after radiofrequency catheter ablation for atrial fibrillation. We present an unusual case of this complication that required surgical treatment.

Case description:

A 54-year-old man presented with persistent left pleuritic chest pain, dry cough and hemoptysis. He had a medical history of atrial fibrillation which was managed by transcatheter radiofrequency ablation seven months before presentation. After the procedure patient's sinus rhythm was restored. However, chest computed tomography angiography after the procedure showed a significant narrowing of the left lower pulmonary vein (from 12 mm to 3.5 mm). Bronchoscopy found striking hyperemia and brisk bleeding to touch of the left lower lobe bronchi. The patient was treated conservatively with antibiotics and antitussives. On the presentation a computed tomography scan of the chest showed patchy consolidation and areas of atelectasis of the left lower lobe parenchyma and the absence of communication between left lower pulmonary vein and left atrium. A quantitative ventilation/perfusion scan revealed that there was no perfusion to the left lower lobe. A balloon angioplasty was performed, however unsuccessfully. The patient underwent left lower lobectomy thereafter. The lower lobe was extremely dense and firm. Numerous tiny sinuous collateral vessels were seen tracking from the left lower lobe across the fissure to the upper lobe, and around the bronchus toward the hilum. The lower pulmonary vein was completely obliterated. The patient was discharged on postoperative day six without previous symptoms. The histological evaluation revealed foci of atelectasis, areas of necrosis, and hemorrhages in the lung. The total obliteration of the lower pulmonary vein was found.

Conclusions:

This case of postablation pulmonary vein occlusion is unique, not only because of its delayed presentation, which had led to lobar infarction and thrombosis, but also because it necessitated surgical intervention.

Disclosure: No significant relationships.

Keywords: lobectomy, pulmonary vein stenosis, atrial fibrillation, transcatheter ablation, complication

A SUGGESTED SURGICAL TREATMENT FOR ATRIO-ESOPHAGEAL FISTULA

Yubin Zhou¹, F. Zeng¹, G. Che²

¹Department of Thoracic Surgery, Sichuan Academy of Medical Sciences and Sichuan Provincial People's Hospital, University of Electronic Science and Technology of China, Chengdu, China ²Department of Thoracic Surgery, West China Hospital, Sichuan University, Chengdu, China

Objectives:

Surgical repair plus omentum flap grafting is a possible surgical procedure to deal with postoperative infection of Atrio-Esophageal Fistula (AEF) patients.

Case description:

A 58-year-old man presented to the emergency department with recurrent dizziness, gatism, and numbress in the left arm. The patient's clinical condition quickly deteriorated owing to massive hematemesis and fever. Urgent contrast-enhanced computed tomography (CT) of chest showed a narrowed and irregular left common pulmonary vein and lobulated contour abnormality on the posterior left atrial (LA) (Figure 1, arrows). Cerebral CT revealed signs of patchy ischemia and infarction in the right frontal lobe. Combined with the patient's history of left atrial radiofrequency ablation 2 weeks before, the diagnosis of atrio-esophageal fistula (AEF) was made definitely. The patient underwent emergency surgery. Through a left posterolateral thoracotomy, a 1-cm laceration in the posterior wall of the LA was visible, which was repaired with a bovine pericardial patch under cardiopulmonary bypass using a femoral artery and vein. The esophageal perforation was sutured separately in two layers (the mucosal layer and the muscle layer). Furthermore, a pedicled omentum flap was placed to cover the repaired lesions of esophagus and left atrial (Figure 2, arrow). Postoperative recovery was uneventful without mediastinitis and sepsis. AEF is a rare and devastating complication of left atrial ablation. Surgical closure of the fistula was the only expedient therapy, but a large part of patients still died of postoperative infection. Surgical repair plus omentum flap grafting, which we performed in the case, was confirmed as a suggested surgical procedure to deal with postoperative infection of AEF patients and to improve the surgical success.

Conclusions:

Surgical repair plus omentum flap grafting can be proposed as an appropriate surgical procedure to deal with postoperative infection of AEF patients.

Disclosure: No significant relationships.

Keywords: computed tomography (CT), atrio-esophageal fistula (AEF), left atrial (LA)





PREOPERATIVE LOCATION AND RESECTION OF SMALL LUNG NODULES LOCATED BY RADIOTRACER VERSUS HOOKWIRE.

<u>Irene Bello</u>¹, A. Jauregui¹, M. Salcedo², E. Pallisa³, L. Romero¹, I. Navales², D. Varona³, M. Deu¹, M. Simó², L. Sánchez¹, F. Ascanio¹, J. Solé¹

¹Thoracic Surgery, Vall d'Hebron Universitary Hospital, Barcelona, Spain ²Nuclear Medicine, Vall d'Hebron Universitary Hospital, Barcelona, Spain ³Radiology, Vall d'Hebron Universitary Hospital, Barcelona, Spain

Objectives:

The aim of this study was to compare the preoperative location and resection of small lung nodules located by radiotracer vs. hookwire.

Methods:

We reviewed patients with subsolid nodules or smaller than 1cm, deeper than 1cm below the visceral pleura, or both, resected by VATS or thoracotomy. Preoperative Computed tomography (CT) location was performed. From 01/07/13 to 01/07/15 nodules were located with hookwire and from 01/07/15 to 30/11/16 the nodules were located with the injection of 0.2mL 99mTc-labelled macroaggregate human albumin (99mTc-MAA). During surgery, in group located with 99mTc-MAA a handheld gamma probe was used to detect the hot spot where the radioactive tracer was located and the area was resected.

Results:

During the study period, 45 patients (28 men; median age 63.6 years) needed preoperative location. Hookwire was undertaken in 20 patients (14 men; 63.8 years) and 99mTc-MAA was undertaken in 25 (15 men; median age 63.4 years). No differences were observed in the characteristics of the patients and the nodules, type of surgery, surgical time nor complications and pathology outcomes between both techniques (Table 1). No patient with pneumothorax or pulmonary haemorrhage needed pleural drainage before surgery. We observed a greater surgical margin in the pathology analysis in nodules located with 99mTc-MAA (2.37mm Vs. 6.23 mm,p=0.004). TABLE 1

		MMATC99	HOOKWI- RE	p
Nodule	Distance below the visceral pleura (mm)	41.9	15.944	0.067
	Size in CT (mm)	8.891	12.631	0.058
	Subsolid morphology (%)	48	30	0.221
Surgery	Surgical time (min)	130	132.65	0.897
	Lobectomy (%)	40	20	0.825
	VATS (%)	88	65	0.065
Outcomes	Nodule's size in pathology (mm)	9.708	10.116	0.8025
	Surgical margin (mm)	6.23	2.375	0.004
	Wedge resection (mm ³)	94.493	73.927	0.443
	Histology(%): Primary lung adenocarcinoma Colon adenocarcinoma Other Cystic adenomatoid hyperplasia Scar Nodule no find Inflammatory	35.6 15.6 2.2 - - 2.2	24.4 6.7 2.2 4.4 4.4 2.2 -	0.233
	Location's complication (%):	12	25	0.257
	Pulmonary haemorrhage(%)	52.39	63.16	0.491
	· Pneumothorax (%)	42.86	15.79	0.062
	Median hospital length of stay (days)	4.28	4.40	0.909

Conclusion:

Radiotracer location of small lung nodules is a simple and feasible procedure with similar outcomes than hookwire localization. Radiotracer location with 99mTc-MAA allows greater surgical margin than hookwire location.

Disclosure: No significant relationships.

Keywords: 99mTc-MAA, radiotracer, small lung nodule, hookwire



HIGH-VOLUME INTENSIVE TRAINING COURSE: A NEW PARADIGM FOR VIDEO-ASSISTED THORACOSCOPIC SURGERY EDUCATION

<u>Alan Sihoe</u>, T. Young, Y. Zhu, L. Jiang, D. Zhou, G. Jiang, D. Gonzalez Rivas Department of Thoracic Surgery, Tongji University Shanghai Pulmonary Hospital, Shanghai, China

Objectives:

To investigate the effectiveness of a novel course teaching video-assisted thoracoscopic surgery (VATS) through intensive operation observations at an ultra-high-volume center.

Methods:

Courses in Uniportal VATS at a specialist unit performing >8000 major lung resections annually (40-50 daily on average) were attended by over 230 surgeons from around the world for two weeks each from 2013-2016. An online survey preserving responder anonymity was completed by 156 attendees (67.8%).

Results:

Attendees included 37% from Western Europe, 18% from Eastern Europe, and 17% from Latin America. Open thoracic surgery experience for over five years was reported by 67%, but 79% had fewer than five years of VATS experience. During the course, 70% observed over 30 Uniportal VATS operations (including 38% observing over 50), and 69% attended an animal wetlab. Hands-on application in the wetlab of what was observed during the course was appreciated by 84% of those attending. Although 72% of responders attended the course less than 12 months ago, there was a strong trend for greater proportions of lobectomies being done by VATS after the course; and for those performing VATS lobectomy, significantly more used fewer ports, took less time to complete the operation, and had lower rates of conversion (see Table). Prior to the course, 51% reported problems with tissue retraction during VATS, 51% with instrumentation, 54% with stapler application, and 43% with assistant coordination – but after the course, the percentages reporting improvement in these categories were 56%, 57%, 58%, and 53% respectively. Of those who had attended other VATS courses before, 87% preferred this high-volume course and none preferred the other(s). After the course, 26% of responders received promotions in their careers, and 98% would recommend the course to colleagues.

	Before Course (% of responders)	After Course (% of responders)	P value
Approximately how many lobectomies are performed by you personally every year?	62.3 30.8 4.8 2.1 0.0 0.0	61.0 33.8 4.4 0.7 0.0 0.0	0.441
Approximately what percentage of the lobectomies performed by you personally are done by VATS? • 0% • 0-10% • 10-25% • 25-50% • 50-75% • 75-90% • >90%	18.5 13.0 10.3 13.0 17.8 15.1 12.3	10.9 8.0 10.2 11.7 22.6 21.9 14.6	0.063
When performing VATS lobectomy, how many ports do you most commonly use? 1 port 2 ports 3 ports 4 ports >4 ports	9.9 33.1 51.2 5.8 0.0	61.0 26.8 10.6 1.6 0.0	<0.001
Approximately what is the average time you require to complete a VATS lobectomy (skin-to-skin)?	4.3 20.7 46.6 25.0 3.4	6.6 43.0 38.0 11.6 0.8	<0.001
Approximately what percentage of your VATS lobectomy operations require conversion to open thoracotomy? <2% 2-5% 5-10% 10-25% >25% 	19.0 24.1 23.3 23.3 10.3	28.9 33.1 28.1 7.4 2.5	<0.001

Table: Comparison of VATS Lobectomy practice Before and After attending the Course

Conclusion:

High-volume operation observation represents an effective modality for surgeons to demonstrably improve VATS proficiency in a short period of time.

Disclosure: A. Sihoe: Medela AG (Baar, Switzerland) - pending research supplies support; previous travel assistance

Keywords: thoracoscopic surgery, training, education, VATS, lobectomy



RECENT OUTCOMES OF SURGICAL RESECTION FOLLOWED BY POSTOPERA-TIVE ADJUVANT THERAPY FOR NON-SMALL CELL LUNG CANCER WITH N2 DISEASE

Jin San Bok, S.H. Choi Cardiovascular and Thoracic Department, Asan Medical Center, Seoul, Republic of Korea

Objectives:

Pathologic N2 (pN2) Non-Small Cell Lung Cancer (NSCLC) have shown poor prognosis, about 30% at 5 years. However recent advance in diagnostic tools, minimal invasive surgery, chemotherapy, and radiotherapy may improve the prognosis of pN2 disease. In this study, we evaluate the outcome of surgical resection followed by postoperative adjuvant therapy for NSCLC with pN2 disease.

Methods:

The patients with pN2 disease underwent surgical resection followed by adjuvant treatment at single institute. A retrospective medical record review was performed. Risk factor of OS and RFS was determined with multivariate Cox regression model.

Results:

From 2004 to 2014, total 680 patients underwent surgical resection for NSCLC with pN2. Among them, 155 patients (22.8%) received adjuvant chemotherapy, 125 patients (18.4%) received adjuvant radiotherapy and 295 patients (43.4%) received adjuvant chemoradiotherapy. The mean age was 60.9 ± 10 years and 446 patients were men (65.6%). Lobectomy was performed in 537 patients (79%), bilobectomy in 56 (8.2%), pneumonectomy in 51 (7.5%). Complete resection was accomplished in 607 patients (89.3%). Extranodal invasion was found in 247 patients (36.3%). Local recurrence occurred in 63 patients (9.3%), distant recurrence in 255 (37.5%). With a mean follow-up of 35 ± 30.1 months, median overall survival (OS) and recurrence free survival (RFS) were 65 ± 5.1 months and 23.3 ± 2.1 months, respectively. 5-year OS rate and RFS rate were 51.8% and 34.5%, respectively. Older age, male, low DLCO, incomplete resection, more number of metastatic LN, no postoperative adjuvant therapy were associated with worse OS. Incomplete resection, more number of metastatic LN, extranodal invasion, non-squamous cell carcinoma, no postoperative adjuvant therapy were associated with poorer RFS.

Conclusion:

In this study, surgical resection followed by postoperative adjuvant therapy showed better outcomes than previously reported. Complete surgical resection and postoperative adjuvant therapy may be important for prognosis.

Disclosure: No significant relationships.

Keywords: non-small cell lung cancer, N2, postoperative adjuvant therapy

BRONCHIAL STUMP COVERAGE WITH FREE PERICARDIAL FAT PAD UNDER THORACOSCOPIC SURGERY: EVALUATION OF RESIDUAL VOLUME ON SIX MONTHS AFTER SURGERY

Takuya Nagashima, H. Ito, M. Nito, A. Wada, M. Hashimoto, J. Osawa, J. Samejima, H. Nakayama

Thoracic Surgery, Kanagawa Cancer Center, Yokohama, Japan

Objectives:

Bronchopleural fistula remains a rare but serious complication after anatomic lung resection. To prevent this complication, several biological materials have been used. Although it is difficult to use some materials under thoracoscopic surgery, free pericardial fat is relatively easy to handle. Bronchial fistula usually occurred within one or two months after surgery. Therefore we evaluated the status of pericardial fat pad at 6 months after surgery using the volume analyser.

Methods:

The bronchial stump of 10 consecutive patients with lung cancer who underwent right lower lobectomy and mediastinal lymph node dissection in thoracoscopic surgery between May 2015 and April 2016 was covered with free pericardial fat pad. Bronchial closure was performed with commercial mechanical staplers in all patients. When free pericardial fat pad was resected, it was put under saline in syringe, and the increased volume was measured. After that, it was sewn with only one stich around the bronchial stump and reinforced with fibrin glue. It took only about five minutes to resect, saw and reinforce it. On six months after surgery Computed tomography was performed, and the residual volume of the fat was analyzed with the volume analyzer SYNAPSE VINCENT by Fujifilm. Then, the residual ratio (residual fat volume/resected fat volume) was calculated. We investigated clinical results.

Results:

The mean volume of resected fat was 8.4ml(3.5-12ml). There was no complication during preparation of free pericardial fat pad. In all cases, the residual fat was identified on computed tomography. The mean volume of residual fat was 4.0ml (0.4 - 7.0ml) and the mean residual ratio was 46.1% (13.3-60.6%). There was no postoperative complication including bronchopleural fistula.

Conclusion:

At six months after surgery, free pericardial fat pad remained demonstrably. Moreover it is easy and safety to handle under thoracoscopic surgery, so it can be a useful method to prevent bronchopleural fistula.

Disclosure: No significant relationships.

Keywords: bronchial fistula, pericardial fat pad, lLung cancer surgery



TRACHEAL RESECTION WITH CICATRICIAL STENOSIS AND TRACHEOS-TOMY

<u>Vladimir Parshin</u>, O. Mirzoyan, Z. Berikkhanov, A. Parshin Surgery, FMSMU, Moscow, Russian Federation

Objectives:

To improve the results of radical treatment of patients with cicatricial stenosis of trachea and tracheostomy.

Methods:

From 1963 to 2015 were operated 1128 patients, which were divided into two consecutive groups: the first - from 1963 to 2000 years (297 patients), the second - from 2001 to 2015 years (831 patients). In 1025 (90.9%) patients the cicatricial stenosis of trachea occurred after mechanical ventilation. The cicatricial stenosis of trachea after tracheostomy occurred 2.7 times more frequently than after intubation. In the first group out of 297 patients 139 had a tracheostomy (46.8%), in the second – out of 831 patients 430 (51.7%) had tracheostomy. In the first group tracheal resection was made only in 59 patients (with tracheostomy - 8 (13.6%), in the second - in 330 (with tracheostomy - 110 (33.3%). Among seven patients after two-level tracheal resection two had a tracheostomy. After 330 operations two patients died – each one in group with and without tracheostomy. The mortality rate was 0.6%.

Results:

The frequency of complications with tracheostomy is two times higher than without it -22(20%) and 26(11.8%), respectively. The most frequent complications with tracheostomy and without it are: anastomositis seven (6,4%) and 14(6,4%), restenosis five (4,5%) and one (0,5%), dehiscence anastomosis two (1,8%) and two (0,9%), respectively. Other complications are bronchitis (two), bleeding from the soft tissue of the neck (two), pneumonia (one), sternomediastenitis (one), throat edema (one). The absolute number of complications and mortality remain minimal. Good long-term results were achieved in 89.8% after tracheal resection. Unsatisfactory results such as retention of tracheostomy or tracheal prosthesis is a result of complications in the hospital period.

Conclusion:

Tracheostomy is an unfavorable factor for tracheal resection. The number of complications in patients with tracheostomy is two times higher than in patients without it. Reducing the frequency of postoperative complications improves long-term results.

Disclosure: No significant relationships.

Keywords: cicatricial, tracheal resection, stenosis, tracheostomy

INTRAOPERATIVE ELECTROMAGNETIC NAVIGATION BRONCHOSCOPY FOR THORACOSCOPIC RESECTION OF LUNG TUMOR

Ke-Cheng Chen

Surgery, National Taiwan University Hospital, Taipei, Taiwan

Objectives:

As a result of increased use of low dose CT, more patients with pulmonary nodules, many with subcentimeter lesions, are being referred to thoracic surgeons, some with concern for primary lung tumor and others with possible metastatic lung lesions. Obtaining a definitive diagnosis of these lesions is difficult. Electromagnetic navigational bronchoscopy (ENB)-guided pleural dye marking followed by VATS is a novel alternative technique for definitive diagnosis. The main objective of this study was to evaluate the feasibility and our initial experience with intra-operative ENB and minimally invasive surgery for diagnosis of lung lesions.

Methods:

Between February 2016 and January 2017, we retrospectively reviewed the clinical characteristics, ENB design, operative methods, and treatment outcomes of 17 patients with lung tumor(s).

Results:

The mean patient age was 63.8 ± 8.2 years. There are 4 women and 13 men in this study. The ENB-guided biopsy yield rate was 23.5%. The successful rate of dye marking was 88.2%. There are three patients undergoing ENB tumor ablation via PDT (photodynamic therapy). There is no procedure-related mortality. 14 patients with lung lesions were successfully operated, either by conventional or uniportal VATS, while three patients were ablated with PDT smoothly.

Conclusion:

Electromagnetic navigation bronchoscopy (ENB) plays a central role in the treatment of lung cancer, either primary or metastatic. Biopsy yield rate is low, while intra-operative ocalizing and marking small pulmonary nodules is effective and safe before minimally invasive resection. Last but not least, direct tumor ablation via PDT showed promising result in our initial experience. In summary, thoracic surgeons should further investigate this method and incorporate it into their armamentarium.

Disclosure: No significant relationships.

Keywords: lung cancer, electromagnetic navigation bronchoscopy, VATS, dye marking


UNIPORTAL VIDEO-ASSISTED THORACIC SURGERY (VATS) LOBECTOMY COMBINED WITH POSTERIOR MIDLINE APPROACH FOR SUPERIOR SULCUS TUMORS INVADING THE SPINE

A. Bussières, <u>Arthur Vieira</u>, D. Kinnear, P. Ugalde Figueroa *Thoracic Surgery, Institut Universitaire de Cardiologie et de Pneumologie de Québec (IUCPQ), Quebec City, QC, Canada*

Objectives:

Expertise in VATS oncological procedures is on the rise since it has become associated with diminished perioperative pain and morbidity. Locally advanced lung cancers, such as Pancoast tumors with spine invasion, can present a technical challenge. We believe that even for such advanced cancers, combining posterior spine resection with VATS lobectomy can decrease perioperative morbidity but still maintain the same oncological resection quality as compared to that of open surgery.

Case description:

The following is a report of two cases of right sided superior sulcus tumor with vertebral invasion. Both patients received induction chemoradiation and surgical resection according to the SWOG 9416 protocol. Superior lobectomy was then performed by uniportal VATS, including mediastinal node dissection and extra-pleural delimitation around the tumor, in order to obtain macroscopically clear margins for the spine and chest wall resection borders. The bronchial stump was buttressed with mediastinal fat and pleural flaps. The patient was then placed in the ventral position and partial corpectomy with chest wall resection and spine stabilization was performed through a posterior midline incision. The en-bloc surgical specimen was then removed via this posterior approach. Both patients had a complete resection (R0). The first patient developed a broncho-pleural fistula and spine fixation material displacement requiring surgical intervention on post-operative day 17. At the one year follow-up, the patient remained disease free and continued to have good functional status. The second patient was discharged on post-operative day eight and was treated for atrial flutter on post-operative day 20.

Conclusions:

Pancoast tumors invading the spine require aggressive yet morbid surgery in order to obtain a margin free en-bloc resection. VATS lobectomy combined with posterior spine resection and stabilization is safe and can diminish the early surgical morbidity without compromising the quality of the resection.

Disclosure: No significant relationships.

Keywords: superior sulcus tumor, vertebral invasion, chest wall, VATS Lobectomy, uniportal, pancoast syndrome

MULTIMODALITY TREATMENT INCLUDING EXTRAPLEURAL PNEUMONEC-TOMY FOR MALIGNANT PLEURAL MESOTHELIOMA – IS IT STILL JUSTIFIED?

<u>Thomas Klikovits</u>, Y. Dong, J. Matilla, S. Taghavi, G. Lang, W. Klepetko, M.A. Hoda *Division of Thoracic Surgery, Medical University of Vienna, Vienna, Austria*

Objectives:

To date, there is no worldwide consensus on the sequence of surgery, radiotherapy and systemic treatment within curative intent therapy protocols for malignant pleural mesothelioma (MPM). Moreover, the role of surgery, especially of extrapleural pneumonectomy (EPP), has become a subject of debate after the Mesothelioma and Radical Surgery (MARS) I trial. However, other recent trials including EPP, such as the SMART protocol, have reported encouraging survival for selected patients. Thus, we aimed to study the short- and long-term outcome of EPP for MPM in the view of different multimodality approaches to identify favourable prognostic subgroups.

Methods:

A retrospective analysis of a prospective institutional database consisting of 111 consecutive patients undergoing EPP for MPM between 1994 and 2016 was conducted

Results:

Eighty two males and 29 females with a mean age of 64 ± 11.9 years were included. 41 patients underwent trimodality treatment (TMT) with neoadjuvant chemotherapy, EPP and adjuvant radiotherapy, 48 patients EPP within other (than TMT) multimodality protocols and 22 patients EPP alone (before 2005). Main histological subtype was epithelioid (n=83; 75%). Postoperative grade 2+ complications occurred in 41%. Total 30-day mortality was 7.2% (n=8) and 3.9% (3/76) after 2005. Median progression free survival (PFS) was 17.8 months. Median overall survival was 23 months and 3- and 5-year survival rates were 36% and 29%, respectively. 5-year survival was significantly better in patients with EPP within TMT (48%) compared to patients with EPP within other multimodality protocols (21%; p=0.047) and EPP alone (16%, p=0.01). Patients with epithelioid subtype and stage I/II undergoing TMT (n=12) had 78% 5-year survival. In a multivariate cox regression model, type of treatment modality (EPP within TMT vs. other), histological subtype and gender significantly influenced survival.

Conclusion:

EPP within a trimodality protocol is a still valuable treatment option, especially for selected patients in early stages and epithelioid subtype.

Disclosure: No significant relationships.

Keywords: malignant pleural mesothelioma, extrapleural pneumonectomy, multimodality treatment



A FATE OF AN "ISOLATED SEGMENT" FOLLOWING LEFT UPPER SUPERIOR SEGMENTECTOMY

Yutaro Koike

Department of General Thoracic Surgery, Juntendo University Hospital, Tokyo, Japan

Objectives:

Segmentectomy is becoming more popular due to the opportunity to detect small-sized lung lesions. Left upper superior segmentectomy (LUSS) is well-known to be a simple and easy segmentectomy for thoracic surgeons. However little is known on specific postoperative complication following LUSS. We present necrosis of "isolated segment" after LUSS and want to make thoracic surgeons pay attention to this particular complication.

Methods:

Among 2060 resected cases in our institute, 129 (6.2%) underwent LUSS from Feburary 2009 to March 2016. Postoperative chest-x ray and/or thoracic computed tomographic scans were retrospectively assessed for all in order to evaluate the postsurgical pulmonary complications following LUSS. Postoperative pulmonary complications were categorized into four groups as follow: A, atelectasis of lingular segment; B, pulmonary torsion of linglar; C, necrosis of "isolated segment" following LUSS; D, hematoma along stapling lines. We investigated the characteristics of each complication and the outcomes.

Results:

LUSS were comprised of 67 (52%) male with an average age of 63 years. Among them, 103 (79.8%) patients were primary lung cancer, 14 (10.8%) were metastatic lung tumors, and 12 (9.3%) were benign lung tumors. Postsurgical lung complications following LUSS were found in 17 (13.1%) patients. The detailed number was as follow, A; 7 (5.4%), B; 1 (1.3%), C; 4 (3.1%), D; 5(3.5%). Among them, 2 (2.9%) cases required surgical intervention due to the lung torsion (B group) and necrosis of remaining segment (C group). Atelectasis of the lingular segment was most common complication after the LUSS. However, all of them were successfully observed by chest CT without any surgical interventions, and all of the atelectasis was recovered in approximately three months after surgical resection.

Conclusion:

We clarified the peculiar lung complications after the LUSS. We have to greatly recognize the cautious complications like lung torsion or necrosis of the residual segment after the LUSS. In contrast, the atelectasis of lingular segment was often observed as a common complication after the LUSS, which could be successfully managed by the periodical observation.

Disclosure: No significant relationships.

Keywords: LUSS, lung cancer, isolated segment

UNIPORTAL VIDEO-ASSISTED THORACOSCOPIC SURGERY WITHOUT ONE-LUNG VENTILATION FOR SYMPATHECTOMY FOR PALMAR HYPERHIDROSIS

Min Zhang

Department of Cardiothoracic Surgery, The First Affiliated Hospital of Chongqing Medical University, Chongqing, China

Objectives:

Sympathectomy for palmar hyperhidrosis is normally performed using bilateral multiportal video-assisted thoracoscopic surgery (VATS) and sequential one-lung ventilation (OLV). We assess a new approach with bilateral Uniportal VATS and without OLV.

Methods:

From April 2014 to May 2015, 40 consecutive adult patients underwent VATS T4 sympathectomy for palmar hyperhidrosis. They were randomized to receive either bilateral Uniportal VATS with tracheal intubation only and no OLV (group A, n=20), or conventional multi-port VATS with sequential OLV (group B, n=20).

Results:

All patients experienced immediate cessation of palmar hyperhidrosis without recurrence postoperatively. There was no conversion to open surgery, operative mortality, or major complication in all patients. The mean operative time was significantly shorter in group A than in group B (39.5±10.0 minutes versus 59.7±10.6 minutes respectively, p = 0.02). The mean lengths of post-operative hospital stay in group A and group B were 19.2±2.0 hours and 20.7±1.6 hours respectively (P = 0.12). When assessed at 3 hours after the operation, complete absence of pain was noted in 15 (75%) of patients in group A and 11 (55%) in group B (p=0.18). However, only 1 patient (5%) in group A requested any analgesia during the in-patient stay compared to 6 (30%) in group B (p=0.04). Only one patient in each group (5%) experienced a minor complication: a small unilateral pneumothorax in both cases resolving on conservative management without chest tube insertion. This study was not designed to look for sequelae after hyperhidrosis surgery (such as compensatory hyperhidrosis), but no patient in either group experienced Horner's syndrome.

Conclusion:

Uniportal VATS with tracheal intubation and no OLV offers equivalent safety, therapeutic efficacy and post-operative lengths of stay as conventional VATS with OLV for hyperhidrosis surgery. However, the new approach may reduce operative times and post-operative analgesic requirements.

Disclosure: No significant relationships.

Keywords: sympathectomy, one-lung ventilation, uniportal, VATS



SURGERY FOR PULMONARY HYDATIDOSIS IN TURKEY IN 2014: A NATION-WIDE STUDY. TURKISH THORACIC SOCIETY, PULMONARY HYDATIDE DISEASE STUDY GROUP

E. Gulhan¹, A. Kilicgun², O. Samancilar³, T. Altınok⁴, <u>Ali C. Kutluk⁵</u>, V. Baysungur⁶, M.R. Celik⁷, H. Akin⁸, U. Yigit⁹

¹Thoracic Surgery, Ankara Ataturk Thoracic Disease and Thoracic Surgery Teaching and Research Hospital, Ankara, Turkey

²Thoracic Surgery, Abant Izzet Baysal University Medical Faculty, Bolu, Turkey

³Thoracic Surgery, Dr.Suat Seren Chest Hospital, Izmir, Turkey

⁴Thoracic Surgery, Necmettin Erbakan University meram Medical faculty, Konya, Turkey

⁵Thoracic Surgery, Yedikule Chest Surgery Center, İstanbul, Turkey

⁶Thoracic Surgery, Sureyyapasa Thoracic Diseases and Surgery Training and Research Hospital, Istanbul, Turkey

⁷Thoracic Surgery, Inonu University medical Faculty, Malatya, Turkey

⁸Thoracic Surgery, Yedikule Chest Disease and Thoracic Surgery Training Hospital, Istanbul, Turkey

⁹Bolu Health Occupation High School, Abant Izzet Baysal University Medical Faculty, Bolu, Turkey

Objectives:

Turkey is still among countries in which hytadid disease is endemic. In this study, it was aimed to figure out the number of operations performed for the treatment of pulmonary hydatid disease in Turkey during 2014, and display the distribution of these operations according to the different regions of the country.

Methods:

The thoracic surgeons in every city are contacted by telephone. A data set is send by email. The age, sex, contact with animals that might be a risk of gaining the hydatid disease, side of the disease, type of surgical method, other organ involvement are recorded and collected from each data set to form the final data, and the results are evaluated. Turkey has 81 cities that are gouped in seven different regions. The number of operations are calculated for each city and region to display the distribuiton.

Results:

Seventy-eight centres from 81 cities joined the study. A total of 715 pulmonary hydatid cysts operations were performed for 690 patients during the study period. The most common operation technique was cystotomy and cappitonage through thoracotomy (76%). The highest incidence rate of operated patients were in Eastern Anatolian Region (2.15 patients per 100 000 person-years).

Conclusion:

Pulmonary hydatid disease still has a high incidence rate especially in southeast and east of Turkey which are more rural areas, and where stockbreeding is very common. Cystotomy and capitonnage is still the most common surgical method used to treat the pulmonary hydatid cysts. Preventive methods should be performed strictly in these cities and regions to decrease the risk of infection.

Disclosure: No significant relationships. **Keywords:** pulmonary, hydatid disese, Turkey, nationwide





INTRA OPERATIVE PARAVERTEBRAL ANELGESIA PROTOCOL FOR POST THORACOTOMY PAIN CONTROL

Mohamad Alamassi

Thoracic Surgery, King Faisal Specialest Hospital, Riyadh, Saudi Arabia

Objectives:

Post thoracotomy pain control is usually achieved by thoracic epidural analgesia (TEA), which is effective, but has its limitations and contraindications, with significant failure rate. Other modalities to control the pain include; paravertebral analgesia (PVA) and morphine patient control analgesia (PCA). We aimed in our study to assess the efficacy of post thoracotomy pain control modalities including: TEA, PVA, and PCA. and to compare the complication and side effect of each modality.

Methods:

One hundred and seventy nine cases undergoing thoracotomy in our institute during the period from January 2012 to July 2015 were reviewed; data were collected retrospectively for prospectively planed study. The TEA was performed by anesthetist, and continuous infusion of mixed bupivacaine 0. 5% with morphine was administered, while the PVA catheter was placed by the surgeon intraoperativly, either in the extra plueral or sub endothoracic facial space, in case if pluerectomy, and continuous infusion of bupivacaine 0.25% alone was administered post-operative. Morphine intravenous bolus was used for PCA. Primary endpoint was Pain control during first 72 hours post-operative period using visual analog scale (VAS) "1 to 10". Secondary end points were the side effects and the complications of each modality

Results:

Sixteen cases were excluded due to ICU admission and keeping them ventilated or due to unclear documentation. From the 163 included cases: TEA was used in 69 patients (40%), PVA in 70 patients (40%), PCA in 24 patients (19%). Mean VAS during first 72 hours aws (for PVA group 0.9, TEA group 1.5, and for PCA group 1.2 out of 10) "p=0.026". Also PVA was significantly associated with fewer side effects than the other modalities (in terms of hypotension p=0.0002, tachycardia p=0.029, nausea/vomiting p=0.0006, and respiratory complications p=0.0469)

Conclusion:

Our data showed superiority of PVA in providing effective post thoracotomy pain control, with less side effects and complications, when compared with TEA & PCA. Intra operative insertion of the catheter by the surgeon adds more to its accuracy and efficacy, even in the cases of parietal pluerectomy and decortications.

Disclosure: No significant relationships.

Keywords: post thoracotomy pain controle, intraoperative insertion of paravertebral catheter, paravertebral analgesia

VIDEO-ASSISTED THORACOSCOPIC SURGERY: THE TREATMENT OF CHOICE IN OCTOGENARIANS WITH NON-SMALL CELL LUNG CANCER

D. Detillon, <u>Eelco Veen</u> Surgery, Amphia Hospital, Breda, Netherlands

Objectives:

Lung cancer is the main cause of cancer-related death in the Netherlands. Surgery provides the best chance to cure non-small cell lung cancer, but lower rates of surgery are recorded in octogenarians because of concerns regarding morbidity and mortality.

Methods:

We analysed the Dutch Lung Surgery Audit database to determine the postoperative outcome of lung cancer resections in patients over 60 years old between January 2013 and December 2014. Three groups were compared: patients aged \geq 80, patients aged 70-79 years, and patients aged 60-69. Multivariable analysis was done of postoperative complications and of operative mortality; the role of video-assisted thoracoscopic surgery (VATS) was also examined.

Results:

In all, 2,372 lung cancer resections were performed, of which 55.2% by VATS. Postoperative complications were observed in 715 patients (30.1%), of which 58 (32.4%) in octogenarians (p=0.387). Factors associated with complications were: gender; percentage predicted forced expiratory volume in 1 second (FEV1%); percentage predicted diffusing capacity of carbon monoxide; American Society of Anaesthesiologists score; chronic obstructive pulmonary disease; and resection more extensive than limited. The mean operative mortality was 2.4% (56 patients), 5.6% (10 patients) in octogenarians (p=0.004). Age \geq 80 years, FEV1%, performance status, and congestive heart failure independently predicted operative mortality. VATS resulted in fewer postoperative complications and lower operative mortality.

Conclusion:

A slightly but significantly higher operative mortality rate was observed in octogenarians, but the incidence of postoperative complications was the same as in younger patients. Surgery should therefore also be applied in octogenarians, with VATS as the preferred approach.

Disclosure: No significant relationships.

Keywords: lung cancer, octogenarians, operative mortality, postoperative complications, video-assisted thoracoscopic surgery



THE FUNDAMENTAL STUDY OF SELF-ASSEMBLY MATRIGEL (PURASTATTM) FOR THE PREVENTION OF PULMONARY VESSEL BLEEDING

Kyoji Hirai¹, S. Takeuchi¹, J. Usuda²

¹Nippon Medical School Chiba Hokusoh Hospital, Nippon Medical School Chiba Hokusoh Hospital, Chiba, Inzai, Japan ²Nippon Medical School Hospital, Nippon Medical School Hospital, Tokyo, Japan

Objectives:

The biological fibrin glue has been used at the vessels on the purpose of the hemostasis in thoracic surgery. The objective of our study is to elucidate whether a new non-biological, self-assembly matrigel, which is peptide hydrogel and compsed of amino acid (1-0.1% w/v) and water (99-99.9% w/v) prevents pulmonary vessels bleeding. This matigel has some benefits that are no risk of infection, removable, biodegradable (eliminated whitin 30 days), easy to use-prefilled syringe and transparent. This agent has already been used as the hemstat in cardiovascular surgery in a part of Eupoean countries

Methods:

Under general anesthesia using ketamine HCL and isoflurane, mini-thoracotomy was done at right seventh intercostal level using Gettingen miniature (20-25Kg). Lower pulmonary artery (PA) (n=5) and pulmonary vein (PV) (n=5) were identified. After taping them, commercial needles of 16 gauge were impaled in PA and PV. The matigel was applied at the impaled sites, respectively. The impaled sites were extirpated for pathological examination. Moreover, after the hemostasis of PA bleeding Gettigen miniatures were awakened from anesthesia. On the purpose of the evaluation of re-bleeding, Chest radiography was performed on postoperative day 7 and 14 (n=5).

Results:

A total of 15 injured pulmonary vessels were evaluated. The matrigel completely prevented PA and PV bleeding in all cases. Histologically, the existence of matrigel at the needle hole could be observed. In all cases no re-bleeding could be found on chest radiography during postoperative course (n=5). The average amount use of matrigel was 3.5 ± 0.4 ml in treatment of PA bleeding (n=10) and was 3.2 ± 0.6 ml in that of PV bleeding (n=5).

Conclusion:

According to our results of this study, this matrigel contributed to the hemostasis of pulmonary vessels bleeding. This product may be a new promising hemostat in place of the existing biological fibrin glue in thoracic surgery

Disclosure: No significant relationships.

Keywords: peptide hydrogel, thoracic surgery, self-assembly matrigel, pulmonary vessel bleeding, hemostat, non-biological

LEARNING CURVE FOR ROBOTIC LOBECTOMY – EXPERIENCE OF A HIGH VOLUME THORACIC CENTER

Danjouma Cheufou Housmanou¹, I. Kyritsis¹, A. Topac¹, A. Slama¹, D.A. Gafencu¹, H. Mardanzai¹, T. Plönes¹, S. Kampe¹, C. Aigner¹ ¹Thoracic Surgery, Ruhrlandklinik, University Medical Center Essen, Essen, Germany

²Anaesthesiology, Ruhrlandklinik, University Medical Center Essen, Essen, Germany

Objectives:

In most hospitals the use of the robotic systems is shared between several departments. Only few thoracic surgery departments have an exclusive access to a robot allowing a liberal application of the robotic approach for several indications and a short learning curve. We summarize our experience with robotic lobectomy in this setting.

Methods:

We analysed our prospective robotic database including all consecutive patients operated from January 2014 to December 2016 and evaluated our learning curve in robotic lobectomies. The learning curve was defined as the first 20 cases.

Results:

During the observation period 115 patients were operated with the robot in our department, 59 of these were lobectomies. Indications, preoperative lung function, comorbidities and median patient age was comparable during the learning curve and thereafter. Mean operative time could be significantly reduced after the learning curve (286+87 vs. 214+60 minutes, p<0,01). The rate of conversions dropped from 4/20 (20%) during the learning curve to 2/39 (5,1%) thereafter. Conversions had to be performed due to bleeding (n=2), technical reasons (n=3) and oncological reasons (n=1). Chest tube duration could be significantly reduced from 7,7+13,8 to 3,9+2,6 days as well as hospital stay from 12,9+15,5 to 7,4+3,2 days. Histology was Non-Small Cell Lung Cancer (NSCLC) in 57 patients and bronchiectasis in 2 patients. No blood transfusions were required, even in the two cases with bleeding conversion. R0 resection was accomplished in all cases. 90 day mortality was 0%.

Conclusion:

In a high volume thoracic center there is a short learning curve for robotic lobectomies. The procedure can be performed with excellent perioperative outcome.

Disclosure: No significant relationships.

Keywords: robotic surgery, learning curve, early stage NSCLC



SLEEVE LOBECTOMY IN PATIENTS WITH N1 NODAL INVOLVEMENT NON-SMALL CELL LUNG CANCER WAS EQUIVALENT TO PNEUMONECTOMY IN PROGNOSIS AND LOCAL CONTROL

Takeshi Matsunaga, K. Suzuki, K. Takamochi, S. Oh General Thoracic Surgery, Juntendo University School of Medicine, Tokyo, Japan

Objectives:

It has been reported that sleeve lobectomy was superior to pneumonectomy with regard to postoperative mortality and prognosis mainly for N0 Non-Small Cell Lung Cancer (NSCLC). However, whether sleeve lobectomy does compromise survival in patients with N1 NSCLC remains controversial.

Methods:

A retrospective study was conducted on 308 patients with pN1 NSCLC, which was resected between 1996 and 2015. Among them, sleeve lobectomy was performed in 49 (SL group) and pneumonectomy was did in 26 (PN group). Comparing two groups, we investigate clinico-pathological features as follows: gender, age, smoking status, tumor marker, tumor location, clinical N factor, pathological T factor and histology. Cumulative survival was estimated with a Kaplan-Meier model. The comparison of survival was made with the log-rank test. In multivariate analysis, Cox's proportional hazard model was conducted for identifying prognostic factors. Furthermore, we investigated the incidence of recurrence between two groups.

Results:

Median follow-up time was 55.7 months. The differences in 3- and 5-year overall survival between SL group and PN group was not significant (66.5%/54.1% vs. 57.9%/52.6%, p-value=0.701). And in multivariate analysis, surgical procedure (SL vs PN) was not prognostic factor. Between two groups, there were no differences in the frequency of locoregional and distant recurrences (22.4% vs 15.4%, p-value=0.556 / 26.5% vs 26.9%, p-value>0.999). And local recurrence was observed in 2 patient undergoing sleeve lobectomy and in 1 patient undergoing pneumonectomy.

Conclusion:

Sleeve lobectomy was equivalent to pneumonectomy in survival and recurrence rate. Preserving pulmonary parenchyma could contribute to QoL in patients, so we thought sleeve lobectomy was appropriate surgical procedure even for patients with N1 nodal involvement NSCLC.

Disclosure: No significant relationships.

Keywords: Lung cancer, sleeve lobectomy, pneumonectomy, N1

SURGICAL RESOLUTION OF PRIMARY SPONTANEOUS PNEUMOTHORAX. MORBIDITY AND LONG TERM RESULTS

<u>Francisco Suarez</u>, M. Fica, J. Lobos, R. Villarroel, R. Aparicio, V. Linacre, C. Suarez *Thoracic Surgery Department, Clinica Santa Maria, Santiago, Chile*

Objectives:

Primary spontaneous pneumothorax (PSP) has an incidence of 7/100.000, usually affecting young men, with recurrence rates between 20-50% after the first episode. The usual management of one uncomplicated first episode is conservative, leaving surgery for recurrence or prolonged air leak. In our institution, the first episode is managed by Video-assisted Thoracic Surgery (VATS). Our objective is to analyze the safety and long-term results of our surgical management of PSP.

Methods:

We prospective collected a consecutive cohort data of patients with PSP, between 2010 and 2016. First episodes of PSP were operated on by VATS, including stapled wedge resection of affected zones plus pleurodesis of the apex. After surgery, patients were monitored for morbidity and classified using the Common Terminology Criteria for Adverse Events 4.0 (CTCAE4). Follow up was made looking for recurrence and new contralateral asynchronous spontaneous pneumothorax.

Results:

One hundred and four patients where admitted, 78 men (75%), median age 27 years (12-58), 79.8% first episode, 12.5% second and 7.7% third. Active smokers 38%. There were no patients with clinically hypertensive pneumothorax. 99 (95%) patients were managed with a wedge resection and talc pleurodesis, two patients with wedge resection and mechanical pleurodesis and 3 patients with previous surgery with pleurodesis alone. Median LOS was three days (1-14), chest tube 2 days (1-14). 30-day morbidity was 8.7%. CTCAE4 Grade 1-2: 7 patients, Grade 3: two patients. Grade 4-5 (mortality): no patients. Median follow-up was 33 months (2-73), with 2/104 patients lost. Two (1.9%) patients recurred at the same side after three and six months. Five (4.8%) presented contralateral spontaneous pneumothorax.

Morbidity (CTCAE 4.0)		
Grade 1-2 Grade 2-3		
4 patients- Persistent Air Leaks	1 patient - Persistent Air Leak (required reinter- vention)	
3 patients - Apical Pleural Space (Radio- logical)	1 patient - Acute Appendicitis	





Conclusion:

The management of primary spontaneous pneumothorax with VATS is a safe and effective option to prevent recurrence, with low morbidity and no mortality in our series. The surgical treatment of the first episode dramatically lowers the risk of recurrence in comparison with the results described with conservative management.

Disclosure: No significant relationships.

Keywords: primary spontaneous pneumothorax, recurrence, VATS, pleurodesis

DOES DIAGNOSIS OF SINGLE LEVEL N2 NON SMALL CELL LUNG CANCER (NSCLC) BY ENDOBRONCHIAL ULTRASOUND (EBUS) RESULT IN LESS FRE-QUENT INCOMPLETE RESECTIONS AFTER INDUCTION THERAPY COM-PARED TO MEDIASTINOSCOPY?

<u>Herbert Decaluwe</u>¹, B. Weynand², J. Moons¹, L. Verbrugge¹, S. Dumont¹, L. Depypere¹, D. Van Raemdonck², C. Dooms¹, P. De Leyn¹

¹Thoracic Surgery, University Hospitals Leuven, Leuven, Belgium ²Pathology, University Hospital Leuven, Leuven, Belgium

Objectives:

We hypothesized that incomplete lymph node resection or fragmentation during videomediastinoscopy (VAM) could lead to incomplete resection after induction therapy in patients with baseline single level N2 NSCLC (pN2a). Our objective was to evaluate the occurrence of incomplete resection, the reason of incomplete resection and its impact on survival after diagnosis by EBUS or VAM.

Methods:

All consecutive patients with pretreatment proven pN2a, induction therapy and surgery were included. A logistic regression analysis was performed to determine risk factors for incomplete resection.

Results:

Between 1996 and 2015, 169 patients were diagnosed with pN2a by EBUS (n=40) and VAM (n=129). Mean number of examined LN-stations was significantly higher after VAM (2.8 vs.1.8, p<0.0001). In 19 cases VAM was positive after negative EBUS. Histology, tumor-size, cN, side, lobar location were not significant different between VATS or EBUS groups; 47% had involvement of subcarinal nodes (7+) at staging with EBUS vs. 30% with VAM (p= 0.035). Incomplete resection occurred in 20% and 29% after EBUS and VAM respectively (p=0.28). Reasons for incomplete resection were positive surgical margins (EBUS 2.5%, VAM 7.%, p= 0.29), positive highest lymph node (EBUS 10%, VAM 19%, p=0.2), extracapsular disease (EBUS 17.5%, VAM 13.2%, p= 0.49) or R2-resection (EBUS 2.5%, VAM 2.3%, p= 0.95). Multivariable analysis of risk of incomplete resection (including EBUS/VAM, size, cN, histology, side; location, 7+, number of stations examined during invasive mediastinal staging) demonstrated 7+ to be an independent risk factor of incomplete resection (OR3.6; 95%CI:1.2-10.6, p=0.021). Overall 5-year survival was 50% after complete resection vs 14% after incomplete resection (p<0.0001). No difference in survival was found between the EBUS or VAM group with or without stratification for complete resection (fig1).

Conclusion:

We found no evidence to assume that videomediastinoscopy is related to more incomplete resections in comparison to EBUS after induction therapy for baseline single level pN2 NSCLC. After complete resection, rewarding survival can be achieved.





Overall Survival (months)

Disclosure: No significant relationships.

Keywords: Mediastinoscopy, EBUS, incomplete resection, Survival, NSCLC, N2

THE ROLE OF SALVAGE LUNG RESECTION AFTER DEFINITIVE CHEMORA-DIATION THERAPY FOR STAGE IIIA(N2) NON-SMALL CELL LUNG CANCER

<u>Akif Turna</u>¹, O. Yaksi², H.V. Kara¹, E. Ersen¹, Z.H. Turna³, F. Dincbas⁴, S. Erturan⁵, G. Aydin⁵, K. Kaynak¹

¹Department of Thoracic Surgery, Istanbul University Cerrahpasa Medical School, Istanbul, Turkey ²Department of Thoracic Surgery, Duzce University Medical School, Duzce, Turkey

³Department of Medical Oncology, Istanbul University Cerrahpasa Medical School, Istanbul, Turkey

⁴Department of Radiation Oncology, Istanbul University Cerrahpasa Medical School, Istanbul, Turkey

⁵Department of Pulmonary Medicine, Istanbul University Cerrahpasa Medical School, Istanbul, Turkey

Objectives:

A combination of platinum-based chemotherapy and definitive radiotherapy is the standard of care for Stage III (N2) NSCLC patients who have single or multiple lymph node metastasis. However, salvage lung resection could be performed in patients with residual disease without lymph node metastasis.

Methods:

Between January 2011 and December 2016 eligible patients had pathologically proven, stage IIIA/N2 non-small-cell lung cancer and were prospectively recorded. Those in the chemoradiotherapy group received three cycles of neoadjuvant chemotherapy (AUCx2 carboplatin and docetaxel 85 mg/m[2] docetaxel) and concurrent radiotherapy with 61.2 Gy in 34 fractions over 3 weeks followed by surgical resection. Also, a group of patients who had definitive chemoradiotherapy without chemoradiotherapy was compared with the surgical group. All patients in two groups were proven to have no N2 disease after chemoradiotherapy.

Results:

A total of 74 patients were enrolled, of whom 35 received chemoradiotherapy followed by surgical resection and 39 had chemoradiotherapy only. Median overall survival was 37 months (95% CI 10.5–44.0) in the chemoradiotherapy + surgery group and 21.1 months (4.0–38.6) in the chemotherapy group (p=0.03). Median overall survival was 37·1 months (95% CI 22·6–50·0) with radiotherapy, compared with 26·2 months (19·9–52·1) in the control group. One patients died in the surgery group within 30 days after surgery.

Conclusion:

Pulmonary salvage resection after definitive chemoradiotherapy is safe and surgical resection after chemoradiotherapy may provide better survival in histologically proven N2 stage IIIA non-small cell lung cancer.

Disclosure: No significant relationships.

Keywords: definitive chemoradiotherapy, N2 disease, non-small cell lung cancer, salvage surgery



A COMPARATIVE STUDY OF MULTI DETECTOR COMPUTED TOMOGRAPHY (MDCT), MAGNETIC RESONANCE IMAGING (MRI), FLUORODEOXYGLUCOSE POSITRON EMISSON TOMOGRAPHY (FDG-PET) AND DIAGNOSTIC LAPAROS-COPY IN ASSESSING ADENOCARCINOMA OF GASTROOESOPHAGEAL JUNC-TION

S. Rathinam¹, <u>Rajendran Vellaichamy</u>², R. Gunaseelan², K. Devy Gounder², S.M. Chandramohan² ¹Thoracic Surgery, Glenfield Hospital, Leicester, United Kingdom ²Institute of Surgical Gastroenterology, Madras Medical College, Chennai, India

Objectives:

The aim of the study is to assess the efficacy and utility of Multi Detector Computed Tomography (MDCT), Magnetic Resonance Imaging (MRI) and Fluorodeoxyglucose Positron Emisson Tomography (FDG-PET) in potentially resectable Adenocarcinoma of the Gastro esophageal junction

Methods:

A prospective study was performed in a tertiary centre between December 2014 to August 2016. It includes 30 patients (M 16 F 14) with a mean age of 57.03 years with potentially resectable GEJ adenocarcinoma with good performance status. Preliminary metastatic exclusion was on the basis of clinical examination, Chest radiograph and ultrasound abdomen. All the patients were subject to Multi dimentional computerised tomography (MD CT), Magnetic resonance Imaging (MRI) of neck, chest and abdomen, Whole body Positron Emossion Tomograpgy(PET). After the imaging the patients also underwent staging laparoscopy followed by surger if resectable. The findings were correlated with post operative histopathological examination.

Results:

There was no statistical differences between MRI and CT in terms of length (p 0.648) and thickness (p 0.572). Even though there was good agreement (0.556) between CT and MRI in the tumour staging (kappa statistics) (p <0.001), 8 cases had discordant findings where the MRI had upstaged the disease. PET was more specific (50%) than CT and MRI (37.5%) in dedecting malignant nodes. With regards to metastasis PET had 100% specificity and 75% sensitivity. Combined MRI and PET had a sensitivity and specificity of 97.11% and 90.91% respectively where as combined MDCT and PET had a sensitivity and specificity of 93.5% and 88.24% respectively.

Conclusion:

MRI was better than MDCT in assessment of organ involement. PET is more specific than MDCT and MRI in assessing malignant nodes, further studies are needed to assess optimum SUV .Diagnostic laparoscopy continues to play a valuable role in diagnosing small peritoneal metastasis of less than 6 mm missed by PET. Our study favours PET MRI fusion assessment for GEJ adenocarcinoma over a PET CT.

Disclosure: No significant relationships.

Keywords: MRI PET, adenocarcinoma, gastroesopgaeal junction

LONG-TERM PROGNOSIS OF SURGICALLY TREATED SMALL CELL LUNG CARCINOMA

Tomoki Shibano¹, S. Endo²

¹General Thoracic Surgery, Jichi Medical University, Tochigi, Japan ²Thoracic Surgery, Jichi Medical University, Tochigi, Japan

Objectives:

The surgical intervention for small cell lung cancer (SCLC) is recommended only for early stage diseases, but this recommendation is based upon low-level evidence. Especially for locally advanced disease (nodal positive limited disease), the surgical indication is controversial. Since the prognosis of Non-Small Cell Lung Carcinoma has largely improved by the development of molecular target drug and immunologic agent, the therapeutic strategy for SCLC must also be discussed to move on to the next stage.

Methods:

We retrospectively investigated 56 surgical cases of SCLC treated at our institution from 2005 to 2016. Survival rate was evaluated with Kaplan-Meier method, and Logrank test was used to compare between the different arms.

Results:

There were 51 males, and five females. Average age was 69.3 ± 8.0 . Forty-one cases were pathologically diagnosed as pure-SCLC, whereas 15 cases were diagnosed as combined SCLC. Lobectomy was the procedure most frequently performed (n=47), followed by bi-lobectomy (n=4), segmentectomy (n=4), and pneumonectomy (n=1). Mediastinal lymph node dissection was performed in 35 cases. Pathological stage were IA (n=13), IB (n=12), IIA (n=13), IIB (n=3), IIIA (n=14), IIIB (n=1), respectively. R0 resection was completed in 51 cases. Median observation period was 27 months. Overall survival (OS) and disease free survival (DFS) at 2-year were 75% and 62%, and OS and DFS at 5-year were 32% and 35% respectively. As for advanced stage SCLC (p-stageIIA-IIIB), OS and DFS at 2- and 5- years were 70%, 57% and 32%, 35% each. There were 5 long-term survivors without recurrence or metastasis for over than 4 years in spite of advanced stage. There were no significant difference between pure SCLC and combined SCLC (OS at 2-y: 70.3% vs. 70.3%, p=0.93).

Conclusion:

There were some patients who benefits from surgery even in the advanced stage SCLC. Further discussion is needed to verify the potential of surgical intervention for SCLC.

Disclosure: No significant relationships.

Keywords: small cell lung cancer, thoracic surgery, prognosis



VALIDATION OF THE 8^{TH} VERSION OF THE INTERNATIONAL MESOTHELIOMA INTEREST GROUP (IMIG) STAGING SYSTEM FOR MALIGNANT PLEURAL MESOTHELIOMA

<u>Ayumi Kuroda</u>, N. Kondo, A. Fukuda, T. Nakamichi, M. Hashimoto, T. Takuwa, S. Matsumoto, S. Hasegawa

Thoracic Surgery, Hyogo College of Medicine, Nishinomiya, Japan

Objectives:

Recently, International Association for the Study of Lung Cancer (IASLC) and International Mesothelioma Interest Group (IMIG) introduced a new version (8th) of the staging system for mesothelioma. We applied the 8th IMIG staging system to our previous cases for validation. TNM descriptors and overall staging were assessed using both the seventh and eighth editions of the staging system. Survival results were reviewed according to both staging allocations.

Methods:

Both 7th and 8th IMIG Staging System were applied to all the patients with malignant mesothelioma (MPM) who underwent curative-intent surgery from April 2004 to April 2016.

Results:

A total of 109 patients were enrolled to this study: 92 males (84.4%) and 17 females (15.5%); age ranged from 37 to 77 years with a median age of 62.2 years; histological subtypes of epithelioid (n=102, 93.6%), biphasic (n=6, 5.5%), and sarcomatoid (n=1, 0.9%); EPP for 60 patients (55.0%) and P/D for 49 (44.9%). The allocation of patients by the 8th pathological stage grouping were as follows: 1 (0.9%) for NA (T0), 17 (15.5%) for stageIA, 52 (47.7%) for stageIB, 8 (7.3%) for stage II, 22 (20.1%) for stage IIIA, 8 (7.3%) for stage IIIB, and 1 (0.9%) for stage IV. Seventy-six patients (69.7%) were classified as pN0, 33 (30.2%) as pN1, and there were no pN2 patients. Eighty-three patients (76.1%) were classified as earlier pathological stages when applied to the 8th in comparison with those applied with the 7th edition. There was no significant difference in survival curves among 7th pathological stages. Although 99 out of 109 patients (90.8%) were classified either of p-stage I or p-stage III in the 8th system, there was a well separated in survival curve in both groups.

Conclusion:

When compared to 7th, 8th edition of the IMIG staging system may offer a better prediction for survival in patients with resectable MPM.

Disclosure: S. Hasegawa: Eli Lilly and Company, Taiho Pharma **Keywords:** MPM, staging system, ver.8

RETROSPECTIVE ANALYSIS OF PATIENTS UNDERGOING OPERATIVE RESEC-TION FOR PRIMARY LUNG CANCER WITH SUSPECTED AND UNSUSPECTED N2 DISEASE

G. Hardman, S. Yoganathan, C. Jeyarajah, <u>Ruchir Mashar</u>, S. Love, K.S. Rammohan *Cardiothoracic Surgery, Wythenshawe Hospital, Manchester, United Kingdom*

Objectives:

Pathological nodal status is a significant factor in determining the management and predicting prognosis of patients with non-small cell lung cancer. Despite high levels of sensitivity and specificity in pre-operative nodal staging, patients can still be found to have unexpected N2 disease at their post resection histological staging. Studies have highlighted this discrepancy and patients with unsuspected N2 disease have a better prognosis than those with clinical N2 disease. We aim to review our experience with clinical and unsuspected N2 disease.

Methods:

A retrospective review of all patients undergoing surgical resection as primary therapy for primary lung cancer between 2011 and 2014 was performed. Those patients who had undergone resection with confirmed N2 disease were identified and clinical nodal staging and pathological nodal staging were compared.

Results:

A total of 1422 surgical resections for primary lung cancer were performed. Of these, 205 patients with confirmed N2 disease were identified. Complete data sets were available for 197 N2 patients. Unsuspected N2 disease was found in 111 patients (7.8% of the total resections, 56% of the N2 group). Of these, 37 patients (33%) and 7 patients (6.3%) underwent pre-operative EBUS and mediastinoscopy respectively. The unsuspected N2 group had a mortality rate of 54% and a recurrence rate of 33%. The clinical N2 group had a mortality rate of 51% and a recurrence rate of 33%.

Conclusion:

Studies have reported 5-year survival rates of unsuspecting N2 disease up to 35% and our results support this. The management of patients with N2 disease remains uncertain and current guidelines maybe too conservative in their approach. We would recommend further investigation into this patient group to assess if a more aggressive approach is warranted.

Disclosure: No significant relationships.

Keywords: surgical management, N2 disease, primary lung cancer



WHICH IS A PROGNOSTIC FACTOR FOR PERIPHERAL PURE SOLID CT1N0 NON-SMALL CELL LUNG TUMOURS, PLEURAL INDENTATION OR ATTACHMENT?

Hironori Ishibashi, C. Takasaki, S. Kumazawa, A. Ui, M. Kobayashi, K. Okubo *Thoracic Surgery, Tokyo Medical and Dental University, Tokyo, Japan*

Objectives:

Peripheral pure solid tumour presents with or without pleural indentation and narrow or broad pleural attachment. The prognosis of patients with peripheral small lung cancers depends on the presence or absence of pleural invasion and the depth of invasion, but their accurate preoperative evaluation is difficult. Our goal was to examine whether the pleural indentation or tumour attachment to the pleura has prognostic value as an alternative to pleural invasion status for cT1N0 Non-Small Cell Lung Cancer (NSCLC) patients after surgery.

Methods:

A retrospective study was performed of 379 patients with pure solid cT1N0 tumours from NSCLC patients who underwent surgery at our institute between April 2010 and November 2016. We divided our patients into three groups by computed tomography (CT); 160 tumours were attached to the pleura (PA), 151 had pleural indentation (PI), and 68 had neither pleural attachment nor pleural indentation (No). The patients' clinicopathological data, and their overall survival and disease-free survival were also assessed.

Results:

The 379 patients consisted of 247 men and 132 women with a mean age of 69.9 years (range, 29–89 years). The extent of visceral pleural invasion was PL0 in 283 patients, PL1 in 56, PL2 in 28, and PL3 in 12. No group tumours presented significantly less lymphatic invasion (P = 0.014), vascular invasion (P = 0.045), and early pT stage (P < 0.01) and a significantly low histological grade (P < 0.01). The median follow-up period for survivors was 29.9 months. The 3-year disease free survival rate of the No, PI, and PA groups were 100%, 91.3%, and 86.0%, respectively. The 3-year overall survival rate of the three groups were 100%, 96.8%, and 88.9%, respectively.

Conclusion:

Patients with peripheral pure solid tumour without pleural indent and pleural attachment might have good prognosis.

Disclosure: No significant relationships.

Keywords: peripheral tumour, pleural indentation, pure solid tumour, lung cancer

COMPLETE RESECTION OF THE PRIMARY LESION FOR STAGE IV NON-SMALL CELL LUNG CANCER

<u>Yasuhiro Chikaishi</u>, M. Takenaka, K. Kuroda, N. Imanishi, F. Tanaka 2nd Department of Surgery, University of Occupational and Environmental Health. Kitakyushu, Japan

Objectives:

The general treatment for stage IV Non-Small Cell Lung Cancer (NSCLC) is systemic chemotherapy. However, some patients, such as those with oligometastasis or M1a disease, are diagnosed after surgery. In this study, we retrospectively examined the outcomes following complete resection of the primary lesion for stage IV NSCLC at our institution.

Methods:

Thirty-eight patients underwent surgery at our department from June 2005 to May 2016 for stage IV NSCLC as the first-line treatment through complete resection of the primary lesion. We retrospectively examined the patient characteristics and prognoses.

Results:

The median follow-up duration for the 38 patients was 17.7 months (range, 1 to 82.3 months). The T factors were T1/T2/T3/T4 in 4/16/12/6 patients, respectively. The N factors were N0/N1/N2/N3 in 16/8/12/2 patients, respectively. The M factors were M1a/M1b in 19/19 patients, respectively. Of the 19 M1b patients, 14 had oligomatastasis. We classified each case into R (-) and R (+) according to the degree of cure. R(-) is a patient who demonstrated no dissemination on the image among M1a and a patient in which all lesions have been locally controlled among M1b. R is a patient with dissemination observed on the image among M1a and a patient with a lesion that cannot be locally controlled among M1b The R factors were R(-)/R(+) in 21/17 patients, respectively. The histology was adenocarcinoma/squamous cell carcinoma/others in 30/5/3 patients, respectively. The 5-year overall survival rate was 29%, and the median survival time was 725 days. The prognosis of N (-) was better than N(+) (P=0.108). Squamous cell carcinoma and R(+) were significantly poor prognostic factors (p=0.002, 0.002 respectively).

Conclusion:

Even at stage IV, if it is other than N(-) or R(-), squamous cell carcinoma, it was thought to be the significance of surgical treatment of intervention

Disclosure: No significant relationships.

Keywords: non-small cell lung cancer, complete resection, stage IV



ANGIOGRAPHY BEFORE RESECTION OF POSTERIOR MEDIASTINAL TUMORS: SELECTION CRITERIA, TUMOR EMBOLIZATION AND SPINAL ARTERY COL-LATERALS

Maria Lucia Madariaga, L. Borges, J. Rabinov, M. Lanuti, D. Mathisen, H. Gaissert Surgery, Massachusetts General Hospital, Boston, MA, United States of America

Objectives:

Resection of posterior mediastinal tumors may be complicated by bleeding or neurologic injury. Preoperative spinal angiography of mediastinal tumors to determine whether embolization is needed has been underreported or not commonly practiced. This study evaluates the selection criteria and outcomes of patients with posterior mediastinal tumors who undergo preoperative angiography and embolization.

Methods:

We report a retrospective study of patients with posterior mediastinal tumors from 2002 to 2016 selected by thoracic or neurologic surgeons to undergo preoperative multi-level spinal angiography. Angiography was performed with or without selective arterial embolization of vascular supply. Closure of large or difficult to surgically access arterial feeders was performed. Embolization was avoided in arterial branches giving rise to anterior or posterior spinal arteries. Resection of tumors supplied by spinal artery collaterals was deferred.

Results:

Nine (10%) of 86 patients with posterior mediastinal tumors underwent preoperative angiography. A mean of 11 (range 2-25) arteries were studied. Embolization in 7 of 9 patients (77%) successfully occluded one to three arteries. There was no significant difference in age, gender, BMI, ASA class, operative time, operative blood loss, complications or mortality between patients with or without angiography. Patients who underwent angiography had larger tumors (1490 vs. 97 cm3, p<0.0001), involvement of the neuroforamen (44% vs. 10%, p<0.05) and longer hospital stay (9 vs. 4.5 days, p<0.05). Angiography was complicated in one patient by vocal cord ulceration after intubation of a tumor-compressed trachea. Shared blood supply between tumor and spinal cord precluded embolization and tumor resection in 1 patient. Utilization of angiography increased over time.

Conclusion:

Selective preoperative angiography for evaluation of posterior mediastinal tumors identifies arterial variations, threatened spinal arteries and targets for embolization, but can be associated with significant complications. The specific role of embolization requires further investigation to standardize indications and number of arteries examined.

Disclosure: No significant relationships. **Keywords:** mediastinal, tumor, angioembolization Poster Abstracts 089 - 273

NOTES



Abstract Author	List	Abstract Author	List
A. Makhlouf G.	P-172	Andratschke N.	P-198
Abdelnour-Berchtold E.	P-214	Andreetti C.	F-075
Abe J.	P-144	Anegg U.	P-109, P-142,
Abu Akar F.	V-088		P-203
Accardo M.	F-033, P-102	Anile M.	F-075
Aguinagalde B.	P-089	Anraku M.	P-153, P-185
Agustí Garcia-Navarro Á.	O-057	Antonoff M.	F-028
Aigner C.	F-014, F-027,	Aokage K.	P-135
	P-261	Aoyama A.	F-026
Akan A.	B-005	Aparicio R.	P-263
Akil A.	P-121	Araujo C.A.	P-241
Akin H.	P-140, P-257	Ardissone F.	O-007
Alamassi M.	P-258	Ardò N.	P-210
Albuquerque A.	P-097	Aresu G.	P-194
Alessandrini G.	P-126, P-189	Argnani D.	B-002, P-090
Aliverti A.	F-053	Armani G.	F-066
Alleblas C.	F-067, P-139	Aruldas C.	B-001, F-050
Allen M.	O-061	Asadi N.	F-062, V-038
Alloisio M.	P-162	Asaf B.B.	P-223, P-231 ,
Almonte Garcia C.E.	P-233		P-235, V-008 ,
Alpay L.	P-197		V-084
Alqumber H.	P-204	Asamura H.	P-099
Al-Sahaf M.	P-195	Ascanio F.	P-247
Alsaied O.	P-124	Atyukov M.	P-143, P-179
Altınok T.	P-257	Aubert JD.	P-214
Altorki N.	F-031, F-047,	Aubry MC.	O-061
	O-060	Augustin F.	F-014, F-017,
Alves De Oliveira H.	F-024		P-169, P-187,
Amiraliev A.	P-199		P-209
Ampollini L.	F-066, O-007,	Augusto M.	P-097
	P-155	Ayalp K.	V-010
Andrade R.	P-124	Aydin G.	P-265

Abstract Author	List	Abstract Author	List
Azcarate L.	P-196	Bertolaccini L.	B-002, P-090,
Bacher A.	F-027		P-168, P-174
Bagan P.	P-213	Bezzi M.	F-075
Bagrov V.	P-199, P-243	Biancosino C.	P-190 , P-236,
Baisi A.	F-019		P-237
Baldes N.	P-181	Bielewicz M.	P-166
Balis E.	P-186	Bieli C.	V-038
Bando T.	P-111, P-160	Bigler D.R.	F-018
Bardet J.	F-014	Bille A.	P-195 , P-206
Barilani M.	P-137	Bishay E.	F-053, P-150
Barmin V.	P-199	Bilen S.	P-140
Basaran F.	P-240	Bjerrgaard L.S.	F-018
Basaran M.	F-051	Boada M.	P-165
Baste JM.	F-014, P-112	Bobek V.	P-115
Basyrov R.	P-156	Bocchialini G.	F-066, P-155
Batirel H.	P-174, P-193	Boctor D.	P-206
Baysungur V.	F-035, P-197,	Boeluekbas S.	P-190, P-236 ,
	P-257		P-237
Bazhenov A.	P-156	Bok J.S.	P-205, P-249
Beck N.	F-046	Bolca C.	P-228
Becucci C.	P-145	Bora G.	F-015
Bedetti B.	P-168, P-174	Borczuk A.	P-117
Bellier J.	P-214	Borges L.	P-273
Bello I.	P-247	Borrelli J.	F-034
Benazzo A.	P-187, P-200	Bortolotti L.	F-029
Benden C.	P-147	Bouros D.	P-129, P-186
Bennet D.	P-128	Brandolini J.	B-002
Benno I.	V-080	Bria E.	P-126, P-189
Berikkhanov Z.	P-251	Brunelli A.	F-014, O-007,
Berna P.	P-213		P-096, P-167,
Bertin F.	P-159		P-168, P-174
		Buderi S.	P-196



Abstract Author	List	Abstract Author	List
Burlacu O.	P-239	Chatziantoniou C.	P-129
Bussières A.	P-253	Che G.	F-037, F-064,
Butas M.	P-239		F-068 , P-092,
Butler C.	F-062, V-038		P-246
Cafarotti S.	F-023, P-173	Chen C.	B-003, F-049
Cahill J.	P-207	Chen K.	F-069
Calia N.	P-219	Chen KC.	P-252
Califano T.	P-125	Chen KN.	B-003
Calvert R.	V-013	Chen LQ.	P-104, P-201
Campos J.R.	F-074	Chen S.	P-202
Cannata A.	P-230	Chen XK.	P-113
Cappabianca S.	P-102, P-125	Chen Y.	F-048
Carbognani P.	F-066, P-155	Chen-Yoshikawa T.	F-026
Carlucci A.	P-125	Chen Z.	F-048
Carriel N.	P-165	Cheufou Housmanou D.	P-261
Carrinola R.	B-004	Chiappetta M.	P-123, P-126,
Carvalho B.	P-241		P-189
Carvalho I.	P-241	Chida M.	O-056, P-144
Casado P.	O-007	Chihara K.	O-056
Casanova Viúdez J.	V-086	Chikaishi Y.	P-271, V-009,
Cascone R.	F-075, P-125		V-039 , V-040
Cassiano F.	F-075	Chikinev Y.	P-101
Castiglioni M.	F-034	Chiyo M.	P-114
Cattoni M.	F-045	Cho D.G.	P-225
Cavallesco G.	P-219	Choi S.H.	P-205, P-249
Cavalli S.	P-155	Choi S.Y.	P-225
Caviezel C.	B-001	Choi Y.S.	F-063, F-072,
Celik M.R.	P-257		P-149
Cerfolio R.	P-162	Cho J.H.	F-063, F-072,
Chambon G.	V-083		P-149
Chandramohan S.M.	P-266	Chong B.K.	P-205
Chari M.	P-096	Chung KM.	F-032

Abstract Author	List	Abstract Author	List
Cikmazkara A.	P-193	Demay S.	F-030
Cimenoglu B.	F-051	Demmy T.	B-006
Coghlan M.	F-030	Denes E.	P-159
Coolen J.	P-106	Denk-Linnert DM.	F-025
Coonar A.	P-194	De Perrot M.	P-170
Coosemans W.	P-119, P-212	Depypere L.	F-014, P-106,
Cordos I.	P-228		P-110, P-119 ,
Coret M.	F-030		P-264
Cosgun T.	V-010	Deroose C.	P-106
Cozma G.	P-239	Deschamps C.	O-061
Cozzolino I.	F-033	Desio M.	F-034
Crisci R.	B-002, P-090	Detillon D.	P-259
Crosta G.	F-029	Deu M.	P-247
Cueto A.	P-157	Devy Gounder K.	P-266
Cufari M.E.	P-196	De Waele M.	P-211
Cusumano G.	F-075	De Wever W.	P-106
Cwikla J.	F-032	Dexter E.	B-006
Cypel M.	P-170	Di Costanzo E.	P-125
Damarco F.	P-128, P-137	Dieci E.	P-162
D'Andrilli A.	F-075	Di Gregorio G.	P-128
Dantas A.	P-241	Di Natale D.	P-102, P-210
Dantas J.	P-241	Dincbas F.	P-265
Darling G.	F-016, P-170	Diso D.	F-075
Date H.	F-026	Divisi D.	B-002, P-090
Dauri M.	P-145	D'Journo X.B.	F-014, V-083
Davoli F.	B-002	Doddoli C.	P-112
Decaluwe H.	F-014, P-096,	Dogruyol T.	F-035
	P-106, P-264	Doi K.	P-094
De Dominicis F.	P-213	Dołęgowska B.	P-166
Deguchi H.	P-144	Dominioni L.	F-029, F-034
De Leyn P.	F-014, P-106,	Dong C.	V-043
	P-264	Dong Y.	P-254



Abstract Author	List	Abstract Author	List
Dooms C.	F-014, P-106,	Evangelista A.	F-015, O-007
	P-264	Eveno C.	P-159
Duman S.	F-051	Evman S.	F-035, P-197
Dumitra T.	P-103	Fabre A.	P-216
Dumont S.	P-264	Facciolo F.	P-123, P-126,
Dunning J.	V-013, V-085		P-189
Durand M.	P-112	Faggi G.	P-128
Dy G.	B-006	Failla G.	F-075
Dylewski M.	P-162	Falco A.	F-066
Dziedzic R.	F-020 , P-095	Falcoz PE.	F-014, F-015,
Dziegielewski P.	F-076		P-168, P-174
Eberhard M.	P-108	Falezza G.	F-029
Eberlein M.	P-190, P-236,	Fang W.	B-003, F-048
	P-237	Faybik P.	F-027
Edwards J.	P-131	Fediuk M.	P-109, P-142,
Egyud M.	F-044		P-203
El-Badry M.	P-172	Feher C.	P-176
Elkhayat H.	P-172	Fernandez-Monge A.	P-089
Elliott M.	F-062, V-038	Fernando Garay M.	V-086
El-Moslimany R.	P-161	Ferrero S.	P-137
Élő G.	P-134	Ferri L.	P-103
Elsaegh M.	V-013	Fibla J.J.	O-057, P-157
Emparanza J.I.	P-089	Fica M.	P-263
Endo S.	O-056 , P-267	Filges S.	F-044
Enilenis I.	P-180, P-234	Filosso P.L.	F-015, F-032,
Epifanov N.	P-199		F-045, O-007,
Erdogan S.	P-140		P-123, P-126,
Ersen E.	P-152, P-265		P-189
Erturan S.	P-265	Fink-Neuboeck N.	P-109, P-142,
Esteban P.	F-078, P-220		P-203
Ests Net-Wg Contributors C	2.	Finley C.	F-030
	O-007		

Abstract Author List Abstract Author List Fiorelli A Gafencu D A P-261 F-033, F-075, P-102, P-125, Gaissert H P-273 Gakidis L P-129 P-210 Fischer S P-121 Galeone C F-079 Foccoli P. F-029 Garces Y. O-061 Forcella D. P-123, P-126, Garcia Jimenez M.D. P-233, V-011 P-189 García-Yuste M O-007 Formisano D Gasperini L. F-079 F-034 Fortunato G Gatti S P-167 P-137 Fossi A Geczi T P-128 F-052 Fourdrain A. Gefke K F-018 P-213 Franco R F-033, P-102 Geleva V. P-211 Frassoldati A. Genoves Crespo M. P-233, V-011 P-219 Frati C. F-066 George R. P-116 Frauenfelder T P-108 Gestkov K P-101 Frongillo E. Ghoniem A F-033 P-172 Giebel F P-237 Fugazzaro S. F-079 Fu J B-003, F-048, Gillaspie E.A. **P-244** P-183 Giller B. P-180, P-234 Fujiwara T. P-114 Giller D P-180, P-234 Fukami T. Gimferrer J.M. P-153 P-165 Giordano S. Fukayama M. P-185 F-028 Fukuda A. Glushko V P-199 P-268 Fukui M Gnetti L F-070, P-188, P-155 P-222 Godfrev T. F-044, P-184 Fukumoto K P-107. P-148. Gofman V P-145 P-226 Gomes-Neto A. F-024 Furak J. F-052 Gómez-Caro A. P-165 Furuhata Y. Goméz Hernández M. T. P-153 F-078, P-220 Furukawa M. Gomyoda T. V-041 V-087 Furuva T. F-071, P-132 González D P-165 Gábor S Gonzalez M P-134 P-214



Abstract Author	List	Abstract Author	List
Gonzalez Rivas D.	P-248	Hamaji M.	F-026
Gossot D.	F-014	Hamamoto A.	P-136
Goto Y.	F-036, P-208	Hanna W.	F-030, P-162
Grande A.	F-034	Hansen H.J.	F-014, F-018
Grande B.	F-050	Han Y.	F-048
Grassi R.	P-125	Hara A.	V-041
Gregori D.	P-128	Hardman G.	P-269
Greve T.	P-190	Harrison-Phipps K.	P-195
Grigoroiu M.	P-112	Harrison S.	F-031, F-047,
Grodzki T.	P-166		O-060
Gronchi F.	P-214	Hasegawa S.	O-058, P-127,
Gschwandtner E.	P-109, P-142,		P-268
	P-203	Hashimoto M.	O-058 , P-127 ,
Guckenberger M.	P-198		P-250, P-268
Guerrera F.	F-014, F-015 ,	Hashimoto R.	P-091, P-136
	F-045, O-007	Hasumi T.	P-144
Guirao Montes A.	O-057 , P-157,	Hattori A.	F-065, P-188,
	P-165		P-222
Gulhan E.	P-257	Hayashi M.	V-041
Gunaseelan R.	P-266	Hayashi Y.	P-099
Gungor A.	P-240	Hayward M.	P-116
Gupta V.	F-016	Healy D.	P-216
Gust L.	F-014	Heesen C.	P-181
Gu Z.	B-003	Heineman D.	F-046
Guzman R.	P-165	He J.	P-110
Haas V.	P-177	Hennon M.	B-006
Hacker P.	F-027	Hernandez-Arenas L.	O-059
Hackl M.	F-055	Hernandez J.	O-057, P-157
Hager H.	F-027	Hernandez N.	F-078
Haidari T.	P-229	Hernández Pérez L.	V-086
Haiqing C.	P-238	Hewitt R.	F-062, V-038
Hamada A.	P-138	Hijiya K.	F-026

Abstract Author	List	Abstract Author	List
Hino H.	P-153	Iquille J.	P-213
Hirai K.	P-260	Ishibashi H.	P-133, P-270
Hirayama S.	P-188, P-222	Ishikawa H.	P-093
Hishida T.	P-099, P-135	Ishikawa Y.	P-111, P-160
Hoda M.A.	P-254	Italian Vats Group	B-002
Hoeijmakers F.	F-046	Ito H.	P-250, V-082
Hoetzenecker K.	F-025, F-055,	Iwata H.	P-094
	P-200	Iwata T.	P-114
Hofstetter W.	F-028	Iwazaki M.	P-091, P-136
Hong T.H.	F-063	Izquierdo C.	P-157
Honguero Martinez A.F.	P-233, V-011	Izquierdo J.M.	P-089
Horinouchi H.	P-091	Jackson J.	F - 044
Hoshino E.	P-111	Jacob B.	F-016
Hua R.	P-141	Jacob N.	P-170
Hu Y.	P-092 , P-183	Jagelavicius Z.	P-245
Hwang Y.	F-022	Jaksch P.	F-027
Hyun K.Y.	F-022	Jales E.	P-241
Ibe T.	V-081	Janilionis R.	P-245
Ibrahim A.	P-211	Jatoi A.	O-061
Ibrahim M.	F-075	Jauregui A.	P-247
Igai H.	V-081	Jayakumar S.	V-013
Ikeda N.	O-056	Jensen P.F.	F-018
Imanishi N.	P-271, V-009,	Jeong S.C.	P-225
	V-039	Jeon H.W.	P-225
Imperatori A.	F-029, F-034	Jeyarajah C.	P-269
Ince S.	P-193	Jiang G.	F-073, O-059,
Inci I.	B-001, F-050,		O-061, P-118,
	P-147		P-120, P-248
Inderbitzi R.	P-173	Jiang L.	P-110 , P-248,
Infante M.	F-029		V-088
Innocenti M.	F-075	Jiao W.	P-184
Inoue M.	F-071, P-132	Jimenez Maestre U.	V-086



Abstract Author	List	Abstract Author	List
Jimenez M.F.	P-220	Kerr A.	P-150
Jimenez Palmer R.	V-011	Kerti M.	P-176
Jordan S.	P-196	Keshavjee S.	P-170
Jovaisas V.	P-245	Khalil H.	F-053
Julia Moya E.	V-011	Khalimon A.	P-199
Jungraithmayr W.	P-147	Khan A.	P-196
Jun W.	P-122, P-154,	Kidane B.	F-016, P-170
	P-178, P-238	Kidd M.	F-032
Kaba E.	V-010	Kikuchi S.	F-036, P-208
Kalatskaya I.	P-184	Kilic B.	P-152
Kalkat M.	P-150	Kilicgun A.	P-257
Kamel M.	F-031, F-047,	Kim D.	P-215
	O-060	Kim D.K.	P-205
Kamiyoshihara M.	V-081	Kim H.K.	F-063, F-072,
Kampe S.	P-261		P-149
Kanaoka R.	P-242	Kim H.R.	P-205
Kanbur S.	F-035	Kim J.	F-063, F-072
Kang C.H.	F-022	Kim K.	P-149
Kaplan S.	P-161	Kim Y.D.	P-225
Kara H.V.	P-152, P-265	Kim YH.	P-205
Karapınar K.	P-140	Kim Y.H.	P-225
Karasaki T.	P-153	Kim Y.T.	F-022
Kaseda K.	P-099	King J.	P-195
Kaseja K.	P-166	Kinnear D.	P-253
Kato D.	F-071 , P-132	Kinoshita Y.	P-148
Kato H.	P-138, P-144	Kiral H.	P-197
Kawamura M.	P-232, P-242	Kirmani B.	P-194
Kawashima M.	P-153, P-185	Kirschner F.	P-181
Kawatani N.	V-081	Kisluk J.	F-076
Kaynak K.	P-152, P-265	Kiss I.	P-115
Kehlet H.	F-018	Kitazawa S.	F-036 , P-208
Kenyon L.	P-207	Klamer J.	F-046

Author Index

Abstract Author List Abstract Author List F-025, F-027, Krenn C. F-027 Klepetko W. F-055, P-187, Krueger T. P-214 Krzyzanowski P. F-044 P-200, P-254 Klikovits T. P-254 Kubisa B P-166 Kudriahov G. Kobayashi K. P-091 V-012 Kobayashi M. Kumar A. P-133, P-270 **P-223**, P-231, Kobayashi N. F-036, P-208 P-235, V-008, Kocaturk C I P-140 V-084 Kocher F Kumata S F-017, P-169, P-192, P-221 Kumazawa S P-209 P-133, P-270 Kohno M. Kurata T P-091, P-136 P-148 Koike Y. P-255 Kurihara M P-151 Kojima F. P-111, P-160 Kuroda A. P-127, P-268 Kolasinska-Cwikla A. Kuroda K. F-032 P-271, V-009, Kolbanov K P-199 V-039, V-040 Kolbas I Kutluk A C P-197 P-140, P-257 Kolodii M Kuwano H P-145 P-153, P-185 Kolokotroni S M Kuzdzal J **P-206** P-168, P-174 Kolostova K. P-115 Kyritsis I. P-261 Konda N. Lafitte S. P-213 P-150 Kondo H. Lagrasta C.A. O-056, P-232, F-066 Laimer G. P-242 **F-017**, P-169 Kondo N O-058, P-127, Laisaar T V-080 Lai Y P-268 **F-064**, P-105 Kondo T 0-056 Lambert D P-117 Kösek V P-211 Lambrecht M P-106 Kovacs L. F-052 Landaluce Chaves M. V-011 Kovalenko A. P-175 Lang G. F-027, F-055, Kowalczuk O. F-076 P-187, P-200, Kovi T.S. P-193 P-254 Kozak A V-012 Lang I. F-027 Kozlowski M Langner T. F-076 P-147



Abstract Author	List	Abstract Author	List
Lanuti M.	P-273	Lischke R.	P-115
Lan Z.	P-110	Litle V.	F-044, P-184
Lapuc G.	F-076	Liu J.	P-110, P-110
Larocca V.	O-007	Liu J.F.	P-130
La Sala A.	F-075	Liu L.	F-037, P-104,
Laudanski W.	F-076		P-158
Lauk O.	P-198	Liu M.	F-048
Lauricella L.	P-167	Liu SL.	P-113, P-164
Lawrence D.	P-116	Liu XB.	P-113, P-164
Lazaro Sahuquillo M.	P-233, V-011	Liu Y.	B-003
Lazzari L.	P-137	Li X.	F-021, P-224
Lazzeri M.	B-004	Li Y.	P-113 , P-164
Lee B.	F-031, F-047,	Li Z.	P-141, P-146 ,
	O-060		P-182, P-238
Lee G.	P-204	Lobos J.	P-263
Lee H.J.	F-022	Lococo F.	P-123, P-126,
Lee H.K.	P-149		P-189
Lee H.P.	P-205	Loidi López C.	V-086
Lee K.H.	P-205	Loizzi D.	P-210
Leon Atance P.	P-233, V-011	Loizzi M.	P-210
Lerut T.	P-119	Lopez D.	P-089
Leuzzi G.	P-123, P-126,	Lopez I.	P-089
	P-189	Lorenzo Martín M.	V-086
Lewczuk A.	F-032	Lorusso B.	F-066
Li H.	P-100, P-122,	Louie B.	F-045
	P-154, P-202	Loundou A.	P-112
Lim M.	P-215	Love S.	P-269
Linacre V.	P-263	Low D.	P-161
Lindenmann J.	P-109, P-142,	Lucchi M.	F-045
	P-203	Lucciarini P.	F-017, P-169,
Lin X.	P-183		P-209
Lin Y.	F-077	Luketich J.	F-044

Abstract Author	List	Abstract Author	List
Luo K.	P-183	Martin-Ucar A.	P-131
Luzo M.C.	F-074	Marulli G.	F-045, P-128
Luzzi L.	P-128	Masai K.	P-099
Lyberis P.	F-015	Mashar R.	P-269
Madariaga M.L.	P-273	Masmoudi H.	V-083
Madeddu D.	F-066, P-155	Massard G.	F-014, F-015,
Maier A.	P-109, P-142,		P-168, P-174
	P-203	Mastromarino R.	P-102
Maier H.	F-017, P-169,	Masuda R.	P-136
	P-209	Mathisen D.	P-273
Maietti E.	P-219	Matilla J.	F-027, P-200,
Maly V.	P-115		P-254
Mani A.	P-116	Matsui H.	P-107, P-148,
Maniscalco P.	P-219		P-226
Mansfield A.	O-061	Matsumoto M.	P-094
Mao T.	P-141	Matsumoto S.	P-127, P-268
Mao W.	F-048	Matsumura Y.	P-144
Maraschi A.	P-125	Matsunaga T.	F-065 , F-070,
Maráz A.	F-052		P-188, P-218 ,
Marcucci C.	P-214		P-222, P-262
Mardanzai H.	P-261	Matsuoka K.	P-192, P-221
Margaritora S.	P-123	Matsuoka T.	P-192, P-221
Mariani A.	P-097	Matsutani N.	P-232, P-242
Mariani S.	B-004	Matsuzaki T.	P-136
Marinescu L.	P-227	Mazzara S.	P-219
Marinova K.	P-168, P-174	Mazzaschi G.	F-066, P-155
Marinus P.	F-045	Mazzella A.	F-015
Marjanski T.	F-020, P-095	Mbuagbaw L.	F-030
Marks R.	O-061	Mcintosh N.	F-062, V-038
Marrades R.M.	O-057	Mcintyre D.	F-062, V-038
Martel I.	P-180	Mclaren C.	F-062, V-038
Martin F.	P-195	Mcvie J.	V-085


Abstract Author	List	Abstract Author	List
Mehran R.	F-028	Montoli M.	B-004, P-137,
Members Of The ESTS Ple		P-230	
Working Group A.	P-168, P-174	Montorsi M.	P-162
Mendogni P.	B-004, P-230	Moon M.H.	P-225
Merlusca G.	P-213	Moons J.	F-014, P-096,
Messina G.	F-033, P-102		P-106, P-119,
Meydan B.	F-035		P-264
Michos P.	P-129	Morenghi E.	P-162
Michos T.	P-129	Morita S.	P-185
Migliore M.	V-013	Moser B.	F-027 , P-200
Milea S.L.	P-211	Motoyama H.	F-026
Minar J.	P-209	Motus I.	P-156
Minerva I.	F-033	Mouhana J.	P-103
Minowa M.	P-144	Mucilli F.	P-123, P-126,
Miron I.	P-239		P-189
Mirzoyan O.	P-251	Mueller M.	B-005
Mitsos S.	P-116	Mulder D.	P-103
Miyamoto Y.	P-094, P-192,	Munoz J.	P-184
	P-221	Murakami D.	V-041
Miyata H.	O-056	Murakawa T.	P-107, P-148,
Miyata N.	P-148		P-226
Miyazaki R.	V-041	Muraközy G.	F-027
Miyoshi T.	P-135	Murphy M.	P-216
Mizobuchi T.	P-151	Muthialu N.	F-062, V-038
Modlin I.	F-032	Nachira D.	P-123
Molina Franjola J.C.	P-103	Nafteux P.	P-119
Molina J.	O-061	Nagai S.	P-192, P-221
Molina Nuevo J.D.	V-011	Nagashima T.	P-250 , V-082
Molins L.	O-057, P-157 ,	Nagayama K.	P-153, P-185
	P-165	Naidu B.	F-053, P-150,
Molnar M.	P-176		P-207
Molnar T.	P-134	Nakagawa T.	P-136

Author Index

Abstract Author	List	Abstract Author	List	
Nakahashi K.	P-138	Nishimura T.	P-153	
Nakajima J.	O-056, P-153,	Nitadori JI.	P-153, P-185	
	P-185	Nito M.	P-250, V-082	
Nakajima T.	P-114	Niu J.	F-028	
Nakamichi T.	P-127, P-268	Nosotti M.	B-004 , F-029,	
Nakamura Y.	P-144		O-007, P-128,	
Nakayama H.	P-250, V-082		P-230	
Nakayama T.	P-232, P-242	Novellis P.	P-162	
Namazova V.	P-180, P-234	Novoa N.M.	F-045, F-078 ,	
Nanda N.S.	P-235 , V-008,		P-220	
	V-084	Nuraliev S.	V-012	
Nardecchia E.	F-034	Nwogu C.	B-006	
Nardini M.	V-013, V-085	Obornev A.	P-179	
Naruka V.	V-013, V-085	O'Brien M.	P-184	
Narula N.	O-060	Occhiati L.	F-075	
Nasar A.	F-031, F-047,	Ohde S.	P-160	
	O-060	Oh S.	F-065, F-070,	
Natale G.	F-033		P-188, P-218,	
Nativ N.	P-145		P-222, P-262	
Navales I.	P-247	Ohtsuka T.	P-099	
Nelson D.	F-028	Oiwa K.	P-136	
Ng C.	F-017, P-169,	Oizumi H.	P-138, P-144	
	P-209	Okabe K.	V-041	
Nguyen A.	F-031, F-047	Okada M.	O-056	
Nichols F.	O-061	Okada S.	F-071, P-132	
Nicod L.	P-214	Okada Y.	O-056, P-144	
Nicolau I.	P-103	Okubo K.	P-133, P-270	
Nieboer B.	F-067, P-139	Okumura M.	O-056	
Nielsen G.	F-044	Okumura Y.	O-058, P-127	
Nigim F.	P-219	Oliaro A.	F-015	
Niklinska W.	F-076	Olland A.	F-015	
Niklinski J.	F-076			



Abstract Author	List	Abstract Author List	
Opitz I.	B-001, F-050,	Park S.	F-022
	P-108 , P-168,	Park S.I.	P-205
	P-174, P-198	Parshin A.	P-251
Oršulić D.	P-217	Parshin V.	P-251
Osawa F.	V-081	Passera E.	F-029
Osawa J.	P-250, V-082	Patella M.	F-023, P-173
Ostrowski M.	P-095	Patrini D.	P-116
Oswald N.	F-053	Pavaloiu V.	P-228
Oszvath B.	F-055	Pecsy B.	F-052
Ota S.	P-144, V-087	Peel J.	F-016
Ottlakan A.	F-052	Peer M.	P-145
Oura H.	P-144	Pego-Fernandes P.	P-097
Ozeren S.G.	P-193	Pelusi G.	P-171
Ozer S.	P-193	Pennathur A.	F - 044
Ozkan B.	F-051	Peryt A.	P-194
Öztürk A.	P-197	Petersen R.H.	F - 014, F-018 ,
Pac Ferrer J.	V-086		P-229
Paladini P.	P-128	Petko M.	P-116
Paleru C.	P-227, P-228	Petracca Ciavarella L.	P-123
Palleschi A.	B-004, P-230	Petrache I.	P-239
Pallisa E.	P-247	Petrov A.	P-143 , P-179
Panagiotopoulos N.	P-116	Piccardo A.	P-159
Pang Q.	F-048	Pichler M.	P-109, P-142
Papagiannopoulos K.	F-014, P-168,	Picone A.	B-006
	P-174	Pierdiluca M.	P-102, P-125
Papakonstantinou N.	F-054, P-186	Pierog J.	P-166
Papanikolaou A.	P-186	Pierre A.	P-170
Pardolesi A.	B-002	Pikin O.	P-199, P-243
Pariscenti G.	F-029	Pilling J.	P-195
Park B.	P-162	Pini R.	F-023, P-173
Park C.B.	P-225	Pinto-Filho D.	F-024, P-167
Park I.K.	F-022	Piontkovskaya K.	P-101

Abstract Author	List	Abstract Author	List
Piquilloud-Imboden L.	P-214 Ratto G.		P-123, P-126,
Piro R.	F-079		P-189
Pischik V.	P-175 , P-179	Raubenheimer H.	P-196
Plönes T.	P-261	Raveglia F.	F-019 , O-007,
Poggi C.	F-075		P-168, P-174
Polyak K.	F-052	Ravn J.	P-229
Pompeo E.	P-145	Rawashdeh M.	P-131
Pompili C.	F-014, P-096	Rea F.	F-045, P-128
Popescu V.	P-227, P-228	Reda M.	B-004
Portes H.	P-112	Redin J.A.	P-089
Port J.	F-031, F-047,	Redwan B.	P-190, P-236,
	O-060		P-237
Porubsky C.	P-203	Refai M.	P-171
Posch F.	P-109, P-142	Regan A.	P-207
Pricopi C.	P-112	Reginelli A.	P-102, P-125
Privitera E.	B-004	Reichelt J.	P-121
Properzi P.	P-230	Rena O.	O-007
Prosch H.	F-055	Renaud S.	F-015
Quaini E.	F-066, P-155	Rendina E.A.	F-045, F-075,
Quaini F.	F-066 , P-155		O-007
Quarantotto F.	P-219	Reynolds E.	F-030
Quero F.	P-157	Rice D.	F-028
Rabinov J.	P-273	Righi I.	B-004, P-230
Rahouma M.	F-031, F-047,	Rinaldi R.	P-219
	O-060	Rinieri P.	F-014
Rajesh P.	P-150	Ris HB.	P-214
Rammohan K.S.	P-269	Rizzi A.	F-019
Ramon I.	O-057	Rocco G.	O-007, P-110,
Rao J.	P-131		P-168, P-174
Rapicetta C.	F-079	Rochus I.	P-212
Rathinam S.	P-266	Rodriguez Ortega C.R.	P-233, V-011
		Roebuck D.	F-062, V-038



Abstract Author	List	Abstract Author	List
Roesner I.	F-025	Sagawa M.	P-144
Roffinella M.	F-032	Said S.	P-244
Rogliani P.	P-145	Saito T.	P-107, P-148 ,
Rojo Marcos R.	V-086		P-226
Romero L.	P-247	Sakai H.	P-091
Rontogianni D.	F-054	Sakairi Y.	P-114
Rosado Rodríguez J.	V-086	Sakai T.	P-242
Ross A.	P-161	Sakurada A.	P-144
Rosso L.	B-004, F-029,	Salama M.	B-005
	P-128, P-137 ,	Salati M.	P-167
	P-230	Salcedo M.	P-247
Roth G.	F-027	Salge M.	P-097
Roth J.	F-028	Samancilar O.	P-257
Rotolo N.	F-029 , F-034	Samejima J.	P-250, V-082
Routledge T.	P-195, P-206	Sanchez G.	P-157
Rozgonyi Z.	P-176	Sánchez L.	P-247
Rubtsova N.	P-199	Sanchez-Lorente D.	P-157, P-165
Rudakov R.	P-199	Sano A.	P-153
Rueth N.	P-124	Santambrogio L.	B-004, F-029,
Ruffini E.	F-015, P-168,		P-128, P-137,
	P-174		P-230
Ruiz-Tsukazan M.T.	F-024	Santelmo N.	F-015, P-112
Rumbero Sánchez J.C.	V-086	Santi I.	P-219
Ryabov A.	P-199, P-243	Santini A.	P-219
Ryota H.	P-148	Santini M.	F-033, F-075,
Rzyman W.	F-020, P-095		P-102, P-125,
Sabbatini A.	P-171		P-210
Sacher M.	F-017, P-169	Saporito A.	P-173
Sadahiro M.	P-138	Saskin R.	F-016
Saeki Y.	F-036, P-208	Sato M.	O-056, P-153,
Safranow K.	P-166		P-185
Sagan D.	O-007	Sato N.	P-144

Abstract Author	List	Abstract Author	List
Sato Y.	F-036, O-056, Shan H.		P-183
	P-208	Shargall Y.	F-030 , P-096,
Sawant A.	P-177		P-168, P-174
Saydam O.	P-140	Shcherbakova G.	P-234
Sayın O.	F-051	Shen L.	P-163
Saylan A.	P-240	Shen Y.	P-170
Scaramuzzi R.	F-033	Shibano T.	P-267
Scarci M.	F-074, P-116,	Shibuya J.	P-144
	P-168, P-174	Shimada J.	F-071, P-132
Scheuepbach R.	F-050	Shimizu K.	V-081
Schiavon M.	P-128	Shim Y.M.	F-063, F-072,
Schieman C.	F-030		P-149, P-204
Schirren J.	P-181	Shinohara S.	P-192 , P-221
Schmid T.	F-014, F-017,	Shinozaki-Ushiku A.	P-185
	P-169, P-209	Shin S.	F-063, F-072 ,
Schneider L.	F-030		P-204
Schneider-Stickler B.	F-025	Shiono S.	P-144
Schneiter D.	B-001	Shirahashi K.	P-094
Schreurs W.	F-046	Shirai S.	P-242
Schumacher S.	P-190	Shirai, T.	P-232
Schutzner J.	P-115	Sihoe A.	F-073, P-118,
Schuurmans M.	F-050, P-147		P-120, P-248
Schwarz S.	P-187, P-200	Silini E.M.	P-155
Schweiger T.	F-025, F-055,	Silva J.	P-241
	P-187	Simó M.	P-247
Seguin-Givelet A.	F-014	Simomura M.	F-071
Semik M.	P-121	Šimundža I.	P-217
Senanayake E.	F-053	Singh G.	P-117
Sepesi B.	F-028	Skov B.G.	P-229
Serra N.	P-210	Slama A.	P-261
Sezen C.B.	P-140	Sledzinska A.	P-095
Shang QX.	P-201	Smelt J.	P-195



Abstract Author	List	Abstract Author	List
Smolle J.	P-203	Stork T.	F-055
Smolle-Jüttner FM.	P-109, P-142,	Stratakos G.	F-054
	P-203	Strießnig A.	P-109, P-142,
Socci L.	P-131		P-203
Sogni F.	F-066	Suarez C.	P-263
Sokolov V.	P-243	Suarez F.	P-263
Sokolow Y.	F-014	Subasi M.	P-240
Solé J.	P-247	Suesada M.	P-097
Solli P.	B-002, P-090,	Sui X.	P-178, P-238
	P-168, P-174	Sun HB.	P-113, P-164
Sollitto F.	P-210	Sun K.	P-177
Sonett J.	P-117	Sunyer G.	O-057
Song S.W.	P-225	Sun Z.	O-061
Sørensen H.M.	F-018	Suzuki H.	P-114, P-144
Spaggiari L.	P-123, P-126,	Suzuki J.	P-138
	P-189	Suzuki K.	F-065, F-070,
Sperduti I.	P-123, P-126,		P-188 , P-218,
	P-189		P-222, P-262
Spicer J.	P-103	Swatek P.	P-109, P-142,
Srinivasan L.	P-207		P-203
Stacher-Priehse E.	P-109, P-142	Swisher S.	F-028
Stahel R.	P-198	Sziklavari Z.	P-177
Ståhlberg A.	F-044	Taghavi S.	F-027, P-200,
Stamatelopoulos A.	P-129		P-254
Stanek I.	P-115	Takahashi T.	P-153, P-185
Stanzi A.	F-014	Takamochi K.	F-065, F-070,
Stefanelli A.	P-219		P-188, P-218,
Stein L.	F-044, P-184		P-222, P-262
Steyn R.	P-150	Takasaki C.	P-133, P-270
Stiles B.	F-031, F-047,	Takenaka M.	P-271, V-009,
	O-060		V-039
Stoerkel S.	P-190	Takeuchi S.	P-260

Abstract Author List Takeyasu Y. P-148 Toloza E. P-162 Takuwa T Topac A. O-058, P-127, P-261 Torre M. B-004 P-268 Torricelli E Tamari S V-087 F-075 Tamburini N. P-219 Tosi D. B-004, P-230 Tanaka F. O-058, P-127, Toyooka S. O-056 P-271, V-009, Trainer S P-181 Travis W V-039, V-040 O-007 Tanaka K Tricard J P-159 P-114 Tanaka M Tsiambas E P-153 P-129 Tsuboi M Taniguchi Y. P-135 P-107, P-148, P-226 Tsuboi T P-136 Tao H. V-041 Tsunezuka H. P-132 Tedde M. F-074 Tsuta K. P-107, P-148 Tejani M. F-044 Tsvirenko A P-156 Tenconi S F-079 Tunea C P-239 Tunezuka H Teng M. F-021 F-071 Turkkan S Terada Y. V-087 P-240 Terauchi K. Turna A. F-071 P-152, P-265 Terminella A. F-075 Turna Z H P-265 Terra R. F-024, P-097, Ueda M. P-192, P-221 Uehara H. P-167 **P-232**, P-242 Tezel C Uemura Y **P-197** P-107 Thomas P Ugalde Figueroa P. F-014, F-045, P-253 UiA O-007, V-042, P-133, P-270 V-083 Ulrich S P-108 Tian Y. P-202 Uramoto H. P-144 Tiberi M. P-171 Urbanek K. F-066 Tinelli C. Uribe-Etxebarria Lugariza-F-019 Tiszlavicz L. Aresti N. F-052 V-086 Toker A Usuda J F-051, P-162, P-260 Vadasz P. P-174, V-010 P-176



Abstract Author	List	Abstract Author	List
Vagvolgyi A.	P-176	Volchenko N.	P-243
Vaira V.	P-137	Volpi S.	P-194
Vallilo C.	P-097	Von Voigt C.	P-181
Vandenberge J.	P-117	Vursol D.	P-199
Van Raemdonck D.	F-045, P-106,	Wada A.	P-250, V-082
	P-264	Wada H.	P-114
Van Veer H.	P-119, P-212	Waddell T.	F-016, P-170
Vaporciyan A.	F-028	Wakejima R.	P-192, P-221
Varela G.	F-078, P-220	Wallis C.	F-062, V-038
Varga J.T.	P-176	Waloszczyk P.	P-166
Varona D.	P-247	Walsh G.	F-028
Vasilev I.	V-012	Wang J.	F-021, F-048,
Veen E.	P-259		F-069
Velez-Cubian F.	P-162	Wang X.	F-037 , F-069
Vellaichamy R.	P-266	Wang ZF.	P-113, P-164
Ventura L.	P-155	Watanabe M.	P-091
Venuta F.	F-045, F-075,	Watanabe R.	P-192, P-221
	O-007	Watarai H.	P-138
Verbrugge L.	P-264	Webb J.	P-150
Veres L.	P-195, P-206	Weckler B.	P-181
Verhagen A.	F-014	Weder W.	B-001, F-050,
Veronesi G.	P-162		P-108, P-147,
Vervloet G.	P-119		P-198
Vicidomini G.	F-033	Wei Y.	B-003
Vidal R.	P-112	Welter S.	O-007
Vieira A.	P-253	Wen C.	F-030
Vigo Á.	F-024	Weynand B.	P-264
Villarroel R.	P-263	Wiebe K.	P-211
Viñolas N.	O-057	Wigle D.	O-061, P-244
Vishnevskaya G.	P-180	Win T.	P-194
Vleugels M.	F-067, P-139	Wirsching A.	P-161
Voiculescu V.	P-239	Witte Pfister A.	P-213

Abstract Author	List		
Woebker G.	P-237 Yang Y.		F-073, P-118,
Wojcik J.	P-166		P-120
Won YD.	P-225	Yasuda A.	P-232
Wouters M.	F-046	Yasufuku K.	P-170
Wurlod DA.	P-214	Yazicioglu A.	P-240
Xiang J.	F-048	Ye B.	P-182
Xiao D.	P-110	Yekeler E.	P-240
Xiao R.	P-100, P-122,	Yendamuri S.	B-006
	P-154	Yeskov S.	P-191
Xie D.	O-061	Ye X.	P-202
Xing H.	F-069	Yigit U.	P-257
Xu X.	P-120 , V-043	Yin W.	F-073
Yablonskii P.	P-143, V-012	Yoganathan S.	P-269
Yablonsky P.	P-179	Yokoi K.	O-056
Yaksi O.	P-265	Yokoi T.	P-148
Yalçınkaya İ.	P-197	Yokose T.	V-082
Yamada E.	F - 044	Yoneda K.	O-058
Yamada K.	V-082	Yoon D.W.	P-149
Yamada T.	P-192, P-221	Yoshida J.	P-135
Yamada Y.	P-147	Yoshida K.	O-056
Yamamoto H.	P-094	Yoshida Y.	P-153
Yamamura A.	F - 074	Yoshikawa R.	V-081
Yanagimoto H.	P-148	Yoshimura T.	V-087
Yang C.	V-088	Yoshino I.	P-114
Yang F.	F - 069, P-098 ,	Yoshiyasu N.	P-111 , P-160
	P-100, P-100,	Yotsukura M.	P-099
	P-122, P-122,	You B.	P-202
	P-154, P-154	Young T.	P-248
Yang H.	F-048 , F-048,	Yuan Y.	P-104
	F-048, P-110	Yu Z.	B-003, F-048
Yang M.	V-043	Zaatar M.	P-108
Yang P.	O-061	Zabaleta J.	P-089



Abstract Author	List	Abstract Author	List
Zaccagna G.	P-090	Zo J.I.	F-063, F-072,
Zanner R.	P-236		P-149
Zemtsova I.	P-143	Zsoldos P.	P-134
Zeng F.	P-246		
Zeng T.	F-049		
Zeng Z.	V-043		
Zhang J.Z.	P-130		
Zhang M.	O-061, P-256		
Zhang P.	B-003		
Zhang R.	B-003		
Zhang RX.	P-113, P-164		
Zhang S.	F-049		
Zhang WQ.	P-202		
Zhang X.	P-146, P-182		
Zhang XL.	P-092		
Zhao G.	V-043		
Zhao H.	P-178		
Zharkov V.	P-191		
Zheng B.	F-049		
Zheng W.	F-049		
Zheng X.	F-048		
Zheng Y.	P-113, P-164		
Zhou D.	P-248		
Zhou J.	P-098, P-100 ,		
	P-122, P-154		
Zhou K.	P-105		
Zhou Y.	O-059, P-246		
Zhou Z.	F-044		
Zhu C.	F-048		
Zhu Y.	P-248		
Zisis C.	F-054, P-186		

25 th European	Conference or	n General	Thoracic Surgery	AUTHOR LIST
---------------------------	---------------	-----------	-------------------------	-------------



25 th European	Conference or	n General	Thoracic Surgery	AUTHOR LIST
---------------------------	---------------	-----------	-------------------------	-------------



25 th European	Conference or	n General	Thoracic Surgery	AUTHOR LIST
---------------------------	---------------	-----------	-------------------------	-------------



25 th European	Conference or	n General	Thoracic Surgery	AUTHOR LIST
---------------------------	---------------	-----------	-------------------------	-------------



25 th European	Conference or	n General	Thoracic Surgery	AUTHOR LIST
---------------------------	---------------	-----------	-------------------------	-------------



25 th European	Conference or	n General	Thoracic Surgery	AUTHOR LIST
---------------------------	---------------	-----------	-------------------------	-------------


