

**ECBIP 2013 ABSTRACTS**  
**2<sup>nd</sup> European Congress**  
**for Bronchology and**  
**Interventional Pulmonology**

**POSTER PRESENTATIONS**

## 2<sup>nd</sup> European Congress for Bronchology and Interventional Pulmonology (ECBIP)

EP-01

### ENDOBONCHIAL HAMARTOMA PRESENTING AS RECURRENT BRONCHOPNEUMONIAS

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Pulmonary hamartomas are the most common benign lung neoplasm accounting for 8% of primary lung tumours and also represent the most common cause of solitary pulmonary nodules.

Endobronchial hamartomas (EH) are however rare tumours with a varying estimated incidence between 1.4% in the largest series analysed, up to 20% based on other smaller series of pulmonary hamartomas.

We report a 50 yo Caucasian male, previously healthy, former 15 pack/year smoker presenting with fever, mild dyspnoea and a productive cough of 6 weeks duration. Within the preceding 6 months he received antimicrobial therapies for recurrent bronchopneumonias. His symptoms would resolve with empiric courses of antibiotics. His last episode prompted further evaluation with CXR demonstrating RUL airspace disease suggestive of possible complete atelectasis. Contrast chest CT scan further demonstrated worsening of the RUL airspace disease and suspicion of an endobronchial tumour of the RUL bronchus.

Combined rigid/flexible bronchoscopy demonstrated a broad-based, grossly poorly vascularised, polypoid mass obstructing the RUL bronchus take-off. Miniature probe EBUS was used to assess the depth of invasion and did not reveal distal extension into the pulmonary parenchyma. Cryotherapy-resection proved difficult and due to the angle of the RUL bronchus take off, neither debulking via rigid forceps nor electrocautery snaring proved possible. Debridement with argon plasma coagulation/flexible forceps achieved complete resection of this lesion with patency of all RUL bronchial take-offs evidenced. No significant bleeding complications occurred. Pathologic evaluation revealed pulmonary fibrolipochondrohamartoma.

Our experience highlights the feasibility and safety of minimal-invasive endoscopic treatment for endobronchial hamartoma.

**Keywords:** Endobronchial hamartoma, rigid bronchoscopy, argon plasma coagulation, EBUS

EP-02

### PRIMARY MALIGNANT TUMOURS OF THE TRACHEA AND MAIN BRONCHI: A RADIOLOGIC AND CLINICAL STUDY

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**Aim:** Our aim is to describe the clinical and CT characteristics of primary tumours of the tracheobronchial tree in fourteen patients.

**Materials and Methods:** Twelve of these patients had epidermoid carcinoma, while the others had malignant melanoma and endobronchial hamartoma in equal number. Cough (14), dyspnoea (8) and haemoptysis (6) were the most common symptoms. Endoscopic evolution revealed the majority of lesions to be bulky and obstructive in nature. Axial helical CT (GE 4 slice, USA) (n=7) and multislice CT (Siemens Sensation 64 CT scanner) (n=7) of the thorax from the level of the proximal trachea were obtained. 3D in-space volume rendering was performed to show structure of lung parenchyma, trachea, main bronchi and segmental bronchia.

**Results:** Tumours were located at the trachea in nine patients, and at the left-right main bronchus in five patients. Radiologic appearances of tumours could be described as intraluminal, wall-thickening and exophytic. The first two forms accounted for 90% of tumours. Among the 14, 12 had squamous cell carcinoma, one had malignant melanoma and one had endobronchial hamartoma. Of the 12 patients with epidermoid carcinoma, ten patients received radiotherapy as the primary treatment and two pneumonectomies (one left and one right sleeve) were performed. Radiation doses ranged from 400 to 600 Gy. Only one patient died during operation. Treatment results were disappointing. Only 8 patients remained disease-free after one year follow-up and the others had persistent or recurrent tracheal tumours.

**Conclusions:** The authors conclude that correct and early diagnosis rates can be increased by applying bronchoscopy and axial multislice CT associated with 3D rendered virtual endoscopy.

**Key words:** CT, virtual bronchoscopy, tracheobronchial tree, endobronchial tumour

## EP-03

**THE ROLE OF EBUS-TBNA IN EVALUATION OF MEDIASTINAL/HILAR LYMPH NODES OF BREAST CANCER PATIENTS**

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**Aim:** Newly arising enlarged or hypermetabolic mediastinal or hilar lymph nodes (LNs) in patients with a previously diagnosed breast cancer raise the suspicion of tumour spread. However, a relatively high proportion of these LNs are due to a benign condition. Accurate diagnosis is needed for appropriate treatment. The aim of study is to determine frequency of metastatic spread of breast cancer to mediastinal and hilar LNs and the role of endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA).

**Materials and Methods:** Consecutive patients with a known breast cancer and suspected hilar/mediastinal LNs were included in this prospective study between December 2008 and December 2012. Computed tomography (CT) of the thorax and positron emission tomography-computed tomography (PET-CT) of all patients were taken. LNs with short axis >1cm at thorax CT and SUV >=2.5 were accepted as suspicious for metastasis. All patients underwent EBUS-TBNA for pathological verification of LNs. Patients with benign diagnosis either underwent invasive procedures or were followed-up. Results were evaluated for the frequency of metastatic hilar/mediastinal LNs and sensitivity, specificity and diagnostic values of EBUS-TBNA.

**Results:** Thirty female patients with a mean age of 51.5±14.0 were included. Thirty of the cases had a diagnosis of breast cancer, whereas one case was diagnosed by EBUS-TBNA. Fifty-six LNs were aspirated with EBUS-TBNA in 30 cases (1.87LNs/patient). Mean short axis of aspirated LNs was 1.56±0.64. Results of EBUS-TBNA revealed malignancy in 12 cases (40.0%), tuberculosis in 3 cases (10.0%), sarcoidosis in 6 cases (20.0%) and reactive adenitis in 9 cases (30.0%). Sensitivity, specificity, positive predictive value and negative predictive value of EBUS-TBNA for malignancy were 92.3%, 100%, 100% and 94%, respectively. When both benign and malignant diseases were considered, sensitivity, specificity and diagnostic accuracy of EBUS-TBNA were 93.3%, 100% and %93.4, respectively.

**Conclusions:** The ratio of benign LNs in patients with breast cancer is relatively high. EBUS-TBNA is a safe, minimally invasive and effective method for clarification of intrathoracic LNs.

**Key words:** endobronchial ultrasound, breast cancer, lymph nodes, fine needle aspiration, mediastinal diseases

## EP-04

**SURVIVAL AND CLINICAL PROPERTIES OF TRACHEAL ADENOID CYSTIC CARCINOMA CASES TREATED BRONCHOSCOPICALLY**

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**Aim:** Primary tracheal tumours were rarely seen and mostly misdiagnosed and followed-up as a diagnosis of asthma or COPD. Prognostic properties of tracheal adenoid cystic carcinoma are undetermined.

**Materials and Methods:** Clinical properties and survival ratios of 7 consecutive cases that had undergone therapeutic bronchoscopy between January 2005 and December 2012 were evaluated.

**Results:** Mean age of the cases was 49.28±17.23 (range 30-76) and 5 of them were female. Resection was performed in 2 cases and metastectomy was done in one. Dilatation was used in all patients with rigid bronchoscopy and a silicone stent was applied in three cases. Two cases died. The survival time for these patients was 406 and 881 days. Both patients died due to widespread metastatic disease. Mean follow-up time for other cases was found to be 652 days (range 165-1439 days). Widespread parenchymal metastases developed in one patient in the follow-up.

**Conclusions:** Although tracheal adenoid cystic carcinomas are locally aggressive tumours they can metastasise and their survival times are variable. Regular bronchoscopic follow-up and endoluminal treatment applications as needed can have additive effects on the survival in cases in which resection and consequent radiotherapy was applied.

**Key words:** Adenoid cystic carcinoma, airway stent, laser

## EP-05

**CURATIVE RESECTION OF ENDOTRACHEAL ADENOID CYSTIC CARCINOMA WITH FLEXIBLE BRONCHOSCOPY AND ELECTROCAUTERY**

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**Aim:** Adenoid cystic carcinoma (ACC) is a rare but distinctive salivary gland-type malignant neoplasm that arises infrequently as a primary tumour in the trachea. Rigid bronchoscopy debulking and/or open surgical resection could be necessary for both the diagnosis and definitive treatment. We report our treatment of a large adenoid cystic carcinoma completely obstructing middle part of the trachea.

**Materials and Methods:** Curative endoscopic resection was performed using an electrocautery snare through a flexible bronchoscope under conscious sedation. Rigid bronchoscope Wolf, flexible bronchoscope (Olympus) and electro snare.

**Results:** After manipulation, the patient underwent open surgical tracheoplasty followed of chemotherapy.

**Conclusions:** This minimally invasive technique decreases both the risk and the cost associated with more invasive procedures that are usually indicated for this lesion.

**Keywords:** adenoid cystic carcinoma, electrocautery

#### EP-06

### NON-HODGKIN'S LYMPHOMA PRESENTING AS TRACHEAL POLYPOID TUMOUR

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Diffuse large B cell lymphoma (DLBCL) is the most common lymphoid neoplasm and accounts for 30-58% of all Non-Hodgkin's lymphoma (NHL) cases. DLBCL may present as a mass lesion anywhere in the body and affects thoracic structures, especially mediastinum and lung parenchyma, in up to 5-43% of patients. However, endobronchial growths occur rarely in lymphoma and more often in Hodgkin's lymphoma than NHL. We report a 60 year-old male patient with diagnosed DLBCL with endobronchial involvement. The patient complained of headache and a lump on the scalp. Mediastinal widening was detected on chest x-Ray during evaluation for general anaesthesia. Computerised tomography scan showed mediastinal enlarged lymph nodes. Flexible fiberoptic bronchoscopy revealed diffuse tracheal mucosal infiltration distal to vocal cords and polypoid mass protruding into the tracheal lumen. Biopsies by rigid bronchoscopy led to the diagnosis of DLBCL and chemotherapy was instituted. Lymphomas should also be included in the differential diagnosis of endobronchial polypoid lesions.

**Keywords:** Non Hodgkin's lymphoma, endobronchial tumour

#### EP-07

### INTERVENTIONAL BRONCHOSCOPY IN PREOPERATIVE DOWN-STAGING

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Interventional bronchoscopy can be palliative and therapeutic, but only a few cases have been described when it was performed preoperative to downstage the disease.

A young, 30 year-old woman presented with an acute respiratory insufficiency and fast progressing atelectasis of the right lung. Bronchoscopy found a tumour obstructing the right main bronchus. Surgical evaluation suggested that pulmectomy was indicated and due to the respiratory insufficiency it was considered a high risk operation. Rigid bronchoscopy was performed and the tumour partially resected, so the upper lobe bronchus was opened. This procedure resolved the respiratory insufficiency and the patient was stable. Histology was inflammatory pseudotumour with low malignant potency. Because of the observed rapid growth and slightly elevated number of mitoses complete resection was required. Another rigid bronchoscopy was performed and remaining tumour was resected, leaving the infiltration on the secondary carina and ostium of the upper right bronchus. All main bronchi were now patent and re-evaluation with PET-CT was performed. Now, after the resection of endobronchial tumour was done with rigid bronchoscopy, a lobectomy was performed and not a pulmectomy, as first suggested.

In selected cases obstruction of the main bronchi causing atelectasis makes it difficult to estimate the extent of the tumour itself and thus to anticipate the optimal surgical resection. In such cases, bronchoscopic resection of the tumour can downstage the disease, offer better assessment of the extent of the disease and ensure less extensive surgical resection.

**Keywords:** Rigid bronchoscopy, tumour, endobronchial, surgery

#### EP-08

### SAFETY AND FEASIBILITY OF ARTERIAL EMBOLISATION BEFORE ENDOBRONCHIAL TYPICAL CARCINOID TUMOURS RESECTION

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**Aim:** Typical carcinoid tumours are low-grade malignant tumours with slow growth and high survival. The gold standard treatment is surgery. However, in some inoperable patients with endoluminal tumours, bronchial selective arterial embolisation before rigid bronchoscopy could be useful as a complementary technique to avoid bleeding and ensure an accurate radical resection.

**Materials and Methods:** Five inoperable patients between 17 to 82 years with endoluminal carcinoid and significant bronchial obstruction were treated endoscopically 24 h after embolisation. Debulking was achieved with rigid bronchoscopy and YAP laser coagulation. Bronchial arterial embolisation was performed with microcoils and PVA particles. Final pathologic diagnoses rendered 4 typical and one atypical carcinoid.

**Results:** No immediate or short-term complications after embolisation were registered. In all patients, endoscopic treatment executed without significant bleeding, allowing a complete and accurate resection. A successful follow-up (2 to 22 months) was observed by CT and autofluorescence bronchoscopy.

**Conclusions:** Arterial embolisation of endobronchial carcinoid tumours is a feasible and safe method to avoid bleeding during rigid bronchoscopy ensuring an accurate endobronchial resection. The impact on recurrences and distant disease should wait for a long term follow-up in a multicentre study.

**Key words:** Bronchial artery embolisation, endobronchial typical carcinoid tumours, rigid bronchoscope, controllable bleeding, complete and accurate resection

#### EP-09

### ENDOBONCHIAL TUBERCULOSIS: BRONCHOSCOPIC AND CLINICAL FEATURES

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**Aim:** To assess bronchoscopic and clinical features of endobronchial tuberculosis (EBTB) in Serbia in a nine-year period.

**Materials and Methods:** Retrospective clinical study was conducted at the Institute for Lung Diseases and Tuberculosis, Clinical Centre of Serbia. In the period from 01/02/2002 to 01/12/2011, 93 cases of patients (pts) with histologically verified EBTB were analysed.

**Results:** There were more men (58.1%) than women. In most cases, endoscopic findings were not specific for tuberculosis (oedematous-hyperaemic and chronic-bronchitic forms). In only 12.9% of pts who had active caseating EBTB, bronchoscopic findings were indicative towards tuberculosis. In 6.4% of pts, tumourous form was seen, while fibrostenotic (late) forms were present in less than 7% of pts. Most pts (96.7%) had symptoms before diagnosis; cough and fatigue were dominant (75% and 53%). In only 10 (10.7%) pts, the cough lasted longer than 6 months. For almost half of patients, fatigue occurred later than 3 months before the diagnosis. In more than half of patients who had a fever, it lasted for up to a month. Haemoptysis was seen in 10 (10.7%) patients.

**Conclusions:** In our population, the single most frequent form was nonspecific bronchitic, with excellent prognosis after antituberculous treatment and complete sanation of lesions. The most complicated form, fibrostenotic, was rare. In patients who reported earlier to the doctor, because of cough, the oedematous-hyperaemic form was significantly more common with good prognosis. Most of the patients examined were of young and middle age, which points out the need to recognise, diagnose and treat EBTB early.

**Key words:** Endobronchial tuberculosis, endoscopic types, clinical features

#### EP-10

### ENDOBONCHIAL METASTASES OF TUMOURS OF OTHER PRIMARY SITES

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**Aim:** Lungs represent one of the most common sites of secondary deposits of various primary tumours. However, the incidence of endoluminal metastases is low (2-28%) because fiberoptic bronchoscopy is not performed routinely in all patients (pts) with pulmonary metastases. Also, these patients may have low performance status, and diagnosis is provided by other procedures. The aim of this study is to evaluate the role of fiberoptic bronchoscopy in determination of endobronchial metastasis.

**Materials and Methods:** During 2011 and the first 3 months of 2012, 3724 bronchoscopies were performed in our department, mostly under suspicion on lung cancer.

**Results:** In total, 46 (1.23%) endobronchial metastases were found. Male to female ratio was 17:29 and the mean age was 52.7 years (ranged from 31 to 74 years). Relapse-free time varied from 6 months to 5 years. All patients had abnormal radiographic findings. Radiography was done on routine control examination in 60% of patients, who were mostly without symptoms. The most common primary malignancy was laryngeal carcinoma (22 pts; 47.8%), breast carcinoma (6 pts; 13%), adenocarcinoma of the colon (5 pts; 10.8%), thyroid gland carcinoma (5 pts; 10.8%) cervical carcinoma of the uterus (3 pts; 6.52%) and other, less common tumours (stomach, oesophagus, prostate, tongue). Bronchoscopic findings revealed that endoluminal metastases were more common in the right lung (in 31 pts; 67.4%). Most of the metastases were seen in upper lobe bronchi (51.6%). Biopsy was performed and pathohistological verification was obtained in all patients. In more than half of the patients, histological type was squamocellular carcinoma.

**Conclusions:** Fiberoptic bronchoscopy with biopsy is a simple, cheap technique in diagnosis of endobronchial metastases. Histological verification is 100% in centrally localised lesions.

**Key words:** Metastases, endobronchial lesions

#### EP-11

### MALIGNANT MELANOMA METASTASES IN LUNG AND PLEURA

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**Aim:** Lungs are one of the most common sites of secondary deposits of various primary tumours (breast, stomach, uterus,

colon, larynx, testis, kidney, bones etc). The accepted opinion is that the lung metastases do not have prominent endobronchial findings. The aim of this study is to evaluate the role of bronchoscopy for the varification lung metastasis of malignant melanomas.

**Materials and Methods:** We examined the frequency of pleuro-pulmonary metastases of malignant melanoma in a 4 year period (2007-2011), during which 14260 bronchoscopies were completed (3600 per year).

**Results:** Metastatic deposits of malignant melanoma in lung or pleura were found in 32 patients (pts) (0.22%); male to female ratio was 20:12. Sixteen pts were in the 4th to 6th decade of life, and 12 were older than 60. Twenty pts had some complaints (cough, dyspnoea, thoracic pain). Cutaneous malignant melanoma was excised in 24 of the 32 pts. Chest x-ray revealed in most cases solitary tumour shadow (20 pts), multiple diffuse "target" lesions in 8 pts and signs of pleural effusion in 4 pts. Endoscopic examination was completed in 26 pts; in 2 pts, biopsy of the enlarged neck lymph node was performed and closed pleural biopsy in 4 cases. Eighteen pts had endoscopically direct or indirect signs of malignancy and in 15 pts biopsies metastatic malignant melanoma was histologically proven. Normal endoscopic appearance was found in 8 pts with solitary nodules on chest x-ray and they all underwent operation that verified malignant melanoma metastasis.

**Conclusions:** Bronchoscopy is a useful diagnostic tool for verification of lung metastasis of malignant melanomas as more than half of pts have endoscopic signs of malignancy and, therefore, the possibility of histological verification is high.

**Key words:** Malignant melanoma, bronchoscopic diagnosis

## EP-12

### POST-OBSTRUCTIVE PNEUMONIAS AS A RESULT OF FOREIGN BODY ASPIRATION

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In the Department of Bronchoscopy of Clinic for Lung Diseases, from 2000-2011, a total of 47,312 bronchoscopies were performed. In 28.6% (13531) patients, the indication was a recurrent pneumonia or pneumonia with prolonged clinical course. In the same period, foreign bodies were extracted in 94 patients. Indication for bronchoscopy was set upon the basis of medical history (positive anamnestic data about foreign body aspiration) and radiographic findings in 72 patients while in 22 patients (0.2%) indications were recurrent or non-resolving pneumonia or pleuropneumonia. All patients were treated with antibiotics for more than 2 weeks and fiberoptic bronchoscopy was performed under local anaesthesia. Endoscopic signs of inflammation were seen with severe granulations and large quantities of pus aspirated. Foreign bodies were observed in the right bronchial tree in 19 patients: in the lower lobe bronchus in 16, in the

middle lobe bronchus in 2 and in the intermediary bronchus in one patient. All three cases where foreign bodies were detected in the left bronchial tree were male patients with neuromuscular diseases. Foreign body extraction was performed using fibre-optic bronchoscopy with forceps and basket in 11 patients; in 4 patients cryoextraction was performed. In 5 patients, after initial exploration, the extraction was done with rigid bronchoscope under general anaesthesia. In 2 patients in whom foreign body was present for more than 10 years, a right lower lobectomy was performed. Aspiration of foreign body must always be taken into consideration in the differential diagnosis of recurrent/non-resolving pneumonia, even when there is no reliable medical history.

**Key words:** Foreign body aspiration, pneumonia, bronchoscopy

## EP-13

### TUBERCULOSIS PRESENTING AS BILATERAL ENDOBRONCHIAL MASS

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Endobronchial tuberculosis (ETB) is an infection caused by mycobacterium tuberculosis (MTB) in the bronchial wall. This entity (EBTB), of which the incidence has been increasing in recent years, is a special type of pulmonary tuberculosis. For early diagnosis, a high index of awareness of this disease is required and the bronchoscopy should be performed as soon as possible in suspected patients. To achieve treatment goals, the diagnosis must be established early and aggressive treatments must be performed before the disease progresses too far. Furthermore, tuberculosis is often not considered in the differential diagnosis of endobronchial masses. Thus, diagnosis is often delayed because of the rarity of this condition and the nonspecific nature of the symptoms. This case report describes endobronchial tuberculosis in a young previously healthy man. A 29 year-old man with no past history of pulmonary diseases presented with the new onset of a dry cough. This was associated with symptoms of fatigue and anorexia. A few weeks after the onset of her cough, she had right-sided pleuritic chest pain and worsening shortness of breath. A chest radiograph showed opacity in her left lower lung field. The bronchoscopy in our institution

showed a polypoid mass in the medial wall of the left mainstem bronchus; the lingular bronchus was completely obstructed by an endobronchial mass, so a biopsy was taken. In the right mainstem bronchus, a small polypoid mass with regular borders was seen, the other bronchus was normal. Histological examination revealed necrotising granulomatous (Tuberculosis).

**Keywords:** Bronchoscopy, endobronchial Tuberculosis

#### EP-14

### TRACHEOBRONCHIAL FOREIGN BODIES

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Between January 1982 and December 2012, endoscopic procedures were performed in 787 patients with suspected tracheobronchial foreign body aspiration; a retrospective review was undertaken in the thoracic surgery department of Dr. Siyami Ersek Thoracic and Cardiovascular Surgery Centre. The following factors were evaluated: sex, age, nature of the foreign body, localisation in the respiratory tree, clinical symptoms, radiological findings, time lapse between diagnosis and removal. Male-female ratio was 1:1.2. In 13.7% of the cases (108 cases), a foreign body was not found. In 82.7% of these cases (651 cases) object/objects were removed by bronchoscopy. As the objects were either peripheral or could not be grasped by the forceps, 28 (4.1%) of the aspirated foreign bodies were removed via thoracotomy + bronchotomy. The total number of patients with a foreign body was found to be 679 (86.3%). About 38.5% of the removed foreign bodies were pins, 23.8% were nuts and 37.5% were varied. 52.2% of the aspirated foreign bodies were localised in the right bronchial system, 32.2% in the left, 13.8% in the trachea and 1.7% in both bronchial systems. There was a complication rate of 2.7%, and 4 mortalities due to the nature of the foreign body in the whole series. The treatment and results are discussed and recent literature is reviewed.

**Keywords:** Tracheobronchial, foreign body, bronchoscopy

#### EP-15

### DIFFICULTY AT DIAGNOSIS: LUNG CANCER OR TRACHEOBRONCHIAL FOREIGN BODY?

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There are multiple causes of endobronchial lesions. Endobronchial foreign bodies may be mistaken as endobronchial tumours in adults and the diagnosis may be delayed. We hereby present the case of an 89 year-old man with an endobronchial lesion

obliterating the right lower lobe bronchus. By clinical and radiological findings bronchogenic cancer was suspected. Repeated fiberoptic bronchoscopic bronchoalveolar lavages and biopsy specimens were taken. Pathology results were reported as chronic inflammation, squamous metaplasia and atypical cells. As the bronchologist was highly suspicious of the existence of a tracheobronchial foreign body after the second fiberoptic bronchoscopy, the patient was referred to our clinic. A rigid bronchoscopy was applied to the patient under general anaesthesia. A dark gray-black lesion was observed, which was biopsied with endoscopic forceps. After cleaning the fibrinous layer, a hard lesion was seen and was felt with the tip of the forceps. The lesion was removed via endoscopic foreign body forceps. Diagnosis was an olive seed which the patient did not remember aspirating.

**Keywords:** Tracheobronchial, foreign body, tumour

#### EP-16

### TWO CASES WITH ENDOBRONCHIAL TUBERCULOSIS TREATED AS ASTHMA FOR MONTHS

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Between July and November 2011, two patients with cough and dyspnoea who finally were diagnosed as endobronchial tuberculosis were analysed. The patients were a computer technician and a house-wife; both were female, aged 34 and 64 years, respectively. While the first patient had had cough and dyspnoea for 5-6 months, the second patient had left-sided pain on the chest wall and night sweating additionally. Upon physical examination, sibilant ronchuses were detected for both cases. Because the early reversibility test with salbutamol was positive on pulmonary function test, inhaled corticosteroid treatment was offered, but neither the symptoms nor findings improved. In both cases, chest radiographs identified no abnormal findings except bilateral foci of microcalcifications. In the first case, tomography showed bilateral calcific foci in superior segments of the lower lobes and bronchiectasis in left lower lobe. Tomography in the second patient observed mediastinal lymph nodes with calcification and slight opacities in the lingula. Mucosal irregularities and hypertrophic lesions were determined in fiberoptic bronchoscopy. While there was no specific diagnosis via the bronchoscopic biopsy specimens, bronchial lavage fluid culture results were positive for *Mycobacterium tuberculosis* in the first case. The pathological evaluation of bronchoscopic biopsy of second case was reported as granulomatous inflammation. Both patients had received a standard anti-tuberculosis therapy. When fiberoptic bronchoscopy was renewed after treatment was completed, significant healing in mucosal lesions was detected.

In conclusion, especially in our country's conditions, we propose that endobronchial tuberculosis have to be taken into con-

sideration when there is a persistent cough in spite of inhaled corticosteroid therapy.

**Key words:** Tuberculosis, bronchial, bronchoscopy, asthma

#### EP-17

### ASSOCIATION OF ENDOBRONCHIAL ANTHRACOSIS AND TUBERCULOSIS

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We analysed the bronchoscopic and bacteriologic characteristics of 105 cases with endobronchial anthracosis (black pigmentation) between 2007 and 2012. These 105 cases had bronchoscopy for any reason; 68 (64.7%) were male and 37 (35.3%) were female. 22 (20.9%) cases had bacteriologically proven tuberculosis. 10 (45.4%) of them were female and 12 (54.6%) were male. The exposure was known in 66 (62.8%) cases and was unknown in the remainder of the group (39; 37.2%). 47 (71.1%) cases had been exposed to domestic biomass fuels ('tandır' bread, wood bread etc.) 10 (15.2%) cases had worked in a coal mine, 5 (7.6%) cases were quarriers, 3 (4.5%) cases were smelters and 1 (1.5%) case was a welder. 64 (60.9%) cases had bilateral anthracosis and 41 (39.1%) cases had unilateral anthracosis detected by bronchoscopy. In 19 (46.3%) of the cases, anthracosis was detected in the right bronchus; in 22 (53.7%) of the cases, anthracosis was found in the left bronchus. In 22 tuberculosis patients, 18 (81.8%) had bilateral anthracosis and 4 (18.2%) had unilateral anthracosis. In 6 (27.2%) cases using sputum or post-bronchoscopic sputum and in 14 (63.6%) cases using bronchoscopic lavage fluid, direct examination or Lowenstein-Jensen culture was positive for *M. tuberculosis*. In 1 (4.5%) case endobronchial biopsy and in 1 (4.5%) case pleural biopsy revealed tuberculosis. The mechanisms for anthracofibrosis and tuberculosis coexistence are not clearly understood; however, in countries like Turkey, where exposure to biomass is still continuing, it should be kept in mind in clinical practice.

**Key words:** Anthracosis, biomass, endobronchial black pigmentation, tuberculosis

#### EP-18

### THE USE OF AETOXISCLEROL TO STOP BLEEDING IN ENDOSCOPIC INTERVENTION

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At the Department of Pulmonary Diseases and Tuberculosis, around 1300 bronchoscopic procedures are performed annually. Apart from routine bronchoscopic examinations, the workplace provides endobronchial interventions, endobronchial ultrasound, stenting, and CT navigated bronchoscopy. In 2011, we performed 31 laser or electrocautery treatments of the airways, usually under general anaesthesia. The main indication for this treatment was symptomatic obturation of the airways by cancer mass. The most common complication of this treatment is bleeding, usually insignificant. If significant, terlipressin, norepinephrine, or laser treatment is applied. However, the results of these methods can be unsatisfactory in some situations, mostly in cases where the walls of a laser- or electrocauter-created channel in the tumour mass continue to bleed. Such bleeding tends to be diffuse and difficult to treat with a laser; if the bleeding area is extensive, norepinephrine may have untoward systemic effects, while terlipressin may be costly – none of the methods result in the complete cessation of bleeding. This paper reports three patients where aetoxisclerol was used to stop bleeding in the airways during endobronchial treatment. All three patients had lung cancer and the intent of the intervention was palliative – to relieve intractable cough, dyspnoea, or haemoptysis. In all three patients, 2% or 4% aetoxisclerol was applied to the bleeding surface, left in place for 10-30s, and then washed away with iced saline. In all three patients, bleeding resolved swiftly and the intervention could be completed successfully. No side effects of aetoxisclerol application in the airways were observed.

**Key words:** Aetoxisclerol, bleeding, endoscopic intervention, laser

#### EP-19

### A CASE OF NOT BEING TOO SHARP: FOREIGN BODY THUMBTACK REMOVAL VIA RIGID BRONCHOSCOPY UNDER SEDATION

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**Aim:** This is the first case reported in Malaysia involving the management of removing a sharp foreign body (thumbtack) in a 13-year-old girl via Rigid Bronchoscopy under sedation.

**Materials and Methods:** A 13-year-old girl presented with coughing with blood streak sputum after accidentally swallowing a thumbtack 4 hours previously. Clinical examination revealed a morbidly obese girl, comfortable at rest, with stable vital signs and pulse oximetry of 100 percent under room air. Breath sounds were vesicular and equal. Imaging (cervical, neck and chest radiograph) revealed the thumbtack lodged in the right bronchus.

**Results:** Rigid bronchoscopy was done under sedation 2 hours after presentation in the operating theatre. Sedation was given (intravenous Propofol/Fentanyl bolus) with spontaneous ventilation. A rigid bronchoscope (tracheal tube) was inserted and

airway inspected. The thumbtack was seen lodged at the right bronchus intermedius with its sharp end partially embedded in mucosa. She was positioned in the Trendelenburg position; a rigid forceps was used to grab the sharp end. It was removed en bloc, together with the tracheal tube and telescope. No complications occurred. She was discharged the next day.

**Conclusions:** Emergency rigid bronchoscopy removal of a sharp foreign body under sedation with proper positioning to avoid distal dislodgement & to avoid complications e.g. collapse, obstructive pneumonia, bleeding due to mucosal tear and mediastinitis is important. Delayed diagnosis and removal can result in serious complications that would necessitate removal via thoracotomy. Other newer suggested methods of removing sharp foreign bodies include laser-assisted removal using ND YAG.

**Key words:** 1. Endobronchial foreign body, sharp, thumbtack; 2. Rigid bronchoscopy; 3. Sedation, intravenous anaesthesia

## EP-20

### WHICH BRONCHOSCOPY PROCEDURE SHOULD BE CHOSEN FOR FOREIGN BODY ASPIRATION IN CHILDREN: RIGID, FLEXIBLE OR COMBINED?

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When foreign body aspiration is suspected in children, rigid and/or flexible bronchoscopy should be performed immediately. Rigid bronchoscopy is the first choice for both the diagnosis and treatment of most likely foreign body aspiration, but it may fail to achieve right upper lobe bronchi or peripheral located foreign bodies. In this report, a 41-month-old male patient with recurrent pneumonia, frequent wheeze episodes and a history of foreign body aspiration (sunflower husk) which was removed by rigid bronchoscopy twice previously is presented. The patient underwent flexible bronchoscopy because of continuing wheeze episodes despite treatment with inhaled steroids, in follow-up. A sunflower husk, which had not been seen before by rigid bronchoscopy, was identified in the basal segment of the left lower lobe bronchi and was removed via forceps. In this case report, it is emphasised that flexible bronchoscopy should be performed to check peripheral airways after the foreign body, which can be separated and has radiolucent characteristics, is removed by rigid bronchoscopy.

**Keywords:** Bronchoscopy, flexible, foreign body, rigid

## EP-21

### WHOLE LUNG LAVAGE IN THE TREATMENT OF PULMONARY ALVEOLAR PROTEINOSIS

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**Aim:** Alveolar proteinosis is a rarely seen disease characterised by surfactant accumulation in the alveoles. Whole lung lavage is the best known treatment, but there are studies showing the effects of GM-CSF and plasmapheresis in the treatment. In this study we aimed to evaluate the efficacy of whole lung lavage treatment and results.

**Materials and Methods:** Recordings of 9 cases that had undergone total lung lavage between January 2005 and December 2012 were evaluated. Complications and clinical properties were evaluated.

**Results:** Mean age of the patients was 37.22±7.93 (range 23-50); 6 of them were male. Half lung lavage was applied to all cases with arterial blood gas PaO<sub>2</sub> <55 mmHg. All of the cases were intubated with a double lumen tube and position of the tube was checked by fiberoptic bronchoscopy. After that, therapeutic lavage was done with 16-42 litre serum saline heated to body temperature, consecutive both side lavage was applied to 4 cases in a 15 day interval and then one sided lavage to 2 of them was applied 525 and 527 days later, respectively. GM-CSF treatment was also given to these two cases. For the other cases, indication for therapeutic lavage did not reoccur. In all of the patients, significant resolution of dyspnoea and an increase of more than 10 mmHg in the PaO<sub>2</sub> was observed after the procedure. All patients received non-invasive mechanical ventilation after the procedure and followed up for 1 to 3 days in intensive care unit. No complications other than a desaturation observed during the procedure in one case and temporary bradycardia in one other were observed.

**Conclusions:** Whole lung lavage is an effective and safe method in the treatment of alveolar proteinosis cases. Appropriate patient involvement and the careful application of lavage followed by careful follow up result in good treatment results in all cases.

**Key words:** Alveolar proteinosis, bronchoscopy, whole lung lavage

## EP-22

### BRONCHOSCOPIC MANAGEMENT IN AIRWAY OBSTRUCTION CAUSED BY MALIGNANT LYMPHOMA

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**Aim:** Interventional bronchoscopic procedures have become a popular method for palliation of airway obstruction; however, little has been reported about their use in patients with malignant lymphoma which occasionally causes a life-threatening condition. The purpose of the study was to evaluate the efficacy and safety of interventional bronchoscopic therapy before medical treatment with severe airway obstruction due to lymphoma.

**Materials and Methods:** Patients who underwent airway stent placement from January 2005 to December 2012 in a single centre were retrospectively reviewed. All procedures were performed using rigid bronchoscope under general anaesthesia.

**Results:** We performed 1783 bronchoscopic procedures under general anaesthesia for 944 patients during the study period. Of the patients, 12 had untreated malignant lymphomas (9 cases non-Hodgkin, 5 B cell, 1 T cell, 1 Hodgkin, 1 KLL, and 1 primary tracheal B cell). For one case, laser was applied three times, for 2 cases core-out was performed twice, for 3 cases once and for 1 case twice dilatation was applied, for 1 case APC was used and for 1 case mechanical cleaning was applied. Y stent was applied for 3 cases. Subglottic haematoma was seen in one case due to KLL; tracheal obstruction was seen in 9 cases, obstruction in the right bronchial system in 5 cases, and obstruction in the right main bronchus in 4 cases. Only minor haemorrhage was observed due to procedure in one case. One case died on the 10th day after procedure. Three patients are still alive, while 9 patients have died. Stent durations were 46 days, 54 days, and 132 days in these three cases. Median survival time was 155 days (range 29-919). Dyspnoea was relieved immediately in 11 of the 12 patients. Stents could be removed in all patients because of the tumour response to tumour-specific therapy.

**Conclusions:** Interventional bronchoscopic therapy is safe and effective in palliation of airway obstruction in patients with untreated malignant lymphoma, and allows tumour-specific therapy. Endoluminal lymphoma can be presented with a wide, slowly growing mass. Tumour can relapse despite treatment after desobstruction; stent was temporary in most of the cases and can be removed easily.

**Key words:** Lymphoma, airway obstruction, stent, bronchoscopy

### EP-23

#### INTERVENTIONAL BRONCHOSCOPIC TREATMENT IN TRACHEOBRONCHOMALACIA: FOR WHOM? WHEN? HOW?

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**Aim:** Tracheobronchomalacia is the result of a weakness in the tracheal and bronchial cartilage that supports the airway, leading to the obstruction of expiratory airflow and interference with secretion clearance. Tracheobronchomalacia (TBM) is an abnormal collapse of the tracheal and bronchial walls. It is characterised by flaccidity of the supporting tracheal and bronchial structures and a significant reduction of airway diameter on expiration seen in the trachea and/or in the mainstem bronchi. The incidence may be as high as 23% among patients with COPD undergoing bronchoscopy. Stabilisation of airway wall using a silicone stent is a treatment option in these cases. Similarly, laser coagulation to the posterior wall is another option.

**Materials and Methods:** Fifteen cases treated in our interventional pulmonology unit were retrospectively evaluated. Applied techniques, stent duration, complications, and long-term treatment successes were evaluated.

**Results:** Mean age was 65.07±13.19 and 10 of the cases were male. Stent was applied for 10 cases: for 4 cases silicone Y, for 4 cases silicone tracheal, for one case to the left main bronchus and for 1 case to the right main bronchus. Stents were removed due to early migration in three of the cases. In 5 of the 7 cases, the stent was removed due to frequent obstructions of the stent following recurrent severe mucostasis. Coagulation with APC was applied to the posterior tracheal wall in one case. A suitable stent was not found for one of the cases with intensely enlarged trachea (longitudinal diameter 45mm). For two cases, the stent was permanent. These cases with frequent admissions to emergency rooms and hospitalisations with COPD and respiratory insufficiency were not observed during the follow-up time (618 and 497 days, respectively). After the procedure, patients were followed-up in an intensive care unit for 1-7 days.

**Conclusions:** Silicone stent can be a good treatment option in cases with tracheobronchomalacia and dynamic collapse. Similar success can be achieved by APC coagulation; however, these cases were with high risk and criteria for the candidates for bronchoscopic treatment should be defined carefully.

**Key words:** Tracheobronchomalacia, silicone stent, bronchoscopy

### EP-24

#### SEGMENTER EMBOLISATION WITH ENDOBRONCHIAL WATANABE SPIGOT IN THE TREATMENT OF BRONCHOBILIARY FISTULA

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Bronchobiliary fistula (BBF) occurs due to an abnormal relationship between biliary ducts and the bronchial tree, but is rarely seen. Malignant causes are the most common in the aetiology of BBFs, although many different causes are recognised. Fiberoptic bronchoscopy was performed in a 74 year-old male patient with the diagnosis of inoperable Klatskin tumour and a pre-diagnosis of BBF with symptoms of yellow-green sputum production and cough. Laterobasal segment opening of the lower lobe of right lung was occluded by three 5mm endobronchial Watanabe spigots by fiberoptic bronchoscope through rigid bronchoscope. Biliary secretion was seen to be interrupted. Treatment by bronchoscopic approaches in the BBF treatment should be kept in mind as an alternative treatment, especially in cases where surgery is refused or not suitable due to illness.

**Keywords:** Biliary fistula, bronchoscopy, spigot

## EP-25

**LONG-TERM TREATMENT OF NEAR-FATAL HAEMOPTYSIS IN A NON-SMALL CELL LUNG CANCER CASE WITH INTERLOBAR CARINAL SILICONE Y STENT INSERTION**

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Massive haemoptysis is a life threatening condition due to airway obstruction and haemodynamic instability and needs urgent treatment.

A fifty-two year-old male patient was admitted with a 6 month duration of hoarseness and a 1 month duration of bloody sputum. In the fiberoptic bronchoscopy, the left upper lobe upper division entrance was totally obstructed with a mucosal infiltration having a tendency to bleed; the lingular segment entrance was observed to be narrowed by oedema. Mucosal biopsies were taken from these places and procedure was ended with bleeding control. At the follow-up in the postoperative room, 1 hour after the procedure, massive haemoptysis (600cc) was observed. The patient was taken back into the operating room and intubated with a rigid bronchoscope. The lumen, starting from the tracheal entrance, was found to be plastered with massive bleeding residues. After the coagulum in the trachea was cleaned, active haemorrhage was observed from the left main bronchus. The possible location of bleeding was occluded by placing gauze dressing soaked with epinephrine (0.2%) with biopsy forceps into the distal end of left main bronchus. During this procedure, cardiac arrest occurred and patient was resuscitated for 5 minutes. Right bronchial tree was carefully cleaned of coagulum and the patient was taken into an intensive care unit after orotracheal tube intubation. Rigid bronchoscopy was repeated on the following day. The gauze dressing placed at the distal end of the left main bronchus was removed. Bleeding was observed to continue from inside the upper lobe. 14x10x10 mm silicone Y stent was placed at the left main bronchus after adjustments were made. The left main bronchus leg was cut up to the carina level, the upper lobe bronchus opening was closed by a bronchial stapler and the leg which was placed in the lower lobe bronchus was cut at 5mm and placed.

After application of the stent, bleeding stopped. The patient was extubated during the 4th hour and was transferred to the ward after 24 hour follow-up in the intensive care unit. In the follow-up, no haemoptysis was observed but the patient was inoperable due to mediastinal invasion. The patient was scheduled for radio-chemotherapy.

In recent years, endobronchial stent applications for the control of haemoptysis in this kind of patient were defined as an alternative treatment. In this case, a massive haemoptysis occurred after a diagnostic bronchoscopic procedure and successful haemoptysis control was sustained after the application of a silicone stent to the secondary carina was presented.

**Key words:** Stent, haemoptysis

## EP-26

**TRACHEAL LASERATION AS A RARE COMPLICATION OF ELECTIVE ENDOTRACHEAL INTUBATION AND TREATMENT WITH SILICONE STENT INSERTION: TWO CASE REPORTS**

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**Aim:** Tracheal laseration is a rare complication of endotracheal intubation and is mostly seen after urgent intubation. Its frequency is 0.005% for one lumen tube and between 0.05 and 0.19% for double lumen tubes. It could be fatal if not recognised as early as possible.

**Case 1:** A sixty nine year-old female patient was taken into the intensive care unit after orotracheal intubation for respiratory insufficiency. She was taken to our intensive care unit, and although her arterial blood gas analyses were normal, she could not be weaned from the ventilator. In the bronchoscopic evaluation, the end of the tube was seen to be occluded with coagulum and rigid bronchoscopy was applied. After cleaning of the coagulum, laseration at the posterior membrane was observed and this area was covered by a silicone stent. On the following day, the patient was extubated and after 8 days of non-invasive mechanical ventilation, the patient was discharged and sent to an inpatient clinic.

**Case 2:** A seventy four year-old female patient operated on for uterine prolapse was referred to our clinic for widespread subcutaneous mediastinal amyloidosis developed early in the postoperative period. In the rigid bronchoscopy, a 2cm laseration area was observed on the posterior membrane of the middle trachea. Laseration was covered by silicone stent insertion. On the following day, subcutaneous emphysema was resolved, and in the control thorax tomography taken two days later mediastinal emphysema was significantly regressed. Stent was removed after the 6th month and laseration was observed to be cured totally.

**Conclusions:** Surgical repair of tracheal laserations have evident difficulties. Different methods were defined using either the endoscopic or sternotomical patch approach. Laseration could cause mediastinal emphysema and can also rarely cause extubation failure. In cases where the posterior membrane integrity is not widely lost, silicone stent insertion could be kept in mind as an alternative treatment.

**Key words:** Tracheal tear, stent, intubation

## EP-27

**BRONCHO-OESOPHAGEAL FISTULA LOCATED NEAR TO LEFT LOWER LOBE BRONCHUS TREATED BY INTERLOBAR CARINAL Y STENT INSERTION**

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Oesophago-respiratory fistulas are a life-threatening complication that can occur not only from lung or oesophageal malignancies but also from non-malignant causes. The treatment of oesophago-respiratory fistulas that present with an increase in the secretion amount, expectoration of the meals, and recurrent pneumonia attacks is hard; protecting the patency of the airway is important.

A forty-five year-old male patient was followed-up in an intensive care unit under mechanical ventilation due to recurrent pneumonia causing respiratory insufficiency after resection due to oesophageal carcinoma. On the fiberoptic bronchoscopy, fistula was detected in the left main bronchus. During the consultation in our unit, intensive secretion was detected in both bronchial systems and a 1.5 cm<sup>2</sup> fistula was detected 1 cm away from the lower lobe bronchus at the posterior wall of left main bronchus. Silicone Dumon Y stent with a diameter of 14x10x10 mm was placed under general anaesthesia with rigid bronchoscopy after adjustments. The left main bronchus leg was cut to 3 cm and the upper and lower leg was cut to 1cm and placed to the secondary carina. In this way, the fistula opening at the distal side of left main bronchus was totally covered by the stent.

Treatment of oesophago-respiratory fistulas is important due to fatal pulmonary complications like pneumonia and respiratory insufficiency, which can occur due to chronic aspirations. Protecting the airway by interventional bronchoscopic techniques can be life saving in patients in which surgical treatment could not be performed. Here, we covered the broncho-oesophageal fistula which could not be fully covered by the usual stents by placing a silicon Y stent to the left interlobar carina. Use of a proper size silicon Y stent should be kept in mind in the handling pathologies that occur in the distal of left main bronchus.

**Keywords:** Oesophagus, fistula, bronchoscopy, stent

#### EP-28

### TOLERANCE AND DURABILITY OF MICRO-TECH FULLY COVERED SELF-EXPANDABLE METALLIC STENTS

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**Aim:** Full covered self-expandable metallic stents (FC-SEMS) have recently been developed to solve certain problems inherent to semi-covered SEMS (i.e. granulomas, problematic removal). There are very few data concerning this new type of SEMS but a high incidence of complications has been reported with various models (i.e. stent migration or malfunction).

**Materials and Methods:** Twenty Micro-Tech® (Nanjing Co.) FC-SEMS were placed in 18 patients (mean age: 62.9 years) during a two-year period in our tertiary medical centre.

Medical charts were retrospectively reviewed to evaluate their tolerance and complications.

**Results:** Fourteen straight stents were inserted for malignant and benign disorders (2 for malignant stenosis, 4 for post-intubation tracheal stenosis, 7 for post-lung transplantation anastomotic stricture in the left main bronchus and 1 for post-lobectomy anastomotic stricture). Six Y-stents were placed for malignant stenosis. Stents were in loco for a mean duration of 145 days. The most common complications were migration (5/20) and granulomas (5/20). Migrations were more frequent with tracheal stents (2/5). Nine straight stents and one Y stent were easily removed. Removal was necessary in 35% of all cases and in 58% of benign disorders. We did not encounter any life-threatening complications, stent coating defects or fractures.

**Conclusions:** In view of these results regarding tolerance and durability, the use of Micro-Tech® FC-SEMS appears to be an interesting alternative to other stents for the management of central malignant disorders and post-lung transplantation left main bronchus stenosis.

**Key words:** Malignant stenosis, benign stenosis, lung transplantation, full covered stent

#### EP-29

### SILICONE Y-STENT PLACEMENT ON THE SECONDARY LEFT CARINA

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**Aim:** To evaluate the feasibility, efficacy and safety of a stenting technique using a silicone Y-stent for patients with airway stenosis around the secondary left carina.

**Materials and Methods:** Under general anaesthesia, using rigid and flexible bronchoscopes, the airway lumen was re-established followed by a Dumon Y-stent placement on the secondary left carina. Patients who underwent airway stent placement from December 2010 to December 2012 in a single centre were retrospectively reviewed.

**Results:** We performed 154 airway stenting procedures for 142 patients during the study period. Nine of them (6 lung cancer, 1 oesophageal cancer, 1 thyroid cancer, 1 renal cancer) underwent a Y-stent (14x10x10 mm) placement on the secondary left carina. Of the patients, eight underwent stenting using a single Y-stent and one underwent Y-stent placement on the secondary left carina followed by another Y-stent placement on the main carina. Respiratory symptoms were relieved in all patients. Three out of 4 patients with supplemental oxygen, including the mechanically-ventilated patient before stent placement, could be discharged without supplemental oxygen. Chest radiograph after the procedure showed an increase of lung volume in all 5

patients with partial or complete atelectasis. Median survival after stenting was 180 days at the time of data collection. Retention of secretions occurred in 1 and haemoptysis in 1.

**Conclusions:** Silicone Y-stent placement on the secondary left carina is technically feasible, safe and effective.

**Key words:** Airway stenosis, airway stents, central airway obstruction, secondary left carina, silicone, Y-stents

#### EP-30

### SILICONE ENDOPROSTHESIS IN THE TREATMENT OF CICATRICIAL STENOSIS

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To study the effectiveness of silicone implants in the treatment of cicatricial stenosis of the trachea. We examined 123 patients aged from 18 to 64 years old. In most patients (101; 82.1%) there was a post-intubation or post-tracheostomy origin of cicatricial stenosis. Prosthesis was used in the presence of absolute or relative contraindications to the circular resection of the trachea, which is the most effective treatment. T-silicone tubes were used in 54 (43.9%) patients in the presence of a tracheostomy. Linear type Dumont stents were used in 69 (56.1%) patients. After removing the implant, re-narrowing of the trachea was observed in 71 (57.7%) patients. They underwent successful tracheal or laryngotracheal resection. Sustained recovery of the lumen of the trachea up to 1 cm or more with adequate ventilation was achieved in 52 (42.3%) patients. Complications occurred in 16 (13.0%) cases. Tracheal stenting is an effective method of preoperative preparation of patients with cicatricial stenosis. Preservation of normal tracheal lumen with adequate respiratory function was achieved by means of endoprosthesis in 42.3% of patients.

**Key words:** Silicone endoprosthesis, cicatricial stenosis, trachea

#### EP-31

### SUCCESSFUL MANAGEMENT OF ALVEOLAR SILICOPROTEINOSIS WITH WHOLE LUNG LAVAGE IN A WAR VICTIM

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**Aim:** Pulmonary alveolar proteinosis is a rare disorder in the practice of pulmonary medicine. Therefore, the diagnostic procedures and treatment options are not well studied. Whole lung lavage is one of the better studied treatment procedures in those patients who have severe symptoms and hypoxemia. Patients generally feel dramatically better after whole lung lavage.

**Case:** In this report we present a case of PAP in whom the cause was probably due to dust inhalation after heavy bombing in a war victim. The patient was managed successfully with whole lung lavage.

**Conclusions:** This is the one of the rare case reports of PAP which was managed with whole lung lavage.

**Key words:** Alveolar proteinosis, whole lung lavage

#### EP-32

### FIBROBRONCHOSCOPY AS AN ALTERNATIVE METHOD FOR TRACHEOBRONCHIAL DESOBSTRUCTIONS

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Fibrobronchoscopy, with its interventional techniques, is an important method in the management of endobronchial tumours. Endobronchial electrocautery, like electrocautery and electroresection, is very important in endobronchial tumour debulking. Therefore, we present 3 cases consisting of a tracheal hamartoma, an adenoid cystic carcinoma and a carcinoid, approached by endoscopic electroresection performed in the Pneumology Hospital of Cluj-Napoca. We will present these clinical cases through their evolution, the obstructive and suppurative symptoms, and respiratory failure, with each one of them necessitating urgent mechanic desobstruction by electroresection and electrocautery. These particularly interesting cases have been selected and have benefited of endoscopic resection under local anaesthesia, in order to underline the difficulty of the method but also for the important and immediate benefit of the patients whose quality of life has significantly improved.

**Key words:** Fibrobronchoscopy, electroresection, endobronchial tumours

#### EP-33

### APPLICATION OF THROMBIN-FIBRINOGEN COMPLEX (TFC) IN CASES OF MASSIVE HAE-MOPTYSIS

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In the Bronchology and Invasive Diagnostics Department of the Clinical Centre of Serbia, the thrombin-fibrinogen complex has been applied in cases of massive haemoptysis since 1988. During 2012, 3482 bronchoscopies were performed in our Department.

The thrombin-fibrinogen complex was applied in 33 pts because of life-threatening haemoptysis and in 3 patients due to bronchopleural fistula. In 40.5% of pts, the cause of haemoptysis was tuberculosis, while in 8 pts bleeding occurred after transbronchial biopsy.

Our long-term experience showed that bleeding after bronchoscopic biopsy could usually be controlled by classical methods

(adrenaline application), so the thrombin-fibrinogen complex has to be saved for cases where these methods fail. The results of thrombin-fibrinogen complex application are excellent in cases when the location of bleeding can be seen and medication can be instilled in segmental or sub-segmental bronchus (1ml or 3ml). The method of choice is fiberoptic bronchoscopy. In cases of massive haemorrhage, after intubation, combination of fibrobronchoscopy and Metress aspiration catheter was shown to be better and safer than rigid bronchoscopy. Through Metress catheter, continuous aspiration is performed, while through the bronchoscope, through a thin catheter, medication is applied to the location of bleeding. Also, the closure of bronchopleural fistulas can be achieved using this complex, but only if they are small to moderate in size.

**Key words:** Haemoptysis, bronchoscopy, thrombin-fibrinogen complex

#### EP-34

### FEASIBILITY AND EFFICACY OF BRONCHOSCOPIC LUNG VOLUME REDUCTION TARGETING AT RIGHT MIDDLE LOBE IN TREATMENT OF A COPD PATIENT WITH GIANT BULLA: A CASE REPORT

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For simple emphysema, the middle lobe is not the optimal target due to the relatively small volume reduction; however, the complication of the giant bulla in the middle lobe is different. The central location of the giant bulla in middle lobe makes the impact more severe because of the compression of the two adjacent lobes. Therefore, we assume that endobronchial valve (EBV) could be used in the middle lobe when the giant bulla is located in middle lobe and evidently compressing the adjacent lungs. The bronchoscopic lung volume reduction (BLVR) was performed in a patient with a bulla located in the middle lobe with an EBV. The patient was followed-up on the 1st day, 1st month, and 3rd month after BLVR. The bulla disappeared with the atelectasis of the middle lobe on the 1st month after BLVR. Three months later, The FEV<sub>1</sub> increased from 0.74L pre-operatively to 0.87L. RV reduced from 3.54 to 2.87L, and TLC reduced from 5.72L to 5.57L. SGRQ was also improved from 64 to 41. 6MWD was increased by 45 meters. No complication was found. In conclusion, our experience and the limited literature supports the result that it is feasible and efficient to use the middle lobe as the only target lobe of BLVR, especially when combined with giant bulla. The serial HRCT review and ventilation/perfusion scan are helpful in the evaluation before BLVR. The effect of BLVR on the giant bulla in emphysema is still to be explored in the future, as are the long-term modifications.

**Key words:** COPD, bronchoscopic lung volume reduction, emphysema, endobronchial valves

#### EP-35

### LONG-TERM EFFECT OF ENDOBRONCHIAL LUNG VOLUME REDUCTION IN ALPHA-1-ANTITRYPSIN PATIENTS

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**Aim:** In severe emphysema, endobronchial lung volume reduction (ELVR) performed by one-way valves inserted via a flexible bronchoscope can give a moderate but significant improvement of lung function and exercise tolerance with minimal risks. Most studies have excluded patients with alpha-1-antitrypsin (AAT) deficiency, but there have been some reported cases with good outcomes. The long-term results are unknown and we therefore would like to present our experience.

**Materials and Methods:** From August 2008 to January 2012, 15 patients were included. Criteria were homozygous AAT deficiency, age <80 years, residual volume (RV) 140% or more, forced expiratory volume in one second (FEV<sub>1</sub>) 15 to 45% of predicted, severe heterogeneous emphysema, symptoms severely restricting daily life, informed consent, and lack of other serious disease.

**Results:** Two patients were non-responders and one patient developed pneumothorax and valve displacement so the valves were removed. One patient improved from a FEV<sub>1</sub> of 0.62 L to 0.84 L, but after 4 months developed repeated and severe pneumonias, so the valves had to be removed. Thus, 11 patients remained for follow-up. In these 11 patients, FEV<sub>1</sub> increased with a mean of 53% and RV decreased by 20%; the quality of life was much improved and four patients no longer needed oxygen. All have now been followed for more than one year and there is no significant deterioration.

**Conclusions:** In summary, selected patients with alpha-1-antitrypsin (AAT) deficiency and severe heterogeneous emphysema can benefit from ELVR with long-term good results.

**Key words:** Emphysema, endobronchial volume reduction, lung function

#### EP-36

### ENDOBRONCHIAL LUNG VOLUME REDUCTION: IMPORTANCE OF RELATIVE LOBE SIZE

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**Aim:** Endobronchial lung volume reduction (ELVR) in severe emphysema can improve lung function in selected cases. Indications are: FEV<sub>1</sub> 15-50%, no contraindications and no other serious disease. We observed that success seemed to correlate with relative preoperative size of the targeted lobe.

**Materials and Methods:** Twenty-five consecutive patients, including 13 with alpha-1-antitrypsin deficiency, with severe

emphysema (FEV1: 17-34% predicted, RV 184-309%) were treated with ELVR. We calculated "normal" lobe areas on the sagittal CT scan of each side in the midline of the thorax on left side to be LL=50%, UL=50%, and on right side UL=40%, ML=15%, UL=45%. One lobe was excluded unilaterally, the left lower lobe (LLL) in 6 patients, RLL in 4, LUL in 5, RUL in 7, and the middle lobe in 3. In two patients, infections necessitated the removal of the valves, and in one the valve was coughed up. We correlated the improvement in FEV1 at 6 months with the irrelative size of the lobe preoperatively.

**Results:** There was a fairly good correlation with size: if the target lobe was not increased in size there was very little or no improvement in this small material.

**Conclusions:** The emphysematous lobe is large because of the elastic pull from the healthier lobe(s). If the non-targeted lobe(s) is contracted preoperatively this indicates remaining elasticity, which can be used after eliminating the targeted lobe. We believe that this simple measurement can be of help in choosing suitable patients for ELVR.

**Key words:** Lung volume reduction; elasticity; lobe size

#### EP-37

### DIAGNOSTIC UTILITY OF BRONCHOALVEOLAR LAVAGE CD4+/CD8+ LYMPHOCYTE RATIO IN SARCOIDOSIS

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**Aim:** Analysing bronchoalveolar lavage (BAL) lymphocyte subsets to determine the ratio of CD4+ to CD8+ lymphocytes can be used in differential diagnosis of sarcoidosis. CD4+/CD8+ ratio in BAL is highly variable in sarcoidosis.

**Materials and Methods:** In order to evaluate the diagnostic performance of BAL CD4+/CD8+ ratio in sarcoidosis, we retrospectively reviewed the medical records of sarcoidosis patients diagnosed and followed in a tertiary reference centre (a university hospital) in the Southern Marmara Region in the last eight years.

**Results:** Two hundred and nineteen sarcoidosis patients (72.1% female, 27.9% male) were included. The mean age of the participants was 49.7±12.8 years old. Histopathological confirmation of the diagnosis was obtained in 152 patients. Further analysis was done in the histopathologically confirmed sarcoidosis group. The sensitivity and specificity of CD4+/CD8+>=4.08 was calculated as 53%, 80% using receiver-operating characteristic analysis. The sensitivity and specificity of a CD4/CD8 ratio>=3.5 was 58% and 77%. According to chest roentgenogram classification, 8.5% of the patients were stage 0, while 56%, 27.7% and 7.8% were Stage I, II and III, respectively. BAL CD4+/CD8+ ratio was found to increase as the radiological stage grows (p<0.05). Bronchoalveo-

lar lavage CD4+/CD8+ lymphocyte ratio>=3.5 was more frequent in patients with pulmonary and extrapulmonary involvement than the lone pulmonary involvement (72.4% vs. 42.4%, p<0.05).

**Conclusions:** Our data suggest that BAL CD4+/CD8+ ratio is a valuable parameter in the diagnostic pathway or sarcoidosis and correlates with the radiologic stage of the disease. The diagnostic value of the CD4+/CD8+ lymphocyte>=3.5 criteria increases as the extrapulmonary involvement accompanies the pulmonary involvement.

**Key words:** Sarcoidosis, bronchoalveolar lavage, CD4+/CD8+ratio

#### EP-38

### THE ROLE OF BRONCHOSCOPY IN DIAGNOSTIC WORKUP OF SARCOIDOSIS

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**Aim:** Bronchoscopy allows multiple diagnostic modalities in suspected sarcoidosis.

**Materials and Methods:** We retrospectively reviewed the medical records of sarcoidosis patients diagnosed and followed in a tertiary reference centre (a university hospital) in the Southern Marmara Region in the last eight years.

**Results:** Two hundred and nineteen sarcoidosis patients (72.1% females; 27.9% males) were included. The mean age of the participants were 49.7±12.8 years old (50.4±11.9 females, 47.8±14.9males, p<0.05). Pulmonary and extrapulmonary involvement was present in 94.5% and 27.4% of the patients, respectively. Histopathological confirmation of the diagnosis was obtained in 152 (69.4%) patients. 57% (n=125) of the study group underwent bronchoscopy. Mucosal hyperaemia (26.8%), external bronchial compression (6.6%) and nodular mucosal lesions (5.1%) were the most prominent bronchoscopic abnormal findings. Bronchoalveolar lavage, bronchial mucosa biopsy, transbronchial biopsy, transbronchial needle aspiration procedures were performed in 63.2% (n=79), 36.8% (n=46), 3.2% (n=4), 8.0% (n=10) of study group, respectively. Success rates for the bronchoscopic procedures were as follows: for bronchial mucosa biopsy 56.5%, for transbronchial biopsy 25%, and for transbronchial needle aspiration 20%. 55.1% of the study group underwent mediastinoscopy and the success rate was 97.2% for this procedure. 7.5% of the study group underwent mediastinotomy and the success rate was 100% for this procedure.

**Conclusions:** Our data suggest that mediastinoscopy and mediastinotomy are very successful procedures for diagnosing sarcoidosis. On the other hand, combining different bronchoscopic procedures may enhance the diagnostic yield in a less invasive manner.

**Key words:** Sarcoidosis, diagnosis, bronchoscopy

### EP-39

## THE ROLE OF FIBROPTIC BRONCHOSCOPY IN THE INTENSIVE CARE UNIT

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The ease of use of the fiberoptic bronchoscope expanded its therapeutic and diagnostic capabilities in intensive care unit (ICU) patients. Main indications are therapeutic aspiration of secretions, diagnosis of ventilator associated pneumonia (VAP), haemoptysis, failure of extubation and suspicion of tracheal rupture or fistula.

In the period from 2003 to 2010, 24,789 bronchoscopies were done in the Department of Bronchoscopy of our Clinic. Bronchoscopy in ICU was performed in 2724 patients, of which most (84%) were in cases of complete or lobar atelectasis. In 12% of patients, the indication for diagnostic and therapeutic bronchoscopy was VAP, and in 4% suspected rupture of the trachea, fistula or unsuccessful extubation. A satisfactory therapeutic effect was achieved in over 93% of interventions. Targeted secretion aspiration in patients with VAP has led to the identification of the most common pathogens: *Pseudomonas* species, *Citrobacter*, *Acinetobacter* and *Klebsiella-Enterobacter* spp. Generally, these patients required repeated bronchoscopy. The best therapeutic effect was achieved in patients without significant co-morbidity in whom VAP developed after polytrauma.

**Key words:** ICU, bronchoscopy, VAP

### EP-40

## EVALUATION OF BRONCHOSCOPY IN OUR CLINIC BRONCHOSCOPY LABORATORY IN 2012

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**Aim:** Bronchoscopy is used in the diagnosis and therapy of pulmonary diseases. This study aimed to determine demographic characteristics of patients who underwent bronchoscopy, indications and complications for bronchoscopy, the distribution of the results of bronchoscopy in our clinic bronchoscopy laboratory in 2012.

**Materials and Methods:** 10969 patients were admitted to our clinic in 2012. Bronchoscopy was performed in 476 (4%) patients. Bronchoscopies were performed by 3 experts. Findings were retrospectively evaluated.

**Results:** 165 (34.7%) patients were female and 311 (65.3%) patients were male. Mean age was 56.71±16.03 years, minimum age was 15, and maximum age was 94. Indications for bronchoscopy were malignancy in 194 (41%) patients, tuberculosis in 98 (21%) patients, haemoptysis in 52 (11%) patients, pneumonia in 44 (9%) patients, interstitial lung disease in 39 (8%) patients, chronic pleural effusion in 16 (3%) patients, and other causes in 33 (7%) patients. 38% of patients were diagnosed by bronchos-

copy. Complications developed in 15 (3%) patients. Epistaxis was seen in 3 (0.6%) patients, haemorrhage in 7 (1.5%) patients, hypertensive episode in 4 (0.8%) patients, and hypoxemia in 1 (0.2%) patient. Complications were controlled in all patients. **Conclusions:** In our clinic, 38% of patients were diagnosed with bronchoscopy. 3% of patients developed complications. Invasive diagnosis and treatment was not required for patients with complications.

**Key words:** Bronchoscopy, pulmonary diseases

### EP-41

## BALF CD4+/CD8+ AND LUNG FUNCTION IN LUNG CANCER PATIENTS TREATED BY THREE PLATINUM COMBINATIONS

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**Aim:** Reports point out acute lung toxicity of chemotherapeutic agents in cancer patients. The aim of our study was to assess BALF CD4+/CD8+ and lung function findings of the 3 most commonly applied platinum-based regimens for the treatment of lung cancer.

**Materials and Methods:** Within a one year period, 20 patients (ECOG 0, 1) agreed to participate in the study, but 15 were ineligible (5 patients died from disease progression before reassessment). Patients underwent lung function tests and BAL of the lung without the tumour, during diagnostic bronchoscopy before and after 6 chemotherapy courses. Platinum-based regimens were a combination of vinorelbine (VN) in 6 patients, gemcitabine (GEM) in 4 patients and etoposide (EP) in 5 patients.

**Results:** All patients but one were male and smokers (93%). Median patient age was 56 years (42-75) and median packs/year was 80 (40-120). No significant difference was noted in the patients' age between the 3-treated groups. No significant changes in CD4+ and CD8+ cells were noted between the 3 groups of treatment. However, changes were noted within each group only for CD4+ cells: VN before vs. after p= 0.05; GEM before vs. after p=0.03; EP before vs. after p=0.3. For CD8+ no significant changes were noted. No changes were noted in lung function tests (FEV1, FVC) between or within the groups.

**Conclusions:** Significant changes were noted in BALF CD4+ cells for VN and GEM regimens, while no significant changes were noted in lung function tests.

**Key words:** Bronchoscopy, BAL, CD4, lung function, lung cancer, chemotherapy

## EP-42

**BRONCHOSCOPIC CHARACTERS AND THERAPY OF PULMONARY ATELECTASIS IN 1359 PATIENTS***Yuanyuan Li, Chengping Hu**Department of Respiratory, Central South University, Changsha, China*

**Aim:** To summarise causes and flexible bronchoscopic characteristics of pulmonary atelectasis; relationships between causes and lesion sites for better bronchoscopy were also discussed.

**Materials and Methods:** The clinical data (including history characters, imaging data, bronchoscopic findings, pathological results and the methods and effect of bronchoscopic treatment) in 1359 patients with pulmonary atelectasis admitted to Xiangya Hospital between October 2001 and May 2007 were retrospectively analysed.

**Results:** One thousand two hundred ninety-four of 1359 patients could be diagnosed by flexible bronchoscopy combined with pathological examination, which resulted in a diagnostic rate of 95.2%. In all of these cases, tumour accounted for 37.2%, while inflammation was seen in 35.5% and tuberculosis accounted for the other 19.9%. Bronchoscopic manifestations included cauliflower-like neoplasms, which were caused by tumours (74.6%). Achymucosa, congestion, unsmooth were the specific findings in bronchoscopic examination. Tracheal cavity scar strictures or closures were often seen in tuberculosis (80.6%), and purulent secretions were most frequently caused by inflammation (92.9%). Bronchoscopic manifestations were also related to lesion sites of different lobes. Bronchoscopic treatment could be bronchoalveolar lavage, freezing and balloon dilatation, etc.

**Conclusions:** Flexible bronchoscopy combined with pathological examination remains the main method for the diagnosis of pulmonary atelectasis. Manifestations of pulmonary atelectasis were related to causes and lesion sites. Bronchoscopic therapy could ease airway obstruction to some degree, which could relieve pulmonary atelectasis, thus, improving respiratory function.

**Key words:** Pulmonary atelectasis, bronchoscopy examination, bronchoalveolar lavage, balloon dilatation, freezing

## EP-43

**CELL-BLOCK SAMPLES OF PERIPHERAL LUNG TUMOURS OBTAINED UNDER CONTROL OF FLUOROSCOPIC C-ARM AND MALIGNANT PLEURAL EFFUSIONS USED AS AN ADDITIONAL DIAGNOSTIC TOOL IN ADVANCED LUNG CANCER***Aleksandar Tepavac<sup>1</sup>, Jelena Stanic<sup>1</sup>, Zivka Eri<sup>2</sup>, Aleksandra Andjelkovic<sup>1</sup>, Nensi Lalic<sup>1</sup>, Milana Panjkovic<sup>2</sup>, Bojan Zaric<sup>1</sup>, Tatjana Boskovic<sup>3</sup>, Tatjana Sarcev<sup>1</sup>**<sup>1</sup>Institute for Pulmonary diseases, Clinic for Thoracic Oncology, Sremska Kamenica, Serbia**<sup>2</sup>Institute for Pulmonary diseases, Department for Pathology, Sremska Kamenica, Serbia**<sup>3</sup>Institute for Pulmonary diseases, Center for Radiology, Sremska Kamenica, Serbia*

**Aim:** Cell-block samples of peripheral lung tumours and additional prepared malignant pleural effusions are validated as additional diagnostic tools for immunocytochemical staining (ICH) and EGFR mutation testing.

**Materials and Methods:** Samples of peripheral lung tumours are obtained by Transthoracic Needle Aspiration (TNA) guided by fluoroscopic C-arm and using 18 gauge needles. All samples are used for direct smears and fixation in 95% ethanol. After fixation, cell-blocks were prepared using standard methods. Malignant pleural effusion samples (20 ml) were prepared for cell-blocks. All of them were used for ICH and molecular analysis.

**Results:** During 2012, we analysed 29 cell-block samples. Most of them (19/29) were obtained by TNA. The rest (10/29) were provided by the preparation of 20 ml malignant pleural effusion. TNA samples in 17 patients were diagnostic: adenocarcinoma (10/17), squamous-cell carcinoma (4/17) and other histology types (3/17). In all of the 10 malignant pleural effusions samples adenocarcinoma was confirmed. All cell-blocks were used for ICH as needed and EGFR mutation analysis. Cell-blocks of advanced lung adenocarcinoma were used for EGFR mutation testing and potential use of Tyrosine-Kinase Inhibitors.

**Conclusions:** TNA as a simple and cost-effective diagnostic tool is an important and integral part in the evaluation of advanced lung cancer, especially adenocarcinoma. In cases of the absence of viable tumour tissue, cell-block samples provided a sufficient number of tumour cells for additional testing.

**Key words:** Advance lung cancer, cell-block sample, transthoracic needle aspiration

## EP-44

**ASSESSMENT OF BRONCHIAL STENOSIS USING VIBRATION RESPONSE IMAGING***Hirota Kida, Masamichi Mineshita, Ayano Tukune, Mariko Okamoto, Teppei Inoue, Kei Morikawa, Naoki Furuya, Hiroshi Handa, Hiroki Nishine, Seiichi Nobuyama, Takeo Inoue, Teruomi Miyazawa**St. Marianna University School of Medicine, Kawasaki, Japan*

**Aim:** Many patients with central airway obstruction may receive significant relief from life-threatening symptoms by interventional bronchoscopy. Treatment outcomes are usually measured by subjective criteria such as dyspnoea and quality of life, along with objective measures such as pulmonary function tests. Flow-volume curves are non-invasive and easy to perform. However, flow-volume curves may not detect several typical abnormalities, especially in stenoses of the unilateral main-stem bronchus. Due to these limitations, we studied how "Asynchrony" affects patients with main-stem bronchial steno-

sis using Vibration Response Imaging (VRI). VRI is an imaging modality that records energy generated by the vibrations of the lungs.

**Materials and Methods:** A lung model using extracted pig lungs in a sealed unit was used. We measured airway pressure of the right and left bronchus simultaneously using two catheters. We validated the relationship between the rate of stenosis and time delay. Time delay increased significantly from 90% in the pig model ( $P<0.05$ ). In patients, the VEP gap also increased sharply from 90% in mainstem bronchial stenosis.

The rate of stenosis was measured by computed tomography using ZAIOSoft software and vibration energy peak gaps in 10 patients with unilateral main-stem bronchial stenosis.

**Results:** Time delay increased sharply from 90% in the pig model study for ventilatory volume and ventilation frequency. In patients, the VEP gap also increased sharply from 90% in the main bronchial stenosis.

**Conclusions:** The VRI was able to identify severe stenoses above 90% in patients. We found VRI was useful in assessing treatment outcomes and decisions on interventional indication.

**Key words:** Intervention, bronchial stenosis, VRI

#### EP-45

### MULTIDISCIPLINARY APPROACH IS CRUCIAL FOR ELECTROMAGNETIC NAVIGATION BRONCHOSCOPY

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**Aim:** Electromagnetic Navigation Bronchoscopy (ENB) is a novel bronchoscopic technique, based on GPS technology. ENB allows peripheral pulmonary lesions to be sampled, which are out of the range of standard bronchoscopes. ENB requires a multidisciplinary approach in order to correctly select the patients among those who are unfit for invasive diagnostic techniques.

**Materials and Methods:** From 2010 to 2012, 33 patients [21 males and 12 females; mean age 60.4 years (range 29-77)] with lung cancer and unfit for invasive diagnostic techniques were evaluated by a multidisciplinary team (thoracic surgeon, oncologist, endoscopist, radiologist) in order to evaluate their eligibility for EBN. An extensive revision of all images and the preoperative tests of patients was made, before giving the indication for EBN. The procedure was carried out under general anaesthesia, using the "In Reach Superdimension® System".

**Results:** Sixteen lesions were located in the pulmonary parenchyma, while 17 patients had mediastinal lymphadenopathy. Ac-

ording to the specific case, during EBN peripheral lung nodules underwent FNAB and mediastinal lymph nodes were sampled by means of transbronchial or transtracheal FNAB. A correct diagnosis was made for 15 out of 17 (88.2%) patients with mediastinal lymphadenopathy and for 14 out of 16 (87.5%) patients with peripheral pulmonary nodules. No complications were recorded during the procedure and all patients recovered uneventfully.

**Conclusions:** A multidisciplinary approach allows the correct selection of the patients undergoing EBN, increasing the success rate of this technique, which represents a valid alternative to standard methods of sampling both peripheral lung lesions and mediastinal lymphadenopathy.

**Key words:** Electromagnetic Navigation Bronchoscopy

#### EP-46

### TRANSBRONCHIAL NEEDLE ASPIRATION: A TOOL FOR A COMMUNITY BRONCHOSCOPIST

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**Aim:** Conventional transbronchial needle aspiration (C-TBNA) has been proven to be a safe, minimally invasive, and cost-effective technique in establishing a diagnosis of mediastinal pathologies. We studied the success of C-TBNA in community practice, in patients with mediastinal lymphadenopathies.

**Materials and Methods:** The technique of C-TBNA was learned solely from the literature, videos and practicing on inanimate models at "Hands-On" courses. Conventional TBNA with 21 and/or 19 gauge Smooth Shot Needles was performed on consecutive patients with undiagnosed mediastinal lymphadenopathy.

**Results:** Fifty-four patients (Male 38), mean age 56.9±11.8 years underwent C-TBNA. Thirty-three patients had nodes larger than 20 mm. Final diagnoses were malignancy (n: 29), sarcoidosis (n: 9), reactive lymph nodes (n: 15) and tuberculosis (n: 1). Final diagnosis was established by C-TBNA in 27. The exclusive diagnostic yield of TBNA was 42.5% (n: 23). Node size had an impact on outcome ( $p=0.002$ ) while location did not ( $p=0.82$ ). C-TBNA was positive in 22/24 when malignancy was suspected (yield 64.7%), and 5/20 when benign diagnosis was suspected (yield 25%) ( $p=0.005$ ). Sensitivity, specificity, PPV, NPV and diagnostic accuracy were 79.4%, 100%, 100%, 73% and 81.5%, respectively.

**Conclusions:** C-TBNA can be successfully learned without formal training and could be easily applied in the community practice.

**Key words:** Transbronchial need aspiration

## EP-47

**LEARNING CURVE OF CONVENTIONAL TRANSBRONCHIAL NEEDLE ASPIRATION**

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**Aim:** Conventional Transbronchial needle aspiration (C-TBNA) is a cheap and safe procedure, which illuminates the aetiology of mediastinal and/or hilar enlarged lymph nodes and prevents the costs and risks of unnecessary diagnostic or therapeutic surgical procedures.

**Materials and Methods:** In the present study, we retrospectively evaluated our first 62 C-TBNA procedures at Erciyes University between May 2012 and December 2012.

**Results:** One hundred and seven lymph nodes were sampled in 62 patients by C-TBNA. Of these 62 patients, 19 (30.6%) were women. The mean size of lymph nodes was  $19.3 \pm 8.1$  mm and each node underwent a median of 2 (range 1-4) passes. Sub-carinal and right lower paratracheal lymph nodes were the most commonly sampled sites. Adequate lymph node samples were obtained in 52 of 62 patients (83.8%). Patients were divided into groups: the first 31 patients were defined as group A, and the second 31 patients were defined as group B. The sensitivity of C-TBNA per patient basis for Group A and B were 70% and 93.7%, respectively. The diagnostic accuracy of C-TBNA for Group A and B was 72.0% (18/25) and 96.0% (24/25), respectively, and the difference was statistically significant ( $p < 0.05$ ). The sensitivity, specificity, PPV, NPV and diagnostic accuracy per patient were 80.6%, 92.9%, 96.7%, 65.0% and 84.0%, respectively, and per nodal station were 76.2%, 89.5%, 96.0%, 53.1% and 79.3%, respectively.

**Conclusions:** In conclusion, C-TBNA is a safe and efficient procedure even with our limited experience and the diagnostic accuracy improves by performing more procedures.

**Key words:** Transbronchial needle aspiration, bronchoscopy

## EP-48

**ADEQUACY OF 22 AND 21 GAUGE EBUS-TBNA SAMPLES FOR GENOTYPING OF PRIMARY LUNG ADENOCARCINOMA**

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**Aim:** Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) is a minimally invasive mediastinal sampling technique. Screening for mutations of the epidermal growth factor receptor (EGFR) gene in non-small cell lung cancer (NSCLC) is important as this mutation confers improved responsiveness to tyrosine kinase inhibitors (1). Samples obtained at EBUS-TBNA are smaller compared to those obtained via mediastinoscopy; however, a recent multicentre study of 119 patients with EBUS-TBNA using 22G needles showed that genetic mutation analysis was possible in 90% (107/119) (2).

The aim of this single centre prospective study was to evaluate the adequacy of EBUS-TBNA samples using both 21G and 22G needles in confirmed primary lung adenocarcinoma.

**Materials and Methods:** A prospective analysis was performed on 200 consecutive patients undergoing EBUS-TBNA between 2009 and 2012 as previously described (3). 21G or 22G needles (Olympus ViziShot, NA-201SX-4021 and NA-201SX-4022) were used at the discretion of the operator. The proportion of confirmed primary lung adenocarcinoma samples in which EGFR mutation testing was feasible was determined.

**Results:** Primary lung adenocarcinoma was confirmed in 31 patients (16%). Sufficient material for EGFR mutation analysis was available in 30 patients (97%). EGFR mutation was present in 2 patients (7%).

**Conclusions:** This single centre study demonstrates both 22G and 21G EBUS-TBNA are adequate for EGFR mutation analysis (achieving sample usability rates higher than published (3) with no clear superiority, unlike recent data suggesting that disease phenotyping may be superior using a 21G needle (4). Further larger studies are required to confirm these findings.

**Key words:** Endobronchial ultrasound, EGFR mutation, genotyping, adenocarcinoma, non-small cell lung cancer

## EP-49

**THE DIAGNOSTIC ROLE OF ENDOBRONCHIAL ULTRASOUND IN PATIENTS WITH SUPERIOR VENA CAVA SYNDROME**

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**Aim:** Superior vena cava syndrome (SVCS), is a syndrome which is characterised by head, neck and upper extremity oedema and congestion, and that developing large veins to drain blood into the inferior vena cava system. In the aetiology, there is usually an intrathoracic malignancy that compresses the superior vena cava. The aim of study is to share our experiences in patients applied with the findings of SVCS and diagnosed with EBUS-TBNA.

**Materials and Methods:** The files of patients applied to our clinic with the findings of SVCS and who underwent EBUS-TB-

NA for the diagnosis between January 2011 and December 2012 were retrospectively analysed.

**Results:** Eleven male cases with the mean age of 62.6±8.9 (min:52,max:81) years were included. The most common complaint was shortness of breath (72.7%), followed by oedema of the face and neck (54.5%). The mean lesion size was 47.4±16.8 (min:30,max:70) mm. EBUS-TBNA was performed from the mass in 9 (81.8%) cases, from the 11L lymph node in one case and from the pre-carinal area in one case. In addition, three (33.4%) patients who underwent EBUS-TBNA on the mass were also sampled using the number 7 LN. Aspiration number per patient was calculated as 3. EBUS-TBNA was diagnostic in 9 (81.8%) cases, one of the non-diagnosed 2 cases was diagnosed by mediastinoscopy and the other one by computed tomography guided needle aspiration biopsy. The final diagnosis of these two cases was both squamous cell carcinoma. Five cases diagnosed as non-small cell lung cancer, 4 cases squamous cell carcinoma, 1 case small cell lung cancer, and 1 case non-necrotising granulomatous inflammation.

**Conclusions:** EBUS-TBNA is a safe method with a high diagnostic value in cases with SVCS without endobronchial lesions.

**Key words:** Endobronchial ultrasound, superior vena cava syndrome, diagnosis

#### EP-50

### THE ROLE OF ENDOBRONCHIAL ULTRASOUND GUIDED TRANSBRONCHIAL NEEDLE ASPIRATION FOR THE DIAGNOSIS OF PERIBRONCHIAL LESIONS

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**Aim:** The diagnosis of peribronchial lesions which do not have endobronchial component visible on bronchoscopy may be difficult. Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA), which is useful for the diagnosis of mediastinal and hilar lymph nodes, can be an alternative method for the evaluation of peribronchial lesions. The aim of this study was to evaluate the role of EBUS-TBNA for the diagnosis of peribronchial lesions.

**Materials and Methods:** The files of 48 patients with peribronchial lesions accessed by EBUS-TBNA between January 2011 and December 2012 were retrospectively analysed. There is no endobronchial lesion observed by bronchoscopy in all patients.

**Results:** EBUS-TBNA was performed in 42 (87.5%) male, 6 (12.5%) female patients with a mean age of 60.8±11.6 years. The EBUS-TBNA was performed from the trachea in 27 (56.2%), left main bronchus in 9 (18.7%), right main bronchus

in 4 (8.4%), intermediate bronchus in 5 (10.4%), left lower lobe bronchus in 2 (4.2%) and right lower lobe bronchus in 1 (2.1%) patients. Cytological and/or histological samples were diagnostic in 46 of 48 patients. The final diagnoses of the peribronchial lesions were small cell lung cancer in 16 (33.4%) cases, squamous cell cancer in 12 (25.0%), non-small cell lung cancer in 11 (22.9%), adenocarcinoma in 6 (12.5%), carcinoid tumour in one (2.1%), spindle cell tumour in one (2.1%) and low grade lymphoma in one (2.1%). There are false negative results with EBUS-TBNA in two cases. One of them was diagnosed as non-small cell carcinoma and the other one as low-grade lymphoma with invasive procedures. The sensitivity and specificity of EBUS-TBNA for the diagnosis of peribronchial lesions were 95.8%, and 100%, respectively.

**Conclusions:** Peribronchial lesions which do not have an endobronchial component visible on bronchoscopy can easily be assessed and diagnosed by EBUS-TBNA as long as it is within the reach of the EBUS-TBNA scope. EBUS-TBNA is a real-time procedure with a high sensitivity, specificity and diagnostic accuracy which can be applied for the diagnosis of peribronchial lesions.

**Key words:** Diagnosis, endobronchial ultrasound, peribronchial lesions, transbronchial needle aspiration

#### EP-51

### A CASE OF PULMONARY EMBOLISM CONFIRMED BY ENDOBRONCHIAL ULTRASOUND

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A 68 year-old male patient with right hilar enlargement was referred to our clinic. He had dyspnoea for 3 weeks. On his thorax CT, he was reported to have a right hilar mass or pulmonary embolism in the right main pulmonary artery. The patient was old and his CT was new. In order not to expose him to more radiation we performed convex probe EBUS. An embolus was detected with EBUS. Therefore, EBUS can be used as an alternative method for the diagnosis of pulmonary embolism.

**Key words:** Pulmonary embolism; endobronchial ultrasound

#### EP-52

### TRANS-OESOPHAGEAL ENDOBRONCHIAL ULTRASOUND-GUIDED FINE-NEEDLE ASPIRATION (EUS-B-FNA): A FOUR YEAR SINGLE CENTRE EXPERIENCE

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**Aim:** There has been no study reporting EUS-B-FNA as a standalone approach for sampling mediastinal lesions as yet. This study attempts to delineate the reasons, efficacy and safety of performing this procedure.

**Materials and Methods:** We retrospectively reviewed clinical characteristics, indications and efficacy of EUS-B-FNA to achieve a diagnosis after four years of performing this procedure at our centre from January 2009–December 2012. Results are presented in a descriptive manner.

**Results:** EUS-B-FNA constituted 67 (15.12%) of the total 443 endobronchial ultrasound-guided fine needle aspirations (EBUS-FNA) performed during the study period. There were 39 males (58.2%) and 28 females (41.8%) with a mean (SD) age of 54 (15) years. The main reasons for performing EUS-B-FNA over EBUS-TBNA were severe hypoxia (24; 35.8%), refractory cough (23; 34.3%), secretions (9; 13.4%) and non-accessibility through endobronchial routes (9; 13.4%). The overall efficacy of EUS-B-FNA in sampling a mediastinal lesion was 91%. The accuracy in achieving a specific pathological diagnosis was 77.6%, whereas the diagnostic yield of a successful procedure was 85.2%. The most common diagnosis on cytology was bronchogenic carcinoma (44.8%). No complications occurred.

**Conclusions:** EUS-B-FNA is a useful tool in the inventory of pulmonologist intervention resulting in 15.12% additional mediastinal lesion samplings with linear endobronchial ultrasound bronchoscope than using EBUS-TBNA alone. EUS-B-FNA broadens the use of this bronchoscope without new equipment, cost or complications.

**Key words:** Trans-Oesophageal Endobronchial Ultrasound-Guided Fine-Needle Aspiration, EUS-B-FNA, EBUS-TBNA, EBUS-FNA

EP-53

### CONVENTIONAL TBNA COMBINED WITH TRANSBRONCHIAL LUNG BIOPSY IS EFFECTIVE IN DIAGNOSING SARCOIDOSIS IN UNITS WITHOUT EBUS FACILITIES

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Our recent Audit of Bronchoscopy over the last 5 years and noted that our conventional TBNA Bronchoscopy biopsy combined with Transbronchial Lung Biopsy was an effective technique in diagnosing Sarcoidosis when facilities of EBUS guided TBNA biopsy of the Lymph Node was not available in the Hospital. No untoward incident occurred during bronchoscopy.

Transbronchial lung biopsies had a diagnostic percentage of 70% of diagnoses made from histopathology but this percentage includes patients where no cause was found. In 44% of cases there was a positive diagnosis found.

Endobronchial biopsies taken had a high rate of diagnosis; when biopsies were taken, 97% led to a diagnosis of some variation and 93% of endobronchial biopsies led to a positive diagnosis.

Blinded conventional TBNA lymph node biopsies had a good hit rate with no evidence of complications like haemorrhage, pneumo-mediastinum or pneumothorax. 75% of the TBNA biopsies led to a diagnosis which included ruling out malignancy; the other 25% needed further investigation such as CT guided biopsies as the aspirate analysed was not from a lymph node. 37% of TBNAs led to an actual positive diagnosis for example cancer or sarcoidosis.

Overall, the safety data in Bronchoscopy was excellent with better yield in combining TBNA Lymph Node biopsy and Trans-bronchial Lung biopsy, specifically in suspected Sarcoidosis.

Through setting up an EBUS services for our Trust i.e. Endobronchial Ultrasound guided (EBUS) guided Transbronchial Needle Aspiration (TBNA) and Transbronchial Lung (TLL) biopsy results could be further improved as they are currently performed without ultrasound guidance.

**Key words:** TBNA, Sarcoidosis, TBLB

EP-54

### TEN-YEAR SINGLE CLINIC TRANSBRONCHIAL NEEDLE ASPIRATION RESULTS

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Transbronchial needle aspiration (TBNA) is a cytological and/or histological sampling procedure from deep submucosal area and masses, lesions or lymph nodes adjacent to the trachea or bronchi. As lung cancer increases progressively, the significance of TBNA is understood. In this study, radiology, fiberoptic bronchoscopy and pathology results which performed TBNA with presenting mediastinal widening are compared in consecutive patients between 2002 and 2013 in our clinic. All TBNA results performed by staff consultants and residents were included in the analysis. A total of 433 lymph nodes were sampled from 324 patients. Patients were on average 55.4±14.1 years and the female/male proportion was 93/231. Sample lymph node stations were bilateral upper and lower paratracheal, subcarinal and hilar lymph nodes. Sample lymph node stations were taken with TBNA, 148 had a diagnosis (134 malignant, 14 granulomatous disease), 57 had normal lymphocytes and 227 had inadequate material. Definite diagnosis was confirmed with different procedures compared with TBNA results in order to calculate sensitivity and specificity. Sensitivity was 38% and specificity was 94%. No complication was seen related to TBNA. Sensitivity of TBNA was greater in malignant disease compared to benign processes.

**Key words:** Transbronchial needle aspiration, lymph node

## EP-55

### FACTORS AFFECTING THE SUCCESS OF THE CONVENTIONAL TRANSBRONCHIAL NEEDLE ASPIRATION IN EVALUATION OF INTRATHORACIC LYMPHADENOPATHY

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**Aim:** Conventional transbronchial needle aspiration (C-TBİAB) is low-cost, safe and minimally invasive diagnostic procedure which is used to diagnosis and staging of lung malignancies. However, due to less diagnostic specificity and sensitivity value than the other methods restrict the use of it. The aim of this study was to investigate factors associated with the correct diagnosis in the C-TBİAB.

**Materials and Methods:** Consecutive 30 patients, who had mediastinal and/or hilar lymphadenopathy on chest computed tomography and malignant lesions founded by performing the C-TBİAB or by further invasive investigation, were enrolled in the study. The demographic characteristics, localisation, size, and number of lymph nodes on which C-TBİAB was performed were recorded. Data of patients who were diagnosed only by C-TBİAB (Group 1) and who required further invasive methods (Group 2) were compared.

**Results:** The average age of the patients included in the study was 62.13±2.5 and 86.7% were male. The mean size of lymph nodes were 23.5 ± 5.1 mm in group 1 and 15.4 ± 5.4 in group 2 and there was a significant difference between two groups (p=0.03). The number of aspirations performed on lymph nodes by C-TBNA was 1.27±0.4 in group 1 and 1±0.2 in group 2; this difference was also significant (p=0.011). The aspiration from subcarinal lymph nodes was more diagnostic than others.

**Conclusions:** Size, number and location of lymph nodes which were C-TBİAB performed affects the success of diagnosis in malignant lesions.

**Key words:** Conventional transbronchial needle aspiration, lymph node, lung malignancy

## EP-56

### COMPARISON DIAGNOSTIC VALUE OF CONVENTIONAL TRANSBRONCHIAL NEEDLE ASPIRATION IN BENIGN AND MALIGNANT LESIONS

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**Aim:** Conventional-Transbronchial Needle Aspiration Biopsy (C-TBNA) is a minimally invasive, safe and cost-effective tech-

nique for the detection of mediastinal pathologies. We aimed in this study to evaluate the value of C-TBNA in malignant and benign lesions, in patients with mediastinal lymphadenopathies.

**Materials and Methods:** In total, 65 patients who were followed up in the chest clinic of Dicle University Hospital between January 2010 and June 2011, with central mass or intrathoracic lymphadenopathy in thorax CT and performed C-TBNA, were included to the study. Age, gender, indication for biopsy, C-TBNA cytopathology results, accurate method of diagnosis and the final pathological diagnosis were retrospectively evaluated. The data were statistically analysed.

**Results:** The mean age of the 65 patients was 57.5 ±17.1, 47 (72.3%) were male and 18 (27.7%) female; the preliminary diagnosis of 43 patients (66%) was lung cancer, in 5 (7.7%) was mediastinal lymphadenopathy, in 11 (16.9%) was granulomatous disease (tb, sarcoidosis, etc.) and 6 (9.9%) had another diagnosis. Malignancy was assessed in 23 patients, sarcoidosis in 2 patients and tuberculosis (tb) in 1 patient by C-TBNA. With the combination of other bronchoscopic and surgical procedures, malignancy was found in 39 (60%) patients, sarcoidosis in 14 (21.5%), TB in 8 (12.3%), and other diagnoses in 4 (6.2%) patients as a definitive diagnosis. The sensitivity of C-TBNA in the diagnosis of malignant lesions was 58%, while 13.5% were found in the diagnosis of benign lesions.

**Conclusions:** The sensitivity of TBNA for benign lesions was lower than for malignant lesions. This result shows that C-TBNA is less useful in the diagnosis of benign diseases such as tb and sarcoidosis.

**Key words:** Conventional-Transbronchial Needle Aspiration Biopsy, mediastinal lymphadenopathy,

## EP-57

### ADDITIONAL DIAGNOSTICS WITH THE ULTRASOUND BRONCHOSCOPE FOR THE TRANSOESOPHAGEAL ASSESS

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**Aim:** To evaluate the role of transoesophageal endoscopic ultrasound with bronchoscope-guided fine-needle aspiration (EUS-B-FNA) in patients with mediastinal or paramediastinal lesions.

**Materials and Methods:** Prospective study which included 279 consecutive patients (221 men; mean age 63, SD 13.08), referred to realise EBUS-TBNA, during a 20 month period. Cases that needed the EBUS-TBNA substituting or complementing for EUS-B-FNA were registered. In all of the cases with previously

realised EBUS-TBNA, cytological samples “in situ” were evaluated before realizing additional transoesophageal exploration.

**Results:** In 50 patients (17.9%), EUS-B-FNA was performed. In 4 cases, indication for the procedure was completing the staging, in 9 cases it was EBUS intolerance, 20 had inaccessible lesions or technical difficulties for EBUS-TBNA and 17 for being contraindicated or having high risk. A total of 77 lesions were punctured (range 4.2-48.9mm): 3 pulmonary left-sided apical masses, 1 subaortic, 1 in the upper right lobe, 3 mediastinal masses, 1 pleural and 68 lymph nodes. In 26 cases (52%), additional diagnostic results were obtained (23 cytological and/or microbiological, 1 for immunohistochemistry and 2 molecular), which supposed 9.3% improvement compared to all of the realised procedures, and 17.3% (26/150) of diagnostic examinations. No complications were observed.

**Conclusions:** The EUS-B-FNA is a feasible technique, which can be an alternative or complementary procedure and can improve diagnostic yield. In our experience it was necessary in at less than one fifth of cases.

Project financed by SEPAR 2010 grant.

**Key words:** EBUS-TBNA, EUS-B-FNA, Lung cancer

#### EP-58

### IMPORTANCE OF POLYMERASE CHAIN REACTION IN PATIENTS WITH HISTOPATHOLOGICAL DIAGNOSIS OF GRANULOMATOUS DISEASE BY EBUS-TBNA

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**Aim:** Transbronchial needle aspiration (TBNA) by the guide of endobronchial ultrasound (EBUS) is a diagnostic method which may be used in the diagnosis of benign granulomatous diseases in contemporary practice. In this study, we planned to evaluate the diagnostic value of TBNA by the guide of EBUS for benign granulomatous diseases and to investigate the impact of cytological, microbiological and mycobacterium tuberculosis (TB)-polymerase chain reaction (PCR) results in specimens.

**Materials and Methods:** Eighty-two patients (53 female, 29 male) who were considered likely to have a diagnosis of granulomatous disease based on clinical and radiologic assessment were included in the study. The mean age of patients was 49.31±13.9 years (min-max: 23-78). The specimens provided by EBUS-TBNA were evaluated for pathological, microbiological, and molecular (TB-PCR) examinations.

**Results:** When the clinical, radiological and laboratory findings of the patients with granulomatous inflammation were evalu-

ated, 27 patients (32.9%) had TB and 55 patients (67.1%) had sarcoidosis. Diagnoses of histopathological granulomatous diseases were established by EBUS-TBNA in 77 (93.9%) patients among those with isolated mediastinal lymphadenopathies. 5 patients were diagnosed by mediastinoscopy. Fourteen patients of mediastinal TB lymphadenopathies were positive for TB-PCR. The sensitivity of the PCR test was 52% and the specificity was 100%; the general efficiency of the test was found to be 85.5%.

**Conclusions:** In cases with granulomatous lymphadenopathies, the specimens which were investigated by EBUS-TBNA for TB-PCR provided important contribution for the diagnosis of TB. Therefore, we believe that TB-PCR should be used as a diagnostic method in cases being investigated for mediastinal lymphadenopathies.

**Key words:** Endobronchial ultrasound (EBUS), transbronchial needle aspiration (TBNA), granulomatous, tuberculosis, polymerase chain reaction (PCR)

#### EP-59

### EBUS-TBNA AND RAPID ON SIDE EXAMINATION (ROSE)

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One of the methods used in some centres to optimise the yield during the EBUS TBNA procedure is ROSE where a pathologist/cytologist is sitting in the operating room. This is a costly function and in many centres they do not employ a person with the necessary expertise for this procedure. The purpose of this study was to evaluate the efficacy of the training of a surgeon to assess cytological preparations to determine if the biopsy is representative for lymphatic tissue.

The surgeon underwent a one-day course demonstrating cytological results from endoscopies ultrasound guided biopsy and was trained to carry out the appropriate staining of the slides – a process that takes 90 seconds. The first 100 consecutive patients who underwent EBUS TBNA in 2012 were included.

Three hundred and fifty-two lymph nodes were biopsied. 11 lymph nodes were rebiopsied based on ROSE that had concluded that the biopsy was not sufficient. Rebiopsies were deemed sufficient in 7 cases. In the remaining 4 cases it was decided that it was not possible to obtain sufficient material from the lymph node. In these 4 cases and the remaining 4 the lymph nodes were less than 4 mm in diameter.

It is easy for a non-pathologist to be trained to a level where it is possible to determine the quality of the biopsies obtained by EBUS-TBNA.

The method only prolongs the procedure by minutes but makes it possible to immediately redo a biopsy with the result of a high yield.

**Key words:** EBUS TBNA, staging, lung cancer, ROSE by endoscopist

EP-60

## ENDOBONCHIAL ULTRASONOGRAPHIC IMAGES OF PERIPHERAL PULMONARY ACID-FAST BACILLUS INFECTION

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**Aim:** Endobronchial ultrasonography (EBUS) has been utilised to detect peripheral pulmonary lesions, and the EBUS appearances of benign lesions have been reported (Kurimoto N, et al. Chest 2002; 122:1887–1894; Cao TY et al. Chest 2006; 130: 1191–1197; Shinagawa N, et al. Ann Thorac Surg 2012; 93: 951–957). In this study, we evaluated EBUS images of acid-fast bacillus infection (AFBI), i.e. infection of mycobacterium tuberculosis (TB) and non-tuberculosis mycobacterium (NTM).

**Materials and Methods:** We retrospectively reviewed the medical records of patients who underwent EBUS and who were subsequently diagnosed as AFBI between August 2011 and January 2013 in our institutes. We analysed EBUS images and the corresponding radiography (chest X-ray and CT scan).

**Results:** We found 12 lesions of 12 patients (mean age of 64, ranged from 40 to 84; M/F = 7/5; TB/NTM = 5/7) from the charts. We classified the EBUS images into 3 patterns: (A) numerous hyperechoic dots without hyperechoic arc, (B) hypoechoic small nodule with discontinuous hyperechoic margin, (C) heterogeneous area with hyperechoic dots and hyperechoic rectilinear margin. Pattern A reflects diffuse infiltration appearance in CT scan; on the other hand, the pattern B imitates small nodular shadow(s) of granulomas. Pattern C is mostly observed as a solitary pulmonary nodular shadow on CT scan; however, the rectilinear boundary of EBUS image was seldom noticed in CT scan.

**Conclusions:** The EBUS images of AFBI lesions can be classified by several representative features, and these may be useful for bronchoscopic diagnosis.

**Key words:** Endobronchial ultrasonography (EBUS), acid-fast bacillus infection (AFBI), mycobacterium tuberculosis (TB), non-tuberculosis mycobacterium (NTM)

EP-61

## PULMONARY INFECTION AFTER EBUS AND EUS SAMPLING OF A CAVERNOUS MASS

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We describe a post-interventional infection after sampling of a cavernous paravertebral pulmonary mass in a 58 year-old fe-

male patient with rheumatoid arthritis. The concurrent medication consisted of methotrexate 10 mg/week, leflunomide 20 mg and ramipril 5 mg daily. The patient had a 30 pack/year smoking history and her father had had pulmonary TB. The patient was evaluated because of hypersedimentation and new thoracic x-ray infiltrates. The thoracic CT showed a large paravertebral and paratracheal cavernous mass of RUL, another similar mass in RLL and a third mass in LUL. There was no fluid in the cavities. Conventional bronchoscopy showed no intrabronchial lesions and the procedure was continued with EBUS and EUS. The largest mass lesion was punctured both through the trachea and oesophagus. The procedure was uneventful. After 7 days the patient presented with high fever and dyspnoea. The CRP was over 200 mg/l and there were new fluid levels in several caverns. Iv-cefuroxime showed insufficient response and was changed to tazobactam–moxifloxacin. The patient was hospitalised for 14 days. All bronchoscopic bacterial and TB samples taken before and during antimicrobial treatment were negative. The EBUS cytology showed nonspecific inflammation, as did the following CT-guided biopsy. No further invasive sampling was obtained and follow-up CT after antibiotic and steroid treatment showed almost complete resolution of all cavities.

**Conclusions:** We describe a sampling-related infection in a patient with rheumatoid arthritis. It seems that prophylactic antibiotics have to be used while sampling possibly inflammatory cavernous lesions.

**Key words:** EBUS, EUS, infection, complication

EP-62

## HAS EBUS REDUCED THE NEED FOR CT GUIDED BIOPSIES?

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**Aim:** At our university hospital, prior to November 2011, patients undergoing investigation for lung cancer were seen in a designated clinic. From November 2011 onwards, EBUS was introduced to this diagnostic pathway. We set out to investigate whether the introduction of EBUS reduced the need for CT guided biopsies.

**Materials and Methods:** Data from the lung cancer clinic, CT guided procedures and EBUS procedures were retrospectively reviewed.

**Results:** Between November 2010 and the end of October 2011, of 315 new referrals seen, cancer was diagnosed in 54 (17% of referrals). From November 2011 until November 2012, 485 new referrals were seen, of which 90 (19%) were diagnosed with cancer. The number of patients undergoing CT guided biopsy was 49 (15.5%) and 49 (10.1%) for both years respectively (p=0.02). During the first year and second year, 33 and 75 patients had peripheral lesions with

mediastinal lymphadenopathy. Prior to EBUS, CT-guided biopsies were performed in all 33 of these patients, whilst during the second period, 28 (37%) patients underwent CT-guided biopsy ( $p < 0.001$ ). This equated to a potential reduction in CT-guided procedures by 63% (95% CI: 52%-74%).

**Conclusions:** The introduction of EBUS reduced the relative need for CT guided biopsy in our cohort. However, with the increasing burden of disease, the improvement in awareness and referral systems, the absolute numbers of CT guided biopsies remained unchanged.

**Key words:** EBUS, CT-guided, Lung biopsy, cancer, thoracic, malignancy

### EP-63

#### THE SETTING UP OF AN EBUS CENTRE IN THE WEST OF IRELAND

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We describe the first year of a new service, where EBUS was newly introduced and performed under conscious sedation. Rapid onsite cytological evaluation was not available; however, cytopathologists were closely involved in nurse training.

From January 2012 until December 2012, 146 procedures were performed. The mean age was 59.6 years. All patients received atomised oral lidocaine and "spray as you go" intubation. The median [Interquartile range] doses of midazolam and alfentanyl were 6 [4-7] mg and 500 [250-500] mcg, respectively. Five (3%) procedures failed or were stopped prematurely due to 1) poor tolerance ( $n=4$ ) and 2) haemoptysis ( $n=1$ ). No procedural deaths occurred.

A total of 259 lymph node stations were sampled (mean 1.8 per patient). The commonest lymph node stations were 4R ( $n=78$ ), 7 ( $n=72$ ) and 11R ( $n=47$ ). Insufficient sampling was reported in 13 of 146 (8.8%) patients, and was associated with fewer sampling sites (1 [1-2] station versus 2 [1-2] stations;  $p=0.03$ ), and did not change over time (first and second half of the year 8.3% and 10% respectively ( $p=0.76$ )).

A positive diagnostic sample was obtained in 79 (63%) samples. The commonest diagnosis was malignancy ( $n=47$  (32.2%): NSCLC adenocarcinoma, small cell carcinoma and NSCLC squamous accounted for 15 (10.3%), 11 (7.5%) and 10 (6.8%) respectively). Sarcoidosis (defined by histology plus radiology) was diagnosed in 32 (21.9%) patients. 39 (26.7%) patients had negative representative sampling.

The introduction of EBUS, supported by nurse training and close liaison with cytopathology, was well tolerated and proved to be a valuable diagnostic tool.

**Key words:** EBUS, Lung cancer, Sarcoidosis, pathology, cytology, thoracic, malignancy

### EP-64

#### FOUR PATIENTS OF PULMONARY EMBOLISM DIAGNOSED WITH ENDOBRONCHIAL ULTRASOUND

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Between 18.03.2011 and 31.01.2013, two hundred and fifty-eight endobronchial ultrasound (EBUS) procedures were performed by the same bronchoscopist; 4 patients (1.5%) were newly diagnosed with pulmonary embolism. All cases were presented with literature.

**Case 1:** A 73 year-old male pre-diagnosis with sarcoidosis and interstitial pulmonary disease had EBUS performed. Because his serum creatinine level was high, angio computerised chest tomography had not been done. Embolus was detected in the left pulmonary artery by EBUS. Fine-needle aspiration biopsy (FNAB) reported reactive lymphadenitis.

**Case 2:** A 60 year-old female with malignant pleural effusion and fludeoxyglucose-positive mediastinal lymph nodes was subjected to EBUS. Emboli were detected in the left and right pulmonary artery by EBUS. FNAB reported adenocarcinoma.

**Case 3:** A 66 year-old female with mediastinal mass. Results of two fiberoptic bronchoscopy procedures had been uninformative. Embolus was detected in the right pulmonary artery by EBUS. FNAB revealed squamous cell carcinoma.

**Case 4:** A 52 year-old male with multiple mediastinal lymph nodes. Embolus was detected in the left pulmonary artery by EBUS. FNAB reported adenocarcinoma.

**Conclusions:** EBUS has a definitive role in the detection and biopsy of mediastinal lymph nodes or masses and staging lung cancer. EBUS provides a new way to diagnose central pulmonary embolism.

**Key words:** Pulmonary embolism, Endobronchial ultrasound

### EP-65

#### PROPOSAL FOR THE USE OF DISPOSABLE BRONCHOFIBROSCOPE AS GUIDE FOR THORACIC TUBE DRAINAGE

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Thoracocentesis is usually performed by guidance such as physical examination (percussion), ultrasonography, or computer-tomography. It is sometimes difficult to insert the drainage tube

into optimal place for aspiration of pleural effusion or air. We used disposable bronchoscope (aScope, Ambu) as a guidance procedure for inserting the drainage tube.

This disposable bronchoscope (aScope, Ambu) has a length of 830mm and outer diameter of 5.4mm. Its weight is 130g.

The disposable bronchoscope is light and easy to handle. This procedure will provide reliable and easy guidance for thoracocentesis.

**Key words:** Thoracoscope, thoracic tube drainage, disposable scope

#### EP-66

### SUPERIOR VENA CAVA THROMBOSIS AND CHYLOTHORAX DUE TO MEDIASTINAL MASS

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Chylothorax, the accumulation of lymphatic fluid in the pleural cavity, is a rare clinical presentation of a mediastinal mass lesion invading the superior vena cava (SVC). Here, we present a patient with a likely malignant mass lesion invading SVC, resulting in SVC thrombosis, SVC syndrome and chylothorax. A 69 year-old man was admitted with progressively worsening dyspnoea and swelling of the face and neck. He was a heavy smoker with an unremarkable past medical history. On physical examination, his face, neck and upper extremities were swollen. There were distended superficial veins over the anterior chest wall. There was dullness and diminished breath sounds at the base of right hemithorax. Routine laboratory analysis was normal. Thorax CT demonstrated a 3x2 cm mass lesion invading the SVC, widespread collaterals and right pleural effusion. There were thromboses in the SVC, bilateral innominate, subclavian and internal jugular veins. PET/CT examination revealed only a high FDG uptake (SUVmax: 10.36) on that mediastinal mass. A turbid, milky-white fluid was aspirated from the right hemithorax. The biochemical analysis (triglyceride 953 mg/dl, cholesterol 50 mg/dl, LDH: 92 U/L) was compatible with transudative chylothorax. Cytology was benign. We instituted a low fat diet, anticoagulation, steroid and diuretic therapy. After relieving of symptoms, we performed fiberoptic bronchoscopy, which was normal. Convex-probe endobronchial ultrasonography revealed an irregularly margined, heterogeneous, hypoechogenic mass lesion located on the right lower paratracheal region. Fine needle aspiration and cell block examination of this lesion was reported as a suspicion of malignancy. The patient refused any further diagnostic investigation and died two weeks after discharge.

**Key words:** Chylothorax, superior vena cava thrombosis, mediastinal mass

#### EP-67

### PLEUROSCOPY IN IDIOPATHIC EOSINOPHILIC PLEURAL EFFUSIONS

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**Aim:** Idiopathic eosinophilic pleural effusions (IEPE) are defined as those where a specific aetiology cannot be established. However, all existing series combine clinical to thoracocentesis criteria to characterise IEPE and no series exists reporting the results of a systematic pleuroscopic approach with patient outcomes after a long follow-up.

**Objectives:** The aim of our study was to assess the outcome of patients with IEPE after systematic diagnostic approach by pleuroscopy.

**Materials and Methods:** We studied all 21 patients with indeterminate eosinophilic pleural effusion among 175 consecutive patients who underwent pleuroscopy under local anaesthesia for diagnostic purposes. Pleural biopsies were systematically obtained from observed lesions. All patients were followed regularly by clinical examination, and imaging.

**Results:** There were 10 patients with IEPE (median age was 50.5 years, ranging from 35 to 91). Pleural eosinophilic count ranged from 10% to 59%. Macroscopic examination of the pleura showed diffuse thickening with pleural plaques in 8 patients in whom microscopic findings were consistent with diffuse pleural eosinophilic inflammation. In 2 patients, macroscopic examination showed scattered nodules in association to non-caseating granulomas after microscopic analysis. Specific diagnosis was not identified in all cases. Follow-up was available for all patients ranging from 24-102 months (median 60 months). None of the patients received any specific treatment during the follow-up period. No relapse of pleural effusion was recorded during this period.

**Conclusions:** Our series gives conclusive information of the outcome of IEPE patients after pleuroscopy assessment and long follow-up. Pleuroscopy is necessary after non-invasive negative initial work-up.

**Key words:** Eosinophilic, pleuroscopy, pleural effusion, idiopathic, thoracoscopy, non-specific

#### EP-68

### RADICAL TREATMENT OF POSPNEUMONECTOMIC PLEURAL EMPYEMA BASED ON THE VALVE BRONCHUS BLOCKING

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**Aim:** To establish the possibility of convalescence after pospneumonecrotic empyema with bronchial fistula without reoperation through the use of a valve to block the bronchus stump.

**Materials and Methods:** The valve bronchus blocking\* was performed in 5 men, aged 29-53 years, with the bronchial fistula and empyema after pneumonectomy by pulmonary tuberculosis in the period 3-6 months after operation. Empyema cavity readjustment (ductal lavage through pleural drainages), TB treatment, detoxification, and symptomatic therapy was used. General clinical, bronchoscopy, and radiological surveillance was processed. The criterion of efficiency was to achieve complete remission.

**Results:** The readjustment of the pleura was required for 1-3 months. Then, there was obliteration of the pleural cavity through the fibrothorax formation, with the mediastinum and diaphragm shifting. Patients were followed until the end of full course of TB treatment, and then the endobronchial valve was removed (11-12 months). Control - bronchoscopy, bronchial washings microbiological testing and CT. Complete remission was achieved in all cases. Complications associated with the valve in the bronchi or during the valve extraction was observed.

**Conclusions:** 1. The principle possibility of postpneumonec-  
tomic empyema with bronchial fistula cure by using of valve  
bronchus blocking without reoperation was proved. 2. The  
valve bronchus blocking can be an alternative to surgical treat-  
ment of patients with postpneumonec-  
tomic pleural empyema.  
\*Application of the endobronchial valve in complex treatment  
of patients with the bronchopleural fistulas after lung resection  
/ Ye. Tseimakh et al. // ERS Annual Congress. – 2010. – P.497s.

**Key words:** TB, postpneumonec-  
tomic empyema, bronchial fis-  
tula, valve bronchus blocking

#### EP-69

### METHOD OF EARLY DIAGNOSIS XDR. STATE ORGANISATION "NATIONAL INSTITUTE OF PHYSIOLOGY AND PULMONOLOGY NAMED AFTER F.G. YANOVSKY NATIONAL ACADEMY OF MEDICAL SCIENCES OF UKRAINE"

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With the increase in the world's MDR TB patients, the problem of early diagnosis of TB and detection of drug resistance is particularly important.

A study was conducted of 145 patients with pleural effusion of unknown aetiology treated in 2011-2012. For morphological verification of diagnosis a biopsy was performed. Videothoracoscopy modified sections of the pleura. Biopsies were studied morphologically, cytologically and microbiologically. General videothoracoscopy diagnostic value in the diagnosis of pleural effusion was 97%. The work was done on the state budget. Histological examination of biopsy specimens obtained indicated a significant proportion of tuberculosis among the causes of pleural effusion (74%). Pleural effusion was identified as the TB aetiology in 100% of cases. Microbiological studies obtained at videothoracoscopy pleural biop-

sies allowed drug sensitivity to be tested, and identified extensive drug-resistant TB in 12% of the subjects. Thus, 12% of patients that do not emit mycobacteria could require individualised chemotherapy regimen in terms of up to 2.5 months. I believe that the use of microbiological studies of pleural biopsy is appropriate. A drug test is necessary for the early detection of extensive drug-resistant TB.

**Key words:** Videothoracoscopy, early diagnosis.

#### EP-70

### THE USE OF WELDING TECHNIQUES IN THE SURGICAL TREATMENT OF PATIENTS WITH XDR

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We investigated the results of treatment of 23 patients with MRTB who used welding technology when performing surgery and 64 patients operated on in a classical way. The welding hardware – EK 300 M worked in an automatic regime. The prime estimation was aimed at the suture hermetic state, which was supported by haemostasis and aerostate, complete lung expansion, postoperative pleural effusion dynamics, lung-pleural complications as well as a thorough postoperative treatment period. The study confirmed the fact that the welding suturing compared with conventional single line mechanical stapler-stitching did not require additional suturing due to insufficient hermetic state in 10.0%±3.8% cases; furthermore, it prevented the need for additional hand stitching on top of the mechanical stapler stitching line due to inadequate haemostasis in 15.0%±4.7% cases. The substantial differences in time of thoracic drainage removals were also stressed at 3 days±0.2 in group-1 and 7 days±2.7 – in group-2 (p<0.05). There was also no recurrence of a specific process in the remaining lung tissue during the formation of the weld. Thus, on the basis of the performed studies, a number of benefits and advantages of biological welding usage for lung tissue suturing in patients with tuberculosis of the lungs were seen, which permitted a decrease of the postoperative treatment time length of the studied patients by means of securing satisfactory development of postoperative time.

**Key words:** Welding techniques, XDR.

#### EP-71

### PLEURAL EFFUSION CYTOLOGY ANALYSIS IN DIAGNOSTICS OF PLEURAL CARCINOSIS

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**Aim:** In a significant proportion of patients, pleural carcinosis cannot be proved by pleural effusion cytology analysis. The aim of this study was to identify the possible factors influencing the success rate of carcinoma cells detection in pleural effusion.

**Materials and Methods:** We analysed the pleural effusion cytology results from 100 patients with different carcinomas. Analysis was performed retrospectively on the basis of patients' clinical, imaging, biochemistry and cytology data by two pulmonologists.

**Results:** Pleural carcinosis was confirmed by cytological examination of pleural effusion in 55 effusions: carcinosis was detected in 11 by other methods. The detection rate was high in small cell lung carcinoma (9/9), macrocellular carcinoma (2/2), lung adenocarcinoma (25/27), some non-pulmonary metastatic carcinomas and was lower in undefined lung carcinoma (2/5) and squamous cell lung carcinoma (2/4). The majority of cases (51/66) required only one sample for carcinoma cell detection; in 4 patients carcinosis was cytologically proven by an additional, second puncture. In 9 patients, one or two additional punctures did not contribute to a better detection rate. The tested effusion volumes were significantly larger in cytology negative patients ( $p=0.02$ ).

**Conclusions:** The most important factor influencing the cancer cell detection rate in effusion seems to be a cancer type. There was an additional value of second puncture, but further repetitive punctures probably do not offer much advantage. The quantity of the effusion is important for further receptor analysis, but does not affect the detection rate.

**Key words:** Pleural effusion, pleural carcinosis

#### EP-72

### PROGNOSTIC FACTORS ASSOCIATED WITH BRONCHOSCOPIC DESOBSTRUCTION IN LUNG CANCER

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**Aim:** We here propose to better identify from a large retrospective study the lung cancer patients with central airway obstruction (CAO) who derived the greater benefit from interventional bronchoscopy

**Materials and Methods:** We retrospectively studied data from 204 consecutive patients treated from 2004 to 2010 for symptomatic CAO due to primitive lung cancer. We analysed survival according to the patient or disease characteristics and aimed to identify homogeneous risk groups by the Classification and Regression Trees (CART) segmentation method.

**Results:** ASA score, stage of disease, histological type and prior treatment were significantly associated with median survival. A better survival was observed for low ASA score (13, 5.9 and 2.9 months for ASA scores of 2, 3 and 4, respectively), squamous cell carcinoma, locally advanced tumours (9.2 and 6.2 months for stage IIIA and IIIB, respectively, vs. 3 months for stage IV;  $p=0.0002$ ) and for patients who received treatment (8.6 vs.

3.2 months for untreated patients). CART segmentation led to the constitution of five distinctive groups of patients. Among these, patients receiving specific treatment for squamous cell carcinoma derived the best survival (median 13 months) from the procedure. Conversely, the survival of ASA 4 patients and those treated for adenocarcinoma is dramatically low (median 0.8 months;  $p<0.0001$ ).

**Conclusions:** This study shows greater differences in survival in lung cancer patients undergoing interventional bronchoscopy. ASA score, stage of disease, histological type and prior treatment are significantly associated with survival and can help clinicians in decision making to select patients who will most benefit from this treatment.

**Key words:** Interventional bronchoscopy, lung cancer, prognostic factors

#### EP-73

### LASER RESECTED LUNG CANCER PATIENT'S SURVIVAL

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Laser resection of central endobronchial cancers is a gold standard among interventional pulmonary techniques.

The objective of the study was to evaluate the survival of laser resected inoperable lung cancer patients. The study included 26 inoperable lung cancer patients, 21 (80.8%) males and 5 (19.2%) females, who were submitted to laser resection.

All investigated patients had symptoms of an obstruction, which involved the trachea in two (7.7%) patients, the main right and left bronchus in eight (30.8%) and 15 (57.7%) patients, respectively, and the intermediary bronchus in one 1 (3.8%) patient.

The examined patients had the following histological tumour types: squamous - 23 (88.5%) patients, adeno - one (3.8%), and other tumour types - two patients.

Mild or moderate hypoxemia was registered in most, i.e. 25 (96.2%) patients, while only one patient had an extremely severe hypoxemia and hypocapnia. The survival of the patients submitted to laser resection ranged from three days to 14.5 months. One patient died three days after the intervention, two patients died within the first two weeks, seven patients died within the first three months, another seven patients survived 4-6 months after the intervention, six patients had a 6-12 month survival, and only three resected patients survived more than a year after the intervention. The mean survival of the patients was 5.4 months.

**Conclusions:** Laser resection, as the palliative treatment modality in terminal stage lung cancer patients improves their quality of life, but does not significantly contribute to their longer survival.

**Key words:** Laser, resection, lung cancer

## EP-74

**REHABILITATION OF BREAST CANCER WITH LUNG POST-BEAM INJURIES**

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**Aim:** Assessment of medical rehabilitation of patients with breast cancer with post-beam injuries of lungs.

**Materials and Methods:** Ninety-two patients with primary breast cancer, earlier treated with the combined treatment of surgery and remote beam therapy, were observed: 36 patients with beam bronchitis (BB), 47 with beam pneumonitis (BP), and 9 with beam fibrosis (BF). 25 patients received magnetotherapy, 48 patients were treated with magneto- and aerosol therapy, and 19 patients with drugs.

**Results:** Magnetotherapy in patients with BB authentically increased indicators of VC, PEF, FEF75, approaching them to the normal; in patients with BP this authentically increased indicators of VC, FVC, PEF, FEF75, and MVV; and in patients with BF, the insignificant increase in indicators of VC, PEF, FEF75, 50, 25 was noted. As a result, magneto- and aerosol therapy in patients with BB also increased all of the main indicators, but only VC authentically increased at decrease in ERV; in patients with BP VC, FVC authentically increased; and in patients with BF the increase in VC, FVC, PEF, FEF75 and MVV were noted. As a result of drug treatment, all of the indicators changed but not authentically.

**Conclusions:** Magnetotherapy authentically reduces restrictive violations, and improves indicators of passability of bronchial tubes as small and average (approaching them to normal), and large (restoring them completely). The magnetotherapy in combination with an aerosol therapy increases the vital capacity of lungs.

**Key words:** Breast cancer, beam bronchitis, beam pneumonitis, beam fibrosis, rehabilitation

## EP-75

**FLEXIBLE BRONCHOSCOPY AS A THERAPEUTIC TOOL IN MOUNIER KUHN SYNDROME**

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Mounier-Kuhn syndrome, or tracheobronchomegaly, is a rare clinical and radiologic entity characterised by marked tracheo-bronchial dilation and recurrent lower respiratory tract infections. Diagnosis is typically accomplished with the use of flexible bronchoscopy, pulmonary function tests and computed tomography.

Herein, we report the case of a 63 year-old woman who had barking type, ineffective chronic cough symptoms, limited physical exertion and recurring respiratory system infection. She had been diagnosed earlier with chronic obstructive pulmonary disease. Thoracic computed tomography showed tracheal dilation (diameter, 31 mm). Fibreoptic bronchoscopy revealed the dilation in the trachea and main bronchi during inspiration, and constriction and even collapse during expiration. It was found that the main left bronchus of the patient was obstructed by thick and viscous mucus plugs, because the patient could not expectorate her sputum by effective cough. Pulmonary function testing disclosed impaired respiratory function. Notable results of laboratory studies were an elevated erythrocyte sedimentation rate (59 mm/h) and leukocytosis (total leukocytes,  $12.5 \times 10^9/L$ ). Pulmonary function testing revealed a forced expiratory volume in 1 sec (FEV1) of 1.03 L (28%), a forced vital capacity (FVC) of 1.39 L (25%), and FEV1/FVC of 74%. Subsequent flexible bronchoscopy thoracic CT revealed that the consolidations had completely disappeared. As a result, therapeutic bronchoscopic intervention is recommended in patients with Mounier Kuhn syndrome having ineffective cough and recurrent pulmonary infections.

**Key words:** Bronchoscopy, Mucus plugging, Tracheomegaly

## EP-76

**TRACHEAL DIVERTICULUM: REPORT OF THREE CASES**

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A right paratracheal air cyst in the thoracic inlet is a rare lesion. It generally originates from respiratory or gastrointestinal system disorders such as laryngocele, pharyngocele, Zenker's diverticulum, tracheal diverticulum, apical hernia, lymphoepithelial cyst, or bronchogenic cyst. We present three cases of right paratracheal air cysts related to the trachea and confirmed as tracheal diverticulum via three-dimensional reconstruction computed tomography and virtual bronchoscopic evaluation. These methods provided better demonstration of the lesions. The lesion may be congenital or acquired, but the acquired form is more common. Tracheal diverticulum is generally overlooked, and neither reported on chest computed tomography nor recognised when it is complicated. We, therefore, aim to draw attention to this entity. In addition, a discussion of the evolution, importance, and complications of, as well as treatments for tracheal diverticulum, is made in light of the currently available literature.

**Key words:** Trachea, diverticulum, computed, tomography, three-dimensional, virtual, bronchoscopy

## EP-77

### TREATMENT OF A SOLITARY ENDOBRONCHIAL VASCULAR MALFORMATION CAUSING MASSIVE HAEMOPTYSIS BY ARGON PLASMA COAGULATION

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Endobronchial vascular malformations can cause massive haemoptyses. They could present as a big endobronchial mass lesion as well as a nodular lesion as small as a lentil, and could be misleading in the bronchoscopic evaluation. They are rarely seen lesions (3/15,000). Their treatment is surgery most of the time, but laser ablation is also a well known treatment method.

A 28 year-old male patient presented with recurrent haemoptysis, which was sometimes in massive amounts, for the last four years. Although bronchoscopy was applied many times, no lesion was detected. In another bronchoscopy due to a massive haemoptysis attack, which was done in our unit, a 2-3 mm protuberance was observed in the entrance of left lower lobe bronchus and evaluated as a vascular malformation. First the base and then the surface of the lesion was coagulated by APC. In the control bronchoscopy performed 10 days later, the lesion had disappeared. The patient is being followed-up without any haemoptysis attacks in the 6 months after treatment.

Endobronchial vascular pathologies are rarely seen. Due to their small sizes and coagulum cover they could be rarely recognised, which could cause fatal results. In haemoptysis cases without apparent lesions, a very careful bronchoscopic evaluation is mandatory. Although laser ablation is a well known endobronchial treatment approach, APC should be kept in mind as an effective treatment option.

**Key words:** Vascular malformation, endobronchial, argon plasma coagulation

## EP-78

### AN EVENT WITH SQUAMOUS CELL LUNG CANCER AND ASPERGILLOMA

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When *Aspergillus* locate to the airway of immune suppressive (like haematological malignancies, organ and bone marrow transplantation, using cortisone, HIV infection) patients and patients with cystic fibrosis, bronchiectasis, and lung cavity le-

sions, *Aspergillus* turns into saprophytic form and aspergilloma occurs in the cavity.

We want to present our event (aspergilloma in the tumour cavity) because it is interesting and rare. A 68 year-old, male patient who had smoked 54 packets per year received cancer chemotherapy, radiotherapy and cortisone because of a brain metastasis. Pneumonia and apse distal of the tumour were seen on lung radiology and CT. During bronchoscopy, white fungal lesions were seen in the right upper lobe cavity. BAL galactomannan antigen was positive, and the report of the biopsy suggested hyaline septal fibre with fungal mycelium.

When a fungal ball and air crescent sign is seen on CT and lung radiology, this suggests an aspergilloma infection. For conclusive diagnosis, bronchoscopic signs and galactomannan antigen are estimable. We want to present our event (aspergilloma in tumour cavity) using a video of the bronchoscopy.

**Key words:** Lung cancer, aspergilloma, video of bronchoscopy

## EP-79

### AN EVENT WITH ANKYLOSING SPONDYLITIS AND ASPERGILLOMA

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Ankylosing spondylitis is a chronic multisystem inflammatory disorder. It can affect the tracheobronchial tree and the lung parenchyma, and respiratory complications include chest wall restriction, apical fibrobullous disease with or without secondary pulmonary superinfection, spontaneous pneumothorax, and obstructive sleep apnoea. Most cases eventually consist of bilateral apical fibrobullous lesions, many of which are progressive with coalescence of the nodules, the formation of cysts and cavities, fibrosis, and bronchiectasis. Mycobacterial or fungal superinfection of the upper lobe cysts and cavities occurs commonly. A 48 year-old male who smoked 20 packs per year was being treated for ankylosing spondylitis. He was referred to our clinic with a cough and brown coloured sputum. He reported prior tuberculosis. On his physical examination kyphoscoliosis was observed and bibasilar crackles was determined. There were thick-walled cavities and air-fluid levels on chest radiology and CT. This was performed with the diagnosis of abscess, septic emboli and opportunistic infections. During bronchoscopy, white fungal lesions were seen in the right upper lobe cavity. Bronchial lavage AFB was negative. *Aspergillus Fumigatus* was determined in the fungal culture of the bronchial lavage. Bronchoscopic biopsy revealed micelyum septate and hyaline hyphae as well as fungal invasion. We presented this patient as a demonstrative example of aspergilloma in an ankylosing spondylitis patient.

**Key words:** Ankylosing spondylitis, aspergilloma, video of bronchoscopy

#### EP-80

### ENDOBONCHIAL BRONCHOMALASY TREATED BY CRYOTHERAPY: A CASE REPORT

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A 36 year-old female patient was admitted with progressive dyspnoea on exertion and stridor for five years. Thorax CT showed bilateral nodular calcifications at upper lobes and luminal narrowing in the right and left main bronchus. Bronchoscopy showed web-like narrowing at left and right main bronchus at the level of carina. The endoscopic findings were interpreted as a sequel infection of probable endobronchial tuberculosis. The patient was treated with cryotherapy for two consecutive sessions. The patient admitted to ICU three days after last cryotherapy due to increased dyspnoea and stridor. The chest X-ray showed left sided total atelectasis and therapeutic bronchoscopy was applied to banish necrotic material and debris. Systemic steroid therapy was started for local oedema and the follow-up of the patient showed amelioration of symptoms.

**Key words:** Cryotherapy, Bronchomalasy, Bronchoscopy

#### EP-81

### UNUSUAL PRESENTATION OF PSEUDOMEMBRANOUS NECROTISING ASPERGILLOSIS: TRACHEAL PERFORATION AND HORNER'S SYNDROME

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Pseudomembranous necrotising tracheobronchial aspergillosis (PNA) has been recently reported in the clinical literature. It is an uncommon form of IPA which occurs in generally immunocompromised patients. However, PNA is rarely seen in immunocompetent patients or mildly immunocompromised patients. We are reporting the first case of a mildly immunocompromised patient with PNA caused by tracheal perforation and Horner's Syndrome. To the best of our knowledge there has not been any case like this reported before in the English literature. A 44 year-old female with a history of uncontrolled diabetes mellitus presented with cough, chest pain, hoarseness, fever and shortness of breath. She had undergone mastectomies for breast can-

cer 13 years ago. On admission physical examinations, she was dyspnoeic and there were bilateral inspiratory crackles. Chest tomography showed wide consolidation and ground-glass opacity, which contained cavitations in the right upper lobe. She was treated with insulin infusion and empirical antibiotics with diagnosis pneumonia and diabetic ketoacidosis. Five days later, she developed Horner's Syndrome. Bronchoscopy showed left cord vocal paralysis, extensive whitish exudative membranes covering the trachea and both main bronchi. Bronchial lavage culture was identified as candida and fluconazole was added. Mucosal biopsy revealed *Aspergillus* species. Several days later her clinical status deteriorated. Large perforation of posterior tracheal wall and the entrance of the left main bronchus were seen in the control bronchoscopy. Liposomal amphotericin-B was started instead of fluconazole. Tracheal stent or repair of tracheobronchial tree was not found to be suitable. She developed respiratory failure on the 25th hospital day and died within two days.

**Key words:** Pseudomembranous necrotising tracheobronchial aspergillosis, tracheal perforation, Horner's syndrome

#### EP-82

### A CASE OF CONGENITAL BRONCHIAL ATRESIA

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Congenital bronchial atresia is a rare condition. Generally, the appearance of a radiological hilar mass on chest X-ray is suspected for any other reason and shall be determined. A 20 year-old male patient with complaints of redness of the eyes and without any pulmonary symptoms was referred to the hospital eye disease clinic with the diagnosis of panuveitis. Corticosteroid therapy was planned and he was referred to our clinic pre-treatment for pulmonary evaluation. Examination was normal, indicating that the pulmonary respiratory system of the patient was not involved. Paracardiac irregularities were observed on the right chest roentgenogram (Figure 1). Thoracic CT examination was planned. CT examination identified 1 cm from the right middle lobe bronchus occlusion secondary to the middle lobe of the collapsed right lung (Figure 2). Fiberoptic bronchoscopy (FOB) was performed. Analysis of the system in the form of bronchial stump inserted to the right middle lobe bronchus (bronchial atresia) was used (Figure 3). The medial wall of the middle segment of the right lower lobe basal segment of the right lobe is made. Endobronchial Ultrasound examination revealed a cystic lesion with a diameter of 1.8 cm (bronchogenic cyst) (Figure 4). In this case, the current findings were diagnosed with congenital bronchial atresia. The patient was scheduled a surgical procedure.

**Key words:** Congenital bronchial atresia, EBUS

EP-83

**RECURRENT PULMONARY THROMBOEMBOLI MANAGEMENT IN A PANCREATIC ADENOCARCINOMA PATIENT: A CASE REPORT**

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It is known that patients with malignancies have a higher risk of developing thrombosis than patients without malignancies. Within the cancer patients, those with distant metastasis and primary lung, pancreas or colorectal cancer have higher risks of venous thromboembolism. In addition to that, recurrences, and especially recurrences while on therapeutic levels of anticoagulant therapy, were observed, mostly in patients with adenocarcinoma.

Our case is a 61 year-old male with a newly diagnosed metastatic pancreatic adenocarcinoma and massive pulmonary thromboembolism. Systemic thrombolytic therapy could not be applied due to recent liver biopsy. After heparin infusion with no clinical response, pulmonary angiography along with selective thrombolytic therapy and thrombus aspiration was performed and recanalisation was achieved. One month after the episode of pulmonary thromboembolism, the patient had chest pain and dyspnoea again, and a new thorax BT scan revealed recurrent emboli in pulmonary artery bifurcation. Doppler ultrasound showed bilateral deep vein thrombosis. We did not observe any clinical recovery after heparin infusion. Pulmonary angiography along with selective thrombolytic therapy and thrombus aspiration was performed for the second time. With the aim of mechanical thromboprophylaxis a vena cava filter was inserted. On follow-up there were no recurrences. Our aim with this case report is to emphasise the risk of recurrent pulmonary thromboembolism despite early diagnosis and treatment. Placement of vena cava filters with or without anticoagulation therapy is still in debate. We wish to point out that more effective treatments are needed to prevent recurrent thromboembolism in cancer patients.

**Key words:** Recurrent pulmonary emboli, vena cava filter, pancreatic adenocarcinoma

EP-84

**RETRIEVAL OF ASPIRATED FOOD BY FIBROPTIC BRONCHOSCOPY**

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Foreign body aspiration (FBA) is uncommon in adults. Rigid bronchoscopy under general anaesthesia is the gold standard of diagnosis and management of FBA. However, recently, flexible bronchoscopy has become the preferred way to remove aspirated foreign bodies in adults. Risk factors for tracheal foreign body aspiration in adults are senility, convulsion, mental retardation or impairment of the gag reflex. The symptoms of FBA may range from coughing, wheezing and dyspnoea to haemoptysis and choking. In adults, FBA causes some pulmonary symptoms which may mimic several medical conditions such as asthma and pneumonia. In our patients, the chest X-ray findings were normal despite a clinical history of FBA. In this report, we present 2 cases with FBA in the bronchus, in both of which flexible bronchoscopy was used to remove the foreign body. In the first case, the stalk of a lemon was extracted from a 42 year-old woman and in the other case of an 82 year-old man, a nut. The foreign bodies were removed with alligator jaws forceps and snare forceps. There were no complications after the procedures. Hence, the removal of foreign bodies under flexible bronchoscopy has a high success rate and can be recommended for adults with FBA.

**Key words:** Food aspiration, fiberoptic bronchoscopy

EP-85

**TRACHEOPATHIA OSTEOCHONDROPLASTICA: CASE REPORTS**

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TPO is a disease in which nodules including bone and cartilage tissue settle in submucosal tissue surrounding airways. It is quite rarely seen and its aetiology is unknown. We presented four cases diagnosed with TPO because it is rarely seen and is often found in nonspecific complaints or infection symptoms. We aim to emphasise the importance of diagnosis via fiberoptic bronchoscopy.

**Key words:** Tracheopathia osteochondroplastica, lung

EP-86

**SUBTLE TRACHEOBRONCHOMALACIA POST TRACHEAL CRASH**

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A healthy 52 yr-old male smoker had a serious accident with a tracheal rupture treated with termino-terminal anastomosis. After 1 year of subjective wellness, he developed a persistent fever, cough and dyspnoea, which were partially solved by antibiotics and steroids. Due to the persistent fever and elevated inflammation markers with negative results from sputum cultures, bone marrow biopsy, virological examinations and autoimmunity screening panels, he was treated with steroids with a

good initial response; however, subsequent worsening of cough and dyspnoea evolved 2 years later into respiratory failure that required intubation and VAM. A bronchoscopy performed for difficult weaning demonstrated the presence of a severe tracheobronchomalacia. A Dumon Y silicone stent was inserted. For the dislodgement it was necessary to replace it with a covered self-expandable metallic stent. However, due to malacic progression downstream of the stent and the onset of sepsis, it was impossible to ventilate the patient and he died within two weeks. This case underlines the difficulties in diagnosis and management of a progressive malacia of the tracheobronchial tree. Chondritis triggered by tracheal trauma is an infrequent cause of severe tracheobronchomalacia. Large airway disease can begin in a subtle fashion which, sometimes, evolves into life-threatening disease due to tracheobronchomalacia. The use of a silicone stent as the first choice for benign disease was appropriate but we encountered a possibly fatal complication following dislodgement. The metallic stent has been properly used as a second choice, even if good results are described in the treatment of tracheobronchomalacia secondary to chondritis.

**Key words:** Chondritis, Tracheobronchomalacia, Tracheobronchial stenting

#### EP-87

### A VERY RARE CASE OF PULMONARY METASTASES OF PARACHORDOMA

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**Aim:** Parachordoma, which is classified in the same class as mixed tumours and myoepithelioma according to The World Health Organisation 2002 classification, is a rare tumour of unknown origin. Recurrence and metastasis are rarely seen. We present a parachordoma case that had metastasised to the lungs.

**Case:** A 50 year-old man was referred to our institution following the appearance of mass lesions at a routine follow-up computed tomographic scan of the thorax. He was operated on due to a mass in the inguinal canal two years previously, which was diagnosed as parachordoma. Due to the detection of iliac bone metastasis, pelvic irradiation had been delivered. Bilateral widespread mass and nodular lesions, prominently on the left lower lobe, were detected on computed tomographic scan. Diagnostic bronchoscopy revealed normal tracheobronchial tree anatomy and no visible tumour. Conventional transbronchial needle aspiration from right intermediate bronchus and transbronchial parenchymal biopsy from left lower lobe were performed. On pathologic specimens, tumour cells were observed to be stained with PanCK, AMA and Vimentin. Pathologic examination confirmed the diagnosis of parachordoma lung metastases. The patient was referred to the oncology department for future treatment.

**Conclusions:** Parachordoma is an extremely rare tumour that was first described by Laskowski in 1951. Only a few lung me-

tastases of parachordoma cases have been reported in literature. Despite parachordoma's generally indolent behaviour, our case adds evidence to the knowledge that parachordoma can metastasise to the lungs and the tumour can be sampled by conventional bronchoscopic procedures.

**Key words:** Parachordoma, pulmonary metastases

#### EP-88

### ENDOBONCHIAL VALVES FOR LIFE-THREATENING HAEMOPTYSIS: A CASE REPORT

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We describe the implantation of endobronchial valves (Spiration®) in a patient with haemoptysis, which represents both a novel indication for the use of these devices and a novel intervention for haemoptysis. Our index patient is a 30 year-old male who developed severe bronchiectasis complicated by bilateral upper lobe aspergillomata following previous pulmonary tuberculosis. The patient had a history of multiple hospitalisations for life-threatening haemoptysis despite repeated bronchial artery embolisations. He was deemed not to be a candidate for surgery, given the bilateral nature of his disease and very poor pulmonary reserves (FEV1 0.78L, 19.3%). After obtaining consent from the patient as well as our local ethics committee, we proceeded to identify the segments involved (CT 3D-reconstruction). With the aid of a flexible bronchoscope, we subsequently implanted three valves in the following segments: right upper lobe (UL) anterior segment, left UL apical and left UL posterior segments. Our patient has remained haemoptysis-free for three months. He has also not experienced any stent-related complications. Moreover, he has shown improvements in his functional capacity (FEV1 1.40 L, 34.2%) and is currently employed as a manual labourer.

**Key words:** Endobronchial valves, haemoptysis

#### EP-89

### TWO ENDOBONCHIAL HAMARTOMA CASES TREATED BY ENDOBONCHIAL METHODS

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Endobronchial hamartomas are seen in 1.5-20% of cases. They are generally localised in large bronchi. Patients are admitted with symptoms due to obstruction or haemoptysis. As hamartomas are accepted as benign tumours and malignant degenerations

are rare, endobronchial treatments are recommended. CASE 1: 45 year-old male patient admitted with recurring cough, phlegm and fever. Lesion with calcification totally obstructing the right main bronchus was found by computerised tomography (CT). Upon bronchoscopy, a mobile smooth-surfaced lesion totally obstructing the right main bronchus with no infiltration to adjacent tissues was seen. Its histopathology was “hamartoma” and the lumen was unobstructed by using endobronchial argon and electro-cauterisation. After removing the obstruction from the right main bronchus, another lesion with similar characteristics was seen in the intermedius bronchus; this lesion, whose histopathology was “hamartoma”, was excised by using electrocauter snare. His complaints receded completely and there was no recurrence in the 24 month follow-up. CASE 2: 61 year-old male patient was admitted with dyspnoea, cough and phlegm which increased in the last 15 days. In his CT, low density lesion narrowing right main bronchus was detected. It was learned that the mass lesion in right main bronchus had been present since 1998. A mobile, smooth surfaced, polypoid lesion obstructing right main bronchus by 50% was seen in bronchoscopy and it was excised by electrocauter snare. Pathological examination of the material was “hamartoma.” There was no recurrence at the 1 year follow-up.

**Conclusions:** Multiple endobronchial hamartomas like the first case were rare entities and both cases were treated by using successful endoscopic treatments.

**Keywords:** Hamartoma, endobronchial

## EP-90

### SILICONE STENT INSERTION IN TRACHEOCUTANEOUS FISTULA: A MINIMALLY INVASIVE AND EFFECTIVE METHOD

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Tracheocutaneous fistulas are mostly seen in paediatric patient group but are also rarely seen in the adult population during laryngo-tracheal separation surgery. Different surgical methods were defined for closing. Silicone T tubes were used in the management of very small number of cases. In this paper, a 51 year-old female patient developed a tracheocutaneous fistula at both ends of the incision border after thyroid surgery was summarised. The patient with was referred to our clinic in the early postoperative period as an air leak was observed at the neck. Two fistula openings were observed 3 cm distal to vocal cords at the 3 and 9 hour localisations in the trachea. Fistula openings were covered with the application of a 16x14x16 mm silicone stenotic stent. Air leak through the skin was stopped. In the follow-up, the patient was asymptomatic and stent was removed at the 7th month of the treatment; fistula openings were seen to be totally closed. The patient was in our follow-up.

Tracheocutaneous fistulas are rarely seen in adults and are mostly iatrogenic. Although the treatment option is surgery, silicone stent insertion, which is minimally invasive and effective, could be an alternative treatment method.

**Key words:** Airway fistula, stent, surgery