LUNG & HEART

P078 Thoracic imaging and mammography as part of unprovoked VTE workup

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Background: The 2012 NICE guideline on thromboembolic disease[1] sets out a strategy to investigate for occult malignancy in patients with unprovoked venous thromboembolism. A CXR is recommended for all patients. CT imaging limited to the abdomen and pelvis and mammography is to be considered in patients >40 years. We audited whether patients are receiving thoracic imaging and what form this takes in our centre. The diagnostic yield for combined thoracic and abdominopelvic imaging was determined. We also examined whether eligible patients were receiving mammography.
Method: A radiology information system search was performed for CT scans containing the key word "unprovoked"performed between September 2012 and September 2015. 185 patients (84 DVT and 75 PE) undergoing CT abdomen and pelvis were identified and their imaging pathway examined.
Results: Of the patients with PE; 59/75 received appropriate CTPA, 4/84 received appropriate VQ and CXR, 8/75 underwent CT thorax and 4/75 both CTPA and CT thorax. Of the DVT patients 12/84 received appropriate CXR, 50/84 received CT thorax and 22/84 received no thoracic imaging at all. The diagnostic yield of occult carcinoma on combined imaging was (5/185) 3.1%. Only (1/81) patients underwent mammography.
Conclusion: Thoracic imaging as part of VTE work up is haphazard with duplicated thoracic CT imaging demonstrated in cases of PE and patients with DVT at risk of receiving no thoracic imaging. Mammography is not regularly carried out as part of occult malignancy screening in our trust.

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P079 Are we over-imaging the obese patent with suspected pulmonary embolism

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Aims: To audit the amount of CT pulmonary angiograms performed in our department over a one year period in the age group 18-50 and determine if there was a sigificant difference in the number of positive studies for pulmonary embolism between obese and non obese patients.
Method: A list was obtained of all CTPAs performed in our institution between the ages of 18-50 over a one year period. Due to the retrosepctive nature of the study, BMI data was not possible and a well recognised surrogate for BMI was used, the "fat bone ratio" which was obtained from the chest radiograph. Inclusion criteria: adequate chest radiograph, age 18-50. The following variables were audited: age, sex, BMI, diagnosis of pulmonary embolism, the presence of airways disease, D Dimer result, other sigificant findings.
Results: 230 CTPAs were performed in our institution over a one year period in our patient cohort, of which 221 were included. 129 were male, 92 were female. 69 (31%) patients were classified as obese, and 11(16%) of these had positive studies. 28 (41%) had no sgnificant findings or airways disease. 152 patients were in the non obese category, of which 24 (15%) had positive studies and 75(49%) had no significant findings or airways disease
Conclusion: Our study concluded that we are not overimaging the obese patient, compared to the non obese patient, contrary to what was initially suspected. However, we are over imaging patients in general with suspected PE, and exposing a significant number, whether obese or non obese, to unnecessary radiation

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P080 Valley fever in the UK? The importance of a travel history

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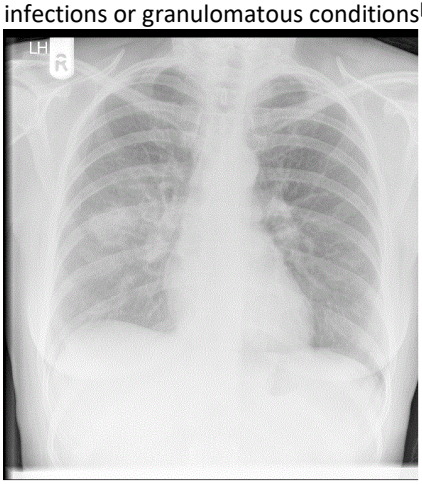
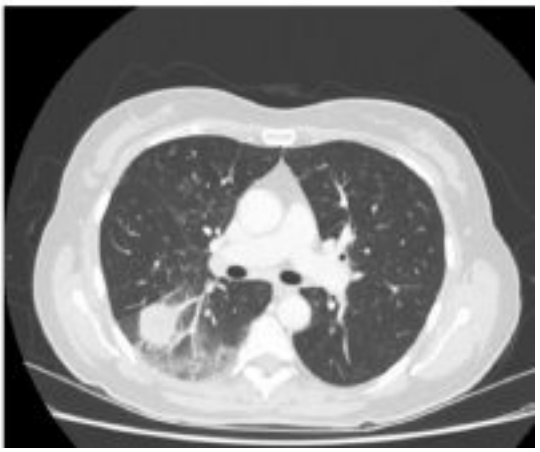
Coccidioidomycosis, also known as Valley Fever, is a fungal infection caused by the inhalation of spores, and is endemic in the Southwestern United States, regions of Mexico, Central America and South America[1]. It therefore came as a surprise to isolate this infection from a patient in a seaside town in North Yorkshire, UK. Coccidioidomycosis is caused by either Coccidioides immitis or Coccidioides posadasii, and once inhaled they are highly infectious, and can cause a wide variation in clinical manifestation and imaging findings[1]. Most infections primarily involve the lungs, and are self-limiting and resolve over a period of weeks to months[1]. Occasionally the infection can spread to cause a very serious disseminated disease. The radiographic

findings can be nonspecific and variable, often raising concern for many differential diagnoses such as malignancy, other infections or granulomatous conditions[1.3].





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P081 **Adequacy of contrast enhancement in CT pulmonary angiograms (CTPAs)**

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Background: CTPAs play a major role in diagnosis of Pulmonary Embolism(PE). To definitively confirm/exclude PE on CTPAs, the technical quality of images is critical. Of the different technical factors, inadequate enhancement has been recognised as a leading cause of suboptimal scans.

Previous research validated a threshold of>210HU in the main pulmonary artery(MPA) for reliable identification of Pes[1]. It was also shown that up to 10.8% CTPAs may be suboptimal from all causes[2]. In line with the RCR audit template,the target for this project was set as <11% CTPAs having <210HU in the MPA[3].

Method: Retrospective analysis of all CTPAs performed in the Trust from 01/08/16-01/10/16. For each scan, the average attenuation in the largest axial image of the MPA was measured. We also analysed the CTPA reports and recorded:

- Reported outcome(positive,negative,indeterminate)
- Comments regarding image quality
- Excluded: repeat CTPAs following a poorly enhanced scan, follow-up CTPAs for known PEs.

Results: Following 4 exclusions, n=253. 50/253(19.8%) CTPAs were positive for PE, 176/253 (64.5%) negative, 27/253(10.7%) indeterminate. Overall, 16/253 (6.32%) CTPAs had <210HU in the MPA. 2 of these scans were positive for PE despite <210HU in the MPA. The remainder of these scans (14/253)were reported as indeterminate.

6 scans with>210HU in MPA noted 'suboptimal opacification' in the report. Overall,35.6% reports incorporated comments on image quality.

Conclusions: The Trust achieved the target of <11% scans with <210HU in the MPA.Review of reports showed that qualitative assessment of enhancement did not always correlate with quantitative measurements. This audit also showed that only 35.6% reports incorporated comments on image quality-a potential area for improvement, as such comments are useful in relaying degrees of diagnostic certainty to clinicians.

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P083 What a radiologist should know before performing a CT-guided lung biopsy?

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Background: In the management of cancer, tissue histology is often the key to both diagnosis and treatment. One of the main radiological services is to obtain this tissue sample. CT-guided biopsies of lung nodule/mass are on the rise due to early detection and rigorous imaging follow-up. To provide and maintain a safe CT-guided lung biopsy service, we investigated factors that may influence the risk of complications and subsequent chest drain/admission.

Method: Retrospective review of 150 consecutive patients who had CT-guided biopsy of suspicious lung nodule/mass. Patient demographics, lung nodule/mass characteristics (size, location, skin to lesion distance, pleura to lesion distance), biopsy needle size and number of biopsies were investigated against post-procedure complications, and chest drain/admission. Statistical correlations were tested using Spearman's test (SPSS v.16).

Results: 33% (50/150) patients had post-procedure pneumothorax. 9% (13/150) experienced haemoptysis. 42% (21/50) of those patients who had pneumothorax required either admission for monitoring and/or chest drain. As skin to lesion, and pleura to lesion distances increased, there is statistically significant correlation ($P<0.05$) with the occurrence of pneumothorax, and chest drain/admission. 90% (19/21) patients who were either admitted or required chest drain had skin to lesion distance of >5 cm. Other investigated factors showed no correlation with post-procedure complication or haemoptysis.

Conclusion: Increasing distance from skin to lung lesion, and pleura to lesion showed statistically significant correlation with post-procedure pneumothorax and requirement for chest drain. These factors should be taken into account when planning a CT-guided lung biopsy particularly when there is high chance of hospital admission for further monitoring.

P084 The impact of national lung cancer awareness campaign 2012 on local services

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Background: The national lung cancer awareness campaign was undertaken in England in 2012 as a step towards improving England's relatively low cancer survival rates. This study was aimed at detecting the change in trend of lung cancer diagnosis at our institute following the campaign. The impact on local workload at various levels was also assessed.

Methods: This was a retrospective study undertaken from May to October 2012, following initiation of the campaign. Comparison was made with the corresponding six months of 2011. Chest X ray [CXR] referrals made exclusively by General Practitioners [GP] were considered. New cases of suspicious CXR findings requiring chest clinic referral were included in the study and were further analysed regarding other diagnostic imaging and procedures undertaken and the outcome. There were 52 cases in the pre-campaign and 121 cases in the post-campaign groups.

Results: We observed a 30% increase in GP CXR referrals following the campaign, leading to 2.3 times more chest clinic referrals and a significant rise in the various diagnostic and follow up investigations. This culminated in a 2.8 times rise in lung cancer diagnosis with a notable 2.6 times rise in detection at an early stage.

Conclusion: This study reflects the impact the lung cancer awareness campaign has had at various levels with significant increase in the GP referrals resulting in improved lung cancer detection. The study also highlights the need for the concerned local services to be well equipped with adequate resources to cope with the resultant heavy impact on workload.

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P085 Lung scar carcinoma: What do you know?

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Background: Lung scar carcinoma (LSC) develops around scars in the lung. It typically occurs as a subpleural site of pre-existing fibrosis in the upper lobes of the lungs. The fibrosis interrupts normal vascular and lymph drainage. This predisposes to metastatic lymph-node and small-vessel spread - even when the tumour is small - resulting in a lower 5-year survival rate. The early detection and diagnosis of LSC is critical for better treatment outcomes LSC should be suspected when a focal scar shows enlargement in follow-up images. Lung scars may occur in any area of fibrosis especially with old TB or pulmonary fibrosis.

Misdiagnosis as an old lesion, often results in a delay in treatment. LSC is usually smaller than 3 cm, is commoner in men and mainly adenocarcinoma.
Purpose: Five LSC cases are described. In two of these early metastatic spread - a feature of LSC - occurred while the primary tumour was small. Careful scrutiny of areas of lung scarring is essential. Changes in a pulmonary scar - enlargement, spiculation and/or associated ground glass opacity should alert the radiologist. By encouraging radiologists to seek out subtle changes in lung scars we seek to facilitate earlier detection and diagnosis of LSC.
Summary: A selection of cases of LSC with plain radiograph, CT and PET CT findings are described. This poster highlights the condition and alerts the radiologist to subtle changes.
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P086 The value of a lateral chest X-ray at an oncology centre

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The lateral chest X-ray is rarely performed, but for our patient cohort of oncology patients it is considered useful in both diagnosing and monitoring disease and treatment response. Although the majority of lesions/pathology can be visualised on the frontal view, some are more clearly identified on the lateral view in relation to position, size changes/appearances during/post treatment and to confirm whether findings are within the lungs or external to the patient.
A frontal chest radiograph is a 2D image of a 3D structure and the lateral view assists with a more complete review of the normal anatomy as well as any pathology in the thorax, in line with other general radiology examinations where two views are the routine. The lateral view gives increased confidence as to where perceived lesions/pathology lie within the thorax and is a lower ionising radiation dose, more readily available and more economic than CT scanning. These factors make the lateral view a preferred option for follow up during treatment and beyond in certain patients to assess response and progression.
This poster will demonstrate how valuable the lateral chest view is by identifying anatomy and pathology, including examples where the radiology reports have been more accurate because of the lateral view.

P087 Common patterns found in 51 chest X-ray discrepancy and missed errors

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Diagnostic errors are a recognised issue in radiology, with error rates of ~30% being replicated in several studies. Reviewing error cases potentiates performance outcomes by reducing reporting errors through education. Regular discrepancy meetings to recognise, assess, and analyse errors made in radiological practice is encouraged by local trusts and the Royal College of Radiologists.
This study retrospectively analyses 51 chest X-ray cases referred to our department's discrepancy meetings from 2009-2017. A database with patient demographics, error classification (perceptual/cognitive/communicative), missed pathology, location, referring symptom, and referring professional was made, with subsequent statistical analysis.
The aims of this study are: (i)to identify recurrent patterns of errors for quality improvement in the department, and (ii)to highlight anatomical areas worthy of further attention during reporting.
Of 51 cases, the average age was 68.5. 56% were male and 44% were female. 22 were ex-smokers, while 17 were smokers, 5 non-smokers, and 7 unknown. 32 discrepancy errors were perceptual/observational (>60%), followed by 15 cognitive/interpretive errors (29%), and 4 communicative (8%). The most notable errors were missed primary cancer (>55%) and infections (14%), including TB and bronchopneumonia. Missed lesions ranged from the peripheral region (41%), hilar (30%) and parahilar (24%) regions. 40% of cases were in the upper zones. The most common symptom on referral was cough, and most referrals came from A&E.
Errors in diagnostic radiology are common, and mostly perceptual. Determining patterns of error can educate reporters by influencing reporting technique, and improve diagnostic quality and accuracy (particularly for lung malignancies) in radiology.
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P088 'Lung fields or minefields': Can we learn from the retrospectoscope?

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Background: The chest X-ray (CXR) is often the first diagnostic test a patient will have in the investigation of suspected lung cancer. Diagnosis of early lung cancer on CXR is challenging as small lesions can be obscured by overlying structures. An awareness of the sites where difficulties may arise helps reduce the likelihood of these errors from occurring[1,2].

Method: All lung cancer diagnoses for 2016 were obtained from the cancer registry. All CXR's performed in the year prior to diagnosis were reviewed using the RCR audit toolkit.[3]Where discordant reports were identified, radiographs and other relevant imaging were re-examined and classified.
Results: A total of 241 CXR's were performed for 165 patients. 21 (15%) of patients had no CXR prior to diagnosis. 5 were diagnosed out of area. Of these 241 radiographs, 56 (23%) were reported as normal. The rest were reported as abnormal, either as a likely cancer or for further follow up. On review, 17 (7%) were felt to demonstrate visible lesions that had not been reported. 7 (3%) showed a subtle abnormality that could only be reported in retrospect. 32 (13%) were occult on CXR even with access to subsequent imaging. We show a selection of cases that were missed initially, but on review were visible. These cases are an invaluable learning resource and act as a reminder of the 'review areas'.
Conclusion: Review of previous films where there has been a diagnosis of malignancy is an important tool in improving quality and reducing future error.

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CARDIAC & VASCULAR

P089 Clinical relevance of incidental findings in lower limb CT angiograms

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Introduction: The aim of this study is to report the incidence and the clinical relevance of extravascular incidental findings (EVIF) in patients who had lower limb CTA.
Method: Consecutive lower limb CT angiograms performed between August 2015 and August 2017 were retrospectively reviewed. The clinical relevance of the non-vascular findings were categorized into A, B or C using guideline recommendations where Category A represents incidental findings of immediate clinical relevance such as suspicion of malignancy, Category B represents findings that may be clinically relevant but most probably benign and Category C represented purely incidental findings of no clinical significance.
Results: A total of 1304 lower limb CTAs performed during the 2 years study period. 84 cases were excluded for missing reports. Mean age of 66± 14.2 years (range 8-98 years). A total of 1635 extravascular incidental findings were reported in 813 patients. Of these, 174 EVIFs (10.6%) were found in the chest, 1236 (75.6%) in the abdomen, 87 (5.3%) in the musculoskeletal system and 138 (8.4%) reported as 'other'. A total of 111 EVIFs (6.8 %) were Category A, 405 EVIFs (24.8%) of Category B and the remaining majority 1119 EVIFs (68.4%) were of Category C. No incidental findings were seen in 407 patients (27.5 %).
Conclusion: The results confirms the importance of Radiology led reports of CTAs as they can lead to detection of serious pathology which would otherwise be missed or diagnosed late.

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P090 The incidence and clinical relevance of extravascular incidental findings in upper limb CT angiograms

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Introduction: CTA has been the gold standard in assessing the vascular system for pathology. It also has the invaluable advantage of imaging the extravascular structures allowing the detection of incidental findings. The aim of this study is to report the incidence and the clinical relevance of extravascular incidental findings (EVIF) in patients who had upper limb CTA.
Methods: Consecutive upper limb CT angiograms performed between August 2015 and August 2017 were included. The clinical relevance of the non-vascular findings were categorized into A, B or C. Category A represents incidental findings of immediate clinical relevance, Category B represents findings that may be clinically relevant however most probably will be benign, whereas Category C findings were purely incidental findings of no clinical significance.
Results: Seventy-nine upper limb CTAs were performed during the 2 years study period. Five were excluded for missing images. A total of 153 EVIFs were reported in 52 patients (70.3%). A total of 12 EVIFs (7.8%) seen in 11 patients were of Category A, 50 EVIFs (32.3%) seen in 20 patients of Category B and the remaining majority 91 EVIFs (59.5%) seen in 21 patients were of Category C. No incidental findings were seen in 22 patients (29.7%).