ORAL PRESENTATIONS

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OP-01

AN IMAGE-GUIDED DIAGNOSTIC PATHWAY FOR UNDIAGNOSED PLEURAL EXUDATES

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Aim: The most efficient approach to undiagnosed pleural exudates remains uncertain. We assessed the efficiency and safety of an image-guided diagnostic pathway including ultrasound (US)-assisted closed pleural biopsy as an alternative to thoracoscopy as a first-line investigation in undiagnosed exudates.

Materials and Methods: Patients with non-diagnostic thoracocentesis were prospectively stratified on imaging as having (A) an associated mass lesion (>10mm) abutting the chest wall; (B) diffuse pleural thickening (>10mm) and/or nodularity, or (C) insignificant/no pleural thickening. US-assisted repeat thoracocentesis and transthoracic fine-needle aspiration were performed on patients stratified to (A), and if non-diagnostic on on-site analysis, a Tru-Cut biopsy was performed in the same session. US-assisted thoracocentesis and Abrams needle biopsies were performed on all other patients aiming at the region(s) of interest (B) or low supra-diaphragmatic pleura (C). Thoracoscopy was reserved for cases not diagnosed by repeat thoracentesis and biopsy.

Results: Final diagnoses in 78 consecutive patients included pleural malignancy (n=42), TB (n=30), and other causes (n=6). Accurate diagnoses were obtained in 69 (88.5%) with US-assisted thoracocentesis and biopsy. The yield was high for TB (93.3%) and malignancy (88.1%). Complications included mild haemoptysis (n=1) and pneumothorax (n=1, no intervention required). Thoracoscopy was performed in 13 cases (16.7%), including all 4 cases that were correctly diagnosed on closed biopsy as non-specific pleuritis, and yielded diagnoses in 12.

Conclusions: A diagnostic algorithm based on pleural morphology, US-assisted thoracocentesis and biopsy has a high diagnostic yield and offers an efficient and safe alternative to thoracoscopy as a first-line investigation in undiagnosed pleural exudates.

Key words: Closed pleural biopsy, ultrasound, pleural effusion

OP-02

OUTCOMES OF TALC PLEURODESIS-THORACOSCOPIC APPROACH VS. CHEST TUBE APPROACH-A SYSTEMATIC REVIEW AND META-ANALYSIS

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Aim: Malignant Pleural Effusion (MPE) is a known complication of malignancy. Talc Pleurodesis (TP) and Indwelling Pleural Catheters (IPC) are used for palliation. In terms of patient outcomes, the IPC approach has been shown to be non-superior to TP (TIME2 trial, Davies et al.). Therefore, the method of choice for palliation needs to be decided on a case by case basis. TP can be achieved by talc insufflation via thoracoscopy (TTI) or talc slurry via chest tube (TS). The best initial approach for TP remains unclear. The aim was to perform a systematic review and meta-analysis of studies comparing TTI with TS in terms of outcomes.

Materials and Methods: Prospective studies (RCTs, cohort studies) were identified by searching databases. Out of 474 results, 2 RCT's and 1 cohort study were identified. Outcomes (risk of recurrence of effusion and respiratory complications) were identified in TS and TTI groups. A meta-analysis was performed with the resultant data displayed in forest plots.

Results: There was no difference in the rates of reduction in the risk of recurrence in the effusions between TTI and TS groups (RR 0.86, 95% CI 0.68-1.08). There was an increased incidence of respiratory complications (RC) in the TTI group (RR 2.05; 95 % CI 1.33-3.16) compared to the TS group.

Conclusions: TTI does not reduce the risk of recurrence of effusion compared to TS, but the risk of RC is increased in the TTI group. Based on these results, TS might be the initial step if TP is chosen.

Key words: Malignant pleural effusion, talc pleurodesis, thoracoscopic talc insufflation, talc slurry, systematic review, meta-analysis, outcomes

OP-03

SEMI-RIGID THORACOSCOPY FOR DIAGNOSING PLEURAL DISEASES AND TALC PLEURODESIS

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Aim: Thoracoscopy with a semi-rigid instrument is a recent technique for diagnosing pleural diseases. The purpose of this study was to report diagnostic yield and complications of the method.

Materials and Methods: Patients with pleural effusion of unknown origin and/or pleural irregularities suspicious for pleural malignancy were included after less invasive means of diagnosis had failed. All procedures were performed under local anaesthesia with intravenous sedation/analgesia with a single point of entry with semi-rigid thoracoscope (Olympus LTF-160). Data were collected prospectively between 2008 and 2012.

Results: One hundred fifteen thoracoscopies were performed on 111 patients. Median age was 65 years (range 28–86 years), 14.4% were female and 85.6% male. 73 (65.8%) patients had malignant pleural disease (mesothelioma, metastatic cancer) and 38 (34.2%) had benign disease. Sensitivity, negative predictive value and accuracy of procedure for malignancy were 96.0%, 93.0% and 97.4%. Pleurodesis was made in 34 patients; in 32 (94.1%) it was assessed as successful after 1 month. There were 24 adverse events: 3 patients had empyemas, 3 patients had bronchopleural fistulae after chest tube placement and lung re-expansion, 5 patients had excessive pain after pleurodesis, 6 patients had sedation-associated hypotension and 7 patients had self–limited fever after pleurodesis. One patient died 11 days after a procedure for advanced carcinoma.

Conclusions: Semi-rigid thoracoscopy is an accurate and safe method for the evaluation of pleural diseases and is useful for therapeutic talc pleurodesis.

Key words: Flex-rigid pleuroscopy, pleural biopsy, pleural effusion, safety, thoracoscopy

OP-04

CRYOBIOPSY VERSUS FORCEPS BIOPSY DURING SEMI-RIGID THORACOSCOPY-COMPARISON OF SAMPLE SIZES

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Aim: Cryobiopsy is a new modality of tissue sampling during semi-rigid thoracoscopy. In a previous work we reported the feasibility and safety of the method. The purpose of this study was to compare the size of biopsy specimens obtained by cryobiopsy with specimens obtained by flexible forceps in different pleural diseases.

Materials and Methods: Twenty-seven patients with pleural effusion of unknown origin that underwent semi-rigid thoracoscopy were included. Biopsies were obtained using a flexible autoclavable cryoprobe 20416-032 (ERBE, Germany), 2.4 mm in diameter, or flexible FB-55CD-1 Olympus forceps. The study was approved by the National Medical Ethics Committee and all participants signed an informed consent form.

Results: Tissue samples were obtained from all 27 patients by forceps and from 26 patients by cryobiopsy; three with each technique per patient. The median size of the cryobiopsy sample was 13.3 (3.3–86.7) mm² and 9.6 (2.3-27.2) mm² for the forceps samples. Median sizes of samples obtained by forceps were 11.9 mm² for flat and 9.1 mm² for nodular lesions, and those obtained by cryoprobe were 10.3 mm² for flat and 28.0 mm² for nodular lesions ($p<0.05$). Diagnostic yield was the same in both techniques in patients where both types of samples were obtained. There were no bleeding problems after the biopsies.

Conclusions: Cryobiopsy during semi-rigid thoracoscopy appears to be an effective and safe new method for obtaining biopsy specimens from the pleural cavity. Cryobiopsy samples were bigger than samples obtained by flexible forceps, especially in nodular lesions.

Key words: Cryobiopsy, flex-rigid pleuroscopy, pleural biopsy, safety, thoracoscopy

OP-05

COMBINED DIAGNOSTIC-THERAPEUTIC MANAGEMENT OF RECURRENT SUSPECTED MALIGNANT PLEURAL EFFUSION

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Aim: Medical thoracoscopy is recommended for the diagnosis of recurrent symptomatic pleural effusions of undetermined aetiology, especially when malignant aetiology is suspected. Traditionally, medical thoracoscopy requires post-procedural tube thoracostomy with a 3-5 day hospitalisation depending on whether or not pleural biopsies and/or chemical pleurodesis were also performed. Numerous therapeutic options including tunnelled pleural catheter (TPC) placement are available for the management of malignant pleural effusions (MPE).

Described is an efficacious alternative in the management of recurrent symptomatic effusions of suspected malignant aetiology, in whom initial evaluation has failed to yield a speciic diagnosis. With this approach, hospitalisation rates are decreased and chemical pleurodesis can be avoided.

Materials and Methods: Retrospective review of 11 patient medical records that underwent medical semi-rigid thoracoscopy/pleural biopsies followed by TPC placement between

12/2009-11/2012. Patients selected presented with recurrent symptomatic unilateral pleural effusions that were:

1. Lacking specific diagnosis after initial evaluation including pleural fluid analysis.
2. Clinically suspicious for MPE.
3. Demonstrating symptomatic relief with prior thoracentesis(es).
4. Rapidly recurrent and symptomatic.

Results: Malignant aetiology was seen in 8/11 (72.7%), and symptom relief in 10/11 (90.9%). Discharge within 4 hours of post-procedural observation was reported for 9/11 (81.8%), while hospitalisation for <48 hours was seen for 2/11 (18.1%): one patient suffered from chest pain, while the second reported exacerbation of COPD. Spontaneous pleurodesis via TPC was reported in 4/11 (36.3%).

Conclusions: Recurrent symptomatic pleural effusions of suspected malignant aetiology can be efficaciously managed via a combined diagnostic-therapeutic approach utilising medical thoracoscopy/parietal pleural biopsies and TPC placement.

This limited experience demonstrates that combining these procedures in selected patients proved efficacious, and avoided chemical pleurodesis in all and hospitalisation in most patients.

Key words: Malignant pleural effusion, semi-rigid video-assisted thoracoscopy, tunnelled pleural catheter

OP-06

VALIDATION OF A METHOD FOR CONTINUOUS PLEURAL MANOMETRY

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Aim: Pleural manometry can predict the presence of trapped lung and guide large-volume thoracentesis. The current technique for pleural manometry transduces pressure from the needle or tube to the outside of the chest, necessitating intermittent cessation of fluid drainage at times of pressure recording [1]. We aimed to validate a technique for performing continuous pleural manometry, where pressure is transduced from an epidural catheter and passed through the drainage tube to sit within the pleural space.

Materials and Methods: Pleural manometry was performed on 10 patients undergoing thoracentesis of at least 500mls, using the traditional intermittent and new continuous technique simultaneously, with pleural pressures recorded after drainage of each 100ml. The pleural elastance (PEL) curves and their 95% confidence intervals, derived using measurements from each technique, were compared using analysis of covariance and the Wilcoxon-matched-pairs-signed-rank test, respectively.

Results: There was no significant difference in PEL calculated using each method ($p>0.1$), however the confidence intervals for the PEL using the continuous method were significantly narrower ($p=0.04$).

Conclusions: Pleural manometry can be transduced from an epidural catheter passed through the drainage tube into the pleural space, which provides continuous recording of the pleural pressure throughout the procedure. This could allow the calculation and display of the pleural pressure and PEL in real-time if the system was connected to a computer with appropriate software.

Key words: Pleural manometry, pleural effusion, thoracentesis, trapped lung

OP-07

INTERVENTIONAL BRONCHOSCOPIC TREATMENT IMPROVES QUALITY OF LIFE IN PATIENTS WITH ADVANCED BRONCHIAL CANCER

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Aim: Improvement of quality of life (QOL) is the main issue in patients with advanced bronchial cancer. Haemoptysis, dyspnoea and irritating cough resulting from endobronchial obstruction are the main causes of QOL disturbance in those patients and interventional bronchoscopic treatment may play a role in solving this problem.

Materials and Methods: Patients with different symptoms related to endobronchial obstruction due to lung cancer were recruited into two groups. The first group was treated with argon plasma coagulation (APC) and the second group was treated with cryotherapy. All methods were applied via the fibreoptic bronchoscope under local anaesthesia. The impact of bronchoscopic treatment on improvement of symptoms, arterial blood gas parameters, pulmonary function test parameters, QOL and performance scales were evaluated.

Results: Forty five patients were recruited to the study. Twenty five patients were treated with APC and twenty patients were treated with cryotherapy. APC and cryotherapy were able to improve symptoms such as dyspnoea (80% and 41.7%, respectively), haemoptysis (both 100%), cough (99% and 66.7%, respectively) and chest pain (both 50%). Also, they improved pulmonary function test and blood gas parameters with subsequent improvement in the performance state of the treated patients.

Conclusions: Bronchoscopic treatment is an effective tool for dealing with symptoms related to endobronchial obstruction with subsequent improvement in pulmonary function and blood gas levels, as well as QOL in these patients.

Key words: Quality of life, interventional bronchoscopy, advanced lung cancer

OP-08

EFFECT OF INTERVENTIONAL BRONCHOSCOPIC TREATMENT ON SURVIVAL IN SMALL CELL LUNG CANCER

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Aim: The efficiency of interventional bronchoscopic treatment methods in malignant airway obstruction is well known, but in all series, the main indication group consists of non-small cell lung cancer patients. However, the place of interventional methods in small cell lung cancer (SCLC) patients with symptomatic airway obstruction is less well evaluated. By some authors, endobronchial treatment in these patients was found to be contraindicated. In this study, the place and effect of interventional bronchoscopy in SCLC patients were discussed.

Materials and Methods: From the 944 cases for which rigid bronchoscopy under general anaesthesia was applied in our unit between January 2005 and December 2012, 52 consecutive SCLC cases evaluated retrospectively. Indications, complications and the effect of the procedure on survival were evaluated.

Results: Mean age of the patients was 56.87±10.16 (range 34-78) and 41 of them were male. The most common obstruction areas were distal trachea and carina invasion, involving both main bronchus (n: 12; 29.2%). The most common complication during the procedure was bleeding (mild in 11 cases and massive in one). One patient died during the procedure (2.4%) and also in one patient the procedure ended early due to hypoxia. The most common method used was mechanical de-obstruction after coagulation with a diode laser or APC. 16 stents were applied to 15 of the cases (36.5%). The most commonly used stent was a silicone Y stent (n: 11). Four cases were still alive and the mean follow-up time was 540 days (range 50-1097 days). In the deceased group the mean survival time was 33 days (95% CI: 26.00-91.71; range 1-683 days).

Conclusions: Interventional bronchoscopic treatment seems to be the last option treatment in terminal stage SCLC patients. Other than emergency situations (suffocation and haemoptysis), chemoradiotherapy was thought to be a sufficient treatment option for airway management; however, this has a negative effect on survival time. Making airways clear and safe using bronchoscopic methods in earlier periods in these patients can increase survival significantly.

Key words: small cell lung cancer, stent, laser, bronchoscopy

OP-09

TREATMENT OF POST-INTUBATION TRACHEAL STENOSIS: 5-YEAR RESULTS

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Aim: The aim of the study was to evaluate the results of post-intubation tracheal stenosis (PITS) treatment in our institution during a 5–year period (from 2006 to 2010).

Materials and Methods: During the 5–year period, we treated 66 patients with iatrogenic post-intubation stenosis of the trachea: 41 males (mean age 48 years) and 25 females (mean age 45 years).

Results: In 42 patients who did not have medical contraindications, surgical resection of stenosis and end to end anastomosis was performed. In only 2 patients (4.7%), relative restenosis developed after the procedure, which was resolved with laser photocoagulation and dilatation with rigid bronchoscopy or a balloon. In the remaining 24 patients, endoscopic procedure under general anaesthesia was performed. In all patients, radial resection with an electro-knife was used, followed by rigid bronchoscopy or balloon dilatation. In only 3 patients (12.5%) were satisfying results achieved after first dilatation. All of the 21 remaining patients underwent a second procedure 2-3 weeks after the first. The second procedure was successful in 8 patients (33%). In 13 patients with restenosis after second dilatation, silicone stents (10 cylindrical and 3 hourglass-like) were implanted. All stents were removed after one year. There was no restenosis after stent removal in all patients.

Conclusions: We conclude that the treatment of choice for patients with post-intubation tracheal stenosis is surgical resection and end to end anastomosis. In patients who are ineligible for or refused surgical procedures, endoscopic dilatation is indicated. In cases of failure after multiple endoscopic dilatations, the long-term implantation of a tracheal stent is the treatment of choice.

Key words: Tracheal stenosis, surgical resection, endoscopic dilatation, tracheal stent

OP-10

TREATMENT OF AIRWAY STENOSES IN WEGENER'S GRANULOMATOSIS

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Aim: Wegener's granulomatosis (WG) is a systemic vasculitis that primarily involves the upper and lower airways and the kidneys. The most frequent airway manifestations include subglottic (SGS) and bronchial stenoses (BS). Endoscopic visualisation of the airways is the best tool for assessing, diagnosing and managing those changes. To determine the safety and efficacy of treating subglottic and bronchial WG's stenoses

with laser-assisted mechanical dilation (LAMD) and combined treatment with immunosuppressive agents.

Materials and Methods: Patients admitted for GW were identified. Diagnosis was based on positive c/p-ANCA or compatible histology. Patients with airway stenoses underwent rigid bronchoscopy under general anaesthesia with radial incisions of the stenosis (diode laser) followed by gentle mechanical dilatation using progressively larger bronchoscopes. Silicone stents were placed when necessary. Medical treatment was prescribed to consolidate endoscopic results. LAMD was repeated at symptom relapse.

Results: Among 82 patients diagnosed with WG, 17 (21%) had SGS or BS (16F; 1M) and were treated endoscopically. 15 out of 17 had airway stenosis as the sole manifestation of WG, while 2 were affected by the systemic syndrome. Endoscopic findings for SGS were 7 sleeve stenoses, 6 web-like stenoses and 2 pseudotumours. No major complications were observed. The average follow up was 82.7 months since first endoscopic treatment. The symptom free period after treatment was variable between 6 and 80 months.

Conclusions: Treatment of SGS is not well defined yet. The ideal treatment should guarantee rapid resolution of airway obstruction, treat the underlying inflammatory disease and prevent relapses. An integrated endoscopic and medical approach is mandatory.

Key words: Subglottic stenoses, Wegener's granulomatosis, bronchoscopy

OP-11

A CASE SERIES: SPEAKING AFTER ENDOSCOPIC TREATMENT FOR COMPLETE TRACHEAL STENOSIS

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Aim: Tracheal stenosis is the result of fibrotic tissue formation after lesions occur in the airway, which in turn produce a decrease in the lumen of the organ. It may appear in patients that have undergone mechanical ventilation for a long time as well as after a tracheostomy. Complete tracheal obstruction compromises speech and open surgery is the standard treatment procedure. However, it is contraindicated in some patients, depending on stenosis length and location or the associated conditions. If there are contraindications, some endoscopic procedures are available.

Materials and Methods: Here, we present 15 cases of complete subglottic stenosis with phonation loss that were successfully treated between 2009 and 2013 with an endoscopic approach. Thereafter, we describe the novel technique used.

Results: A rigid bronchoscope is placed through the vocal cords, above the stenosis. Subsequently, the tracheostomy tube is removed and a Schieppati's needle is placed at the centre of the stenosis, which then functions as a guide. Afterwards, dilation of the stenosis is performed in a sequential way using a Jackson's bougie. The tissue is removed using the bronchoscope until the desired lumen diameter is reached. After this, a Dumon's tracheal stent is placed distal to the vocal cords, which secures the airway and closes the tracheostomy.

Conclusions: Here we solved successfully a serious obstructive complication that affects breathing and communication, attaining normal pulmonary function tests parameters and immediate phonation recovery. We also avoided the use of the open surgery approach which comprises a higher risk of serious complications for patients.

Key words: Bronchoscopy, endoscopic treatment, complete tracheal stenosis

OP-12

OVERCOMING THE LIMITATIONS OF CLASSICAL DELIVERY TECHNIQUES FOR A SELF-EXPANDING Y TRACHEOBRONCHIAL STENT USING AN ENDOSCOPIC-GUIDED APPROACH THROUGH COMBINED SUSPENSION LARYNGOSCOPY AND JET VENTILATION

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Aim: The Y tracheobronchial stenting occurs most often in difficult respiratory situations, requiring effective ventilation and an easy and reliable delivery system. The most commonly used Y-shaped silicone Dumon stent involves the expertise of rigid bronchoscopy and has some technical limitations. The new self-expandable metallic Y-stents provide an easy to use delivery system; however, limitations include the wide diameter of the introducer that limit effective ventilation and the fluoroscopic, indirect guidance, which limits the precise positioning of the prosthesis.

Materials and Methods: We describe a 4 steps procedure: 1) Insertion of a 2mm Jet Ventilation catheter between the vocal cords. 2) Positioning a rigid suspension laryngoscope next to the Jet Ventilation catheter in front of the vocal cords to provide maximum exposure of the proximal airways and a large working pathway. 3) Introduction of the prosthesis introducer sheath (8mm) and a flexible bronchoscope (4.9 mm) through

the laryngoscope in parallel. 4) Positioning and delivery of the stent under direct endoscopic control and constant ventilation.

Results: Two patients with oeso-tracheal fistula and 2 with obstructive carcinoma of the carina were treated using this technique. The 4-step procedure was easy to perform and allowed perfect positioning of the prosthesis in every case, while avoiding ventilation issues. The mean duration of the procedure, excluding prior tumour debulking procedures but including jet ventilation and suspension laryngoscopy set-up, was 15-30 minutes.

Conclusions: The use of combined suspension laryngoscopy, flexible bronchoscopy and jet ventilation techniques make challenging endoscopic interventions on the proximal airways-such as self-expanding Y tracheobronchial stent delivery-easy, precise and safe.

Key words: Delivery techniques for tracheobronchial stent, combined suspension laryngoscopy flexible bronchoscopy and jet ventilation techniques

OP-13

ASSESSMENT OF TRACHEOBRONCHIAL STENOSIS USING A NOVEL STEREOSCOPIC BRONCHOSCOPE FOR AIRWAY MEASUREMENT

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Aim: Stereoscopic bronchoscope (BF-Y0006, Olympus, Tokyo) is a new diagnostic tool to measure the diameter and cross-sectional area of the airway. The bronchoscope, which operates in the same way as a normal bronchoscope, utilises two lenses to measure the airway using the principles of triangulation. To assess the accuracy of stereoscopic bronchoscope measurements, we compared stereoscopic bronchoscopy images with multi-detector computed tomography (MDCT).

Materials and Methods: Between February 2009 and February 2012, we performed airway stenting on 21 patients: 15 malignant and 6 benign cases. We then compared pre-operative stereoscopic bronchoscope images and MDCT to assess narrowing areas in the airway at 165 points. Of these, 134 were considered normal and 31 were deemed abnormal. Stereoscopic bronchoscope also has the capability to measure the size of the airway during intervention in real-time.

Results: Diameter and length measurements at all areas taken by stereoscopic bronchoscope and MDCT were near equal in all patients. Significant correlations were seen at all 165 sites ($r=0.7944$, $p<0.0001$), and for 134 normal ($r=0.849$, $p<0.0001$) and 31 abnormal sites ($r=0.785$, $p<0.0001$). Stereoscopic bronchoscope is also useful for assessing improvements in airway stenosis post-operation, such as laser ablation or ballooning, and for observing the sequence of changes in airway diameters.

Conclusions: Stereoscopic bronchoscopy was able to measure the size of the airway during intervention, making it possible to choose the appropriate size stent.

Key words: airway measurement, stereoscopic bronchoscopy, airway stent

OP-14

EFFECTIVENESS OF THE TEMPORARY POSITIVE EXPIRATORY PRESSURE DURING AEROSOL THERAPY IN THE MANAGEMENT OF PATIENTS WITH TRACHEOBRONCHIAL STENT

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Aim: Bronchial stent for the treatment of tracheobronchial stenosis may cause mucus plugging with different degrees of respiratory distress, occasionally requiring bronchoscopic clearance that occurs more with silicone stents than metal ones. Our aim was to reduce the occurrence of mucous plugging and consequent respiratory distress in patients with tracheobronchial silicon stent utilising Temporary Positive Expiratory Pressure (T-PEP) during aerosol therapy.

Materials and Methods: Fifty patients implanted with tracheobronchial silicone stents were randomly divided into two groups: Group 1 received T-PEP on day 1 post-implantation in association with aerosol therapy; Group 2 received aerosol therapy only. Barthel Index, MRC scale and a four point endoscopic score for the degree of secretions accumulated were used in follow-up evaluations at day 1, day 30, and 3 and 6 months post-stent placement.

Results: Mean follow-up was 254 days, stent infections occurred in 33% of patients without T-PEP and 22% with T-PEP, mucus obstruction requiring bronchoscopic clearance in 9% in group 2 and 3.7% in group 1. The overall stent complication rate was reduced in group 1 with less infections and mucus obstructions requiring bronchoscopic clearance. QoL and physical performance was better in group 1.

Conclusions: We advise the early utilisation of T-PEP in silicone stents to reduce clinical complications, hospital stay and costs.

Key words: Malignant stenosis, tracheobronchial stent, mucostasis, Temporary Positive Expiratory Pressure

OP-15

IMPROVEMENT IN QUALITY OF LIFE (QOL) AFTER ND:YAG LASER RESECTION OF CENTRAL LUNG CANCER

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Aim: Nd: YAG laser resection is one of the most commonly used interventional pulmonology techniques for urgent desobstruction of malignant central airway obstruction (CAO). The major aim of this trial was to evaluate the potential influence of Nd: YAG laser resection on overall quality of life in patients with central lung cancer.

Materials and Methods: Patients with malignant CAO scheduled for Nd:YAG laser resection were prospectively recruited to the trial. All patients were given the European Organisation for Research and Treatment, Quality of Life questionnaire (EORTC-QLQ-30) before the procedure and approximately 2 weeks after the treatment.

Results: There were 37 male and 10 female patients, with an average age of 54±10 years. The most common tumour type was adenocarcinoma, diagnosed in 51% of patients. Tumours were most usually located in the right main bronchus (53.2%) and left main bronchus (27.7%). The majority of patients were diagnosed in stage IIIB (53.2%) and stage IV (25.5%). The most common ECOG performance status was 1 (72.3%), while ECOG 2 was diagnosed in 21.3% and ECOG 3 in only 2.1% of patients. The majority of patients were current smokers (70.2%). Nd:YAG laser resection significantly improved ($p<0.000$) the quality of life according to the EORTC QLQ-30 questionnaire. However, in some of the questions (5, 14-17, 20, 25-28), dealing with nausea, vomiting, diarrhoea, constipation, family life, social activities and financial situations, we did not observe a statistically significant improvement. There was statistically significant improvement ($p<0.000$) in the overall physical condition and overall quality of life.

Conclusions: Nd: YAG laser resection of malignant CAO significantly improves the quality of life in patients with lung cancer.

Key words: Bronchoscopy, interventional pulmonology, lung cancer, Nd:YAG laser resection, quality of life

OP-16

ENDOLUMINAL THERAPY IN POST-INTUBATION AND POST-TRACHEOTOMY STENOSES OF THE TRACHEA

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Aim: The prevalence of endotracheal tube-related airway obstructions in patients who were followed up with artificial airways in intensive care units decreased to nearly 1% after the use of low cuff pressure tubes. On the other hand, stenoses caused by long-term use of tracheotomy cannula still have a very high percentage and were seen in nearly 30%. Dilatation is a well known and well applied life saving method to save time until operations in emergency situations. However there is no consensus about choosing endoscopic treatment methods as a curative treatment in these stenoses.

Materials and Methods: Recordings of consecutive 132 cases that had undergone bronchoscopic treatment between January 2005 and December 2012 were evaluated retrospectively. Methods, complications and treatment success were evaluated.

Results: Seventy (53%) of the cases were male, and the mean age was 51.93±18.18 (range 6-87). Mean rigid bronchoscopy séance was 3.75 (1-18) and fibreoptic bronchoscopy séance was 3.8 (0-22). Dilatation was only used in 43 (32.5%) of the cases, while a Montgomery T tube was placed in 9 cases and silicone stent was placed in the remaining. Mucostasis was observed 66 times in 32 (24.2%) cases, stent migration was observed 74 times in 42 (31.8%) patients and granulation causing obstruction was observed in 7 (5.3%) of the cases. Mean follow-up time was 577.82±45.92 days (1-2298). Eighteen cases which were inoperable at the beginning could have undergone operations after treatment. No mortality due to the procedures was observed.

Conclusions: Interventional bronchoscopic treatment approach is safe and effective in tracheal stenosis occurring due to artificial airways. The main principles of the bronchoscopic treatment are patience and close follow-up.

Key words: Trachea, stenosis, rigid bronchoscopy, stent

OP-17

GUIDE SHEATH SUCTION FOR BRONCHOSCOPIC SPECIMEN

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Aim: Guide sheath suction (GSS) is a specimen collection technique applying negative pressure using a syringe attached to the proximal end of the guide sheath (GS) utilised with an endobronchial ultrasonography (EBUS) probe. In this prospective study, we performed the GSS method to assess the diagnostic yield and compare it with those of bronchial brushing, biopsy, and washing.

Materials and Methods: Patients with suspected peripheral lung cancer were identified between June 2012 and January 2013 in our hospital. We performed a GSS method for lesions after visualisation with EBUS, then inserted a new guide GS and per-

formed bronchial brushing and/or forceps biopsy with endobronchial ultrasonography with a guide sheath (EBUS-GS).

Results: 30 patients were included in this study and the GSS method was performed in 26 of the patients. The size of the lesions ranged from 24-107 mm in the long axis (mean, 48.4 mm). Final diagnoses were 24 cases of lung cancer, 1 metastatic lung cancer, and 1 of pneumonia. A definitive cytopathological diagnosis was made in 23 of the 26 brushing samples (88.5%), in 21 of the 26 (80.8%) forceps biopsies, in 17 of the 26 (65.4%) bronchial washings, and in 21 of the 26 (80.8%) GSS samples. There were no complications associated with GSS.

Conclusions: The diagnostic yield of GSS was equivalent to that of forceps biopsy. The GSS method will relieve us of the bronchial washing procedure.

Key words: Guide sheath suction

OP-18

TRACHEAL OXYGEN ADMINISTRATION DURING BRONCHOSCOPY: PROOF OF CONCEPT

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Aim: Does oxygen supplementation through the working channel of a flexible bronchoscope result in higher capillary oxygen pressure (PcO_2) than O_2 administration at the same flow rate using a nasal cannula in healthy volunteers?

Materials and Methods: In 8 healthy volunteers, we measured PcO_2 at the ear lobe during bronchoscopy at an increasing O_2 flow rate (ambient air, 2 L O_2/min and 4 L O_2/min), both through a nasal cannula or directly into the trachea by using the working channel of the bronchoscope as the administration route. Two minutes after starting O_2 administration at any given flow rate and through any given route, PcO_2 was measured. Five minutes of ambient air breathing was applied before switching from one administration route to the other.

Results: At an O_2 flow rate of 2 and 4 L/min, PcO_2 was systematically and significantly higher in cases of tracheal administration as compared to nasal administration (repeated measure ANOVA, $p<0.0005$). PcO_2 during ambient air breathing, at an O_2 flow rate of 2 L/min and at O_2 flow rate of 4 L/min was 77.8+8.0 mmHg, 105.3+15.0 mmHg and 124.9+23.6 mmHg, respectively, using the nasal administration route. PcO_2 levels were 78.4+9 mmHg, 145+44.5 mmHg and 180.6+57.8 mmHg, respectively, using the tracheal administration route.

Conclusions: Tracheal administration of O_2 during flexible bronchoscopy leads to higher PcO_2 levels than the conventional nasal route of administration. These findings grant further research to find out whether the development of a bronchoscope with a dedicated channel for oxygen administration may be feasible or useful.

Key words: Oxygen supplementation, flexible bronchoscopy, capillary oxygen pressure

OP-19

NEW INTELLIGENT FORCEPS FOR ENDOSCOPIC-NAVIGATED BIOPSY

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Aim: We present a new instrument enabling the optical characterisation of lung tissue prior to biopsy. This instrument consists of two optical fibres incorporated into standard biopsy forceps. We utilised the already known principle of NIR spectroscopy of penetrating light, which enabled us to discriminate between normal and abnormal tissue in order to guide the biopsy.

Materials and Methods: We have designed an instrument for the measurement of a penetrated NIR light through the lung tissue. It consists of two fibres, 0.5 mm in diameter, incorporated into routine biopsy forceps. One of the fibres is a detector; the other is a source fibre. The indicator fibre is 3mm longer than the source fibre and is separately covered with insulation to the end. The detector fibre is connected to the NIR spectroscope and the source fibre to the NIR source. For feasibility experiments, we utilised an animal model with incorporated tumour phantoms. Measurements of normal lung tissue show significantly different spectral characteristics compared to tumour tissue.

Results: Multiple measurements over normal lung tissue proved high attenuation of NIR light compared to tumour tissue, which characterised itself by a unique peak at spectral bands from 600 to 700 nm.

Conclusions: We conclude that our results show good applicability of NIR spectroscopy utilising biopsy forceps for discrimination between normal and abnormal tissue during bronchoscopy procedures.

Key words: Bronchology, optical biopsy, NIR radiation

OP-20

ACCURACY OF EBUS-EUS VERSUS MEDIASTINOSCOPY IN STAGING OF NSCLC: AN INTENTION TO DIAGNOSE APPROACH

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Aim: EBUS-EUS has become the primary approach for mediastinal staging of NSCLC. Nevertheless, cases with inadequate samples are usually excluded from the series when the accuracy of the test is calculated. Now, we calculate the negative predictive value (NPV) and accuracy of EBUS-EUS in two situations, with or without the inclusion of inadequate samples, and compare these results with those from historical control cases undergoing mediastinoscopy.

Materials and Methods: We reviewed the cytopathological reports of a series of 116 cases of NSCLC in which mediastinal staging was performed by EBUS-EUS and compared to those obtained in 225 cases staged by mediastinoscopy. The gold standard was the histological study of lymph nodes resected at thoracotomy or the presence of malignant cells in the specimen from EBUS-EUS or mediastinoscopy. In the EBUS-EUS series, predictive values and their 95%CI were calculated for two different scenarios: excluding all cases with inadequate samples and including these cases as false negatives or true negatives depending on the final pathology report after thoracotomy or mediastinoscopy.

Results: The prevalence of pN2 was similar in both series (0.64 vs. 0.59). In the mediastinoscopy series, NPV was 0.87 (95%CI: 0.78-0.93). In the EBUS-EUS series, excluding all inadequate samples, NPV was 0.88 (95%CI 0.81-0.88) while it was 0.86 (95%CI: 0.79-0.86) if inadequate samples were included in the calculations.

Conclusions: The accuracy of EBUS-EUS decreases if inadequate samples are included in the calculation of predictive values. However, even in this scenario, the accuracy of the EBUS-EUS is comparable to mediastinoscopy during staging of NSCLC.

Key words: Mediastinal staging, EBUS-EUS, Mediastinoscopy, inadequate samples

OP-21

DETECTION OF MTB IN TB PATIENTS BAL FLUID BY USING GENOTYPE® MTBDRPLUS ASSAY

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Aim: The aim of the present study was evaluate the PCR-based Genotype®MTBDRplus assay in BALF from patients with suspected pulmonary TB.

Materials and Methods: 53 BALF samples were examined. The Genotype®MTBDRplus system was applied to screen the strains for the rapid MTBC detection and presence of rpoB (S531L, H526D, H526Y and D516V), katG (S315T) and inhA promoter region (C15T and A16G) mutations. The target loci were amplified by PCR and then hybridised with the respective site-specific and wild type probes.

Results: Out of 53 samples, 13 (24.5%) were without sputum and 40 (75.4%) were with sputum. Out of these 40, 5 (12.5%) were sputum-smear pos., and 35 (87.5%) were sputum-smear neg. Out of 53, 23 (43.3%) were BALF culture-pos. Out of these 23, 4 (17.3%) had a pos. sputum smear, 10 (43.5%) had a pos. BALF smear, and 17 (73.9%) were PCR-pos. All 10 BALF smear positive samples were PCR-pos. Out of the 17 PCR-positive BALF samples, only one showed rifampin (rpoB S531L) and isoniazid (katGS315T) resistance. Genotype®MTBDRplus assay allowed a rapid diagnosis in 8 (61.5%) out of 13 BALF culture-positive smear-negative patients, and in 5 (38.5%) out of 13 cases without sputum. Of these 5 patients, 4 (80%) were BALF culture positive. 10 (52.6%) out of the 19 sputum smear negative patients were both BALF PCR- and culture-positive. One BALF-and sputum-smear positive sample appeared to be negative by Genotype®MTBDRplus assay, as well as BALF culture

Conclusions: Combined use of BALF smear and MTB complex-Genotype®MTBDRplus assay has a good diagnostic yield.

Key words: Pulmonary tuberculosis, bronchoalveolar lavage, PCR-based Genotype®MTBDRplus assay

OP-22

RIGID BRONCHOSCOPY IN ADULT POPULATION USING TOTAL INTRAVENOUS ANAESTHESIA (TIVA) WITH SPONTANEOUS VENTILATION: THE NORTH BORNEO EXPERIENCE

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Aim: We aim to document our experience in the use of diagnostic/therapeutic rigid bronchoscopy using Total Intravenous Anaesthesia (TIVA) with spontaneous ventilation without the use of muscle paralysing agents or inhalational anaesthesia.

Materials and Methods: A retrospective study in all (n=90) patients that underwent elective diagnostic/interventional rigid bronchoscopy in our centre from 1st January 2012-1st December 2012 using TIVA with spontaneous ventilation.

Results: Mean age of patients= 54.3%. 56% of patients were ASA Class II. Main indications for procedure were cough & abnormal CT findings (38.9%), smear negative tuberculosis (17.8%) and incidental abnormal CT findings (15.6%). The favoured combination of anaesthesia given was boluses of Fentanyl (50-100 mcg), Propofol (0-50 mcg) and maintained by TCI (target controlled infusion) of Propofol. Mean intraoper-

ative duration=30.2 minutes & mean recovery room time=37.9 minutes. Intraoperative complications were 46% (majority: mild-moderate bleeding and transient hypoxia), which were mostly reversible and related to the procedure. 7% had postoperative complications. Biopsy yield was satisfactory=67% showed either granuloma, malignancy, abscess, atypical cells, interstitial pneumonitis or others. Statistical Analysis was done comparing these variables: patients ASA score, age and total bolus/maintenance of Fentanyl/Propofol in relation to intraoperative, postoperative complications, intraoperative time and recovery time, and were subsequently found to have no significance.

Conclusions: Rigid bronchoscopy using TIVA with spontaneous ventilation is safe, provides rapid induction and reversal, and has a short intraoperative and post-operative recovery time with acceptable complication rates. More studies are needed at our centre to gauge the cost effectiveness, safety and efficacy of TIVA for rigid bronchoscopy in adults compared to inhalational anaesthesia/paralysing agents.

Key words: 1: Anaesthetic techniques, bronchoscopy; 2: Anaesthetics i.v., propofol; 3: Ventilation, spontaneous

OP-23

CONVENTIONAL VS. ULTRATHIN BRONCHOSCOPY IN THE DIAGNOSIS OF SOLITARY PULMONARY NODULES (SPN)

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Aim: Ultrathin bronchoscopes (UB) can be guided under fluoroscopy to reach the SPN. The aim of this study is to compare its diagnostic yield against conventional bronchoscope (CB).

Materials and Methods: Two hospitals prospectively collected patients referred to the SPN study by bronchoscopy under fluoroscopy guidance. One centre performed the procedures with a CB (diameter 5.5 mm) and the other a UB (diameter 2.8 mm). In both groups, bronchial washings were routinely collected. In the conventional group, brushing was always performed and biopsies were obtained only when biplane fluoroscopy confirmed that forceps were in contact with the lesion. In the UB group, biopsies were only performed when an endoluminal lesion was seen; if there were no endobronchial lesion, then bronchial brushing was done.

Results: Both groups were similar, except for the number of brushes performed. Conventional [n=27]: age 67.6; gender (male) 66.7%; diameter 20.1 (SD 5.9); SUVm (n=20) 9.1; localization 0% (inner), 50% (middle), 50% (outer); bronchus sign 45%; biopsy performed 40.9%; brushes 2 in 55%, 3 in 44.4%. Ultrathin [n=39]: age 66.9; gender (male) 79.5%; diameter 21.5 (SD 6.0); SUVm (n=32) 7.7; localization 11.1% (inner), 55.6% (middle), 33.3% (outer); bronchus sign 68.4%; biopsy performed 59.1%; brushes none in 20%, 1 in 69.2%, 2 in 7.5%%, 3 in 2.6%. The final diagnosis was achieved in 44.4% in the CB group vs. 38.5% in the UB group (p=0.6).

Conclusions: Ultrathin bronchoscopy is just as effective as conventional bronchoscopy under fluoroscopy guidance in the diagnosis of SPN. Partially supported by FIS, SOCAP, FUCAP.

Key words: Solitary pulmonary nodule, ultrathin bronchoscope

OP-24

DIAGNOSTIC YIELD OF RADIAL PROBE-ENDO-BRONCHIAL ULTRASOUND (EBUS) COMBINED WITH FLUOROSCOPIC GUIDANCE IN THE EVALUATION OF PERIPHERAL PULMONARY LESION (PPL): A ONE YEAR EXPERIENCE

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Aim: Endo-bronchial ultrasound (EBUS) with guide-sheath (GS) has improved the diagnostic yield (D.Y.) of PPL. However, the guide-sheath technique does not allow a direct visualisation of the place where samplings are obtained, and movement of the sheath during the procedure can reduce the yield. We investigated a procedure that combined EBUS and fluoroscopic guidance instead of the EBUS with guide-sheath. The PPL was localised using the combination of EBUS and fluoroscopy and sampling was done under fluoroscopic guidance in the location where the lesion was identified by the EBUS.

Materials and Methods: We performed a retrospective analysis of the first 51 consecutive patients who underwent investigation for PLL with radial EBUS during one year by two pulmonologists. Final diagnosis was obtained from pathology or from changes over time.

Results: Mean size 22.3+/-9mm, mean distance to the hilum 51.27+/-20.19mm, to the pleura 27.9+/-14.9mm. A definitive diagnosis was established for 37/51 PPL (D.Y 72.5%). The D.Y. for lesion <1cm was 50% (2/4), from 1-2cm 71.4% (15/21), 2-3cm 72.8% (8/11), >3cm 77.7% (7/9).The first 10 cases had a D.Y. of 70%, from 11-20 was 50%, from 21-30 was 80%, from 31-40 was 80%, and from 41-51 was 82%. The operator with more procedures had a better yield (34/45=75.5% vs. 3/6=50%). The presence of a bronchogram increased the D.Y. (82.14% with, 63.15% without). Pure ground glass nodules have a lower D.Y. (1/6=16.6%) than mixed (3/4=75%) or solid nodules (33/41=80.5%).

Conclusions: The EBUS + fluoroscopic guidance is performed as the EBUS-GS is described in literature to diagnose PPL. The benefit of fluoroscopic guidance over the GS technique is a bet-

ter spatial definition of the PPL, enabling accurate sampling and a saving of single use sheaths.

Key words: Radial EBUS, fluoroscopic guidance, diagnostic yield, peripheral pulmonary lesion

OP-25

ANALYZING IMAGES OF ENDOBRONCHIAL ULTRASONOGRAPHY (EBUS) USING HISTOGRAM TO ASSIST IN THE DIAGNOSIS OF LUNG CANCER

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Aim: Recently, brushing and biopsy techniques of EBUS using a Guide Sheath (EBUS-GS) have become available for the diagnosis of lung cancer. Obstetrics and gynaecology fields have previously reported that quantification of sonographic echogenicity with histograms were useful for the diagnoses of tissue. To evaluate whether histogram data collected from EBUS-GS images can contribute to the diagnosis of lung cancer or not.

Materials and Methods: Sixty clear EBUS images (35 lung cancer and 25 inflammatory disease) were included in this study. The region of interest (ROI) was set within a 5mm radius from the EBUS probe with 400 pixels (20×20). Histograms were created and compared using imageJ software, with a width of the histogram: (maximum – minimum gray scale) / 256 (full gray scale) × 100 (%), height of the histogram: (maximum pixel counts), and the standard deviation of the histogram.

Results: The diagnosis yield by the width of the histogram showed a sensitivity of 74%, specificity of 72%, and positive predictive value of 78% when the cut-off level was 22 for lung cancer. Standard deviation of histograms also contributed to the diagnosis of lung cancer, with a sensitivity of 77%, specificity of 76%, and positive predictive value of 81% when the cut-off level was 10.7. Height of the histogram was not useful due to low sensitivity.

Conclusions: The width and standard deviation of EBUS image histograms were useful in differentiating lung cancer from inflammatory lesions.

Key words: EBUS-GS, lung cancer, diagnosis

OP-26

ASSESSMENT OF TRACHEAL STENOSIS USING IMPULSE OSCILLOMETRY WITH RIGID BRONCHOSCOPY

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Aim: Impulse oscillometry (IOS) assessment is useful in the evaluation of central airway stenosis before and after treatment. Previous studies reported that IOS with endotracheal tubes could be utilised at ICU. This study assesses the efficacy of IOS measurements with rigid bronchoscope during intervention in the endoscopic suite.

Materials and Methods: IOS was performed in 21 patients with tracheal stenosis during bronchoscopic intervention from April 2009 to February 2012. Measurements evaluated resistance at 5, 10, 15 and 20Hz during spontaneous breathing under general anaesthesia. IOS measurements recorded before and after interventional procedures were then compared using rigid bronchoscope.

Results: After interventional procedures, which included stenting, argon plasma coagulation and balloon dilation, airway patency was well maintained in all patients. Resistance at 5-20Hz showed significant improvements, R5: 1.39±0.90kPa/l/s to 0.68±0.37kPa/l/s (p=0.0032), R10: 1.34±0.82kPa/l/s to 0.66±0.36kPa/l/s (p=0.0021), R15: 1.35 ±0.76kPa/l/s to 0.69±0.35kPa/l/s (p=0.002), and R20: 1.39±0.72kPa/l/s to 0.74±0.33kPa/l/s (p=0.0012).

Conclusions: In this study, R20, which indicates proximal airway components, was a useful parameter before and after interventional procedures using rigid bronchoscope and to evaluate tracheal stenosis.

Key words: Impulse Oscillometry (IOS), rigid bronchoscope, tracheal stenosis

OP-27

ENDOBRONCHIAL ULTRASOUND (EBUS)-GUIDED SUCTION CATHETER-BIOPSY IN THE DIAGNOSIS OF PERIPHERAL PULMONARY LESIONS

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Aim: EBUS guided biopsy became standard in the diagnosis of peripheral pulmonary lesions (PPL). Suction catheter-biopsy is a technique for obtaining a histology sample from peripheral lung parenchyma. The aim of this study was to evaluate diagnostic efficiency, feasibility and safety of EBUS-guided suction catheter-biopsy (SCB) in comparison to transbronchial biopsy (TBB) in the diagnosis of PPL.

Materials and Methods: Radial EBUS probes (UM-3R) without guiding sheaths were used to navigate suction catheter and TBB forceps to the PPL. The catheter was connected to

the collection canister via a vacuum pump. The SCB specimens were fixed with 10% buffered formalin at room temperature overnight. Tissue specimens were embedded in paraffin. Serial sections, 4-μm thick, were cut from each selected block, deparaffinised, rehydrated and stained for histological examination.

Results: There were 168 patients enrolled in this study: 69.9% males and 30.1% females. The main lesion diameter was 4.7±1.9 cm. Diagnostic efficiency of EBUS-SCB was 71.3% and EBUS-TBB 70.8%. Prevalence of malignancy in the study was 41.1%. Sensitivity, specificity, positive and negative predictive value (PPV and NPV) of EBUS-SCB in diagnosis of malignancy were 95.1%, 44.2%, 52.6% and 93.3%, respectively. Positive and negative likelihood ratios (PLR and NLR) for both SCB and TBB were 1.7 and 0.1, respectively. Sensitivity, specificity, PPV and NPV for EBUS-TBB were 95.3%, 46.2%, 55.3% and 93.4%, respectively. Complications occurred in 2 patients: one pneumothorax and one excessive bleeding.

Conclusions: EBUS guided SCB is efficient, feasible and safe in the diagnosis of peripheral lung cancer. Absence of a guiding sheath might be the reason for relatively low specificity.

Key words: Bronchoscopy, endobronchial ultrasound, peripheral pulmonary lesions, suction catheter biopsy

OP-28

INTERVENTIONAL BRONCHOSCOPY IN THE PALLIATION OF ENDOBRONCHIAL METASTATIC TUMOURS

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Aim: Only 1.1% of all endobronchial tumours were metastatic. Different organ cancers, most commonly of the colon and breast, can result in endobronchial metastasis. The first finding of endobronchial metastasis could be airway obstruction. In this study, treatment results of 18 consecutive cases in which bronchoscopic treatment was applied were evaluated.

Materials and Methods: Eighteen consecutive cases that had undergone rigid bronchoscopy under general anaesthesia for an endobronchial lesion in our interventional bronchoscopy unit in between January 2005-December 2012 were evaluated. Applied methods, complications, and survival properties were evaluated.

Results: Mean age of the cases was 48±15.24 (range 24–76) and 13 of them were female. In 12 of the patients, the lesion was located in the trachea; in 10 it was located in the right main bronchus and in 11 it was located in the left main bronchus. In one case, a lesion was observed in the left upper lobe entrance. The most common primary organ was bone (n: 5, 27.7%) and kidney (n:4, 22.2%). Ten stents were applied to 9 cases. In other cases, desobstruction following thermic methods was sufficient. Mean application number was 1.47 (range 1–3). Haemorrhage was observed due to procedure in 3 cases but no mortality was observed. Five of the cases were still alive and the mean follow-up time was 528 days (range 62–1177 days). Mean survival time for deceased cases was 122 days (range 2–885 days).

Conclusions: Endobronchial metastases are rarely seen but mostly cause symptomatic obstruction. Bronchoscopic treatment approaches were effective in overcoming obstruction and significantly increase survival. Due to the short survival times of primary bone tumours, possible endobronchial metastasis frequency was more than predicted.

Key words: Endobronchial metastasis, bronchoscopy, laser, stent

OP-29

DIAGNOSIS OF SARCOIDOSIS WITH ECHOIC FEATURES OF ENDOBRONCHIAL ULTRASOUND

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Aim: Sonographic features during endobronchial ultrasound (EBUS) have been shown to be useful for the prediction of malignant lymph nodes in the mediastinum and the hilum. The aim of this study was to assess the utility of the morphologic features of mediastinal and/or hilar lymph nodes obtained by EBUS in patients with sarcoidosis.

Materials and Methods: The records of 224 patients with a mediastinal and/or hilar lymphadenopathy were investigated retrospectively. The lymph nodes were characterised based on the EBUS images as follows: (1) a short-axis dimension either less or more than 1cm, (2) shape (oval or round), (3) margin (indistinct or distinct), (4) echogenicity (homogeneous or heterogeneous), (5) presence or absence of central hilar structure (CHS), and (6) presence or absence of granules.

Results: The size of the evaluated lymph nodes ranged from 5mm to 70mm. For shape, 123 (30.1%) lymph nodes were characterised as oval and 286 (69.9%) as round. For margins, 100 (24.4%) nodes exhibited indistinct margins and 309 (75.6%) had distinct margins. For echogenicity, 199 (48.7%) nodes were characterised as homogeneous and 210 (51.3%) as heterogeneous. The central hilar structure was observed in 20 (4.9%) of the nodes and the presence of granules in 130 (31.8%) nodes. Presence of granules in a lymph node visualised by EBUS showed the diagnosis of sarcoidosis with highest positive predictive value and specificity (98.4%; 99.3%). Logistic regression analysis revealed that only having a distinct margin was an independent predictive factor for the diagnosis of sarcoidosis.

Conclusions: In conclusion, we have found that lymph nodes having distinct margins tended to suggest sarcoidosis. Further prospective studies are recommended to confirm the utility of sonographic features during EBUS-TBNA.

Key words: Sarcoidosis, echoic features, endobronchial ultrasonography, diagnosis

OP-30

THE ITALIAN NATIONAL REGISTRY FOR LUNG VOLUME REDUCTION COILS (LVR-COILS) TREATMENT OF PULMONARY EMPHYSEMA: PRELIMINARY RESULTS

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Aim: Patients with severe emphysema may benefit from LVR-coil bronchoscopic treatment. We present our first safety and efficacy results.

Materials and Methods: In the setting of the Italian registry, patients with severe, heterogeneous emphysema underwent uni- or bilateral LVR-coil treatment in 4 hospitals. Baseline and follow-up tests included pulmonary function and 6MWT.

Results: Over 2 years 35 procedures (310 coils) were performed in 29 pts (baseline FEV_1 23±7% pred, RV 239±49%, TLC 130±21%). Twenty-three pts received unilateral treatment and 6 were treated bilaterally. Each procedure took in average 39 (35-80) minutes, to place 8.8 (±0.9) coils per lobe. Most of the pts experienced mild (25) or severe (2) haemoptysis. Other adverse events were 1 pneumothorax, pneumonia (4), COPD exacerbation (7) and chest pain (2). One month after treatment (27 pts), a significant reduction in RV was reported (239±49% vs. 218±57%, p=0.007), although TLC did not change significantly (130±21% vs. 127±19%, ns). Exercise capacity improved significantly according to the 6MWD (240±78 vs. 273±88mt, p=0.04). FEV_1 also improved significantly (23±7% vs. 28±8%, p=0.001). Three-month follow-up data in 15 pts showed a return-to-baseline in FEV_1 (23.8±5%, ns) and RV (228±48%, ns). Improvement in 6MWD was maintained (290±134mt).

Conclusions: LVR-Coil treatment of severe emphysema is feasible, safe and effective in improving lung physiology, pt symptoms, exercise capacity and quality of life. A significant improvement in FEV_1 is remarkable. Its return-to-baseline after 3 months points out the need for a bilateral treatment. The setting of a national registry allows standardised patient selection and follow-up in routine practice. This research setting is advisable for every "commercially" available "sperimental" device.

Key words: COPD, emphysema, bronchoscopy

OP-31

EFFICIENCY OF THE ENDO-BRONCHIAL VALVE TREATMENT FOR PATIENTS WITH SEVERE HETEROGENEOUS EMPHYSEMA

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Aim: Patients with advanced stage of chronic obstructive pulmonary disease (COPD) have limited treatment options. Volume reduction surgery is reported to be effective for selected patients with severe COPD with emphysema. There is a high-risk of surgery in these patients with hypoxemia hypercapnia. Endo-bronchial valve treatment (EBVT) is a minimally invasive method that has been identified for these patients. To investigate the effects of EBVT on pulmonary functions and quality of life in stage III-IV COPD patients.

Materials and Methods: Data of COPD patients who underwent EBVT were analysed retrospectively. Stage III-IV COPD patients who were receiving optimal medical therapy and were followed-up at least one year after the study were chosen as control. Baseline and 6th month data of pulmonary functions, diffusion capacity (DLCO), arterial blood gases (ABG), 6 minute walking distance (6MWD), and Saint George Respiratory Questionnaire (SGRQ) scores were compared for groups.

Results: EBVT was applied to 19 patients (14 male, 5 female, age 65.63±7.91y). The control group included 20 patients (17 male, 3 female, age: 63.75±11.04). There was no difference between EBVT and medical therapy groups in case of baseline data. In the EBVT group, there was no difference between baseline and 6th month data of pulmonary functions, 6MWD, and SGRQ. PaO_2 was significantly increased in the EBVT group (baseline PaO_2: 60.13±13.5 mmHg, 6th month 65.47±9.98 mmHg; p=0.009). There was no significant difference between the data of baseline and 6th month in control group.

Conclusions: EBVT is an easy, minimally invasive method. When correct individuals were selected PaO_2 improvement could be observed with EBVT in advanced emphysema patients.

Key words: Chronic obstructive pulmonary disease, endo-bronchial valve treatment, therapeutic bronchoscopy

OP-32

CORRELATION BETWEEN PATIENTS' BACKGROUNDS AND THE THERAPEUTIC EFFECT OF BLVR USING EMV

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Aim: The purpose of this study is to determine the clinical indications and assess the mechanisms of clinical improvement of BLVR using EMV retrospectively.

Materials and Methods: A study of 29 patients was conducted. Several independent variables were used to evaluate patients.Heterogeneity (heterogeneous emphysema vs. homogeneous emphysema), target area (lobar: placement into the lobar bronchus vs. placement into the segmental bronchus), and fissure integrity (complete vs. incomplete) were assessed. The dependent variables used consisted of four therapeutic effects: change in lung volume, %FEV1, 6MWT, and updated BODE index. The multiple regression analysis was performed to calculate the standardised partial regression coefficients (SPRC).

Results: The multiple regression analysis for change in lung volume yielded SPRCs of 0.400 (p=0.026) for heterogeneity (heterogeneous > homogeneous) and 0.324 (p=0.067) for fissure integrity (complete > incomplete). There was no significant correlation in SPRCs for %FEV1 and 6MWT. SPRC between the heterogeneity (heterogeneous > homogeneous) and the updated BODE index was 0.380 (p=0.036). In the heterogeneous emphysema group, the updated BODE index improved 4.5 points in the lobar group and 2.78 points in the segmental group (p=0.04).

Conclusions: This study suggests that it is desirable to select a patient with heterogeneous emphysema and to place EMV(s) in the lobar bronchus. Furthermore, it has been shown that there is no correlation between lung volume reduction and the therapeutic effect, and some patients of the segmental placing group recover. This is most likely due to the redirection of airflow reflected by the therapeutic effect rather than lung volume reduction.

Key words: Emphysema, BLVR, EMV

OP-33

BRONCHOSCOPIC LUNG VOLUME REDUCTION WITH AIRWAY VALVES

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Aim: Emphysema is unique among COPDs in that it involves the irreversible destruction of alveolar tissue. Conventional medical treatment consisting of bronchodilator and anti-inflammatory medications is generally of limited benefit. In advanced disease, surgical treatment has high morbidity and mortality. Bronchoscopic lung volume reduction (BLVR) methods are minimally invasive, safe and easy.

Materials and Methods: We have some experience of BLVR with endobronchial valves (EBV) for emphysema and prolonged air leaks of the lung. BLVR indications: advanced heterogeneous emphysema, severe airflow obstruction (FEV1 <45%), and hyperinflation (TLC >100%, RV >150%). The aim of BLVR with airway valves is to limit airflow to the least functional lung segments in order to improve gas exchange in healthier parts of the lung. Computed tomography (CT) and VQ scans are used to identify parts of the lung(s) with poor function. One of our trials compared the safety and efficacy of ZephyrR EBV in heterogeneous emphysema to best medical treatment.

Results: Thirty-nine subjects were enrolled; 19 subjects were randomised to EBV and 20 to control. Only PaO_2 was significantly increased in the EBVT group (baseline PaO_2: 60.13±13.5 mmHg, 6th month 65.47±9.98 mmHg p=0.009). We fixed EBV for two prolonged air leaks in patients who had pneumothorax too.

Conclusions: BLVR with valves may be considered in the treatment of selected patients with severe emphysema and hyperinflation with heterogeneous disease in the absence of significant collateral ventilation or in those who have a complete fissure on CT scanning. Also, it is useful for prolonged air leaks of the lung.

Key words: Emphysema, bronchoscopic lung volume reduction, air leak, valve

OP-34

A NEW ENDOSCOPIC STANDARDISED GRADING SYSTEM FOR MACROSCOPIC CENTRAL AIRWAY COMPLICATIONS FOLLOWING LUNG TRANSPLANTATION: THE MDS CLASSIFICATION

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Aim: Anastomotic complications after lung transplantation include stenosis, dehiscence, granulation tissue, bronchomalacia and fistula. They have already been included in classifications. None has been universally accepted. Moreover, no grading system has integrated all of these complications. The Groupe Transplantation (GT) (Transplant Group) has mandated the Groupe d'Endoscopie de Langue Française (GELF), to develop an endoscopic classification, in order to describe the macroscopic aspects of bronchial anastomoses, and downhill airways, using a standardised and exhaustive grading system.

Materials and Methods: An endoscopic classification that would take into account the three major aspects of the description of bronchial anastomoses was elaborated. The first param-

eter is the macroscopic evaluation (M), the second is the diameter (D) of the anastomosis, and the third is the sutures (S) of the anastomosis. Each parameter can be classified from 0 to 3. This classification was then submitted to experts from 9 French centres responsible for lung transplant for their opinion, using a questionnaire, according to a Delphi methodology.

Results: After the first round of consultation, all experts agreed on questions 1 and 4. Answers were positive for questions 2 (59%), 3 (56.25%) and 5 (70%). A modified classification, incorporating propositions from the first round, was then submitted. This second round allowed a consensus: the MDS classification.

Conclusions: The MDS classification, established by a consensus of French experts, could represent a standardised, universally acceptable system to describe the central airway complications after lung transplant.

Key words: Lung transplant, anastomotic complications, bronchial stenosis, bronchial dehiscence, bronchomalacia, classification

OP-35

EFFICIENCY OF BRONCHOSCOPIC TREATMENT IN BRONCHOPLEURAL FISTULAS

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Aim: Bronchopleural fistulas can develop as a complication after lung resections, malignancies, iatrogenic or after trauma and can be fatal. Although there is not any consensus about the treatment modalities, palliative treatment, surgical interventions and endoscopic approaches are used frequently.

Materials and Methods: We evaluate the treatment modalities and their effect on survival in the BPF patients treated with therapeutic bronchoscopic techniques in our unit between January 2005 and December 2012.

Results: Twenty two patients with mean age 55±12.4 were included; nineteen were male. Underlying disease was NSCLC in 13, aspergilloma-haemoptysis in 2, COPD in 2 and tuberculosis empyema in 5 of the patients. In 17 of the patients, postoperative fistulas developed. Eleven of them were located on the right and 6 of them located on the left. The following stents were used: in 9 cases only one, in 2 cases twice 18x14x14 mm diameter silicone stent, in one case 18x12x60 mm, in another one 22x14x60 mm conic covered metallic stent. Other than stent applications, in 6 cases, endobronchial Watanabe spigot (EWS), and in 4 cases as a total of 6 séance polidocanol was used as a sclerosing agent. In two cases in which a stent was used, fistulas >1cm were totally closed. In 5 of the EWS cases, the leak was stopped, and two of the cases were discharged from the intensive care unit. In 2 cases in which polidocanol was used (fistula diameter <5 mm), the fistula was closed totally. In two cases in which APC was used (fistula diameter <5 mm), the fistula was closed totally. When considering all methods, full success was obtained in 8 patients, partial success in 3 patients, and in 11 cases it was unsuccessful. Time of death from the procedure was 28-485 days (mean 129 days); 12 patients were still alive and under our follow-up. All of the early deaths were due to sepsis, and procedure failure was due to lack of infection control and due to secretion retention.

Conclusions: BPFs are hard to treat and have a high mortality rate, especially when they develop after lung resection. The use of appropriate interventional bronchoscopic methods in adjunct with other treatment options can play an important role in the efficiency of BPF treatment.

Key words: Bronchopleural fistula, silicone stent

OP-36

AIRWAY MANAGEMENT IN MALIGNANT OESOPHAGO-RESPIRATORY FISTULAS

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Aim: Tracheobronchooesophagopharyngeal fistulas can be caused by benign or malignant causes and frequently cause life threatening clinical conditions. The double-stenting method was used in the correction of this problem. Airway management was vital in these cases.

Materials and Methods: Fifteen cases (11 men) treated in our interventional pulmonology unit were retrospectively evaluated. Mean age of the patients was 53.6±12.15 (range 31-74). Applied techniques, complications, treatment success and survival results were evaluated.

Results: Mean age was 53.6±12.15 (range 31-74). In total of 28 séance, rigid bronchoscopy was applied: for 9 cases only once, for 3 cases twice, for 1 case 3 times and for 2 cases 5 times rigid bronchoscopy was applied. For two cases laser was used; for 4 cases once and for 1 case three times the core-out method was applied; for 6 cases once and for 2 cases twice dilatation was used; for 5 cases once and for 2 cases twice APC was applied; and mechanical cleanup was applied for 11 cases once, for 1 case three times and for 1 case four times. In total, stent was applied in 13 cases, with 9 of them being silicone Y stents. One of the cases is still alive on the 558th day of the follow-up but the other cases have since passed away. Median survival time was 39.5 days (range 4-640 days).

Conclusions: Malignant oesophago-respiratory fistulas mostly have a poor prognosis. Protection of the airway in an early period can improve survival. Although they are in critical clinical status, interventional bronchoscopic methods are the only treatment options for these patients.

Key words: Airway fistula, oesophagus, stent

OP-37

INTERVENTIONAL BRONCHOSCOPY: NEO-ADJUVANT/ADJUVANT THERAPY IN LUNG CANCER SURGERY

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Aim: To show the importance of interventional bronchoscopy before or after surgical resection of lung tumours as a way to keep useful parenchyma, reduce complications or make marginal functional operations possible.

Materials and Methods: A series of central lung tumours will be discussed showing indications and endoscopic or surgical techniques making border-line resections possible.

Results: 8 cases of endoscopic preoperative resection of central tumours lead to 2 moderately well controlled haemorrhages; there were 2 temporary atelectasis identified as surgical complications. No long-term complications or local recurrences were seen. One case of suture line recurrence after marginal sleeve resection in a severe emphysema patient treated with endoscopic resection and endobronchial adjuvant brachitherapy will also be showed.

Conclusions: This short series of unusual cases shows the feasibility of combined endoscopic and surgical treatment of central lung tumours. Sparing functional parenchyma with oncologically good results is the main advantage of this approach.

Key words: Interventional bronchoscopy, lung cancer resection, combined treatment

OP-38

WHEN IS AN EBUS PROCEDURE SUFFICIENT?

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Aim: Guidelines from ESTs recommend that at mediastinoscopy biopsies from stations 2R, 2L, 4R, 4L and 7 should be the result of the procedure. The procedure may be accepted with biopsies from 4R, 4L and 7.

The purpose of this project is an assessment if the Endoscopic Ultrasound following the part of the guidelines for mediastinoscopy.

Materials and Methods: Abstracts from ERS 2012 were reviewed, and 20 relevant abstracts were identified. Thirteen abstracts did not contain information on how many stations were biopsied; seven abstracts provided data for 526 patients, meaning that 950 lymph nodes were biopsied, which corresponds to a mean 1.8 lymph nodes biopsied. In Medline, 18 relevant publications were located dealing with 2068 patients. 4188 lymph nodes were biopsied, mean 1.7 per patient.

Results: Only a small part of the publications describe either the number of stations or at least the number of nodes that were biopsied compared with the number of patients involved. The ratio between the number of lymph nodes and patients that were included in these projects suggests that the diagnostic and staging procedure in a large proportion of lung cancer patients is of a lower standard than if they had been offered the mediastinoscopy.

Conclusions: There is a big task in developing and implementing guidelines for the diagnostic and staging process of lung cancer when mediastinoscopy is not used. Since an increasing share of the staging process for the patients included in oncology projects are based on Endoscopic ultrasound, this can cause uncertainty about the results of these studies.

Key words: Lung cancer, staging; EBUS TBNA number of lymph nodes biopsied, publication search

OP-39

UTILITY OF CERVICAL ULTRASOUND BEFORE EBUS

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Aim: EBUS-TBNA is a procedure for sampling mediastinal lymph nodes. The role is one of either diagnostics or staging, and is most commonly utilised for suspected thoracic malignancy and suspected sarcoidosis. Cervical ultrasound in various settings of lung cancer has been shown to identify lymphadenopathy in 12-43% of cases. As part of a pilot project, we attempted to determine whether there was a role for cervical ultrasound pre-EBUS.

Materials and Methods: Consecutive patients referred for EBUS underwent a respiratory physician operated cervical ultrasound (Hitachi Medical systems, 5.0-10.0 MHz linear probe) to determine the presence of cervical lymph nodes and their radiological appearance. Size, shape, presence of hilar structures and homogeneity were recorded. Physiological lymph nodes were considered if they were oval with preserved hilar structures.

Results: Of the 46 patients referred for EBUS, 34 (74%) underwent a cervical ultrasound. Suspected cancer, sarcoidosis and tuberculosis were indications in 19 (56%), 13 (38%) and 2 (6%) patients, respectively. Overall, 22 (64.7%; 95% CI 51-79%) patients had visible lymph nodes, of which 8 (24%; 95% CI 15-33%) appeared abnormal. In patients with suspected malignancy, 12 (74%; 95% CI 58-90%) were positive for cervical lymphadenopathy and 6 (32%; 95% CI 21-43%) were considered abnormal. Of the 13 patients with suspected sarcoidosis, 6 (46%) had cervical lymphadenopathy, with 2 (15%; 95% CI 7-23%) being considered abnormal.

Conclusions: Patients undergoing EBUS for mediastinal lymphadenopathy frequently have cervical lymph nodes which may provide an alternative site for diagnosis or staging. Further work is warranted.

Key words: Ultrasound, EBUS, cervical, lymphadenopathy, sarcoidosis, lung cancer

OP-40

THE UTILITY OF ENDOBRONCHIAL ULTRASOUND-GUIDED TRANSBRONCHIAL NEEDLE ASPIRATION IN MEDIASTINAL OR HILAR LYMPH NODE EVALUATION IN EXTRAPULMONARY MALIGNANCY

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Aim: The purpose of this study was to determine the diagnostic performance of endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) in the diagnosis of mediastinal and hilar lymphadenopathy in patients with known extrapulmonary malignancy.

Materials and Methods: Between March 2011 and January 2013, 258 EBUS procedures were undertaken and 24 patients (9.3%) with known extrapulmonary malignancy were identified. Retrospective analysis was performed in this group.

Results: There were 12 male and 12 female patients, with a median age of 65 and 57 years, respectively. 46 lymph nodes (LNs) were aspirated with EBUS-TBNA in 24 cases (1.91 LNs/patient). Results of EBUS-TBNA revealed malignancy in 11 cases (45.8%), sarcoidosis in 1 case (4.1%), anthracotic lymph node in 4 cases (16.6%) and reactive adenitis in 8 cases (33.3%). The diagnostic sensitivity, accuracy, and negative predictive value of EBUS-TBNA per patient were 84.6%, 91.6%, and 84.6%, respectively. There were no serious complications related to EBUS-TBNA.

Conclusions: EBUS-TBNA is a safe, minimally invasive, and effective method and can be considered as the initial test for the histopathological diagnosis of mediastinal and hilar lymphadenopathy in patients with extrapulmonary malignancy.

Key words: Endobronchial ultrasound-guided transbronchial needle aspiration, extrapulmonary malignancy

OP-41

REAL-TIME ENDOBRONCHIAL ULTRASOUND-GUIDED TRANSBRONCHIAL NEEDLE ASPIRATION FOR SAMPLING MEDIASTINAL AND HILAR LYMPH NODES

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Aim: Transbronchial needle aspiration (TBNA) is an established method for sampling mediastinal lymph nodes to aid in diagnosing lymphadenopathy and staging lung cancers. Real-time endobronchial ultrasound (EBUS) guidance is a new method of TBNA that may increase the ability to sample these nodes and hence to determine a diagnosis. This study was conducted to evaluate the diagnostic value of real-time TBNA of the mediastinal and hilar lymph nodes under direct endobronchial ultrasonography (EBUS) guidance.

Materials and Methods: One hundred and eighteen patients were included from January 2010 to June 2012 in the study. In 113 of them, sampling from mediastinal and/or hilar lymphadenopathy by real-time TBNA under direct convex probe EBUS guidance was performed. Final diagnosis was based on cytology, surgical results, and/or clinical follow-up.

Results: One hundred thirteen patients underwent CP-EBUS (men and women; mean age, 53.59±13.51 years; range, 18 to 85 years). CP-EBUS-guided TBNA was performed to obtain samples from mediastinal lymph nodes (37 nodes) and hilar lymph nodes (8 nodes) and mediastinal and hilar lymph nodes (69 nodes). Twenty-four (75%) of the 32 malignant cases were diagnosed by CP-EBUS TBNA. The sensitivity, specificity, and accuracy of CP-EBUS-guided TBNA in distinguishing benign from malignant lymph nodes were 77.41%, 100%, and 93.3%, respectively. The procedure was uneventful, and there were no complications.

Conclusions: Real-time CP-EBUS-guided TBNA of mediastinal and hilar lymph nodes is safe and has a good diagnostic yield. This ultrasound puncture bronchoscope provided an excellent view for assisting in safe and accurate diagnostic interventional bronchoscopy.

Key words: Bronchoscopy, EBUS, lymphadenopathy, transbronchial needle aspiration

OP-42

CURRENT DIAGNOSTIC TECHNIQUES FOR TUBERCULOSIS WITH MEDIASTINAL LYMPH NODE INVOLVEMENT

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Aim: In the diagnosis of tuberculosis (TB) with mediastinal nodal involvement it is essential to perform surgical techniques for sampling. Our purpose has been to analyse the use and diagnostic yield of the current different techniques.

Materials and Methods: Patients diagnosed with thoracic lymph node TB in two Spanish University Hospitals, for 7 years in one and 46 months in the second, were retrospectively analysed. TB was confirmed by microbiology and/or pathological

examination after endobronchial ultrasound transbronchial needle aspiration (EBUS-TBNA) or trans-oesophageal endobronchial ultrasound-guided fine-needle aspiration (EUS-B-FNA), trans-tracheal needle aspiration using standard bronchoscopy or mediastinoscopy.

Results: 33 patients (mean age 47, 22 males) were diagnosed with mediastinal lymph node and/or hilar involvement TB. Conventional needle aspiration was performed in 1 case, EUS-B-FNA in 3, EBUS-TBNA in 22 and mediastinoscopy in 12, 7 of them without prior EBUS-TBNA. Mediastinoscopy was the only diagnostic technique in 27% (9/33). During EBUS-TBNA/EUS-B-FNA, 62 stations were sampled, more punctured 7, 4R and 10L. Necrosis was observed in 17 cases (68%), granulomas in 14 (56%), the smear of the aspirate was positive in 24% and culture in 47.6%. Endosonography was decisive for the diagnosis in 63.6% (21/33) of cases. In two cases, EBUS-TBNA was negative (8%), and it was necessary to perform mediastinoscopy.

Conclusions: Currently, puncture techniques guided by ultrasound bronchoscope are crucial for the diagnosis of tuberculosis with mediastinal lymph node involvement in most cases, and should be implemented in the routine diagnostic algorithm.

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Key words: Tuberculosis, EBUS-TBNA, EUS-B-FNA, mediastinoscopy

OP-43

USEFULNESS OF ENDOBRONCHIAL ULTRASOUND GUIDED TRANSBRONCHIAL NEEDLE ASPIRATION IN NON-SMALL-CELL LUNG CANCER RESTAGING - PILOT STUDY

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Aim: The goal of the pilot study is to assess the diagnostic yield of EBUS–TBNA in restaging of patients with NSCLC after being submitted to neo-adjuvant therapy.

Materials and Methods: EBUS-TBNA has been performed on patients with NSCLC with pathologically confirmed N2 disease that were submitted to neo-adjuvant therapy.

Results: A total of 21 patients were submitted to restaging by using EBUS-TBNA between September 1 2010 and August 31 2012. Out of the 21 patients, 17 were male and 4 were female with a mean age of 57.8, ranging from 42 to 71. Biopsy was performed on 49 mediastinal lymph nodes (stations: 2R-5, 2L-0, 4R-20, 4L-5 and 7-19). EBUS-TBNA bronchoscopy revealed metastatic lymph nodes in 11 out of 21 patients (52.4%) and in 12 out of 49 biopsy samples (24.5%). In two cases, N3 disease was proven. Out of the 10 patients whose lymph node stations were initially accessible for EBUS-TBNA with negative or uncertain results that were later submitted to mediastinoscopy and thoracotomy, metastatic lymph nodes were proven in 6 cases. In four patients during mediastinoscopy, proven metastases were found in the lymph node stations 4R-1 and 7-5. Two patients with negative results after mediastinoscopy were submitted to thoracotomy of station 7 which showed metastatic alterations. Results only of four patients were confirmed negative. No complications were identified during EBUS-TBNA.

Conclusions: EBUS-TBNA bronchoscopy is a safe and efficient technique for mediastinal restaging of patients with NSCLC.

Key words: EBUS TBNA bronchoscopy, restaging, lymph nodes

OP-44

EBUS-GUIDED BRONCHOSCOPY COMPARED TO FLUOROSCOPY-GUIDED TBNA IN THE DIAGNOSIS OF PERIPHERAL PULMONARY LESIONS

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Aim: To evaluate the efficacy of endobronchial ultrasonography (EBUS)-guided bronchoscopy without a guide sheath for diagnosing peripheral pulmonary lesions (PPL) compared to fluoroscopic-guided trans-thoracic needle aspirate (TTNA).

Materials and Methods: During 2011, we enrolled 120 patients with PPL and positive EBUS findings. The performed sampling procedures included transbronchial biopsy, catheter biopsy and brush biopsy. The other group of 120 patients simultaneously underwent fluoroscopy-guided TTNA, with aspiration needle or cutting needle sampling procedures.

Results: The overall sensitivity of EBUS guided bronchoscopy in PPL diagnostics vs. froroscopy-guided TTNA was 0.675 vs. 0.717 or 0.675 vs. 0.825 if TTNA was performed twice. The overall diagnostic yield for PPL <3 cm in diameter was statistically increased from 0.43 for the patients submitted to fluoroscopy-guided TTNA to 0.51 for the patients undergoing EBUS-guided bronchoscopy. The overall diagnostic accuracy for lung cancer, benign tumours and inflammatory lesions was 0.62, 0.22 and 0.13, respectively, for EBUS-guided bronchoscopy vs. 0.82, 0.08 and 0.07 for TTNA.

Conclusions: Fluoroscopic TTNA is a relatively rapid procedure but its sensitivity falls for smaller lesions compared to

EBUS-guided bronchoscopy. Exposure to radiation during the TTNA procedure is longer than during EBUS-guided bronchoscopy. EBUS guided bronchoscopy as a minimally invasive technique with a satisfactory sensitivity becomes the benchmark in PPL diagnosis.

Key words: Peripheral pulmonary lesions, EBUS-guided bronchoscopy, transthoracic needle aspirate (TTNA)

OP-45

ALGORITHMIC APPROACH OF CT AND EBUS GUIDED TBNA WITH RAPID ON SITE (PULMONOLOGIST'S) EVALUATION FOR MEDIASTINAL EXPLORATION

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Aim: We investigated the efficacy of an algorithm integrating CT-19G-TBNA and EBUS-22G TBNA combined with rapid on-site evaluation (ROSE) by a trained pulmonologist in the diagnostic approach of mediastinal enlargements.

Materials and Methods: CT-TBNA was performed for stations 4R, 4L and 7, for lymph nodes >1.5cm. EBUS-TBNA was performed in cases of previous negative CT-TBNA, l.n. size <1.5cm, or stations: 2, 10, 11. Maximum 5 needle passes (n.p.) were performed unless sufficient sample was confirmed by ROSE. Samples were classified as non-diagnostic (C1), benign (C2), probably benign (C3), probably malignant (C4), or malignant (C5).

Results: 67 patients were enrolled, CT-TBNA was performed in 41 (57.7%) and EBUS TBNA in 30 (42.3%) l.n. stations. CT-TBNA mean l.n. size was 2.6cm (±0.7SD) in stations 4R:18 (54.5%), 7:11 (33.3%), 4L:3 (9.1%), and 3p:1 (3%). Mean n.p. was 2.76 (±1.3SD), which was significantly less compared to standard 5 ($p<0.0001$). ROSE indicated C1:5 (12.2%), C4:8 (19.5%) and C5:28 (68.3%). Cohen's Kappa for sample adequacy was 0.76 (substantial concordance between pulmonologist and cytopathologist). EBUS-TBNA mean l.n. size examined was 1.9cm (±0.7SD) in stations 4R:7 (23%), 7:5 (16.7%), 4L:1 (3%), 10R:9 (30%), 10L:2 (6.7%), 11R:2 (6.7%), 11L:3 (10%), and 2R:1 (3%). Mean n.p. was 3.3 (±1.1), which was again significantly less compared to standard ($p=0.004$). ROSE indicated C1:3 (10%), C2:1 (3%), C4:7 (23%) and C5:19 (63%). Kappa was 0.41 (moderate concordance). CT-TBNA was diagnostic in 32 (78%) of the cases while EBUS-TBNA in 20 (67%).

Conclusions: Following the proposed algorithm, we used EBUS-TBNA in only 43% of cases attaining an overall sensitivity of 87%. ROSE led to a significant reduction of passes, mostly in CT-TBNA. ROSE, by the on-site pulmonologist, reached an overall moderate concordance regarding sample adequacy, which was even greater for CT-TBNA.

Key words: TBNA, EBUS guided TBNA, Rapid on Site Evaluation