tracheobronchial tree during bronchoscopy, including normal bronchial epithelium, dysplastic mucosa and hilar lung cancer.

Methods The newly developed integrated-type ECS for the bronchoscope has a built-in two imaging system with a conventional mode and a high-power endocytoscopic mode. ECS has a high magnification of 570×. Thirty-seven patients including 9 hilar lung cancer, 6 abnormal sputum cytology, 19 squamous dysplasia, and 3 after photodynamic therapy were entered into the study and underwent white light, narrow band imaging and autofluorescence imaging bronchoscopy. Both the abnormal area of interest and surrounding normal bronchial mucosa were stained with 0.5% methylene blue and examined with ECS. Histological examinations with haematoxylin and eosin stain were performed using the biopsied specimens. The ECS imaging was analysed and correlated with the corresponding histological examination.

Results ECS imaging could distinguish between different types of bronchial epithelium including normal bronchial mucosa, squamous dysplasia, and hilar lung cancer. Squamous dysplasia and hilar lung cancer were predictive with sensitivity of 85.7% (12/14) and 90.9% (10/11) and specificity of 100% (12/12), respectively. These ECS images corresponded well conventional histology.

Conclusion ECS was useful for the discrimination between normal bronchial epithelial cells and dysplastic cells or malignant cells during bronchoscopy in real time. This novel technology has an excellent potential to provide *in vivo* diagnosis during bronchoscopic examinations.

S37 COMPARISON OF DYNAMIC CONTRAST ENHANCED MRI (DCE-MRI) PARAMETERS WITH INTEGRATED PET-CT AND SERUM MESOTHELIN IN THE BASELINE ASSESSMENT OF MALIGNANT PLEURAL MESOTHELIOMA

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Integrated PET-CT scans and serum mesothelin measurement have shown early promise in predicting prognosis and evaluating treatment response in malignant pleural mesothelioma (MPM) but may be less reliable with sarcomatoid histology or prior talc pleurodesis. Dynamic Contrast Enhanced-MRI (DCE-MRI) with pharmacokinetic analysis is a novel metabolic imaging modality providing a measure of tumour blood flow and angiogenesis. We prospectively examined the relationship between pharmacokinetic parameters on DCE-MRI with PET-CT, serum mesothelin and histological subtype in MPM patients at diagnosis.

Method 30 pre-treatment patients with a histologically proven MPM underwent DCE-MRI and integrated PET-CT and serum mesothelin assay (MESOMARK) at a single visit. SUVmax and total glycolytic volume (TGV) were reported from PET-CT scans with TGV calculated using MIM software version 4.2.2 (MIMvista corp.). Gadolinium washout rate (GWR) on DCE-MRI was defined at a region of interest from a straight line fit to the kinetic curve data (CAD software—ViewForum R6.3 V1L3, Philips Medical Systems) between peak enhancement in the first 2 min and the last data point.

Results 70% (21/30) epithelioid and 30% (9/30) sarcomatoid histology. 43% (13/30) had undergone prior talc pleurodesis. Histology did not statistically significantly affect SUVmax, TGV or GWR. Serum mesothelin was significantly greater in the epithelioid group (3.2 nM/l (2.0, 6.3) vs 0.6 nM/l (0.5, 0.8) p<0.001). There was no significant difference in mesothelin, SUVmax, TGV or GWR between talc pleurodesed and non-pleurodesed patients in the whole group, but in the epithelioid sub-group there was a trend to significantly higher TGV with talc pleurodesis (talc: 2799 (1931,11257) no talc: 955.5(146.8,2354) p=0.053) that was not observed with GWR (p=0.4179). While SUVmax strongly correlated to TGV (r=0.725, p<0.001), there was no correlation between GWR and TGV (r=0.203, p=0.282) or between mesothelin levels and any of the imaging values.

Conclusion Metabolic imaging has been proposed as an important component of the assessment and management of patients with malignant pleural mesothelioma. Gadolinium washout rate on DCE-MRI may be less sensitive to talc pleurodesis than PET-CT parameters and MRI is a cheaper, more readily available modality that involves shorter patient appointment times, warranting further study in MPM prognostic evaluation and treatment response monitoring.

S38 FOURIER TRANSFORM INFRA-RED (FTIR) SPECTROSCOPY ON SPUTUM FROM LUNG CANCER PATIENTS, HEALTHY CONTROLS AND A HIGH-RISK COHORT

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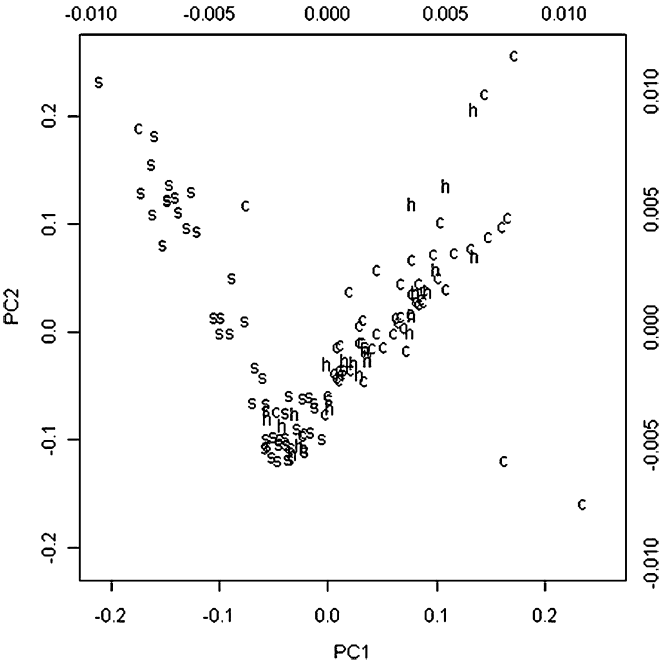
Introduction New cheap and high throughput technologies may allow earlier diagnosis and cost-effective screening programmes for lung cancer (LC). We have shown that sputum is a feasible biofluid for FTIR spectroscopy analysis[1] and now further evaluate FTIR in diagnosing LC.

Methods Sputum was taken from three groups: a) 54 patients (mean age 66.6±8.7 years) with a histological diagnosis of LC (39 NSCLC, 9 small cell, 1 carcinoid, 5 clinical diagnosis). b) 24 patients (mean age 65.1±13.6 years) having bronchoscopy for possible LC



Abstract S38 Figure 1 Principal component analysis of cancer (c), healthy control (s) and high-risk (h) spectra.

but no evidence of cancer was found after 1-year follow-up (high-risk). c) 54 healthy controls (HC) (mean age 51.1±15.3 years) who had no history or symptoms of LC or known respiratory disease. Sputum was self-expectorated and frozen immediately at −80°C, thawed in batches, mucolytics were added then samples centrifuged at 3000 rpm for 10 min to form pellets. FTIR was performed using the VERTEX 70 spectrometer (Bruker Optics Ltd, Banner Lane, Coventry, UK). Median absorbance values for each wavenumber for the LC and HC cohorts were compared, then principal component analysis (Abstract S38 Figure 1) and logistical regression identified the wavenumbers that provided the greatest accuracy in differentiating the two groups; the high-risk cohort was then applied to the predictive model to see if they could be correctly identified.

Results 126 light absorbance wavenumbers were significantly different between the LC and HC groups (each $p<0.05$). Two wavenumbers, 1031.7 cm^{-1} and 1409.7 cm^{-1} were used to develop a predictive model providing a sensitivity of 93% and specificity of 91%. This model then predicted 17 of the 24 high-risk cohorts as LC.

Conclusion FTIR spectroscopy can distinguish LC from HC with high accuracy but had reduced specificity when applying high-risk patients, tending to over-diagnose LC. Follow-up will determine if these 17/24 people are indeed false positives or have pre-cancerous molecular changes not identifiable by current methods.

REFERENCE

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S39 SUB TYPING OF NON SMALL CELL CARCINOMA IN EBUS-TBNA SAMPLES

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Introduction Differentiation and accurate classification of NSCLC (Squamous, Adenocarcinoma, Large cell carcinoma) is crucial in determining the prognosis and selecting targeted chemotherapy regimens. However, it is not always possible to subtype the tumours particularly if the biopsy samples are small and such undifferentiated tumour is referred as NSCLC not otherwise specified (NOS). It has been shown that 25% of bronchial biopsy specimens and 40% cytological specimens result in a diagnosis of NSCLC-NOS. However, the frequency of NSCLC-NOS with EBUS-TBNA samples is not known.

Methods We looked at the cytology reports of all patients with an EBUS-TBNA diagnosis of NSCLC over a period of 13 months. In patients with a diagnosis of NSCLC-NOS, we obtained further information on the details of the EBUS procedure and the cytological methods used.

Results Of the 243 patients who underwent EBUS-TBNA, 78 with a diagnosis of NSCLC were included. A confident initial cytological sub typing of NSCLC was possible in 68 (87%). Analysis of the remaining 10 patients with a diagnosis of NSCLC-NOS showed that biopsies taken from the lymph nodes were deemed adequate for cell block and immunohistochemistry (IHC) in all but one patient. Despite this, IHC was performed on 3 out of 9 samples. IHC was able to subtype the tumour in these cases. The Haematoxylin and Eosin (HE) and IHC profile of the 10 patients are shown in Abstract S39 Table 1.

Abstract S39 Table 1

Patients	HE	P63	CK5/6	TTF1	Final diagnosis
1	NSCLC-NOS	ND	ND	ND	NSCLC-NOS
2	NSCLC-NOS	ND	ND	ND	NSCLC-NOS
3	NSCLC-NOS	ND	ND	ND	NSCLC-NOS
4	NSCLC-NOS	ND	ND	ND	NSCLC-NOS
5	NSCLC-NOS	ND	ND	ND	NSCLC-NOS
6	NSCLC-NOS? Squamous	ND	ND	ND	NSCLC-NOS? Squamous
7	NSCLC-NOS? Adenocarcinoma	IT	IT	IT	NSCLC-NOS? Adenocarcinoma
8	NSCLC-NOS	++	++	–	Squamous
9	NSCLC-NOS	–	–	++	Adenocarcinoma
10	NSCLC-NOS	–	–	++	Adenocarcinoma

HE, Haematoxylin and Eosin; Squamous carcinoma markers — p63, cytokeratin 5/6, adenocarcinoma marker — Thyroid transcription factor 1, ND, Not done, IT, Inadequate tissue.

Conclusion Thus we have shown that adequate tissue samples can be obtained at EBUS-TBNA and the frequency of NSCLC-NOS is less (7/78=9%) compared to the histological bronchial biopsy samples. In cases, where morphological sub typing of NSCLC on HE is not possible, immunohistochemistry should be performed.

S40 EARLY EXPERIENCE OF ENDOBRONCHIAL ULTRASOUND-MINIPROBE (EBUS-MP) FOR INVESTIGATION OF PERIPHERAL PULMONARY MASS LESIONS

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Introduction Peripheral pulmonary mass lesions are common findings in respiratory medicine. The frequency of detection of such lesions is rising with increasing availability of radiological imaging techniques. Their aetiology may need to be established by tissue sampling to facilitate appropriate management, for example, suspected malignancy. Traditional investigations include CT-guided biopsy, bronchoscopic biopsy, endoscopic ultrasound with fine needle aspiration (EBUS/EUS) and surgical intervention. Each modality has potential complications, for example, pneumothorax following CT-guided biopsy. Endoscopic ultrasound miniprobe is established as a valuable tool, particularly in the staging of early GI tumours and in extraductal visualisation of the biliary tract. EBUS-MP has been used for qualitative assessment of bronchial mural structures in lung transplant recipients but little is known about the role of EBUS-MP sampling of peripheral pulmonary mass lesions. The purpose of this paper is to demonstrate our experience with this technique to date.

Methods All EBUS-MP procedures were carried out over a 6-month period in a tertiary respiratory centre. Patients were referred for suspected malignancy. All procedures were undertaken by the same consultant bronchoscopist, assisted by a respiratory trainee. An Olympus UM-S20-17S 1.7 mm Miniprobe® was identify the target lesion. Samples (biopsies or endobronchial brushings) were then taken from the identified subsegmental bronchus. Each case was subsequently reviewed with respect to diagnostic rate, subsequent management, complications and potential alternative investigations to EBUS-MP.

Results 24 EBUS-MP procedures were performed on 22 patients (Age range 53—82 years (mean 70.4 years)). FEV1 ranged from 0.8 L to 2.9 L. 20 of 22 CT-identified lesions (14—60 mm) were visualised with EBUS-MP. No complications occurred in study population. Abstract S40 Figure 1 shows detailed outcomes for EBUS-MP.

Conclusions EBUS-MP is a novel technique in bronchoscopy. Our early experience has demonstrated some potential usefulness of the procedure, allowing good visualisation of lesions. No complications have occurred to date. We believe that EBUS-MP sampling may have