part to play. However, we have noted increasing numbers referred for MRM from the screening programme. This paper is a retrospective evaluation where we sought to determine the reasons for the MRM referral.

Method: A retrospective evaluation of all women referred for MRM from the local breast screening programme.

Results: 26 screening ladies had MRM over a 7 month period. 7 (27%) were for lobular carcinoma, 7 (27%) for disease extent prior to surgery, 6 (23%) where biopsy was not technically possible or where there were non compliance issues and 5 (19%) where additional reassurance was sought by the patient or referring surgeon.

Conclusion: There is demand from the breast screening programme in patients where more accurate evaluation of disease is sought. This is so with lobular neoplasia where multifocal disease may be occult and DCIS where standard imaging may be misleading. In ladies where conventional techniques point very heavily towards a benign diagnosis then MRM may be sufficient to allow a more conservative policy by, for example, follow up only. Finally some cannot tolerate biopsy or where a biopsy is technically demanding and in such instances MRM can be reassuring and allow a conservative approach.

P-047 **Comparative study of prognoses in screening and symptomatic Asian breast cancer patients based on Nottingham prognostic index**

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University Hospital of South Manchester NHS Foundation Trust

Aim: To study prognostic differences in three groups of Asian breast cancer patients depending on age and presentation:
I) Screening >47yr
2) Older symptomatic > 47 yr
3) Younger symptomatic <47 yr

Material and Methods: Our study includes 100 Asian breast cancer patients (81% invasive, 19% DCIS) diagnosed between 2009-2013. These include:
Screening: 21 {13 (62%) invasive, 8 DCIS}
Older symptomatic: 44 {36 (82%) invasive, 8 DCIS}
Younger symptomatic: 35 {32 (91%) invasive, 3 DCIS}

For 81 invasive cancers tumour grade, size, lymph node involvement, ER/PR and Herceptin receptors status and Ki-67 have been recorded and Nottingham Prognostic Index (NPI) calculated. The screening histories of eligible patients have also been obtained.

Results: Asian women with screening detected breast cancer have a better prognosis than both the symptomatic groups with smaller average size, lower grade and less nodal involvement. However, there was poor screening attendance in older symptomatic Group.

The mean NPI (±SD) is 3.81 ± 0.96 for screening detected Group and 4.76 ± 1.18 for older symptomatic Group . This difference is statistically significant (p=0.008).

The mean NPI for younger symptomatic Group is (4.56 ± 1.23) and is not statistically significantly different from older symptomatic (p=0.528). The symptomatic tumour prognostic features are mixed with greater proportion of high grade tumours in younger symptomatic Group and more lymph node involvement in older symptomatic Group.

Conclusions: Asian women with screen detected breast cancer have the best prognoses. Older symptomatic patients however have poorer prognoses similar to younger symptomatic patients, highlighting the need that screening eligible Asian women should not miss their screening appointments.

Clinical: Chest

P-048 **Lung cancer screening at a glance**

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Lung cancer screening with low dose CT is a current hot topic within thoracic radiology. National Lung Screening Trial (NLST) showed promising results of a 20% mortality reduction in the United States. European trials are also under way, which will soon offer more evidence of mortality benefit of lung cancer screening. These include the

Nederlands-Leuvens Longkanker Screenings Onderzoek (NELSON) trial, our own UK Lung Screening trial (UKLS), and several other trials by Italy, France, Denmark, and Germany. We present an up to date summary of the current evidence base.

P-049 **Lesion detection performance: Comparative analysis of low-dose CT on two hybrid imaging systems**

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Purpose: Incidental findings, in low-dose CT images obtained during hybrid imaging, are an increasing phenomenon with advancing CT technology. Understanding procedural limitations, therefore, is important when reporting images and recommending follow-up. This study assesses lesion detection in CT images obtained during attenuation correction acquisitions on two SPECT/CT systems.

Methods: An anthropomorphic chest phantom, containing simulated lesions of varying size and density, was imaged on a GE Infinia Hawkeye4 and a Siemens Symbia T6 with low-dose CT settings used in myocardial perfusion imaging. On the Symbia T6, multiple reconstruction algorithms defined at acquisition enabled use of images from a sharp body kernel. Twenty-two observers completed a lesion detection task, assessing forty-six images (15 normal, 31 abnormal containing 41 lesions) from each SPECT/CT system. Data was analysed using the jackknife alternative free-response receiver operating characteristic (JAFROC) method.

Results: JAFROC analysis showed a significant difference ($p<0.0001$) in lesion detection with figures of merit 0.599 (95% CI 0.568, 0.631) and 0.810 (95% CI 0.781, 0.839) for Infinia Hawkeye4 and Siemens Symbia T6 respectively. Lesion detection on the Infinia Hawkeye4 was generally limited to larger, higher density lesions. The Siemens Symbia T6 images allowed improved detection rates with mid-sized lesions and some lower density lesions, but observers struggled to detect small lesions on both image sets.

Conclusions: Lesion detection is more reliable in low-dose CT images from the Symbia T6 than those from the Infinia Hawkeye4. This phantom based study gives an indication of lesion detection and its reliability in the clinical context, as shown by the systems used in this study.

P-050 **Vanishing lung: Going... going... bong**

Katherine Klimczak; Andy Beale
Great Western Hospitals NHS Foundation Trust

Aims/objectives: To present the radiological findings in Vanishing Lung syndrome; to review the complications of misdiagnosis

Content: This poster will give a brief history of Vanishing lung syndrome, also known as idiopathic giant bullous emphysema. The aetiology and typical presenting features will be discussed. Cases from our institution will then be used in a pictorial review to highlight the radiological findings of the condition on plain film and CT, its complications, and the potential consequences of misdiagnosis.

Relevance/impact/discussion: Vanishing lung syndrome was first diagnosed in 1937. It is an uncommon condition that normally affects young males and has been associated with cannabis smoking. It is characterised by extensive paraseptal emphysema which merges into giant bullae, often in the upper lobes. The findings can be asymmetrical and the bullae often occupy more than one third of the hemithorax. Complications include compression of the remaining normal lung, infection, pneumothorax and increased rate of lung cancer. CXR appearances can be misdiagnosed for a pneumothorax which could lead to unnecessary needle aspiration in an emergency setting.

Although illicit drug use is reported to be on the decline, cannabis remains the most commonly used illicit drug, especially among the adolescent population. At the beginning of 2000, the UK had the highest level of cannabis use in Europe. In light of this, the incidence of vanishing lung syndrome will no doubt be on the increase and we as Radiologists need to appreciate the imaging findings to be able to suggest the diagnosis.

P-051 **Radiographic patterns of lung adenocarcinoma in Malaysia - an update**

Norafida Bahari; Liza Fisal
Universiti Putra Malaysia

Introduction: Lung cancer is the most frequently diagnosed cancer in the world, and the leading cause of death from cancer. The detection and diagnosis of lung cancer usually begins with a chest radiograph, either in a symptomatic patient or in a patient undergoing a chest radiograph for an unrelated reason. The appearance of lung cancer is

variable, and can range from a subtle finding, to the dramatic, depending on location, stage at presentation, and associated findings. Radiologic manifestations of bronchogenic carcinoma include obstructive pneumonitis or atelectasis, lung nodule or mass, apical mass, cavitated mass, or nodule or mass associated with lymphadenopathy. Chest radiography is a readily available, inexpensive, and useful imaging modality in the workup of patients with non-small cell carcinoma. Therefore, chest radiography is used most often as an initial investigation. Traditionally lung adenocarcinoma recognized as peripheral mass.

Methodology: Over 5 years' period, all cases of biopsy proven lung adenocarcinoma were included in the study. The chest radiograph/s at presentation was reviewed. Total numbers of 50 cases were collected.

Results: Age distribution is as seen in other malignancies generally; more in age group more than 50y.o with median age of 56y.o + 12 SD. Unilateral distribution is more common accounted for 86% of cases with no significant predominant side or zones. Solitary pulmonary mass is still the most common radiographic presentation (58% of cases) followed by consolidation (20%). 24 out of 29 masses located centrally, either at hilar/perihilar region or centrally located in the lung lobe, only 1 mass occupying the entire lobe and 4 masses are located peripherally. About only 10% of the masses forms cavity. Patients who presented with nodules are mainly small nodules which scattered in the entire lung field with area of confluent of nodules seen faintly on radiographs. This confluent area proved to a small mass-lesion on CT scan with positive tissue diagnosis histopathologically.

Conclusion: Chest radiography remains the primary means of radiographic assessment of lung carcinoma. The lung adenocarcinoma is no longer predominantly peripherally located. Patient with any suspicious radiographic presentations which is persistent or worsening are require CT scan of thorax and tissue diagnosis for further evaluation.

P-052 **Multi-centre analysis of incidental findings on low resolution CT attenuation correction (CTAC) images**

Joanne Sil; Richard Lawson; Tom Kane; Mark Elias; Andrea Howes; James Birchall; Peter Hogg

School of Health Sciences, University of Salford; Nuclear Medicine Centre, Central Manchester University Hospitals NHS Trust; Nuclear Medicine Department, Blackpool Teaching Hospitals NHS Foundation Trust; Nuclear Medicine Department, Wrexham Maelor Hospital; Nuclear Medicine Department, Derby Hospitals NHS Foundation Trust; School of Health Sciences, University of Salford

Objectives: To review new incidental findings detected on low resolution CT attenuation correction (CTAC) images acquired during SPECT-CT myocardial perfusion imaging (MPI). To determine whether the CTAC images had diagnostic value and warrant reporting.

Methods: A multi-centre study was performed in four UK Nuclear Medicine departments. CTAC images acquired as part of MPI performed using SPECT were evaluated to identify incidental findings. New findings considered to be clinically significant at the time of the radiologist written report were evaluated further. Positive predictive value (PPV) was determined at the time of definitive diagnosis.

Results: Of 1819 patients studied, 497 (27%) had a positive CTAC finding. 51 (2.8%) patients had findings that were clinically significant at the time of report and had not been previously diagnosed. Only 4 (0.2%) of these were potentially detrimental to patient outcome.

Conclusion: One centre using older equipment had a PPV of 0% and the study suggests that these CTAC images should not be reported. Two centres with more modern equipment had low PPVs of 0% and 6% respectively and further research is suggested prior to drawing a conclusion. The centre with best quality CT had a PPV of 67% and the study suggests that CTAC images from this equipment should be reported.

Advances in knowledge: Current literature relating to the prevalence and significance of incidental findings on CTAC images is limited. This study demonstrates that the benefit of reporting these images depends on the type of equipment used.

P-053 **An audit of use of Computed Tomography Pulmonary Angiography (CTPA) in the diagnosis of suspected pulmonary embolism**

Safia Rehman; Stewart Mercer; Enas Elamin; Kunal Gupta

George Eliot Hospital NHS Trust

CTPA is imaging modality of choice for PE diagnosis. This audit aims to check that clinical probability is assessed and documented for all suspected cases, D-dimer is used appropriately, clinical probability and D-dimer are stated on all requests and diagnostic yield of CTPA for PE is comparable to that expected (25%) as per BTS and NICE guidelines. A

retrospective study of 25 patients over one month is done. Our findings are that clinical probability is fully assessed and documented in only 3 cases, D-dimer is done in 15 including 2 high-risk, D-dimer result is stated on only 10. Clinical probability is clearly stated on only one request. CTPA results are positive for PE in 2 cases, both high risk. D-dimer is done in both cases. We recommend that clinical probability should be assessed, documented and stated on all requests. D-dimer should not be done in high risk cases. Clinical proformas should be introduced and used to make sure that there is complaince. Re-audit every year

P-054 **Computed Tomography (CT) attenuation values of pleural fluid: Can it be used to differentiate between exudate and transudate?**

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The James Cook University Hospital, South Tees Hospitals NHS Foundation Trust; Chelsea and Westminster Hospital NHS Foundation Trust

Objectives: To assess the utility of computed tomography (CT) in characterization of pleural effusion based on attenuation values.

Methods: We retrospectively analysed 107 pleural effusions of 107 patients. Mean age 69.9 years (range 4-93). 70 male and 37 female. All patients had diagnostic pleural tap and CT scan within 1 week of each other. Pleural fluid biochemistry results were analysed to classify effusion as transudate or exudate by using light's criteria. The mean Hounsfield unit (HU) of effusion was determined by a region of interest on the three slices with the greatest antero posterior diameter. Freeform cursor was used to determine the mean value. The association between mean Hounsfield unit and pleural proteins level was analysed by using Pearson's correlation test.

Results: 81 of the 105 effusions were exudate and 26 were transudate. The mean attenuation of exudate was 13.01 HU and standard deviation 3.9 HU. It was higher than transudate (9 HU/ SD 3.4). There was no positive relationship between pleural protein and mean Hounsfield units (r = 0.17). There was overlap between exudate and transudate effusion in 10 – 15 HU range (57/107 – 53%), limiting the accuracy of attenuation values in differentiation between two.

Conclusion: Recently published study has shown lower attenuation values for exudates. Our study has demonstrated that attenuation value of exudate is higher than transudate and there is no co- relation between pleural protein levels and Hounsfield units.

P-055 **Incidental cardiac findings on CT thorax**

Madhusudan Paravasthu; Dhivya Murthy Paravasthu; John Curtis; Erica Thwaite

Aintree University Hospital NHS Foundation Trust

Aim: To present a series of incidental significant cardiac findings on CT of the thorax.

Content: A pictorial review of incidental significant cardiac findings identified on CT of thorax including atrial myxoma, myocardial infarction, pericardial disease, left atrial and LV thrombi, Septal defects, valve vegetation, anomalous origins of coronary artery etc with their respective multimodality imaging features.

Relevance: Cardiac abnormalities can be potentially missed on routine CT thorax as the examination is not routinely geared for the assessment of heart. Nevertheless it is imperative to be aware of these abnormalities which can be present incidentally and provide significant information towards clinical management of the patient. We present a review of such significant "incidental" findings identified on routine CT of the thorax. This is to emphasize the importance of assessing the heart and the pericardium and the coronary origins on routine CT of the chest. This review is intended to serve as an educational tool for the trainees and junior radiologists as well.

P-056 **The influence of observer training for the detection of simulated pulmonary lesions on single computed tomography images of an anthropomorphic chest phantom: A jackknife alternative free-response receiver operating characteristic analysis**

Carst Buissink; John Thompson; Marcel Voeta; Audun Sanderund; Larissa V. Kamping; Laura Savary; Misbha Mughal; Cátia S. Rocha; Gabrielle E. Hart; Rute Parreiral; Greg Martin; Peter Hogg

Hanze University of Applied Sciences, The Netherlands; University of Salford; Hanze University of Applied Sciences, The Netherlands; Oslo and Akershus University College of Applied Sciences; Hanze University of Applied Sciences, The Netherlands; Haute Ecole de Sante Vaud-Lausanne, Switzerland; Oslo and Akershus University College of Applied Sciences; Lisbon School of Health Technology, Portugal; University of Salford; Lisbon School of Health Technology, Portugal; University of Salford

Purpose: To determine the influence of both observer training in free-response methodology and simulated lesion appearances on an observer's ability to successfully localise simulated lesions within an anthropomorphic chest phantom on single computed tomography (CT) images.

Materials and methods: 34 undergraduate radiography students, attending an ERASMUS intensive programme, analysed 46 (31 abnormal containing 1-3 lesions, 15 normal) low-resolution CT images produced primarily for attenuation correction (AC) by two single photon emission computed tomography/computed tomography (SPECT/CT) systems. The evaluation was completed under two conditions, pre- and post-training, with a six-week wash out period between evaluations. Lesions were localised under the free-response receiver operating characteristic (FROC) paradigm and each evaluation was analysed separately using jackknife alternative FROC (JAFROC) analysis.

Results: JAFROC analysis revealed a statistically significant difference in lesion detection performance between the two sets of low-resolution CT images in both evaluations (pre-training, $F(1,506) = 25.2$, $p<0.001$; post-training, $F(1,1435) = 32.6$, $p<0.001$). In addition to offering a slight increase in statistical power, the figure-of-merit (q) for all treatments was increased from the pre-training evaluation (0.684 (0.573,0.796) and 0.437 (0.334,0.540)) to the post training evaluation (0.784 (0.694,0.875) and 0.560 (0.464,0.655)). The incorrect localisation fraction was also reduced post-training (0.128) compared to pre-training (0.282).

Conclusions: Focussed training of lesion appearances and FROC methodology has a significant impact on a naïve observer's ability to localise simulated lesions on CT images produced with an anthropomorphic chest phantom.

P-057 **Development and validation of a psychometric scale for assessing PA chest image quality: A pilot study**

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Purpose: To develop and validate a psychometric scale for assessing image quality for chest radiographs.

Methods: A review of the literature was undertaken to identify items which could be used to evaluate image quality perception. A draft scale was then created and presented to a focus group (student and qualified radiographers). Within the focus group the draft scale was discussed and modified accordingly. Next, a series of seven postero-anterior chest images were generated using a phantom across a range of image qualities. Image quality was initially confirmed using signal-to-noise ratio (SNR) and group consensus. Participants were invited to independently score each of the images using the modified image quality scale. Bandura's theory was used to guide scale development. Cronbach alpha was used to test interval reliability.

Results: An image quality scale of 22-items was created. Forty participants used the scale to grade image quality on each of the seven images (SNR 17.2 to 36.5). Aggregated mean image score increased with increasing SNR from 42.1 to 87.7 ($r=0.98$, $P<0.001$). For each of the 22 individual scale items there was clear differentiation of low, mid and high-quality images. Cronbach alpha coefficient of >0.7 was obtained across each of the seven images.

Conclusion: This study represents the first development of a chest image quality scale based on Bandura's theory. There was excellent correlation between the image quality scores derived using the scale and the SNR and group consensus. This pilot study will be followed by more detailed scale item and factor analysis.

P-058 **We refer: An audit of in-house radiology referral to ensure patients receive CT imaging for suspected bronchial neoplasm in a timely fashion**

James Chambers; Jonathan Wide

St Helens and Knowsley Teaching Hospitals NHS Trust

Aims: 1) To ensure patients with radiological signs of bronchial neoplasm receive CT imaging of the thorax within two weeks.
2) to assess the positive-predictive value of our departments coding for suspected bronchial neoplasm.

Relevance: Lung malignancy is the leading cause of cancer death in the UK. Government standards have been set to ensure that patients with diagnosed cancer receive treatment within 31 days from decision to treat or the earliest clinically appropriate date. CT imaging provides vital information used to determine definitive treatment of lung cancer and thus early imaging can reduce delays in patient care.

Content: We describe the role of in-house referral for CT imaging in suspected bronchial neoplasm, the processes involved in this and the associated patient benefits. We use our audit findings to discuss waiting times for such imaging and the ideal positive-predictive value for detecting bronchial neoplasm on plain film, providing both positive and negative examples.

Outcomes: 141 patients were identified retrospectively over a nine-month period. 1) 75% of all patients referred for CT imaging were scanned within two weeks, 22% were scanned within 3 weeks and 3% took over 3 weeks to scan. 2) 53% of chest radiographs coded as suspected bronchial neoplasm were positive for lung malignancy.

Conclusion: The vast majority of patients with suspected bronchial neoplasm on plain film received CT imaging within two weeks. However, our audit indicates there is still room for improvement. Further research is needed to determine the ideal positive-predictive value in this scenario.

P-059 **Pneumothorax... is the expiratory CXR needed?**

Adil Mahmoud; Colin Noble
Glasgow Royal Infirmary, NHS Greater Glasgow and Clyde

Aim: The aim was to assess the adequacy of the inspiratory chest radiograph (CXR) to exclude pneumothorax.

Method: Retrospective data collection was performed. The data sources were Clinical Portal and PACS. Patient included were those who referred for CXR to exclude pneumothorax (inspiratory and expiratory CXR) in Glasgow Royal Infirmary (GRI) for the period June - July 2013. Then all the included data were analysed and put in tables and graphics.

Results: Total number of included cases was 157 with age distribution was 14 to 92 year. As expected, the age distribution was skewed to the younger age groups (41 patients were in their twenties). Majority of the cases were male (63 out of 157). 88.5% of the patients were referred from Accident and Emergency department of GRI, while the others were from Acute Assessment Unit. Only 9 cases of pneumothoraces were diagnosed on radiographs. This equates to an incidence of 6%. 8 out of 9 were easily detected solely on the inspiratory CXR. The inspiratory CXR of the last case was independently reviewed by 2 Consultant Respiratory Radiologists in our department. The apical pneumothorax was not detected on the inspiratory film but was subsequently identified by both on the expiratory film.

Conclusion: 1 out of 9 pneumothoraces was not detected on inspiratory CXR alone, which equates 11%. This means we perform (157 X 2) CXR to confirm 1 pneumothorax.

P-060 **Pictorial review of pleural "masses"**

Madhusudan Paravasthu; Dhivya Murthy Paravasthu; Erica Thwaite; John Curtis
Aintree University Hospital NHS Foundation Trust

Aim: We aim to present a pictorial review of pleural mass lesions both benign and malignant, with conditions that mimic pleural masses.

Content: A pictorial review of a variety of cases of pleural masses is presented. Imaging appearances on different modalities is discussed for both benign and malignant pleural masses such as pleural fibroma, pleural plaques, mesothelioma, lipoma, pleural metastasis. We also discuss entities which mimic pleural masses such as neurofibromas, vascular anomaly, rib fracture etc.

Impact/relevance: Pleural masses are not uncommon and their imaging findings can be subtle on plain radiography and can often be missed or misinterpreted. A review of all pleural masses and their imaging appearances on plain radiography, CT, MRI is presented to provide a summary of these entities. Certain imaging features can confidently differentiate benign from malignant entities and awareness of these cannot be overemphasized. This review hopefully would serve as an educational tool and a quick revision of pleural based mass lesions for the trainees.

P-061 **Introducing radiographer chest x-ray reporting at a cancer hospital**

Claire Barker; Susan Todd; Susan Bird; Fenella Wong
The Christie NHS Foundation Trust

The majority of radiographs performed at our cancer hospital are adult chest x-rays. In line with best practice to formally report radiographs in a timely manner, we began training two radiographers to report chest radiographs in 2010. At that time, no other cancer hospital had radiographers reporting chest x-rays.

We present our experiences of formal training of reporting radiographers at a specialist cancer centre. Following completion of the Postgraduate Certificate in Clinical Reporting (Adult Chest), we implemented a further period of dedicated oncological training to ensure our training was specific to our patient group and to meet local clinical governance requirements.

We discuss the impact of chest x-ray reporting radiographers on the radiology department as a whole and as part of the reporting team, including a review of discrepancy audit findings.

P-062 **Radiologically guided percutaneous lung biopsies: Retrospective evaluation of diagnostic yield and complication rate**

Mohamed Elshafi; Mohamed Ahmed
Galway University Hospital, Ireland

Introduction: Radiologically guided lung biopsy is a relatively safe procedure to obtain tissue samples to aid the histological diagnosis of suspicious lung lesions.

Objectives: To determine the sensitivity and complication rate of radiologically guided percutaneous lung biopsies in our institution and compare those with standards set by the British Thoracic Society (BTS).

Methods: This is a cross-sectional study. All patients who had radiologically guided lung biopsy in a period of 10 months were included. Primary outcome was the ability to reach a histological diagnosis. secondary outcome was the complication rate.

Results: 94 radiologically guided lung biopsies were performed. the procedure was done under CT guideance in 84 patients (89.4%), Fluoroscopy in 7 patients (7.4%) and ultrasound in 3 patients (3.2%). Core biopsies were taken in 90 (95.7%) procedures using co-axial needles while 4 patients had fine needle aspirations. The overall diagnostic rate for benign and malignant causes was 88.3%. Malignancy was diagnosed on 78 biopsies (83%). Sensitivity for detection of malignancy for lesions >2 cm. in size was (94.3%). False negative rate was 2.1%. The procedure was complicated by pneumothorax in 26 patients (27.7%). Only 5 (5.3%) patients required chest tube insertion. Other encountered complications were haemoptysis and parenchymal hemorrhage which occured in 13 patients (13.8%). There was no procedure-related mortality in this group.

Discussion: We achieved higher diagnostic rate than the level set by the BTS but pneumothorax rate is slightly higher. This could be because the majority of our samples were taken using large bore cutting needles.

P-063 **Effects of tube potential and scatter rejection on image quality and effective dose in digital chest X-ray examination: An anthropomorphic phantom study**

Daniel Shaw; Stephen Rimmer; Ian Crawshaw

The Christie NHS Foundation Trust; Leeds Teaching Hospitals NHS Trust; York Teaching Hospitals NHS Foundation Trust

Objectives: The purpose of this study was to investigate the effects of tube potential and scatter rejection techniques on image quality of digital posteroanterior (PA) chest radiographs.

Methods: An anthropomorphic phantom was imaged using a range of tube potentials (81 to 125 kVp) without scatter rejection, with an anti-scatter grid, and using a 10cm air gap. Images were anonymised and randomised before being evaluated using a visual graded analysis (VGA) method.

Results: The effects of tube potential on image quality were found to be negligible ($p>0.63$) for the flat panel detector (FPD). Decreased image quality ($p=0.031$) was noted for 125 kVp relative to 109 kVp, though no difference was noted for any of the other potentials ($p>0.398$) for computed radiography (CR). Both scatter rejection techniques improved image quality ($p<0.01$). For FPD imaging the anti-scatter grid offered slightly improved image quality relative to the air gap ($p=0.038$) but this was not seen for CR ($p= 0.404$).

Conclusions: For FPD chest imaging of the anthropomorphic phantom there was no dependence of image quality on tube potential. Scatter rejection improved image quality, with the anti-scatter grid giving greater improvements than an air-gap, but at the expense of increased effective dose.

CR imaging of the chest phantom demonstrated negligible dependence on tube potential except at 125 kVp. Scatter rejection improved image quality, but with no difference found between techniques. The air-gap resulted in a smaller increase in effective dose than the anti-scatter grid and would be the preferred scatter rejection technique.