associated with this subgroup, to enable further understanding of why patients with non-draining effusion may have poor prognosis.

Methods Baseline demographics and pleural fluid (PF) characteristics of patients enrolled in TIME3 were compared to patients enrolled in TIME2,[2] a randomised controlled trial of indwelling pleural catheter versus chest drain and pleurodesis for patients with recurrent MPE. Demographic characteristics compared were: age, sex, histological type of cancer and ECOG performance status (PS). Pleural fluid characteristics compared were: total protein, glucose, cytology (positive or negative), pH, lactate dehydrogenase (LDH) and presence of septations on ultrasound. These characteristics were compared using t test for linear variables and chi squared for categorical variables.

Results The median survival was 58 days (IQR 27–123) in TIME3 versus 187 days (IQR 48–358) in TIME2. Patients with non-draining effusions had a significantly higher PF LDH (mean 1900 (SD 3100) versus 660 (SD 840), p<0.001) and CRP (mean 117 (SD 80) versus 62 (SD 55), p<0.001). Patients in TIME3 were on average 4 years older (mean 71 years in TIME3 versus 67 in TIME2, p=0.01) and less likely to be cytology positive (24% versus 51%, p=0.021).

Conclusion Non draining MPEs have a higher LDH than those without. There was a large difference in mortality between groups, but despite this no identifiable differences in baseline ECOG, PS or tumour type, despite these variables being associated with a poor prognosis in unselected cohorts of patients with MPE.[1] We postulate that survival in MPE may be associated with septations and the intrapleural inflammatory milieu. Further study of the association between PF LDH, septations and survival is warranted.

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Abstract P234 Table 1

Variable	TIME2	TIME3	Difference (p)
Number of patients	106	71	-
Mean age (years) (SD)	67 (11)	71 (9.4)	0.013
Male:female (% male)	46:60 (43)	41:30 (58)	0.06
Median time to death (days) (IQR)	187 (48–358)	58 (27–123)	
Type of cancer (%)			
- breast	27 (25)	12 (17)	0.47
- lung	25 (24)	22 (31)	
- mesothelioma	11 (10)	9 (13)	
- other	43 (41)	28 (39)	
ECOG PS 0–2:3–4 (% 0–2)	60:46 (57)	42:29 (59)	0.11
Bloods			
White cell count	9.8 (5.4)	11.0 (5.4)	0.15
CRP	62 (55)	117 (80)	<0.001
Pleural fluid characteristics:			
- Cytology positive: negative (% positive)	54:48 (51)	17:34 (24)	0.021
- pH (SD)	7.4 (0.24)	7.4 (0.34)	1.0
- mean glucose (mmol/L) (SD)	5.4 (2.8)	4.6 (3.6)	0.13
- LDH (U/L) (SD)	660 (840)	1900 (3100)	**<0.001**
- Total protein (g/dL) (SD)	43 (8.1)	41 (10)	0.18
Septated on ultrasound (yes:no)	Not recorded	59:7	-

P235 ASSESSMENT OF DIAPHRAGM MOTION IN PATIENTS WITH UNILATERAL OR ASYMMETRICAL PLEURAL EFFUSIONS

[1]MG Aldik, [1]A Sibly, [2]L Telisinghe, [1]C Daneshvar. *[1]Department of Respiratory Medicine, Plymouth Hospitals NHS Trust, Plymouth, UK; [2]Department of Clinical Research, Faculty of Infectious and Tropical Diseases, London School of Hygiene and Tropical Medicine., London, UK*

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Introduction The diaphragm is the most important respiratory muscle. In patients with pleural effusions, abnormal diaphragm shape and movement on inspiration may be observed. We aimed to explore the possible significance of these findings in a our pleural service.

Methods Between August 2015 and June 2016, all patients with an index thoracic ultrasound scan reporting a unilateral or significantly asymmetrical bilateral pleural effusion were retrospectively assessed. Patients were examined in the upright position by an RCR level 1 trained physician. A routine standardised reporting form was used to record dimensions, echogenic properties, the presence of septations, pleural nodularity and diaphragm nodularity, shape and movement. Pleural fluid characteristics and final diagnoses were assessed.

Results Of 491 patients assessed, 259 met the inclusion criteria. Thoracocentesis was performed in 70%, with exudative defined by Light's criteria being met in 121 (47%). A diagnosis was established in 84% of cases with the commonest aetiology being malignancy (32%). The median [interquartile range] size of the pleural effusions was 8 [5–10] cm in medial depth and 3 [2–4] rib spaces in height, with 118 (46%) being echogenic. Diaphragm assessment revealed that paradoxical movement of the diaphragm was observed in 56 (22% [95% CI 16.6%–26.6%]) of patients while 11 (4.3% [95% CI 1.8%–6.7%]) had an inverted diaphragm. Patients with paradoxical diaphragm movement had larger effusions (median depth 11 cm versus 7 cm; p<0.001) and a higher proportion of effusions of malignant aetiology (45% versus 11%; p<0.001) when compared with individuals with normal diaphragm movement. In multivariate analysis, adjusting for age, gender, effusion depth and height and diaphragm shape, effusions of malignant aetiology were associated with an increased odds of paradoxical diaphragm movement (adjusted odds ratio 4.47 (95% CI 1.83–10.95; p<0.001).

Conclusion Paradoxical diaphragm movement in the context of a unilateral or asymmetrical pleural effusion is frequently observed, is independently associated with malignant pleural effusions and may be a useful point of care clinical sign.

P236 A SYSTEMATIC REVIEW OF INTERVENTIONS TO IMPROVE HEALTH RELATED QUALITY OF LIFE IN MALIGNANT PLEURAL EFFUSION

[1]P Sivakumar, [2]A Saigal, [2]L Ahmed. *[1]St Thomas' Hospital, London, UK; [2]Whittington Hospital, London, UK*

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Introduction Malignant pleural effusion (MPE) Results in breathlessness and impairment of health related quality of life (HRQOL). Despite this there is a lack of consensus on the ideal treatment strategy to improve HRQOL.[1]

Aims To perform a systematic review of the published literature to examine the efficacy of interventions in improving quality of life outcomes of patients with malignant pleural effusion.
Methods Five electronic databases were systematically searched and assessed. We included all studies evaluating HRQOL outcomes for the following interventions: therapeutic thoracocentesis, talc slurry pleurodesis (TS), indwelling pleural catheter insertion (IPC) and thoracoscopic talc poudrage pleurodesis (TTP). Meta-analysis was not performed due to substantial heterogeneity in the published data.
Results Of 56 abstracts, 16 were included in the review, all of which reported HRQOL outcomes as a secondary endpoint. Six of these studies were randomised controlled trials (RCTs) with two considered very good quality. One eligible study on therapeutic thoracocentesis outcomes was identified. 880 patients in eight studies received TTP; 475 patients in six studies received TS; 750 patients in eight studies underwent IPC insertion. TTP, TS and IPCs were all associated with modest but inconsistent improvements in HRQOL up to 12 weeks. In eight comparative studies (both randomised and non-randomised data), no intervention was significantly different to another in HRQOL outcomes at any time point. The attrition to follow up was 47.3% (582/1228) at three months.
Conclusion To our knowledge, this is the first study to systematically review the evidence for HRQOL outcomes following invasive pleural interventions for malignant pleural effusion. TTP, TS and IPCs seem to improve HRQOL in MPE over 4 to 12 weeks, but there is insufficient longer term data due to high attrition rates. Evidence for the most effective treatment strategy is limited by the small number of randomised or comparative studies.

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P237 PLEURAL ABNORMALITIES PREDATING THE DEVELOPMENT OF MESOTHELIOMA

M Hassan, R Asciak, RJ Hallifax, R Mercer, NM Rahman. *Oxford Centre for Respiratory Medicine, Oxford University Hospitals, Oxford, UK*

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Background Mesothelioma is an aggressive tumour of the pleura that is closely related to asbestos exposure. Asbestos is known to cause benign pleural thickening, effusion and plaques and the majority of patients with these abnormalities do not develop mesothelioma. It has been noted, however, that asbestos-exposed patients who have pleural plaques are at increased risk of mesothelioma.[1] This study aimed to describe the range of pleural abnormalities seen on CT done at some time before the diagnosis of mesothelioma was made.
Methods Electronic radiological records of all patients who were diagnosed with mesothelioma in the trust from 2009 till June 2017 were screened for any chest CT (or abdomen CT with at least half of the thorax imaged) obtained at least 6 months prior to the CT that triggered the diagnosis of mesothelioma. CTs were examined for the presence of pleural plaques, thickening, nodules and/or effusion. CT studies were divided into 3 time periods: within one year (A), 1–3 years before (B), and more than 3 years before (C) the diagnostic CT.
Results 170 patients were screened. 39 patients had one or more pre-diagnosis CTs. A total of 53 CTs were available for comparison. Effusion was the most common abnormality seen in 23/53 CTs followed by thickening seen in 17/53, then plaques 15/53 and pleural nodules in 5/53. Four nodules (2 in period A and 2 in period B) progressed to tumour later on. Effusion was seen in 50% of studies from periods A and B. Pleural thickening and plaques were noticeable in around 40% of CTs from periods A and B. 13 studies did not show any pleural abnormality (3 studies in period A, 4 in period B and 6 in period C).
Conclusion Mesothelioma is a rapidly progressive disease that can be difficult to track in radiological studies done before clinical presentation. Pleural effusion, followed by smooth thickening and plaques, are fairly common abnormalities in pre-diagnosis CTs.

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P238 TRAINING OPPORTUNITIES IN THORACIC ULTRASOUND FOR RESPIRATORY REGISTRARS – ARE CURRENT GUIDELINES USER FRIENDLY?

[1]AE Stanton, [2]M Evison, [3]M Roberts, [4]J Latham, [5]A Clive, [6]E Battala-Duran, [7]R Bhatnagar, [8]R Asciak, [9]B Diggins, [10]O Bintcliffe, [11]D Lees, [12]M Parsonage, [13]P Denny, [14]K Gow, [15]C Avram, [16]M Gautam, [8]NMR Rahman. *[1]Great Western Hospitals NHS Foundation Trust, Swindon, UK; [2]University Hospital of South Manchester, Manchester, UK; [3]King's Mill Hospital, Sutton-In-Ashfield, UK; [4]Raigmore Hospital, Inverness, UK; [5]Bristol Royal Infirmary, Bristol, UK; [6]Royal Devon and Exeter Hospital, Exeter, UK; [7]Southmead Hospital, Bristol, UK; [8]Churchill Hospital, Oxford, UK; [9]Royal Cornwall Hospital, Truro, UK; [10]Royal United Hospitals , Bath, UK; [11]Mid-Cheshire Hospitals NHS Foundation Trust, Crewe, UK; [12]Wirral University Teaching Hospitals NHS Foundation Trust, Wirral, UK; [13]East Lancashire Hospitals NHS Trust, Blackburn, UK; [14]Fairfield General Hospital , Bury, UK; [15]North Manchester General Hospital, Manchester, UK; [16]Royal Liverpool and Broadgreen University Hospital, Liverpool, UK*

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Introduction Acquiring competency in thoracic ultrasound (USS) is mandatory for all respiratory trainees by the end of ST5, but it is often challenging for trainees to meet the requirements in current RCR guidelines for level 1 competency (≥1 session/week over≥three months, with 5 scans per session performed by trainee). We aimed to clarify where thoracic ultrasound training opportunities currently exist for respiratory registrars to inform further debate around the competency framework.
Methods Trainees in the South west, North West and Oxford deaneries were invited to submit data on numbers of thoracic USS performed by both radiology departments (specifying numbers of scans per morning/afternoon session) and respiratory teams (specifying pleural clinic/procedure list/respiratory ward/other ward or clinic) over a randomly selected 4 week period between January and May 2017. Data was to represent total number of scans performed within each department, not number of scans done by one individual.
Results Data was provided from 14 hospitals (6 South West, 7 North West, 1 Oxford) including 3 tertiary pleural centres. Results are shown in Table 1. Full Results from 2 centres represent estimated numbers and one site (North Manchester) submitted 3 weeks data. There was no radiology session in

Abstract P238 Table 1 Numbers of thoracic USS examinations performed by radiology and respiratory departments

Hospital	Radiology Numbers			Respiratory numbers (range, mean per week)							No. Pleural clinics / week	No. Pleural procedure lists / week
	Total (in 4 weeks)	Range (per session)	Mean per week	Pleural clinic	Pleural Procedure list	Ad hoc resp ward	Ad hoc day unit	Ad hoc other ward	Ad hoc other clinic	All resp mean per week		
GWH, Swindon	0	0	0	0-7 4.5	*	0-2 1	3-5 3.75	3-5 4	*	13.25	1	N/A
Exeter	0	0	0	3-5 4	1-2 1.25	5-9 9.25	*	*	*	12	1	1
BRI	20	0-2	5	2-5 3.75	*	0-4 1.5	*	4-11 7	*	12.25	1	N/A
Southmead	0	0	0	10	3	9	5	10	*	37	1	1
RUH, Bath	0	0	0	8	*	3	*	5	*	16	2	0
Royal Cornwall	44	0-4	11	*	1-4 2.5	2-4 2.75	0-2 1	2-6 4.25	0-1 0.5	11	0	0-1
Oxford	29	0-3	7.25	23-44 36.5	5-12 9.5	1-5	0-1	1-2	*	50.5	2	2
University Hospital South Manchester	16	0-3	4	12-16 13.75	4-6 4.75	1-2 1.5	*	0-2 1	*	21	2	2
Bury	1	0-1	0.25	*	*	0-3 0.75	0-1 0.5	*	*	1.25	0	0
East Lancashire	49	0-4	12.25	0-5 3	2-4 4	2-4 3.25	*	0-6 2	*	12.25	1	2
Mid-Cheshire	4	0-1	1	*	*	1-3 1.75	0-1 0.75	0-1 0.25	*	2.75	0	0
Wirral University NHS Trust	40	0-4	10	0-4 2.75	1-2 1.5	2-5 4	0-1 0.5	0-2 0.75	*	9.5	1	1
North Manchester	0	0	0	4-6 5.3	2-3 2.7	2 2	*	1-3 2	*	9	1	1
Royal Liverpool and Broadgreen	0	0	0	8-10 9	8-16 12.5	*	12-18 15	*	*	36.5	0	1

any hospital with ≥5 thoracic ultrasound sans performed (out of total of 55 weeks sampled across all sites).

Conclusions In almost all surveyed hospitals from two deaneries, and a tertiary centre from a third, the majority of thoracic ultrasound is performed by respiratory teams rather than radiologists and in a variety of elective and unscheduled situations. Similarly the principle opportunity for USS training exists within the respiratory team and is deliverable out-with the tertiary setting. The currently recommended exposure of regularly attending a list or session to undertake 5 USS is not achievable in radiology departments even where thoracic USS is being performed, including surveyed tertiary pleural centres. Future recommendations on USS training requirements for respiratory trainees need to be flexible to take account of where opportunities exist and should recognise the role that both radiology and respiratory teams provide.

P239 IS A PLEURAL ON-CALL SERVICE BENEFICIAL?

R Asciak, R Hallifax, RM Mercer, J Corcoran, J Wrightson, M Hassan, C Bradley, I Psallidas, NM Rahman. *Oxford University Hospitals, Oxford, UK*

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Aim To audit the pleural on-call service referrals and outcome.

Method Our unit instituted the provision of a "pleural phone" and pleural email service as a central point of contact for pleural related questions, both internally for our large Trust, and externally including local GPs, to facilitate a more open model of care, increase efficiency of the diagnostic pathway and prevent unnecessary admissions or procedures. All documented pleural phone (9 am-5 pm,Monday-Friday) and email (any time) referrals between March 2016-February 2017 were analysed.