S15 IS CONTRAST-ENHANCED COMPUTED TOMOGRAPHY (CT) SCORING A USEFUL TOOL IN PREDICTING PLEURAL MALIGNANCY ON THORACOSCOPY?

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[1]B Buckley, [2]M Haris, [2]B Miller, [2]S Leyakathali khan, [2]S Diver, [2]S Kearney, [2]M Munavvar. *[1]School Of Medicine, Universtiy of Manchester, Manchester, UK; [2]Royal Preston Hospital, Preston, UK*

Background CT and Thoracoscopy are useful tools in the evaluation of patients with pleural diseases. Previous studies have shown that certain features on CT may help in differentiating malignant and benign pleura and these may correlate with thoracoscopic findings. We aimed to assess whether a simple scoring system based on CT appearance criteria could be used to predict the likelihood of pleural malignancy.

Methods 104 patients who underwent semi-rigid thoracoscopy between January 2008 and April 2012 were studied. The scans were reviewed by the Chest Radiologist who was blinded to the thoracoscopic findings and pleural biopsy results. Five CT features were given a score of 1–3, where 3 suggested a feature was present, 1 not present and 2 if uncertain. An overall impression of likelihood of malignancy was then scored 1–3, 3 being malignant, 1 benign and 2 indeterminate. Data was analysed using chi-square and logistic regression.

Results N=104, mean age 74 years (range 40–93); female 35(34%), male 69(66%). Pleural biopsy histology was available in 90 of which 57 (63%) were malignant and 33 (37%) benign; 7 did not have biopsy and 7 were either insufficient or non-diagnostic. In those with malignancy, pleural thickening was noted in 43 (sensitivity 88%, specificity 34%) and nodularity in 29 (sensitivity 52%, specificity 82%) on thoracoscopy.

Using a score of 1 and 3, specificity and sensitivity for circumferential/diffuse pleural thickening was 39% and 65%, nodular pleural thickening 94% and 53%, parietal pleural thickening >1cm 94% and 26%, mediastinal involvement 76% and 63%, smooth pleural thickening 33% and 81%, and overall impression score was 84% and 63%. Total score ≥8 for all 5 features and the overall impression ($p<0.0001$) was significantly associated with malignancy.

A score of 3 for nodular thickening ($p<0.0001$), parietal thickening ($p=0.03$), mediastinal involvement ($p=0.0011$) and a combined score ≥ 4 for these 3 features (sensitivity 79%, specificity 73%, $p=0.0001$) was highly suggestive of malignancy.

Conclusion These results suggest that a CT scoring system based on the above features can be reliably used to predict pleural malignancy prompting more intensive evaluation such as thoracoscopy, although this will require further validation.

Abstract S15 Table 1 CT prediction score comparing Malignant and Benign pleura

CT appearance and score Diffuse Pleural thickening	Malignant pleura (n = 57)	Benign pleura (n = 33)
1-Low	20 (35%)	13 (39%)
2-Moderate	0	0
3-High	37 (65%)	20 (61%)
Nodular Pleural thickening		
1- Low	27 (47%)	31 (94%)
2- Moderate	3 (5%)	1 (3%)
3- High	27 (47%)	1 (3%)
Parietal Pleural thickening		
1- Low	42 (74%)	31 (94%)
	0	0
2- Moderate	15 (26%)	2 (6%)
3- High		
Mediastinal involvement		
1- Low	21 (37%)	25 (76%)
2- Moderate	7 (12%)	2 (6%)
3- High	29 (51%)	6 (18%)
Smooth Pleural thickening		
1- Low	11 (19%)	11 (33%)
2- Moderate	1 (2%)	0
3- High	45 (79%)	22 (67%)
Overall likelihood of malignancy on		
CT Pleural scoring		0
1- Low	0	28 (85%)
2- Moderate	21 (37%)	5 (15%)
3- High	36 (63%)	

Categorical variables shown as N(%)

S16 A LARGE, PROSPECTIVE, MULTICENTRE STUDY EVALUATING THE SURVIVAL OF PATIENTS WITH MALIGNANT PLEURAL EFFUSION ACCORDING TO THE UNDERLYING CELL TYPE

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[1]AO Clive, [2]CE Hooper, [3]ETH Fysh, [4]C Tobin, [2]AJ Morley, [2]N Zahan, [2]C Sellar, [1]R Bhatnagar, [2]AR Medford, [3]YCG Lee, [1]NA Maskell. *[1]University of Bristol, Bristol, UK; [2]North Bristol NHS Trust, Bristol, UK; [3]University of Western Australia, Perth, Western Australia; [4]Sir Charles Gardiner Hospital, Perth, Western Australia*

Malignant pleural effusion (MPE) is a common clinical problem, which causes significant morbidity and has a variable prognosis. This is the largest series to date evaluating the survival of patients with MPE according to their underlying cell type.

Methods We prospectively collected data on patients presenting with MPE from two large pleural services over a 3 year period. All patients gave written informed consent. Patients were followed up for a minimum of 9 months or until death or loss to follow up (whichever was sooner). For survival analysis, the log rank (Mantel-Cox) test was applied to Kaplan Meier survival curves.

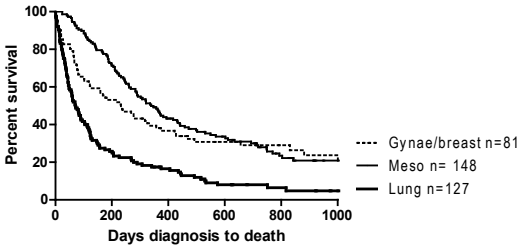
Results Data was collected on 466 patients. The median age of the patients was 71 (IQR 65–79) and 63% were male. 56% of effusions were right sided and 41% patients had an effusion occupying >50% of the hemithorax. 73% of patients had confirmation of pleural malignancy based on cytology or pleural biopsy, 21% had a presumed malignant effusion with confirmed malignancy elsewhere and 6% had a radiological diagnosis.

Patients with a pleural effusion secondary to mesothelioma (n=148) had the longest median survival (MS) at 339 days. This is significantly longer than those effusions caused by lung cancer (n=127, MS 71 days) (95% CI –0.56–4.45, $p<0.0001$). Cell types with an intermediate survival, included gynaecological malignancy (n=33; MS=268 days), urological cancer (n=11; MS=220 days), gastrointestinal malignancy (n=16; MS 268 days), haematological malignancy (n=27; median survival 204 days) and breast cancer (n=48; MS 204 days). Lung cancer, adenocarcinoma of unknown primary (n=9; MS 87 days) and sarcoma (n=6, MS 65.5 days) had the shortest survival.

The Kaplan-Meier survival curve for the 3 largest groups is shown in the figure.

Conclusions Selecting the most appropriate strategy for management of malignant pleural effusion depends on patient choice, their clinical condition and the perceived prognosis. This data confirms that the survival of patients with malignant pleural effusion varies widely depending on the site of their primary malignancy. Accounting for this may help to better inform patients of their prognosis and aid clinical decision making.

Figure: Survival of patients with malignant pleural effusion by cell type



Abstract S16 Figure 1

S17 PLEURAL IRRIGATION TRIAL (PIT): STANDARD CARE VERSUS PLEURAL IRRIGATION, A RANDOMISED CONTROLLED TRIAL IN PATIENTS WITH PLEURAL INFECTION

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[1]CE Hooper, [1]AJ Edey, [1]AJ Wallis, [2]AO Clive, [1]AJ Morley, [1]M Darby, [1]N Zahan, [1]JE Harvey, [1]AR Medford, [2]NA Maskell. *[1]North Bristol NHS Trust, Bristol, UK; [2]University of Bristol, Bristol, UK*

Background Pleural infection remains common with an increasing incidence. It is associated with a high morbidity and mortality. Despite chest tube drainage and antibiotic therapy up to 30% of patients will die or require surgery. Case reports suggest that irrigation of the pleural space with saline may be beneficial but this has never been the tested in the form of a randomised controlled trial.
Method Randomised controlled pilot study comparing saline irrigation (250ml normal saline intra-pleurally over one hour, 3 times a day for 3 days) plus best standard care, with best standard care alone, in patients with pleural infection (microbiology positive or pH<7.2 or purulent pleural fluid and clinical infection) requiring chest tube drainage, who had a residual pleural collection on baseline CT thorax. Primary outcome was percentage change in CT pleural volume from day 0 to day 3. Secondary outcomes included referral for surgery, hospital stay and adverse events.
Results 47 patients approached, 38 randomised, 3 excluded (drain fell out/no residual fluid on CT/removal of consent). Saline irrigation results in significant reduction in CT pleural collection volume compared to standard care – Irrigation group 29.15% reduction (95% CI 16.2–62) vs Standard care 13.9% (95% CI –4.1–26.3) p<0.04. There was also a significant reduction in the need for thoracic surgery in the irrigation group 9/17 vs 2/18 p=0.01 (OR 9.0, 95% CI 1.56–51.9). No differences were seen in length of hospital stay or fall in inflammatory markers (CPR, WCC and procalcitinin). The safety profile of saline irrigation was good with no serious complications and adverse events did not differ between groups.
Conclusion Saline irrigation improves fluid drainage in pleural infection (as measured by volumetric CT), leading to reduction in referral for surgery. No change in hospital stay was noted. This study now needs to be repeated as a large multicentre RCT powered to look at mortality and length of hospital stay.

Investigation of lung cancer

S18 BRONCHOALVEOLAR LAVAGE, TRACHEAL WASH AND INDUCED SPUTUM SURFACTANT PHOSPHOLIPID KINETICS FROM HEALTHY VOLUNTEERS

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A Dushianthan, R Cusack, V Goss, AD Postle, MPW Grocott. *Southampton NIHR Respiratory Biomedical Research Units, University Hospital Southampton, Southampton, UK*

Introduction and Aims: Pulmonary surfactant is a complex mixture of lipoproteins synthesised and secreted by alveolar type II cells. The assessment of surfactant synthetic function and metabolism may provide essential information in disease states characterised by surfactant dysfunction. Airway surfactant is thought to be of alveolar origin. However, surfactant kinetics from airway secretions may vary from alveolar surfactant. Stable isotope labelling of surfactant precursors enables dynamic mapping of surfactant PC molecular species. This study aimed to compare three surfactant recovery methods [bronchoalveolar lavage (BAL), tracheal wash (TW) and induced sputum (IS)] to assess surfactant PC kinetics in healthy adults. Surfactant phosphatidylcholine (PC) is synthesised *de novo* from choline via CDP-choline pathway. By labelling choline with deuterium, a naturally occurring isotope of hydrogen, it is possible to assess surfactant PC synthesis and metabolism in humans.
Methods Healthy human volunteers had an infusion of *methyl*-D_9-choline-chloride [3.6mg/kg] for 3 hours. BAL and TW specimens were taken at 24 and 48 hours and induced sputum samples were taken at 0, 8, 24, 48 and 96 hours after choline infusion. The lipid fraction was extracted with chloroform and methanol. The samples were analysed by triple quadrupole electro spray ionisation mass spectrometer (ESI/MS). The results are expressed in mean (+/–standard error of mean).
Results Ten healthy volunteers were recruited. The endogenous PC composition from BAL and TW were similar. The newly synthesised PC fraction mirrored the endogenous composition at 48 hours for both BAL and TW IS PC composition and D_9 labelled PC fraction was variable. The total PC D_9-incorporation at 48 hours was higher than 24 hours for BAL (0.55±0.04%), TW (0.56±0.04%) and IS (0.58±0.06). PC16:0/16:0 D_9-incorporation had significant correlation for BAL and TW (r^2=0.8201, P<0.05).
Conclusions Isotope labelling of choline using ESI/MS analytical method, it is possible to assess surfactant PC metabolism. The tracheal aspirate is an alternative technique to assess surfactant metabolism in patients otherwise unable to tolerate invasive bronchoscopy. This methodology may be utilised to assess surfactant synthetic function in patients with acute lung injury.

S19 ROLE OF CT IN ASSESSING PLEURAL MALIGNANCY PRIOR TO THORACOSCOPY

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N Hassan, H Rostom, M Nagendran, D Srikantharajah, E Brown, A Manuel, M Maruthappu, NM Rahman. *University of Oxford, Oxford, United Kingdom*

Introduction The definitive diagnosis of pleural malignancy depends upon histological proof obtained via pleural biopsy. CT is reported to have a high sensitivity and specificity for the diagnosis of malignant pleural disease, and is part of the routine diagnostic work up of these patients. However, studies assessing the sensitivity of CT for pleural malignancy were carried out in relatively small cohorts of patients, and there remains a need for further data. The aim of this study was to assess the sensitivity and specificity of CT in detecting pleural malignancy (both primary and metastatic) prior to definitive histology obtained via thoracoscopy in a large cohort of patients with suspected malignant pleural disease.
Methods Retrospective review of thoracoscopy procedures carried out between 2010 and 2012 at the Churchill Hospital, Oxford, comparing histological results from thoracoscopy with the CT reported diagnosis before the procedure.
Results A total of 136 procedures were assessed. Thoracoscopic pleural biopsies were successfully obtained for histological analysis in 121 (89%) cases. Of these, 87 (72%) had CT chest scans prior to the procedure for which reports were available, and were included in this analysis. A total of 45/87 (52%) cases had a diagnosis of malignant pleural disease on the basis of the thoracoscopic biopsies. In those with a final histological diagnosis of malignancy,