not significantly different to online FeNO ($p = 0.51$). Median (IQR) offline FeNO of 5-breaths was 16 (7–22) ppb and 10-breaths 13 (5–19) ppb, lower than online FeNO ($p = 0.03$ and $p = 0.005$ respectively).

The predicted offline values are compared with measured offline values, expressed as a percentage of online, in Table 1.

Abstract P287 Table 1

	Predicted FeNO as a percentage of online	Offline as a percentage of online FeNO (median)	Interquartile range	p-value
1 breath	94.7%	97.2%	73.1–120.1%	0.81
5 breaths	73.5%	63.6%	42.9–92.8%	0.58
10 breaths	47%	43.4%	30.9–67.8%	0.41

Conclusion One-breath offline collection methods had comparable results to online FeNO measurements, but higher breath number resulted in lower values likely due to sample contamination with ambient gas and dilution of nitric oxide. These results suggest that multiple breaths should not be used to obtain an offline FeNO result.

P288 PREVALENCE OF NON-PULMONARY EMBOLISM DIAGNOSES ON CT PULMONARY ANGIOGRAPHY. ONE YEAR EXPERIENCE IN A DISTRICT GENERAL HOSPITAL

¹S Barnes, ²C Ingham, ³A Pryce, ⁴R Russell. ¹Royal Berkshire Hospital, Reading, UK; ²Stoke Mandeville Hospital, Aylesbury, UK; ³Hammersmith Hospital, London, UK; ⁴Lymington Forest Hospital, Hampshire, UK

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Introduction and objectives CT pulmonary angiography (CTPA) is recommended as the investigation of choice for suspected pulmonary embolism (PE). Even in appropriately risk-assessed groups, CTPA often proves negative for PE, but additional diagnostic information is still provided by technically adequate scans. We reviewed our CTPAs to assess technical quality and final diagnosis.

Methods Retrospective review of CTPAs performed in 2013 in a 588 bed district general hospital. All patients selected were considered either intermediate or high probability for PE based on Wells PE clinical risk scoring. Only imaging performed on patients presenting as acute admissions was reviewed. Patients under the age of 16 were excluded, but no upper age limit was applied in order to be fully representative of our patient population and clinical practice. Scans were assessed for their diagnostic and technical quality by the reporting radiologist.

Results 720 CTPAs were selected for review. Patient mean age 66.4 (range 17–103). PE was demonstrated in 135 studies (18.8%). 111 CTPAs (15%) excluded PE and were otherwise normal. 355 CTPA (49%) excluded PE but revealed an alternative diagnosis. Of these, cardiac failure (26%), emphysema (19%), pneumonia (16%), interstitial lung disease (10%), bronchiectasis (9%) and pleural disease (8%) were the most frequently reported clinically significant diagnoses. 119 CTPAs were considered technically inadequate to exclude PE based on insufficient contrast opacification, however an alternative explanatory diagnosis was seen in 76 (64%) of these. In the remaining

43 cases no diagnosis was reported, and only 2 patients had repeat CTPA performed during the same admission. Four patients from the non-diagnostic group represented within a 3 month follow up period and were subsequently proven to have PE on repeat CTPA.

Conclusions CTPA can provide an alternative diagnosis in the majority of cases even if PE is excluded. Of these, cardiac failure and emphysema were the most common diagnoses. Physicians must be vigilant for non-diagnostic scans and arrange further tests as appropriate, as in our series 4/43 patients with technically inadequate imaging on initial presentation subsequently represented with PE.

P289 ISOLATED MEDIASTINAL AND/OR HILAR LYMPHADENOPATHY: WHAT CAN EBUS-TBNA ADD?

V Connor, V Tippet, T Kennedy, B Challoner. Aintree University Hospital, Liverpool, UK

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Introduction and objectives In recent years, endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) has been increasingly used to investigate patients with isolated mediastinal and/or hilar lymphadenopathy (IMHL). There is currently a lack of high quality research to confirm the diagnostic yield and accuracy for these patients.

The aim of this review was to examine the diagnostic yield of EBUS-TBNA in patients with IMHL, to ensure accurate information is being given to patients considering undergoing the procedure.

Methods A retrospective service review was carried out, including consecutive patients listed for EBUS-TBNA between June 2013–June 2014 in a single UK centre.

Results 135 patients were evaluated who underwent EBUS-TBNA as a first diagnostic test (full results in Table 1). 35 patients with IMHL underwent EBUS-TBNA within the study period; IMHL was defined as the presence of enlarged mediastinal/hilar lymph nodes on computer tomography (CT) without suggestion of intrathoracic/extra-thoracic malignancy. 34 of these had a diagnostic test (97%); pathological cause was found in 9 patients (sarcoid $n = 7$, malignancy $n = 2$) with the remaining being diagnosed with reactive lymphadenopathy ($n = 25$ 74%).

This group of 35 patients was sub-classified into those with IMHL with a radiologically suggested diagnosis e.g. sarcoid ($n = 22$) and those with no suggested cause of IMHL ($n = 13$). EBUS-TBNA was diagnostic in 95% and 100% of patients respectively with the most common diagnosis in both groups remaining that of reactive lymphadenopathy.

Conclusions A significant proportion of patients with IMHL were found to have a diagnosis of reactive lymphadenopathy. With a pathological cause only being found in a minority of cases the appropriateness of EBUS-TBNA to investigate these patients could be questioned.

Our results found a significantly higher prevalence of reactive lymphadenopathy than previously published data; Evinson *et al.* reported this diagnosis 48% of patients and the REMEDY trial reported reactive lymphadenopathy in 5% of patients.

The detection of IMHL and its burden on the health service is likely to increase with increasing use of CT. Due to this a large multi-centred prospective study of patients with IMHL would be advisable to further investigate what the most appropriate strategy to manage these patients should be.

Abstract P289 Table 1 Results of 135 patients undergoing EBUS-TBNA as a first line investigation for mediastinal and/or hilar lymphadenopathy

Group	Patients (n)	Patients with diagnostic test	Nodes sampled	Number of total passes	Inadequate samples (n)	Diagnostic samples (n)	Diagnosis of samples
1: IMHL-	35	34 (97%)	66	151	5 (8%)	61 (92%)	Reactive: 45 (74%) Malignant: 4 (6%) Non-caseating granulomas: 12 (20%)
1a: IMHL with no radiological suggested diagnosis	13	13 (100%)	24	44	1 (4%)	23 (96%)	Reactive: 17 Malignant: 2 Non-caseating granulomas: 4
1b: IMHL with radiologically suggested diagnosis	22	21 (95%)	42	107	4 (10%)	38 (90%)	Reactive: 28 Malignant: 2 Non-caseating granulomas: 8
2: radiologically diagnosed likely lung cancer with mediastinal lymphadenopathy	90	86 (96%)	145	279	8 (6%)	137 (94%)	Reactive: 60 Malignant: 76 Non-caseating granulomas: 1
3: other e.g. known/suspected malignancy (excluding lung), previous cancer diagnosis, post cancer treatment	10	10 (100%)	19	40	0	19 (100%)	Reactive: 13 Malignant: 4 Non-caseating granulomas: 2

P290 DO LUNG FUNCTION INDICES CORRELATE WITH RISK OF PNEUMOTHORAX FOLLOWING CT-GUIDED BIOPSY?

P Griffiths, J Heaton, S Claxton, D Hughes. Wirral University Teaching Hospital NHS Foundation Trust, Liverpool, UK

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Introduction CT-guided lung biopsy is a widely used and established technique for the diagnosis of lung lesions, and several risks are well described. The most common complication is pneumothorax, occurring in approximately 20% of cases. We aimed to characterise the risk of post-procedure pneumothorax in our patient population, and determine whether lung function indices correlate with the incidence of pneumothorax.

Methods Patients undergoing CT-guided biopsy of intraparenchymal lesions from January 2014–2015 were retrospectively identified. Patients were stratified in to those with and without post-procedure pneumothorax. Spirometry and transfer factor for carbon monoxide (TLCO) were reviewed and compared using an unpaired *t* test.

Results 111 procedures were performed in 111 patients (53 men 58 women; mean age 70.4 years; range 40 to 88), all done for suspected malignancy. Pneumothorax was identified in 25 patients post biopsy (21%; age range 61 to 87; mean $\pm$ SD age, 73.4 $\pm$ 6.7), 12 female (48%) and 9 patients (36%) had emphysema.

Of the 25 patients with pneumothorax, FEV₁ ranged from 32 to 115% predicted (80.5% $\pm$ 23.57%) and FVC ranged from 54 to 125% (91.9% $\pm$ 19.1%). TLCO was available for 14 patients, range 34 to 99% predicted (71.5% $\pm$ 19.2%). Of the 86 patients with no pneumothorax, FEV₁ ranged from 27 to 126% predicted (73.9% $\pm$ 29.9%) and FVC ranged from 38 to 139% predicted (85% $\pm$ 21.9%). TLCO was available for 50 patients (58%), range 31 to 108% predicted (63.2% $\pm$ 18.9%).

There was no significant difference in FEV₁ (*p* = 0.199), FVC (*p* = 0.109), FEV₁/FVC ratio (0.99) or TLCO (0.176) between the two groups.

In patients developing pneumothorax, those requiring a chest drain (6/25, 24%) showed no significant difference in FEV₁ or FVC (*p* = 0.76 and *p* = 0.41 respectively) to those managed conservatively. TLCO however was significantly lower in patients requiring chest drain insertion (79% $\pm$ 16.1% vs. 52.8% $\pm$ 12.8%, *p* = 0.002).

Conclusion From our patient group, spirometry data and TLCO showed no correlation with the frequency of pneumothorax. In those patients developing pneumothorax, a low TLCO may predict the need for invasive management.

P291 RELATIONSHIP OF *IN VITRO* PARTICLE SIZE TO *IN VIVO* LUNG DEPOSITION AND EXHALED FRACTION

¹G Poli, ²B Lipworth. ¹Chiesi Farmaceutici S.p.A., Parma, Italy; ²Scottish Centre for Respiratory Research, Ninewells Hospital, Dundee, UK

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Introduction and objectives The particle size distribution and the median mass aerodynamic diameter (MMAD) of an inhaled product are important characteristics which may influence the deposition of the drug in the lung and as a consequence may also affect its therapeutic index. We evaluated the relationship between *in vitro* MMAD and *in vivo* lung deposition (LD, expressed as fraction of the delivered dose) and the exhaled fraction (EF), using relevant literature from scintigraphic studies conducted in healthy volunteers and asthmatic patients. Moreover the relationship between the ratio of EF to LD and MMAD has been further assessed.

Methods Data from 21 studies in healthy volunteers (15 with pressurised metered dose inhalers (pMDI) and 6 with dry powder inhalers (DPI)) and 11 studies in asthmatic patients (8 pMDI and 3 DPI) have been evaluated. Asthmatic patients had a FEV₁ >70% predicted, supporting pooling of the data with that of healthy volunteers.