diagnosis of malignant and benign lesions. Sampling is done with either 21-gauge (21G) or 22-gauge (22G) needles. There are only two published (non-UK) studies which have evaluated the effect of EBUS-TBNA needle gauge on diagnosis.[1,2] Neither study demonstrated a difference in diagnostic yield but one study suggested better preservation of histological structure with the 21G needle.[1] The aim of this retrospective UK study was to evaluate the diagnostic utility of 21G versus 22G EBUS-TBNA needles. Our hypothesis was that the 21G needle would allow greater histological characterisation of non-small cell lung cancer (NSCLC) and benign mediastinal lesions.

Methods A retrospective analysis was performed from 185 patients referred for EBUS-TBNA between 2011 to 2012. EBUS-TBNA was performed as previously described under conscious sedation.[3] 21G or 22G (Olympus ViziShot, NA-201SX-4021 and NA-201SX-4022) was used at the discretion of the operator. Pathologists were blinded to needle gauge. Contingency table statistical analysis was performed (GraphPad Prism version 5) to compare diagnostic utility of 21G and 22G EBUS-TBNA needles and ability to subcharacterise NSCLC and benign lesions.

Results Performance data (table 1) showed non-inferior diagnostic utility for 21G and 22G needles. Subgroup analysis of benign 21G tissue samples revealed superior characterisation (especially for sarcoidosis) compared to 22G samples (30/37, 81%, versus 17/33, 52%, p=0.008). Similarly, characterisation of NSCLC was superior in 21G samples versus 22G samples (28/33, 85%, versus 25/41, 61%, p=0.02).

Conclusion This UK single centre retrospective study suggests 21G EBUS-TBNA needles are superior in characterising benign lesions (especially sarcoidosis) and NSCLC Making a positive benign diagnosis avoids the need to perform mediastinoscopy; additionally, identification of lung adenocarcinoma allows appropriate epidermal growth factor receptor mutation testing and targeted oncological therapy.

References

1. Nakajima T, Yasufuku K, Takahashi, Shingyoji M, Hirata T, Itami M, Matsui Y, Itakura M, Ilzasa T, Kimura H. Comparison of 21-gauge and 22-gauge aspiration needle during endobronchial ultrasound-guided transbronchial needle aspiration. Respirology (2011); 16: 90–94.
2. Oki M, Saka H, Kitagawa C, Kogure Y, Murata N, Ichihara, Mortamni S, Ando M. Randomized study of 21-gauge versus 22-gauge endobronchial ultrasound-guided transbronchial aspiration needles for sampling histology specimens. J Bronchol Intervent Pulmonol (2011); 18:306–310.
3. Medford AR, Agrawal S, Free CM, Bennett JA. A performance and theoretical cost analysis of endobronchial ultrasound-guided transbronchial needle aspiration in a UK tertiary respiratory centre. QJM (2009); 102(12):859–64.

S23 ROLE OF TRANSOESOPHAGEAL FINE-NEEDLE ASPIRATION USING AN ULTRASOUND BRONCHOSCOPE IN MEDIASTINAL STAGING AND DIAGNOSIS OF LUNG CANCER

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Objective To evaluate the role of transoesophageal fine-needle aspiration using an ultrasound bronchoscope (EUS-B-FNA) as an alternative means of diagnosing and staging lung cancer.

Methods This was a retrospective analysis of 132 cases of EUS-B-FNA between July 2008 and March 2012 in a large tertiary centre for respiratory medicine. EUS-B-FNA was performed with an OLYMPUS linear ultrasonic bronchoscope (BF-UM40) using a 21 Gauge needle. Samples were deposited into Cytolyte for cytological examination.

Results Of the 132 patients, 76 were male and 56 were female. The mean age was 69 years (range 40–86 years). No patients had a tissue diagnosis of malignancy prior to the procedure. 86 patients had a peripheral mass on CT, 43 had a mediastinal mass, and 3 patients had a new pleural effusion on CXR and mediastinal lymphadenopathy on CT scanning. EUS-B was used to sample subcarinal (n=100), L4 (n=46), R8 (n=4), R4 (n=2), R2 (n=2), L8 (n=1), L9 (n=1) and paragastric (n=1) lymph node stations. It was also used to sample RLL (n=4), RUL (n=3), LUL (n=3), LLL (n=1), paraoesophageal (n=2) and anterior mediastinal (n=1) masses. A left adrenal mass was sampled in 1 patient. EUS-B was used as a first line procedure in patients with enlarged lower mediastinal lymph nodes, reduced oxygen saturations (SpO2<90%) or FEV1 (<1.0L), and those with a poor performance status. It was also used as a second line procedure in patients who could not tolerate bronchoscopy or EBUS procedures, and those with normal brocnhoscopy or EBUS procedure. There were no complications and the procedure was well tolerated. Of the 132 cases, a tissue diagnosis was obtained in 100 patients. Samples revealed no malignant cells in 22 patients. Samples were insufficient for diagnosis in only 2 cases. Of the 22 negative samples, 11 patients were referred to Thoracic Surgery, all of these patients also had a negative staging mediastinoscopy and so underwent surgical resection. 6 patients went on to have a CT guided biopsy which provided a tissue diagnosis. 3 patients were not fit for further investigation and so were treated on the basis of a radiological diagnosis of lung cancer.

Conclusion EUS-B-FNA should be considered as a safe and effective investigation in the diagnostic and staging algorithm in lung cancer. It allows sampling of stations L4, 7 and 8, and is effective as a first line procedure in patients with reduced oxygen saturations or FEV1, and a poor performance status.

Clinical studies in COPD

S24 PROFILE OF THE AIRWAY MICROBIOME IN COPD USING MALDI-TOF

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Introduction Bacterial infections are well known to have an association with chronic obstructive pulmonary disease (COPD), with Streptococcus pneumoniae, Haemophilus influenzae and Moraxella catarrhalis often seen at exacerbation. Many microbiome studies

Abstract S22 Table 1

EBUS-TBNA Needle	Sensitivity (%)	Specificity (%)	Positive Predictive value (%)	Negative Predictive Value (%)	Prevalence (%)	Accuracy (%)
21G n=88 (48%)	90	100	100	88	58	94
22G n=97 (52%)	91	100	100	85	66	94
Combined n=185	90	100	100	86	62	94

have relied on molecular methods which can be prolonged and expensive. The use of matrix-assisted laser desorption/ionisation-time of flight (MALDI-TOF) offers an efficient and economical approach to the evaluation of the airway microbiome, necessary to increase knowledge of the role of the microbial community in COPD.
Aims To identify the range and diversity of bacteria which form the airway microbiome in COPD To consider whether the MALDI-TOF is an appropriate method for this study.
Methods 44 patients from the London COPD cohort produced 65 sputum samples at baseline and exacerbation mean (±SD) age 73.7 years (±9.4); predicted FEV1 50.7% (±18.12); male gender 77.5%; exacerbation samples 47.7%. Sputum samples are initially sent to the NHS Royal Free Trust microbiology lab where traditional culture methods are performed. Once processed the agar plates were collected and different colonies are spotted onto target plates and loaded onto the MALDI-TOF MALDI-TOF profile spectrum is then generated allowing for data interpretation. Isolates that were defined as pathogenic were removed from the data with those classified as typical bacteria were then included separately. Results: Streptococcus, Staphylococcus, Rothia and Neisseria are the most dominant genera seen in baseline and exacerbation NRTF samples at the genus level contributing to 85, 28, 20 and 18 percent respectively. MALDI-TOF identified 25 NRTF groups at genus level in the COPD samples. In the typical pathogenic genus groups Haemophilus is the most dominant group identified by this method.
Conclusion The MALDI-TOF identifies a diverse bacterial range in COPD patients including pathogenic organisms and those defined as NRTF The MALDI-TOF is quick and inexpensive, as well as efficient which is an advantage over molecular assays.

S25 ARTERIAL STIFFNESS AND AIRWAY INFECTION AND INFLAMMATION DURING COPD EXACERBATIONS

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Introduction Cardiovascular risk is elevated following COPD exacerbations requiring systemic therapy (Donaldson *et al*, Chest 2010:137; 1091–7). We have recently shown that a potential mechanism is increased arterial stiffness during COPD exacerbations compared to the stable state (Patel *et al*, AJRCCM 2012:185; A5853). We hypothesised that arterial stiffness may be mediated by airway infection and inflammation during COPD exacerbations.
Methods We used aortic pulse wave velocity (aPWV) as a non-invasive validated measure of arterial stiffness using Vicorder apparatus (Skidmore Medical, UK) in outpatients from the London COPD cohort when they presented within seven days of exacerbation symptom onset and prior to any systemic therapy. These events were defined using our usual symptomatic criteria (Seemungal *et al*, AJRCCM 1998:157; 1418–22). We collected spontaneous sputum at the same clinic visit to identify typical bacterial (*S pneumoniae, H influenzae* and *M catarrhalis*) and rhinovirus infection using PCR. We also measured IL-6 and IL-8 in sputum supernatant using commercial ELISA kits (R&D Systems, USA).
Results 32 exacerbating COPD patients produced a spontaneous sputum sample during the same clinic visit as an aPWV measurement. Their stable clinical characteristics were: 69% male; 25% current smokers; median (IQR) 39 (21.74) pack year smoking history;

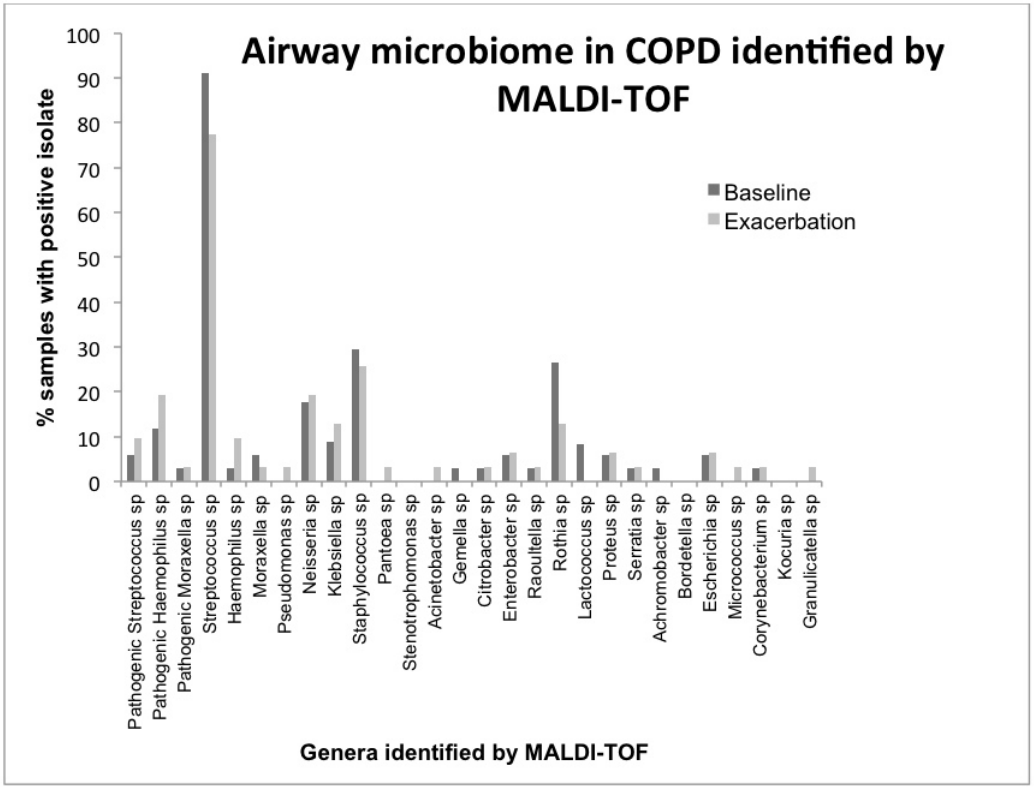

Figure 1, Genera identified by MALDI-TOF in baseline and exacerbation sputum samples from patients with COPD.

Abstract S24 Figure 1