those sending samples, including surgeons and radiologists performing biopsies, so that specimens are sent correctly.

Abstract P59 Table 1 Results

	Pulmonary tuberculosis (N=36)	Extra-pulmonary tuberculosis (N=33)	Total (N=69)
Culture confirmed	29 (81%)	17 (52%)	46 (67%)
No growth on culture	4 (11%)	10 (30%)	14 (20%)
No sample obtained	3 (8%)	4 (12%)	7 (10%)
Sample obtained but not sent for culture	0	2 (6%)	2 (3%)

REFERENCE

1. Annual Report on tuberculosis surveillance in the UK 2009. Health Protection Agency. http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1259152022594.

P60 QUESTIONABLE UTILITY OF T-SPOT TESTING IN A TB EXPOSURE INCIDENT ON A CLINICAL HAEMATOLOGY UNIT

doi:10.1136/thx.2010.150979.11

[1]J Brebner, [1]J Mann, [2]H Jones, [1]W Bladen, [3]N Syed, [1]P Dawkins. *[1]Respiratory Department, New Cross Hospital, Wolverhampton, UK; [2]Microbioloby Department, New Cross Hospital, Wolverhampton, UK; [3]Health Protection Agency, West Midlands, UK*

Introduction Interferon-gamma release assays (IGRAs) have been promoted as having a key role in contact tracing for tuberculosis (TB). In immunosuppressed patients T-SPOT is considered to be the test of choice for detection of latent TB infection. We describe a contact tracing exercise carried out on a Clinical Haematology Unit (CHU) where 168 patients had significant nosocomial exposure to a case of smear-positive TB.

Methods A 29-year old female homeless patient with Hodgkin's lymphoma was diagnosed with smear positive pulmonary tuberculosis (TB). In the 6 months prior to diagnosis she had attended the CHU on 31 occasions including several prolonged inpatient stays. The Incident Management Team initiated a retrospective exercise to identify those at risk in this vulnerable population.

Results 485 haematology patients were subdivided into three cohorts of risk, as well as 69 significant staff contacts. 168 patients considered at highest risk were contact traced and offered screening. 149 of these 168 patients underwent T-SPOT testing. 11 patients did not attend and six patients had died from their underlying condition. In two patients it was not performed as they were already receiving anti-TB therapy. One of these patients had no other known exposure prior to the index case. Of the 149 patients tested with T-SPOT, 19 (12.8%) had a positive result, 76 (51.0%) had a negative result, and 54 (36.2%) had an indeterminate result (negative result with a failed positive control). All those with positive and indeterminate results were followed up in clinic. No further cases of TB were identified. Due to the large number of indeterminate results further T-SPOT testing of additional cohorts was not conducted.

Conclusions T-SPOT testing is considered to have superior sensitivity to tuberculin skin testing in certain immunosuppressed populations, where indeterminate T-SPOT test results have been reported to be infrequent. However, the number of indeterminate results in our study was significantly higher than previously reported in other immunosuppressed groups. This episode calls into question the stated utility of T-SPOT testing in this cohort of patients with haematological conditions. More research is required on the efficacy of IGRAs in the severely immunosuppressed.

P61 PULMONARY NONTUBERCULOUS MYCOBACTERIAL (NTM) CULTURE IS COMMON FOLLOWING LUNG TRANSPLANTATION, AND NTM LUNG DISEASE IS ASSOCIATED WITH POOR PROGNOSIS

doi:10.1136/thx.2010.150979.12

T T Gorsuch, I Crossingham, M Cullen, M Al-Aloul. *Wythenshawe Hospital, Manchester, UK*

Introduction NTM lung disease (NTMLD) is commonly associated with advanced pre-existing lung disease or defective cellular immunity. Lung transplant (LTx) recipients receive potent immunosuppression and often have structural lung abnormalities, so might be at uniquely high risk of NTM infection and disease. However, there is little published about NTM following LTx.

Method We carried out a retrospective study of NTM in LTx recipients attending our centre between 1/1/2005 and 31/8/2009. NTMLD was diagnosed according to American Thoracic Society (ATS) guidelines.

Results 326 respiratory samples (from 172 LTx recipients) were sent for mycobacterial culture, of which 51 samples (15.6%) from 39 patients (22.6%) grew NTM. Samples from 32 patients (82%) grew *M avium* complex (MAC), three grew *M abscessus*, two *M gordonae*, one *M kansasii* and one *M malmoense*. Nine patients had multiple positive cultures (maximum four), but only one species was ever isolated from each individual. None had NTM preoperatively, although one had a single isolate of NTM before the study period. 23 patients had positive culture from BAL or multiple sputum samples, and 21 patients had chest radiology compatible with NTM. ATS radiological and microbiological criteria were met in 13 patients (33%). Those diagnosed with NTMLD according to ATS guidelines had a significantly higher death rate than those from whom no NTM were isolated (HR 2.42, 95% CI 1.09 to 5.37), whereas those who did not meet ATS criteria did not. Four patients were treated for NTM: one was cured, while two deteriorated and died. The fourth developed renal impairment and treatment was abandoned; symptoms and lung function improved.

Comment In our cohort, respiratory NTM were cultured more frequently than previously reported, but a smaller proportion met ATS criteria for NTMLD and fewer were treated than in a previous cohort (15.6%, 33% and 10% respectively, compared with 6.5%, 73% and 82%). MAC is consistently the most common isolate. Patients with NTMLD by ATS criteria do worse than those without. Our data suggest that LTx is likely to be a risk factor for NTM infection but the majority of isolates represent colonisation/contamination. We advocate following ATS guidelines for treatment decisions of NTMLD after LTx.

P62 ARE WE MISSING OPPORTUNITIES TO OBTAIN A MICROBIOLOGICAL DIAGNOSIS OF TB?

doi:10.1136/thx.2010.150979.13

Z Al-Nakeeb, V Gupta, C Bell, M Woodhead. *Manchester Royal Infirmary, Manchester, UK*

Introduction TB incidence is rising in the UK, with drug resistance becoming increasingly problematic. Diagnosis with microbiological culture and confirmation of sensitivity is therefore vital. This study investigated how often we are not achieving microbiological diagnosis at our centre, what factors influence this and whether opportunities to obtain microbiological samples were missed.

Methods A retrospective study of all 156 cases (adult and paediatric) diagnosed with TB at Central Manchester Teaching Hospitals in 2009 was carried out. Demographic details, site of disease, types of specimens and results of TB culture were recorded. Cases where

Abstract P63 Table 1 Diagnostic accuracy of serum and pleural fluid procalcitonin for complicated parapneumonic effusion in sub-groups

Sub-group	Sample type	Number of patients	AUC (95% CI)	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
Pleural fluid pH ≤7.2	Serum	n=20	0.81 (0.61 to 1.00)	91% (59 to 100%)	67% (30 to 93%)	77% (46 to 95%)	86% (42 to 100%)
	Pleural fluid	n=20	0.60 (0.34 to 0.86)	82% (48 to 97%)	56% (21 to 86%)	69% (39 to 91%)	72% (29 to 96%)
Excluding inpatient stay >48 h	Serum	n=98	0.83 (0.69 to 0.97)	78% (49 to 95%)	85% (75 to 92%)	46% (25 to 67%)	96% (88 to 99%)
	Pleural fluid	n=89	0.86 (0.78 to 0.99)	92% (64 to 100%)	84% (74 to 92%)	50% (29 to 71%)	98% (92 to 100%)
Excluding antibiotics for >48 h	Serum	n=81	0.98 (0.94 to 1.00)	100% (48 to 100%)	86% (67 to 93%)	31% (11 to 59%)	100% (95 to 100%)
	Pleural fluid	n=77	0.89 (0.79 to 1.00)	80% (28 to 99%)	81% (70 to 89%)	22% (6 to 48%)	98% (90 to 99%)

there were no specimens or cultures were negative were analyzed in detail.

Results Most disease was pulmonary (n=69). Other disease sites included lymph node (n=34), ocular (n=12) and pleura (n=10). 128 (82%) patients had samples sent for microbiology. 92 (59%) patients were culture positive and 36 (23%) were culture negative. 28 (18%) patients had no specimens sent for culture. Factors which were associated with whether samples were sent for culture included site of disease ($p<0.0001$), with ocular disease being the least likely to be sampled, and age of patients ($p=0.002$). 45% patients <17 years did not have samples sent compared with 12.5 % patients 17–64. Ethnicity did not influence the frequency of sampling. A negative culture result was related to the specimen type ($p<0.0001$) and patient's age ($p=0.019$), with fewer paediatric samples positive. Site of disease or ethnicity did not affect culture results. In 25/28 cases with no microbiological specimens it was considered reasonable that specimens were not sent, as most of these were either ocular (n=12) or paediatric (n=9). In 3/28 (11%) samples could have been sent and all involved adult patients not born in the UK who had procedures whereby specimens were sent only for histology. 32/36 culture negative cases were considered to have been managed appropriately. 4/36 (11%) culture negative cases were potential missed opportunities for further sampling and were all due to patients with pleural TB not having pleural biopsies.

Conclusion In our centre, despite a microbiology negative rate of 41%, reasonable opportunities to obtain a microbiological diagnosis are seldom missed.

Investigating pleural disease

P63 A PROSPECTIVE OBSERVATIONAL TRIAL EXAMINING THE DIAGNOSTIC UTILITY OF SERUM AND PLEURAL FLUID PROCALCITONIN IN THE INITIAL INVESTIGATION OF UNILATERAL PLEURAL EFFUSIONS

doi:10.1136/thx.2010.150979.14

[1]C E Hooper, [2]A J Morley, [3]J E Harvey, [1]N A Maskell. *[1]Academic Respiratory Unit, Department of Clinical Sciences, University of Bristol, Southmead Hospital, Bristol, UK; [2]Pleural Clinical Trials Unit, Southmead Hospital, Bristol, UK; [3]North Bristol Lung Centre, Southmead Hospital, Bristol, UK*

Differentiation of pleural infection from other causes of pleural effusion, particularly pleural malignancy can be difficult. Clinical features and readily available tests are non-specific resulting in early over-diagnosis of pleural infection. Procalcitonin (PCT) is produced in response to acute bacterial infection and its measurement in serum has shown promise in directing and shortening antibiotic courses in lower respiratory tract infections. We prospectively examined the diagnostic accuracy of PCT in the investigation of unilateral pleural effusions.

Methods Consecutive patients with a unilateral pleural effusion, referred to a UK teaching hospital were included. Baseline serum and pleural fluid PCT was measured by enzyme-linked-fluorescent-assay (Vidas BRAHMS PCT—BioMerieux) and results compared to final diagnosis. Clinical data were collected prospectively and the ultimate diagnosis agreed against established criteria by two respiratory consultants, blind to the PCT result. Patients were followed up to histological or microbiological diagnosis, radiographic resolution or for 12 months.

Results 145 patients, median age 72 (31–96). 71 inpatients, 75 outpatients. Effusion diagnoses: Complicated parapneumonic (CPE) 26/145, Simple parapneumonic (SPE) 7/145, Malignant 73/145, Idiopathic pleuritis 4/145, TB 1/145, other benign cause 34/145. Four patients with symptomatic non-thoracic bacterial infection and four with frank empyema were excluded from analysis. The Receiver operating characteristic (ROC) curve for serum PCT distinguishing CPE from non-infective diagnoses gave an AUC of 0.779 (95% CI 0.658 to 0.899) and at an optimum cut-off of 0.09 ng/ml had sensitivity 73%, specificity 81%, PPV 44% and NPV 94%. The ROC curve for pleural PCT gave an AUC of 0.809 (95% CI 0.709 to 0.908) and at an optimum cut-off of 0.1 ng/ml had sensitivity 81%, specificity 78%, PPV 45% and NPV 95%. Sub-group analysis excluding patients with >48 h in patient stay or >48 h antibiotics further improved diagnostic accuracy. In patients with pleural fluid pH ≤7.2 serum PCT distinguished CPE from other effusions with an AUC of 0.808 (0.613–1.000).

Conclusion Serum and pleural fluid procalcitonin have promising diagnostic characteristics in distinguishing complicated parapneumonic effusions (Abstract P63 Table 1) from unilateral effusions of non-infective origin, having particularly high negative predictive values. Procalcitonin could help the clinician to decide optimal management pathways for individual patients.

P64 COURSE AND VARIATION OF THE INTERCOSTAL ARTERY BY COMPUTED TOMOGRAPHY

doi:10.1136/thx.2010.150979.15

[1]N M Rahman, [2]E J Helm, [3]O Talakoub, [1]R J O Davies, [4]F V Gleeson. *[1]Oxford Centre for Respiratory Medicine, Oxford, UK; [2]Department of Radiology, University Hospitals Coventry and Warwickshire NHS Trust, Coventry, UK; [3]Department of Electrical and Computing Engineering, University of Toronto, Toronto, Canada; [4]Department of Radiology, Oxford Radcliffe NHS Trust, Oxford, UK*

Background The intercostal artery is thought to be shielded in the groove of the superior rib; however, the course and variability of the intercostal artery, and factors which may influence these, have not been described in vivo. Describing these variables in vivo has potentially important implications for avoiding complications during common pleural procedures.

Methods Maximum intensity projection (MIP) reformats in the coronal plane were produced from CT pulmonary angiograms, to identify the posterolateral course of the contrast opacified intercostal artery. A novel semi-automated computer segmentation algorithm was used to identify and measure distances between the lower border of the superior rib, the upper border of the inferior rib and the position of the intercostal artery when exposed in the intercostal space, and manually verified by a radiologist. Position and