PLEURAL GAS DOES NOT RE-ENTER THE LUNG IN SPONTANEOUS PNEUMOTHORAX WITH PERSISTENT AIR LEAK: IMPLICATIONS FOR THE MECHANISM OF TENSION PNEUMOTHORAX

GRAHAM SIMPSON, STEPHEN VINCENT, JANINE FERNS
Department of Thoracic Medicine, Cairns Base Hospital Cairns QLD 4870

Background: Pneumothorax is traditionally classified as closed (where the visceral pleural defect has healed), open (where the visceral pleural defect remains patent) and valvular (when air enters the pleural cavity during inspiration but cannot reenter the lung in expiration). Valvular pneumothorax is thought to be the mechanism for the development of tension pneumothorax.

Methods: Eight patients with spontaneous pneumothorax and no evidence of tension pneumothorax who had intercostal catheters inserted and who had persistent air leaks were studied. One litre of marker gas containing 0.3% methane was introduced to the pleural cavity via the chest drains which were then clamped. Exhaled breath and pleural gas samples were taken at 5 minutes and analysed using a Sensormedics V Max Flash Multi Gas Analyser which can detect methane at a concentration of 0.0005%.

Results: No methane was detected in the expired gas of any patient.

Conclusion: These results suggest pleural gas does not re-enter the lung on expiration even with an 'open' pneumothorax and do not support the current explanation for the mechanism of the development of spontaneous tension pneumothorax.

No conflict of interest
TP-098
MANAGEMENT OF PERSISTENT AIR LEAKS AFTER SPONTANEOUS PNEUMOTHORAX WITH MEDICAL THORACOSCOPY

JAMES BROWN, STEPHEN VINCENT, GRAHAM SIMPSON
Department of Respiratory and Sleep Medicine, Cairns Base Hospital, Queensland 4870

Introduction The optimal management of persistent air leak after spontaneous pneumothorax remains uncertain. Medical thoracoscopy is utilized widely throughout Europe and Northern America by thoracic physicians for the management of pleural disease, including undiagnosed pleural effusion, malignant effusions and less commonly pneumothorax. Australia has limited experience in this modality. We report the success of medical thoracoscopy followed by dry talc poudrage in the management of persistent air leak (PAL) after both primary and secondary pneumothorax.

Methods Data was collected retrospectively from medical records in patients who underwent medical thoracoscopy for persistent air leak secondary to primary or secondary pneumothorax at Cairns Base Hospital during 2007-2011.

Results Eight patients, 6 male and 2 female underwent medical thoracoscopy for persistent air leak secondary to primary (1) or secondary (7) pneumothorax. In seven patients this was their first pneumothorax, in one it was his second. All patients had intervention for their pneumothorax prior to thoracoscopy – 7 intercostal catheters (ICC) and 1 aspiration. Median duration of PAL was eight days. After thoracoscopy, the mean time to removal of ICC was 3.4 (range 1-7) days. Mean hospital stay after thoracoscopy was 4.1 (range 3-7) days. There has been no recurrence of pneumothorax in any patient.

Conclusion Medical thoracoscopy provides an alternative to surgical intervention for persistent air leak from pneumothorax.

Conflict of Interest: None
TP-099
Cough-Bubble Test Compared with Chest X Ray to Identify Pneumothorax Resolution

AA Azad¹,², F Thien², C Steinfort¹
¹The Geelong Hospital Respiratory department, ²Box Hill Hospital Respiratory department

Chest radiographs can miss 39% of pneumothoraces¹. Fifty percent of respiratory physicians’ usual practice is to clamp the chest tube then perform CXR to detect presence of an air leak². Cough-Bubble test (CBT) is requesting the patient to cough and observing bubbling of underwater seal drainage after release of the clamp to indicate persistence of pneumothorax.

Aim: To assess the utility of CBT compared with CXR in pneumothorax.

Methods: All patients admitted to The Geelong hospital respiratory unit during 2010 and to Box Hill hospital respiratory unit during 2011 for intercostal drainage of pneumothorax were eligible. If no bubbling is observed in underwater seal drainage apparatus on ward review, then ICC is clamped for 4 hours and a CXR is performed. To compare CBT with CXR, the clamp is released after 4 hours and CBT is performed. Then the CXR is reviewed.

Results: Twenty seven observations have been performed. Eleven cases of residual air were detected (40%). In 2 cases (7%), both CXR and CBT were positive. In 2 cases (7%), CBT was positive but CXR was negative. Removal of ICC in both cases resulted in recurrence of pneumothorax.

Conclusion: CBT test appears to be more reliable to guide removal of ICC.


Conflict of Interest: No
TP-100
A PROSPECTIVE, MULTICENTRE STUDY OF PREDICTORS OF THE NEED FOR PLEURODESIS OR INDWELLING PLEURAL CATHETER FOR PATIENTS WITH MALIGNANT PLEURAL EFFUSION

ETH FYSH¹,2,3, C BUDGEON¹,3, AW MUSK¹,3, YCG LEE¹,2
¹ University of Western Australia, ² Lung Institute of Western Australia, ³ Sir Charles Gairdner Hospital, Perth, Australia.

Aim To identify predictors of the need for definitive therapy for MPE.

Methods A prospective, multicentre, observational study was undertaken of demographic, clinical, radiological, and laboratory data and the treatments of patients with MPE. Logistic regression was performed to determine variables useful for predicting need for pleurodesis or indwelling pleural catheter (IPC).

Results 146 patients had complete data for analyses and 62 (42%) needed definitive therapy: 30 pleurodesis, and 32 IPC. The remaining 84 patients had only thoracentesis, because of poor prognosis, no effusion recurrence or no symptomatic benefits with drainage. Univariate analyses revealed increased effusion size (OR 1.46; 95%CI [1.03, 2.07], p=0.036); mesothelioma (OR 1.99; 95% CI [0.97, 4.08]; p=0.060), and pleural pH (OR 0.12; 95% CI [0.01, 1.14]; p=0.065) were associated with need for definitive therapy whereas underlying emphysema was associated with reduced use of definitive therapy (OR 0.37; 95% CI [0.14, 0.98]; p=0.05). Multivariate analyses revealed that patients with trapped lung were more significantly more likely to require definitive therapy with an OR of 3.30 (95%CI 1.27-8.64), p=0.015. Patients with MPEs from primary lung cancer were less likely (OR 0.36; 95%CI 0.16-0.79; p=0.011) to be treated with definitive therapy.

Conclusion Patients with trapped lung were more likely, while those with lung cancer were less likely to require pleurodesis or IPC for their effusion management.

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Nomination: Ann Woolcock Young Investigator Award.

Conflict of interest No
CONSCIOUS SEDATION COMPARES FAVOURABLY TO GENERAL ANAESTHESIA FOR ENDOBRONCHIAL ULTRASOUND TRANSBRONCHIAL NEEDLE ASPIRATION (EBUS TBNA).

AJ RITCHIE, DI FIELDING
Department of Thoracic Medicine, Royal Brisbane and Women’s Hospital, QLD, Australia

Aim To retrospectively review the safety and procedural success of EBUS TBNA performed at the Royal Brisbane and Women’s Hospital under general anaesthesia (GA) or conscious sedation (CS).

Method All patients undergoing EBUS TBNA in a twelve month period were included in analysis. The decision for CS or GA was at the discretion of the proceduralist. Each week there are two CS lists and two GA lists.

Results A total of 218 patients (89 in CS group and 129 in GA group) were analysed. There was no difference in patient age or gender distribution between groups. Patients in the CS group had a higher age adjusted Charlson co-morbidity score (mean(SD) 7.4 (3.53) p=0.0009 and worse lung function, mean FEV1% 71.3(20.6) p=0.027. The procedure was completed faster in the CS group 25.9(7.3) min than the GA group 32.8(10.4) min, p<0.0001. Recovery was significantly longer in the GA group 121.17(44.9) min than in the CS group 95(48.6) min, p<0.0001. There was no difference in procedural success between the groups with a diagnosis achieved in 94% in the CS group and 91% in the GA group, p =NS. There were no procedural complications in either group. There was a significantly higher rate of other complications in the GA group 40% compared with 8% in the CS group, p<0.0001, although most were minor.

Conclusions EBUS TBNA can be performed successfully and safely under conscious sedation. No procedural complications were observed in this study. There was a significant rate of complications related to anaesthesia, although most were minor.

Conflict of interest No
TP-102
LINGUAL THYROID: AN UNEXPECTED BRONCHOSCOPIC FINDING

L SHEERS, J HUNT, AM SOUTHCOTT
Department of Respiratory Medicine, Western Health, VIC, 3011

Introduction Lingual thyroid is a rare embryological abnormality in which the gland fails to descend normally and lies at the base of the tongue. It is usually asymptomatic, however hypothyroidism develops in approximately one third and regional symptoms such as dysphagia, dysphonia, dyspnoea, or haemoptysis can occasionally occur. Cough has not previously been described. Hypothyroidism, if present, is treated with thyroid hormone replacement. Surgical excision may be required if there are significant local symptoms, otherwise treatment is conservative.

Case A 29 year old woman with a history of asthma presented with chronic cough and generalised fatigue. Because of the chronicity of her symptoms, flexible bronchoscopy was performed. A smooth mass arising from the base of the tongue with normal overlying mucosa was seen. The distal tracheobronchial tree appearance was consistent with tracheobronchitis and bronchial washings cultured H. influenzae. Both CT and ultrasound of the neck demonstrated two ovoid solid lesions at the tongue base suspicious for ectopic thyroid tissue, with absence of normally positioned thyroid tissue. CT chest was normal. A pertechnetate thyroid scan confirmed the presence of lingual ectopic thyroid tissue and the absence of tracer uptake in the thyroid bed. Thyroid function tests were unremarkable. Treatment with amoxicillin and both oral and inhaled steroids resulted in a gradual improvement in her symptoms. The incidental discovery of this base of tongue mass, which on investigation was found to be ectopic thyroid tissue, was probably unrelated to this lady’s presenting symptoms.

Conclusion Lingual thyroid, a form of thyroid ectopia, is a rare abnormality. This case describes the incidental discovery of a lingual thyroid gland at bronchoscopy, a very unusual bronchoscopic finding.

Support No
Conflict of interest No
TP-103
UTILITY OF ENDOBRONCHIAL ULTRASOUND TRANSBRONCHIAL NEEDLE ASPIRATION IN THE ASSESSMENT OF MEDIASTINAL LESIONS IN PATIENTS WITHOUT A PRECEDING DIAGNOSIS OF PULMONARY MALIGNANCY

S Karunaratne, H Jersmann, P Robinson
Department of Thoracic Medicine, Royal Adelaide Hospital, Adelaide, South Australia, SA 5000

**Aim:** To investigate the clinical utility of endobronchial ultrasound transbronchial needle aspiration (EBUS-TBNA) in the diagnosis of mediastinal lesions in patients without known lung cancer.

**Methods:** A retrospective review of all EBUS-TBNA procedures performed at the department of Thoracic Medicine at The Royal Adelaide Hospital from Feb 2010 – July 2011 was conducted. Patients with mediastinal masses and/or lymphadenopathy in the absence of known pulmonary malignancy were included in the study. Patient demographic data, procedural complications and PET scan results were recorded. Diagnostic gold standard was defined as tissue diagnosis on EBUS-TBNA or CT fine needle aspiration cytology or histology on mediastinoscopy or video assisted thoracoscopy. In addition long term clinical follow up demonstrating stability was used to define a benign aetiology.

**Results:** A total of 75 patients without a preceding diagnosis of pulmonary malignancy underwent EBUS–TBNA from Feb 2010 – July 2011. A final diagnosis was available in 73 patients; 36/73 (49.3%) were malignant and 37/73 (50.7%) benign. Seventy five percent (27/36) of malignant lesions and 73% (27/37) of benign lesions were diagnosed from EBUS–TBNA. The overall diagnostic yield from EBUS-TBNA was 74%. There were no severe complications documented during any of the EBUS procedures.

**Conclusions:** EBUS-TBNA offers a safe and less invasive diagnostic choice with good diagnostic yield in patients without known pulmonary malignancy.

**Conflict of Interest:** None
TP-104
INTRODUCTION OF NEW ENDOBRONCHIAL ULTRASOUND SERVICE (EBUS): DIAGNOSTIC YIELD AND IMPACT ON LUNG CANCER MANAGEMENT AT THE GOLD COAST HOSPITAL.

M SINGH, P SIVAKUMARAN, C CHIA
Department of Respiratory and Sleep Medicine, Gold Coast Hospital, Southport, QLD, Australia.

Objective: To evaluate the diagnostic yield and learning curve effect on diagnostic performance using EBUS-TBNA in mediastinal lymphadenopathy.

Methods: Using our prospectively maintained database, we performed a retrospective chart review of all patients at the Gold Coast Hospital who underwent EBUS-TBNA for evaluation of mediastinal lymphadenopathy or for staging of thoracic malignancy from June 2010 to October 2011.

Results: During the study period, 49 patients underwent EBUS-TBNA for various indications. We divided them into 2 cohorts-group A (first 20 patients) had sensitivity of 80%, specificity of 100% and NPV 75% whereas group B (next 20 patients) had sensitivity, specificity and NPV of 90%, 100% and 90% respectively. 34/49 (70%) were diagnosed with malignancy using EBUS-TBNA. Overall sensitivity, specificity and NPV for malignancy were 84%, 100% and 75% respectively. There were no complications related to the procedure. Diagnostic yield was better after first 20 procedures confirming 'learning curve' effect.

Conclusions: EBUS-TBNA is able to accurately and safely diagnose mediastinal lymphadenopathy with good sensitivity and specificity. Learning curve for EBUS-TBNA was noted to be about 20 procedures which showed improved diagnostic yield in group B with experience.

Conflict of Interest: None
Aim: Bronchoalveolar lavage (BAL) is a valuable research and diagnostic tool. There has been sparse data over the years regarding different methods of acquiring BALs. The aim of this study was to 1. Determine the difference in the volume returned between wall suction versus handheld syringe 2. Revisit which lobe yields the highest volume return and 3. Demonstrate increasing yield from sequential aliquot instillations.

Methods: 100mls normal saline using 4 aliquots of 25ml syringes were instilled- 14 BALs were performed using low pressure wall suction and the total volume return calculated. 57 BALs were performed using a handheld syringe and the volume return after each aliquot was measured.

Results: 71 patients have been tested to date. Results are expressed as mean ± SEM. Result 1: The % of fluid aspirated using wall suction was equivalent to that using syringe suction (45 ± 6ml to 44 ± 2ml, p = 0.86).

Result 2: The % of fluid aspirated from the RML was significantly higher than the other lobes (48 ± 2ml to 33 ± 4ml, p < 0.001), shown in Figure A).

Result 3: There was a progressive increase in the volume of BAL returned from the 2nd to the 4th aspirate (all results p < 0.001), shown in Figure B).

Conclusion: The RML yields a significantly higher volume compared with other lobes and there is an progressively increase in yield with sequential aliquot instillations.

Conflict of interest: No
TP-106
TURNING WHEEL BRONCHOSCOPE ALLOWS BETTER ACCESS TO DIFFICULT AIRWAYS AS ASSESSED ON A LOW FIDELITY SIMULATOR

DI FIELDING, F BASHIRZADEH, A RITCHIE
Department of Thoracic Medicine Royal Brisbane and Womens Hospital

Aim To evaluate a prototype bronchoscope with a turning wheel (TW) which turns the whole shaft of the scope, thereby reducing the need for manual turning by the operator. Potentially such a wheel would improve access to difficult bronchi and reduce the need for force in turning.

Methods A low fidelity bronchial model with up to 5th order bronchi (Koken Co Ltd) was used. Four different bronchoscopes were used: 2 with TW (TW5.5 mm and TW4.9 mm), and 2 without (Olympus 1T180, 6mm, and P180, 4.9mm). All subjects practised with the TW scopes to familiarise themselves for 20 minutes. Each subject tested the 4 scopes in randomised order. The task was to pass a transbronchial biopsy forcep 2 cm into each of 25 predetermined small 5th order bronchi in order. The forcep was not allowed to be forced into the airway and a maximum of 1 minute was allowed for attempting entry to each 5th order bronchus. Primary endpoints was number of bronchi entered, with secondary endpoints of overall procedure time and bronchoscopists comfort of use of the scope as measured by a 7 point likert scale.

Results 8 bronchoscopists of intermediate or advanced experience were tested. Comparing TW5.5 and 1T180 %bronchi missed, time in minutes and comfort scores results were 6.5(14.1) vs 41.5(17), p.008; 8.35(0.4) vs 15.3(2.8), p .002; and 6.0(.1) vs 3.6(0.7), p.008. Comparing TW4.9 and P180 %bronchi missed, time in minutes and comfort scores results were 0.5(2.8) vs 4(5.7), P=NS;7.2 (2.6) vs 7.0(2.6) P = NS; 6.6(0.7) vs 5.5(0.3) p=.02.

Conclusions. For scopes of similar size the TW assisted in entry to small bronchi which are important in more advanced bronchoscopy procedures. The TW 4.9 was also the most comfortable scope to use. This is potentially a significant innovation and warrants ongoing evaluation in patients.

Supported by Olympus Australia
Nomination Nil
Conflict of interest Nil
TP-107
PROTOTYPE HIGH DEFINITION NBI BRONCHOSCOPE ENABLES ACCURATE MEASUREMENT OF VESSEL CALIBRE

DI FIELDING 1, P NGUYEN 1, L NANDAKUMAR 2, M SINGH 2.
1Department of Thoracic Medicine 2Department of Histopathology, Royal Brisbane and Womens Hospital

Aim High definition bronchoscopy provides clarity of fine details of endobronchial structures. This is useful in NBI, because standard NBI images can be blurry and make interpretation difficult. We tested the clarity of the image by comparing endobronchial vessel calibre with that seen on biopsy from the same area.

Methods A prototype Olympus bronchoscope YO0030, with magnification factor x30 was used. Abnormal areas were captured in NBI mode on blue ray recordings. Still images were taken at the same distance from the mucosa as an image of a pre-measured 10 μm scale. Histology of endobronchial biopsies with CD31 vessel staining was used to measure calibre of vessels in the epithelium and immediate submucosa. Five vessels were measured on Jpeg photos of each biopsy both on bronchoscopic images and histology, using Photoshop pixel count.

Results 5 biopsies (4 bronchial, one laryngeal) with a range of histology from severe dysplasia to metaplasia were analysed. Very high pixel count on images (1250x450) allowed high magnification clarity of mucosal vessel measurement in all bronchoscopic images. Mean(SD) of vessel calibres in μm for bronchoscopic image and histology in descending order of lesion severity were Lesion 1[109(17)vs86(18)],Lesion 2[99(10)vs88(12)],Lesion 3[75(17)vs82(3)], Lesion 4[61(3)vs51(17)], Lesion 5[61(14)vs55(7)].Higher dysplasia grades had larger vessel calibre. Mann Whitney U test for all images showed no significant difference, p=.17

Conclusions Endobronchial vessel calibre correlated well with histology, and was similar to previous reports using more complex high magnification systems. Vessel calibre measurement is easy to accomplish and could provide a way to objectively decide on taking endobronchial biopsies.

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Nomination Nil
Conflict of interest Nil
Aim. To assess baseline and post course improvement in anatomy knowledge relevant to bronchoscopy procedures including TBNA, and guided transbronchial lung biopsy. Also to compare results for experienced and inexperienced bronchoscopists.

Methods. Attendees at a 4 day EBUS training course were given pre reading materials, then on arrival were given a 30 question multichoice pictorial exam. There were 10 questions respectively on segmental, lymph node and endobronchial anatomy. The course comprised teaching using lectures, low and high fidelity bronchoscopy models (Accutouch) for node and airway anatomy, and virtual bronchoscopy simulators (Lung Point) for segmental and airway anatomy. At the end of the course an exam of equal difficulty was given with the same distribution of content.

Results. There were 23 subjects, 13 consultants with at least 5 years bronchoscopy experience, and 10 advanced trainees, mostly starting their second year of training. Results are expressed as percentages. Pre and post course results were 52.0 (SD14.8) and 78.9 (7.6), P<.0001. There were no significant differences in results for experienced versus inexperienced subjects. Pre/Post test results for the different subject areas were as follows: Endobronchial 52.0(14.8) vs 83.2 (12.4), Nodal 48.5(19.8) vs 77.1(16.3), Segmental 55.5 (17.6) vs 69 (15.2).

Conclusions Baseline knowledge was poor, even in this group of motivated and mostly experienced bronchoscopists. Using a variety of educational tools significant improvements were obtained. The greatest improvements were seen in endobronchial anatomy. Importantly the more junior doctors were able to attain a similarly advanced knowledge level to experienced doctors. This anatomy questionnaire could be further validated and given to advanced trainees early in their training, particularly those wanting to specialise in advanced bronchoscopy.

Supported by Olympus Australia
Nomination Nil
Conflict of interest Nil
Aim: To audit our experience with tunnelled indwelling pleural drainage catheters inserted for the control of fluid in patients with malignant effusions.

Methods: A retrospective review of clinical outcomes for patients managed within our Multidisciplinary Lung Cancer Group between 2008-2011

Results: Seventy six PleurX catheters were inserted between 2008 and 2011; sixty two into the pleural fluid, fourteen into peritoneal fluid. M:F, 23:53. Mean age 74 years old (45-89 years old). All fluid collections were known to be malignant prior to insertion. All were inserted under local anaesthetic with awake sedation, by thoracic and respiratory proceduralists. Seventy three were inserted as a day-only procedure; 3 were inpatients. The primary malignancy was breast carcinoma in 27, NSCLC (Non-Small Cell Lung Cancer) in 19, gastric carcinoma in 7, mesothelioma in 5, colorectal cancer in 4 and < 2 cases each of 10 other malignancy. All achieved control of fluid. Of the 62 inserted into the pleural cavity, 40 have since died (36 died with PleurX in situ, 6 removed prior to death; mean time from insertion to death 6 weeks), 22 are still alive (11 removed, 11 still in situ) but none have required another drainage procedure. Of the 15/62 PleurX removed, 8 had achieved pleuradesis, 2 were blocked (and reinserted), 1 was leaking around the insertion site (and was replaced), 4 were removed for infection. All these complications occurred prior to 2009. There have been no complications since then.

Conclusions: PleurX catheters are used regularly in our unit in the early management of malignant effusions. In our experience they provide safe, definitive control of pleural fluid for patients with advanced malignancy with much lower rates of discomfort and time in hospital than repeated aspirations or talc pleuradesis.

Conflict of Interest: No