

p107 **Brachial plexopathy in breast cancer - what the radiologist needs to know**

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**Background:** Breast cancer commonly metastasises to supraclavicular and cervical paravertebral regions. In addition, the standard treatment for breast cancer involves radiotherapy to the supraclavicular fossa. The brachial plexus, an intricate and challenging anatomical region to image and interpret, is subsequently vulnerable to damage and dysfunction, either due to the malignant infiltration or as a complication of radiotherapy-induced nerve damage. While brachial plexopathy is a relatively rare occurrence, the radiologist needs to be able to differentiate between these causes. The superior soft tissue contrast and multi-planar imaging offered by magnetic resonance imaging (MRI) enables the accurate assessment and characterisation of abnormalities of the brachial plexus, as well as delineation of the extent and integrity of adjacent structures. Our local MRI brachial plexus protocol includes multiplanar T1, T2, STIR, and post-contrast sequences.

**Purpose:** We offer a pictorial review of the anatomy of the brachial plexus and discuss the clinical presentation of brachial plexopathies. We present cases from our metastatic breast cancer multi-disciplinary team meeting at a large tertiary oncology centre, which illustrate the MRI features of brachial plexopathies from tumour recurrence versus radiation-induced damage secondary to supraclavicular radiotherapy. In addition, we highlight how FDG-PET/CT imaging plays an important adjuvant role in the imaging and assessment of the state of the brachial plexus, supplementing the MRI findings, differentiating the causes of the plexopathy, restaging disease, and monitoring response.

p108 **Evaluating the impact of best practice guideline implementation for women aged 35-39 years attending a diagnostic breast clinic**

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**Background** Following implementation of new national guidelines (Willet et al., 2010) which removed mammography from the first-line investigations performed in women aged 35 -- 39 years attending diagnostic breast clinics, this retrospective study reviewed the ultrasound findings in 35-39 year old women diagnosed with cancer one large DGH in the North of England. Method A retrospective audit of ultrasound findings and outcomes (histology and / or follow-up) of all women aged 35 -- 39 years who attended the diagnostic breasts clinics at a DGH between 1.1.12 and 31.7.15.

**Results** 1141 women met the study inclusion criteria. 17 breast cancers were detected. Malignancy was suggested on the basis of ultrasound appearances in 23 (false positive) and 14 (true positive) cases. Three further malignant (false negative) cases were classified as normal (n=1) or benign (n=2) at ultrasound. Two of these malignant cases were diagnosed at the time of presentation on the basis of mammography performed in accordance with other guidelines (positive family history and unexplained deep vein thrombosis). One case was diagnosed at representation after an 8 month interval. In this study the sensitivity of target ultrasound scanning was 82.35%, specificity was 97.95% and overall diagnostic accuracy 97.77%.

**Conclusion** Ultrasound examinations targeted to the site of a presenting focal abnormality in women aged 35 -- 39 years will fail to detect a small number of malignancies due to overlap in benign and malignant appearances and due to the low, but finite, prevalence of asymptomatic cancer elsewhere in the breasts in this population.

WILLETT, A. et al. 2010. *Best practice diagnostic guidelines for patients presenting with breast symptoms*. DH, London.

## LUNG AND HEART

p109 **The diagnostic adequacy of lateral chest radiographs: A district general hospital experience**

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**Background:** The lateral chest radiograph (CXR) is important in detecting lower-lobe pathology and mediastinal masses <sup>1</sup> It allows clear visualization of the mediastinal compartments and spaces<sup>2</sup>. A frontal chest radiograph may only provide visualization of about 80% of the lungs.

The protocol at Macclesfield District General Hospital includes a lateral CXR for any patient presenting with first episode of haemoptysis. In this audit, we evaluate the diagnostic quality of the lateral chest radiographs obtained, comparing results from two subsequent audit cycles.

**Methods:** We retrospectively evaluated outpatient lateral chest radiographs performed over 6 week periods.

**Standards:**

- \* 100% for clear visualization of the upper third of the lung zones
- \* 100% for both hemidiaphragms being visible
- \* 100% for true lateral projection

Following local presentation of the first audit and recommending improvements, we carried out a re-audit after a 6 month interval.

**Results:**

After 2 audit cycles, there was an improvement of :

- \* 60% of patients having the upper third of lung upper zones visible, previously 17% in the first cycle
- \* 65% of were a true lateral projection compared to 26% previously
- \* 95% of radiographs had both hemidiaphragms visible compared to previously 87%,

**Conclusion:** A considerable improvement in all criteria has been seen, particularly regarding the areas of important diagnostic value. Following local presentation of the second audit cycle, it was agreed to continue with recommendations such as providing prompt regular feedback to radiographers, re-calling patients if necessary and further education.

1. Ahmad, N. (2001). Good positioning is key to PA chest X-ray exams. [Online] Available from:

<http://www.auntminnie.com/index.aspx?sec=ser&sub=def&pag=dis&ItemID=52189>. [Last accessed 17.05.16.] 2. Ballinger and Frank. (1999) *Merrill's Atlas of Radiographic Positions and Radiologic Procedures*. 9th ed. London: Mosby. 550.

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**p110 The lost art of the lateral chest radiograph? - Relevant indications and pathology**

Huub Wit; Graham Dack; Sophie McGlade; Richard Riordan; Tinu Purayil

*Plymouth University Hospitals NHS Trust*

**Background:** The lateral chest radiograph is an extremely valuable but often underutilised tool for clarifying equivocal abnormalities observed on the frontal chest radiograph. Despite technological advances in computed tomography and plain radiography (such as digital tomosynthesis, dual energy subtraction and bone suppression) the lateral chest radiograph remains a powerful tool for problem solving when used in appropriate situations, and should not be assigned to the annals of radiological history. The rise in alternative imaging for follow-up of abnormalities observed in the frontal chest radiograph has, for some trainees, resulted in lack of familiarity with the lateral chest radiographs and perpetuates the underutilisation and under-recognition of its value.

**Purpose:** This two poster series will reunite the reader with the tools needed to accurately interpret the lateral chest radiograph. This second poster will provide an explanation of the appropriate indications for a lateral radiograph and give a pictorial review of the relevant pathologies which can be demonstrated.

**Content:** The poster will provide the reader with pathological examples to illustrate the utility of the lateral chest radiograph as a relevant tool in the modern radiologist's armamentarium.

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**p111 The lost art of the lateral chest radiograph? - Thoracic anatomy and systemic review method**

Sophie McGlade; Graham Dack; Huub Wit; Richard Riordan; Tinu Purayil

*Plymouth University Hospitals NHS Trust*

**Background:** The lateral chest radiograph is an extremely valuable but often underutilised tool for clarifying equivocal abnormalities observed on the frontal chest radiograph. Despite technological advances in computed tomography and plain radiography (such as digital tomosynthesis, dual energy subtraction and bone suppression) the lateral chest radiograph remains a powerful tool for problem solving when used in appropriate situations, and should not be assigned to the annals of radiological history. The rise in alternative imaging for follow-up of abnormalities observed in the frontal chest radiograph has, for some trainees, resulted in lack of familiarity with the lateral chest radiograph and perpetuates the underutilisation and under-recognition of its value.

**Purpose:** This two poster series will reunite the reader with the tools needed to accurately interpret the lateral chest radiograph. This first poster will demonstrate the anatomical structures which may be appreciated on a normal study and provide the reader with a tool for systematic review of the lateral chest radiograph.

**Content:** This poster will contain examples of normal lateral chest radiograph studies and demonstrate a process which the reader can follow to ensure systematic review.

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p112 **CATCH protocol: is it effective?**

Elizabeth Barclay; Shelly Lamb; Anna Sharman

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**Background:** A significant number of GP-requested chest radiographs (CXR) are acquired to rule out underlying pathology in patients with persistent coughs, often heavy smokers. Plain films provide reassurance when normal, and useful guidance for management when pathology is clearly visible. However, a proportion of CXRs are ambiguous and require further imaging. The CATCH protocol was designed this year to trial the effectiveness of low dose chest CT scans in clarifying equivocal CXRs. The protocol intends to identify early lung cancers and other subtle pathologies, or discern normal variants whilst limiting patients' exposure to radiation; low dose CT scans use a quarter of the dose of radiation of standard CT scans. The CATCH pathway requires GP-requested CXRs to be reported within 24-48 hours and low dose CT scans to be arranged within 3-4 weeks after the CXR is acquired. There is a different pathway within our hospital for the CXRs demonstrating a definite lung cancer.

**Purpose:** To demonstrate the effectiveness of the CATCH protocol using data from the first 6 months of the pathway. Outcomes include; 1. Are we meeting the standards set for CXR reporting time (24- 48hours) and subsequent CT scan appointment scheduling (3-4 weeks)? 2. CT findings of equivocal CXR appearances: Are we picking up early lung cancers? 3. Patient survey

**Results:** What is the impact on patients? Summary of content: Title, Background (incl CATCH protocol), results of pathway, CXR and CT images, Patient survey results. Organisation/display: focus of poster will be on CXR & CT images.

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p113 **Gentle reminder: Normal anatomic variants seen in chest X-ray**

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The chest radiographs is a common imaging examination and usually the first study in any evaluation of thoracic disease and some abdominal emergencies. Much pathology can be diagnosed by the chest X-ray and similarly its comprehensive anatomy distribution can also lead to misdiagnosis. Most chest evaluation from chest X-rays are mostly standard irrespective of race, however few variations in the anatomy of structures makes it susceptible for wrong diagnosis. A number of anatomic variants in the chest compartment can mimic significant pathology. The subject of this review is gentle reminder of normal variants within the chest identified by chest X-rays. Anatomical variation refers to an anatomic structure that is different from normal but it is mostly non pathological. They do not constitute a disorder and most patients are asymptomatic. Almost every organ in the body has a variation and the onus lies within the clinician or the radiologist to identify it. Anatomical variants are due to defects in developmental stages.

1. [http://www.radiologymasterclass.co.uk/gallery/chest/variants/normal\\_chest\\_X-ray](http://www.radiologymasterclass.co.uk/gallery/chest/variants/normal_chest_X-ray)

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p114 **Assessment of the adequacy of contrast enhancement in CT pulmonary angiograms: 3 audit cycles at a large teaching hospital**

Sophie Cheshire; Caterina Dalcol; Klaus Irion; Marcio Samuel Samuel Cunha Rodrigues; Eva Filipa De Sousa Dias Padrao; Marie Stokes

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**Background:** Research suggests that a level of 210 Hounsfield Units (HU) is required to differentiate chronic thrombus from enhancing vessel (1) and up to 10.8% of CTPAs may be suboptimal due to all causes, including poor contrast enhancement and motion artefact (2). The RCR has defined the standard for CTPAs as a level of contrast enhancement of the main pulmonary artery (MPA) of >210HU in <11% of all scans. This audit consists of three full audit cycles at a large teaching hospital to evaluate the diagnostic quality of CTPAs.

**Method:** Retrospective audits were completed in 03/2015, 09/2015, 04/2016 and 09/2016. The average HU of the MPA was measured and compared to the standard.

**Results:** A total of 396 CTPAs were analysed. To date, the target has not been met. During the first audit, we measured HU <210 in 15.3%. Recommendations were to incorporate bolus tracking at the SVC. Reaudit demonstrated HU <210 in 24%, so bolus tracking of the MPA was introduced. This protocol is used at our sister site where the target was met with HU <210 in 8%. Second reaudit showed 14.9% suboptimal scans. Further recommendations included a saline chaser and third reaudit showed 13.9% CTPAs HU <210. Further changes in protocol have now been implemented to include a bolus test, optimisation of patient positioning and further radiographer training.

**Conclusion:** Despite multiple protocol changes, the standard has not been achieved. Further changes are currently being implemented and reaudit will take place in 3 months time.

1. Wittram C, Maher MM, Halpern E, Shepard JO. Hounsfield unit values of acute and chronic pulmonary emboli. *Radiology* 2005; 235; 1050-1054. 2. Adequate contrast enhancement of CT Pulmonary Angiograms. <https://www.rcr.ac.uk/audit/adequate-contrast-enhancement-ct-pulmonary-angiograms>

p115 **Can the frequent use of computed tomography pulmonary angiography be justified by finding diagnoses other than pulmonary embolism?**

Rahel Mahmud; Shilpy Sharma; Philip Kelly; Martin Whyte

*Kings College London Foundation Trust*

**Background:** Frequent use of computed tomography pulmonary angiogram (CTPA) is partly due to belief that it gives alternative diagnoses if negative for pulmonary embolism (PE). We determined the yield of CTPA in finding alternative diagnoses for pulmonary embolism (PE) in acute medical admissions.

**Methods:** Retrospective cohort study of consecutive CTPAs for suspected PE over two-months. Presence/absence of PE was recorded. In 'negative' studies, presence of alternative diagnoses was recorded. The preceding chest radiograph was reviewed for presence of alternative diagnosis; if none evident, novel pulmonary pathology on CTPA was present. Case notes were evaluated whether novel CTPA findings accounted for symptoms. Patients with pulmonary nodules were followed-up for 12 months.

**Results:** Of 145 CTPAs, PE present in 20 patients (14%). Of remaining 125 patients, 29 (23%) had an alternative diagnosis, of which 9 (7%) had novel alternative diagnosis. One patient didn't have chest radiograph. Novel diagnoses comprised: septic-emboli; subcentimetre pulmonary nodule (n=5 patients; largest 7mm); reactive hilar lymph node; aortic dilatation; breast mass (later biopsy-proven benign fibroadenoma); bronchopleural fistula; empyema; hydropneumothorax; aortic root dilatation; and minimally-displaced endotracheal tube. Novel CTPA features explaining symptoms seen in n=4 (3%). Four patients with pulmonary nodules had two further chest CTs (14mSv/patient) and one patient had one further chest CT over 12-months. Benign pulmonary nodules in 4 patients; one patient remains under review pending repeat chest CT.

**Conclusions:** CTPA use is not justified by finding alternative pulmonary pathology. Incidental findings of benign nodules lead to further investigation with implications for radiation exposure and cost-effectiveness.

1. Chandra, S. (2013) Finding an alternative diagnosis does not justify increased use of CT-pulmonary angiography. *BMC Pulmonary Medicine*. 13(9/12), 1-8. 2. Gosalia, R. (2010) Pulmonary Embolism at CT Angiography: Implications for Appropriateness, Cost, and Radiation Exposure in 2003 Patients. *Radiology*. 256(8/12), 625-32.

p116 **A review of the impact of 2015 British Thoracic Society pulmonary nodules guidelines on cases in a virtual follow-up clinic**

Sunna Asghar<sup>1</sup>; James Hawthorne<sup>1</sup>; Aanand Vibhakar<sup>2</sup>; Kristopher Swarski<sup>1</sup>; John Murchison<sup>1</sup>

<sup>1</sup>Royal Infirmary of Edinburgh; <sup>2</sup>University Hospitals of Leicester

**Background** Pulmonary nodules detected on imaging are a marker of potential lung cancer. The British Thoracic Society (BTS) issued new guidelines for investigating pulmonary nodules in 2015, one reason for this was to reduce the number of unnecessary follow-up CT scans (Callister et al. 2015). Our aim was to compare our current practice against the new BTS guidelines.

**Methods** 169 cases in a virtual nodule clinic were retrospectively analysed. Using electronic patient records data was obtained on baseline demographic, nodule characteristics, number of scans performed in follow up, scan interval times, and the resulting malignancies over a 4.5 year period.

**Results** A total of 578 CT scans were performed within this time period, the average number of CTs per patient was 3.45. Using the new BTS guidelines there would have been 77 less CT scans performed within this time period. There were 8 (4.7%) recorded malignancies and all malignant cases would have been identified using the BTS guidelines.

**Conclusion** The number of malignancies identified in our virtual clinic is in line with previous studies (McWilliams et al. 2013). By using the new BTS guidelines no malignancies within our clinic would have been missed, however the guidelines would have allowed less CTs to be performed. This could lead to a reduced radiation risk to patients as well as cost-savings for the department.

1. Callister, M.E., et al. (2015) *BTS guidelines: British Thoracic Society guidelines for the investigation and management of pulmonary nodules: accredited by NICE. British Thoracic Society Pulmonary Nodule Guideline Development Group, on behalf of the British Thoracic Society Standards of Care Committee. Thorax* 2015;70:Suppl 2 ii1-ii54 doi:10.1136/thoraxjnl-2015-207168 2. McWilliams, A., et al. (2013) *Probability of Cancer in Pulmonary Nodules Detected on First Screening CT. N.Engl.J.Med., 2013, 369, 10, 910-919, Massachusetts Medical Society*

p117 **Does delay in presentation with pulmonary embolus relate to thrombus load and right ventricular dilatation?**

Sunna Asghar<sup>1</sup>; Karim Samji<sup>1</sup>; Aanand Vibhakar<sup>1</sup>; Jh Reid<sup>2</sup>; Ejr Van Beek<sup>3</sup>; John Murchison<sup>1</sup>

<sup>1</sup>Royal Infirmary of Edinburgh; <sup>2</sup>Borders General Hospital; <sup>3</sup>University of Edinburgh

**Background** Pulmonary embolism (PE) is commonly viewed as an acute disease however patients frequently present with a more sub-acute clinical history. Our study aim was to quantify the delay in presentation in a series of patients, and relate that delay to thrombus load at diagnosis with CT pulmonary angiogram (CTPA), and to right ventricular dilation as measured on that CTPA.

**Methods** We retrospectively reviewed the admission notes and CTPAs of 55 patients with PE to calculate the CTPA delay. From the CTPA, the modified Miller Score (MMS) (range 1-16) was used to quantify thrombus load ( $\geq 13$  constituted massive PE) and the right ventricular/left ventricular (RV/LV) ratio was calculated.

**Results** The average CTPA delay was longer (226.9 hours vs. 70.8 hours) in patients with a larger thrombus load ( $MMS \geq 13$  vs.  $MMS \leq 12$ ). CPTA delay was longer for patients with RV/LV ratio  $1 \leq$  vs. RV/LV ratio  $\geq 1$  (159.3 hours vs. 90.4 hours) reflecting greater thrombus load in this group. Patients with Massive PE and RV/LV ratio  $1 \leq$  had longer delay (420.2 hours) than those with RV/LV ratio  $\geq 1$  (138.6 hours).

**Conclusion** Our data confirms there is often a delay in presentation in patients with PE and with increasing delay to CTPA there is an associated increase in thrombus load. Patients with a larger thrombus load but a lower RV/LV ratio tend to have a longer clinical history. We hypothesise that the time delay may have produced an element of compensatory RV hypertrophy in this group which has resulted in the reduced RV dilatation.

p118 **Variants of pulmonary sarcoidosis**

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**Background:** Sarcoidosis is an idiopathic granulomatous disease that can affect any organ. The radiological and clinical expression of sarcoid is markedly varied. The many different radiological guises of this disease can lead to incorrect or delayed diagnoses.

**Purpose:** Sarcoidosis commonly presents as asymptomatic symmetrical bilateral hilar and mediastinal adenopathy with or without perilymphatic pulmonary nodularity. Less common radiological patterns, however, do occur with which the radiologist should be familiar. The different imaging forms of sarcoid are not mutually exclusive and can overlap. Radiologists should be aware of the natural history of the disease from the many different acute presentations to established fibrosis as well as the differential diagnoses including any disease causing a granulomatous reaction or thoracic adenopathy. PET-CT can be used to monitor disease activity.

**Summary:** Examples of the many imaging appearances of sarcoidosis are illustrated and described. Typical parenchymal features are symmetrical adenopathy, nodular opacities, ground glass opacification, linear opacities and fibrosis. Atypical features include the alveolar form, necrotising sarcoid, primary cavitation and mosaic attenuation. Aspergilloma, pleural disease, pulmonary hypertension and direct/indirect airway involvement can occur but are uncommon in clinical practice.

PET-CT is being increasingly used as a second line investigation to target biopsy or establish whether the disease is active or responding to treatment: examples of PET-CT in sarcoidosis and sarcoid reaction are displayed. Sarcoid reaction is an uncommon but important phenomenon that can result in cancer patients being inappropriately staged or labelled as non-responders to therapy.

p119 **A multimodality pictorial review of Hypertrophic Pulmonary Osteoarthropathy (HPOA)**

Leon Sergot<sup>1</sup>; David Shatti<sup>2</sup>; Andy Beale<sup>1</sup>; Martin Williams<sup>2</sup>; Cassandra Speers<sup>2</sup>

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**Background:** Hypertrophic Pulmonary Osteoarthropathy (HPOA) is characterised by diaphyseal and metaphyseal periostitis and new bone formation, most commonly of the distal extremities. The periosteal new bone is laid down in response to pulmonary abnormalities such as bronchogenic carcinoma (typically NSCLC), mesothelioma, bronchiectasis, chest sepsis, and pulmonary lymphoma. A painful condition, it can potentially be the first radiographic presentation of an underlying pulmonary lesion.

**Purpose:** To review the multi-modality appearances of HPOA and differing ways in which patients may present. The modalities include plain film, CT, and Whole Body Bone Scan.

The learning objectives include:

- 1) recognition of HPOA across differing modalities;
- 2) to facilitate early diagnosis of potential underlying pulmonary abnormalities driving the condition.

**Summary:** The poster will display plain radiograph, CT and whole body bone scan images of at least 4 different cases of HPOA. It will also illustrate how the patient presented and pertinent causative diagnoses underlying each case.

1. Renton, P. (1998) *Orthopaedic Radiology. Pattern Recognition and Differential Diagnosis 2nd Ed*, London, UK: Martin Dunitz Ltd, p. 327-8

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p120 **Follow-up of incidentally detected pulmonary nodules - Are we following the BTS guidelines?**

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<sup>1</sup>NHS Greater Glasgow and Clyde; <sup>2</sup>Glasgow Royal Infirmary

**Background:** CT detected pulmonary nodules occur commonly and the number being identified is rising due to increased use of CT. The 2015 British Thoracic Society guidelines have replaced Fleischner guidelines for investigation and management of pulmonary nodules and are significantly different. By routinely dismissing nodules < 5mm without knowing clinical pre-test probability and by generating vital volumetric analysis to guide future follow-up, radiologists now have a key role in implementation of these guidelines.

**Method:** The audit assessed local compliance with BTS guidelines and agreed standard was that 100% of patient should have their nodules followed up in accordance with BTS guidelines. Thoracic CT studies performed over 5 weeks were identified where an indeterminate nodule had been identified for the first time (index scan) or was being followed up (f/u scan). Previous scan findings, physician's request, radiologist's report including, if any, recommended FU, and patient outcomes were assessed for adherence to guidelines.

**Results:** 61 scans were identified (7 index, 54 f/u). Appropriate future FU was recommended in 13 (21%) of reports of scans identified and in the remaining cases, 30 (49%) were recommended appropriate followup by physicians. In almost a quarter of reports, there was no mention of volumetry and this affected the future followup.

**Conclusion:** Overall compliance with BTS guidelines is poor at our centre, with many radiologists quoting Fleischner guidelines in their reports. Volumetric analysis and VDT for subcentimeter nodules is not routinely measured by radiologists and a significant number of nodules weren't discharged from followup due to this

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p121 **Combined Pulmonary Fibrosis and Emphysema (CPFE): Coincidence or combination?**

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<sup>1</sup>Peninsula Radiology Academy; <sup>2</sup>Royal Cornwall Hospitals NHS Trust

**Background** Combined pulmonary fibrosis and emphysema (CPFE) is a clinicroadiological entity first defined by Cottin in 2005, characterised as a combination of upper zone emphysema and lower lobe fibrosis with unexpectedly low lung volumes in patients with a heavy smoking history, exercise hypoxaemia and a severe reduction in carbon monoxide transfer<sup>1</sup>. The coexistence of emphysema and pulmonary fibrosis has been described in multiple series<sup>2,4</sup> despite data suggesting this combination is uncommon and in fact inversely associated<sup>3</sup> and it remains unclear if really is a distinct clinical syndrome or merely a coincidental coexistence of two conditions in the spectrum of smoking-related lung disease. Thus despite its eleven year 'history' CPFE remains a poorly understood and rarely diagnosed condition.

**Purpose** To explore the literature surrounding CPFE and provide the reader with an understanding of the syndrome, its defining characteristics and the implications for prognosis, complications and treatment.

**Content** A description of the syndrome with a guide to its features and impact.

1. Cottin V, Nunes H, Brillet PY, et al. (2005) *Combined pulmonary fibrosis and emphysema: a distinct underrecognised entity. Eur Respir J.* 26:586-93. 2. Hiwatari N, Shimura S, Takishima T. (1993) *Pulmonary emphysema followed by pulmonary fibrosis of undetermined cause. Respiration.* 60:354-8. 3. Washko GR, Hunninghake GM, Fernandez IE, et al. (2011) *Lung volumes and emphysema in smokers with interstitial lung abnormalities. N Engl J Med.* 364:897-906. 4. Wiggins J, Strickland B, Turner-Warwick M. (1990) *Combined cryptogenic fibrosing alveolitis and emphysema: the value of high resolution computed tomography in assessment. Respir Med.* 84:365-9.

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p122 **Thoracic manifestations of vasculitis simplified**

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Queen Alexandra Hospital Portsmouth

**Background;** The vasculitides are non infectious inflammatory conditions of blood vessels walls resulting in reactive damage, haemorrhage and infarction. The most widely used classification of primary vasculitis is according to the vessel size affected. Radiologists must be aware of these multisystem conditions as they often have non-specific presentations which can mimic malignancy. We will highlight new terminology which has replaced the eponymous terms for these conditions

**Purpose:** We will review cardiothoracic manifestations of the primary vasculitides, their classification and nomenclature. The large vessel vasculitides Takayasu's Arteritis (TA), Giant Cell Arteritis (GCA) and Behcet's Disease (BD) will be reviewed. TA and

GCA are pathologically similar, GCA affects older patients. These cause aneurysms and stenoses of the aorta and major branches. They can present occultly as suspected malignancy and radiologists may be the first to suggest their diagnosis. BD is an important cause of PA aneurysms. Our review of small vessel vasculitis will focus on the ANCA- associated diseases Granulomatosis with Polyangiitis (GPA), Eosinophilic GPA (EGPA) and Microscopic Polyangiitis (MPA). These have a range of manifestations including nodules/masses, consolidation, airways disease, and cardiac involvement. We will highlight features on multimodality imaging including CT, MRI and PET scanning, will illustrate the role of biopsy and importance of multidisciplinary working to establish diagnosis.

**Summary** The poster will highlight the classification of vasculitis. Cardiothoracic manifestations of primary vasculitis will be reviewed across multimodality imaging. Our cases will highlight the important role radiology plays in the diagnosis and follow up of patients with

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p123 **Systemic arterial air embolism after percutaneous lung biopsy: A hypothesised mechanism and a life-saving management algorithm**

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*Royal Free NHS Foundation Trust*

**Background:** Systemic arterial air embolism is a rarely encountered major complication in percutaneous lung biopsy, occurring in up to 0.21% of biopsies (2). It can be fatal, or lead to neurological or cardiovascular morbidities (3). Its aetiology is disputed in the literature (4). Management of this potentially fatal condition is often poorly understood, perhaps due to confusion between venous and arterial air embolism (1). Prompt management of systemic arterial air embolism has the potential to improve outcome. This requires the radiologist to have a high degree of suspicion of this condition, knowledge of its clinical manifestations and familiarity with effective early management techniques.

**Purpose:** Present a hypothesis of the mechanism of air embolism  
Educate radiologists of the clinical and imaging manifestations of systemic air embolus  
Provide a management algorithm for this potentially fatal complication.

**Summary:** We present a pictorial review of a case series of two patients who developed systemic arterial air embolism following percutaneous lung biopsy. Using CT images obtained during the procedures we hypothesise that the passage of coaxial needle through bronchovascular bundles causes bronchovenous fistulae, leading to systemic air embolism. We present CT images of coronary and cerebral air embolism in these patients and outline an algorithm for early recognition and initial management of systemic arterial air embolism.

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p124 **A pictorial review of imaging findings in lung diseases associated with recreational drug use**

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<sup>1</sup>Peninsula Radiology Academy; <sup>2</sup>Royal Devon and Exeter Hospital; <sup>3</sup>Plymouth Hospitals NHS Trust

The use of inhaled recreational drugs may result in a spectrum pulmonary disease and these complications are encountered with increasing frequency in day to day practice. Presentation may vary from patient to patient. Appropriate consideration therefore should be given to this group of conditions when formulating a differential diagnosis. We present a series of cases demonstrating the characteristic CT imaging appearances associated with the use of a variety of recreational substances including: tobacco, nicotine vaping, cannabis, crack cocaine and others. This review focuses on CT findings and these are correlated with other imaging, where appropriate.

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p125 **High resolution CT: Typical features of common diagnoses**

[Kelsey Watt](#)<sup>1</sup>; Jack Looker<sup>2</sup>; Sarah Higgins<sup>2</sup>

<sup>1</sup>Plymouth Hospitals NHS Trust; <sup>2</sup>Torbay Hospital

**Background:** High-resolution CT (HRCT) is a powerful tool for the diagnosis of interstitial lung disease, though many radiologists, and registrars in particular, may shy away from reporting them due to unfamiliarity or perceived complexity. Differentiating between usual interstitial pneumonia (UIP) and non-specific interstitial pneumonia (NSIP) has significant prognostic implications for the patient. Sarcoidosis has a broad spectrum of findings, but has typical features depending on the severity of disease. Hypersensitivity pneumonitis (HP) or extrinsic allergic alveolitis (EAA) may not necessarily manifest itself on HRCT in the acute phase, but the tomographic features of the subacute or chronic phases can be important for prognostication.

**Purpose:** 1. Describe the typical findings of UIP on HRCT  
2. Describe the typical findings of NSIP on HRCT and distinguish it from UIP

3. Describe the spectrum of typical findings of sarcoidosis on HRCT
4. Describe the causes and typical features of HP on HRCT

**Summary:** Here we present HRCT cases that clearly demonstrate the features typical of UIP, NSIP, HP (or EAA), and the broad spectrum of findings typical of sarcoidosis at various stages of disease. The cases demonstrate the typical features which differentiate these conditions from one another, and where appropriate, correlation with chest radiographs is also made.

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#### **A comparison of the radiological findings in patients with pneumocystis jiroveci pneumonia in patients with HIV and non- HIV immunocompromised patients**

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<sup>1</sup>Mersey School of Radiology; <sup>2</sup>The Royal Liverpool and Broadgreen University Teaching Hospital

**Background:** Pneumocystis jiroveci (PJ) is an atypical fungus that causes pneumonia in immunocompromised human hosts, particularly those with deficiency in cell-mediated immunity. Some studies have shown clear differences in radiological findings in HIV and non-HIV Pneumocystis Jiroveci Pneumonia (PJP).

**Aims and Objective:** To review radiological differences of PJP in HIV and non HIV immunocompromised patients in our population.

**Method:** A retrospective study of all patients who were admitted to a large University Hospital with confirmed PJP from April 2011 to Feb 2015. A total of 55 patients were reviewed. We defined typical HRCT findings of PJP as ground glass opacification ( GGO).

**Results:** Among the 55 patients, 22 were HIV related PJP and 33 were non-HIV related PJP. HRCT was not available in 1 patient in HIV group and 3 patients in non-HIV group. Among the HIV group with HRCT (21 patients), 14 (66%) showed typical HRCT features, 6 (33%) atypical features and 1 was equivocal. Among the non-HIV group with HRCT (30 patients), 10 (33%) patients showed typical HRCT features, 19 (66%) atypical features and 1 equivocal.

**Conclusion:** Typical changes were noted more commonly in HIV immunocompromised patients compared to non-HIV. Absence of ground glass appearance should not rule out PJP pneumonia and further tests may need to be carried out if there is a high clinical suspicion of PJP.

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#### p127 **Should pelvis be included in CT staging of lung cancer?**

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**Purpose:** The NICE guidelines for staging lung cancer (LC) recommends contrast-enhanced chest CT scans, including the liver and adrenals. In our center, we do not routinely scan the pelvis as part of the staging scan. This may raise a potential pitfall of missing pelvic metastasis. Although the incidence of bone metastasis in Non Small Cell lung Cancer is 20-40%, there is little information on the incidence of pelvic metastasis in isolation. This study examines the incidence of pelvic metastasis in LC patients and whether the pelvis should be included as part of staging CT scan.

**Method:** 489 patients diagnosed with primary LC in 2013 were identified from local LC MDT database. Local RIS were reviewed retrospectively for staging CT and any subsequent PET/CT, MRI or bone scans. 6 patients with clinical and CXR diagnosis of LC, were excluded from the analysis as they too unwell for further investigations.

**Result:** Overall incidence of metastasis to the pelvis was 11%(53/483) and almost all of these were osseous (49/53, 92%). 44/53(83%) patients also had multi-organ metastases. 31/53(58%) patients had CT pelvis included in the initial staging CT which were requested for suspected malignancy work-up. The initial CT identified pelvic metastases in 94%. 9/493(2%) patients had isolated pelvic metastases.

**Conclusion:** Our data suggests incidence of isolated pelvic metastasis is low, predominantly osseous, therefore has little additional benefit in including pelvis as part of the staging CT scan. In cases with curative intent whole body PET/CT is indicated, which is likely to detect pelvic metastasis.