

- The clinical application of FDG and amyloid-PET, with regards to safety, radiological reporting and economics

Conclusion: FDG and amyloid PET both identify AD with high specificity and sensitivity. To date their use has been mainly restricted to research and AD drug trials. They are of definite benefit in the hands of a specialist dementia expert who wishes to confirm/outrule AD in a case of diagnostic uncertainty, however our limited knowledge and therapeutic options to treat AD restricts their use in everyday clinical settings.

BREAST

p102 **UK National Breast Screening Programme: Is there a demand for out of hours appointments?**

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The UK National Breast Screening Programme has attempted to attract as many women as possible since its inception in the late 1980s in the UK following the Forrest report. Age extension was brought in nationwide during the past few years. However in recent times, the uptake has been generally lower, particularly in the initial round of screening. In addition, there has been a strong government drive to offering services 24 hours a day 7 days a week where possible. Traditionally breast screening was offered during office hours only, Monday to Friday. An audit was originally carried out in 2009 to determine whether out of hours appointments would attract women, and how this varied across age demographics. This audit was extended and updated earlier this year. This poster will demonstrate whether there is indeed a demand for out of hours appointments, how this varies across age and location demographics, and how this could work in reality.

p103 **The outcome of a departmental audit into digital mammography blurring.**

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Background The screening service noted an increase in the number of technical issues associated with blurring. A review of related articles discussed the effects of compression paddle movement as a cause(1 and 2). With limited resources and academic support, the department attempted a more basic practical attempt to address the issue of blurring in our mammographic images.

Method An audit was undertaken where all patients were asked to hold their breath during their mammographic examination over a period of 6 months. Any exceptions were documented with a given reason. During film reporting, all images with blurring were documented.

Results 192 examinations contained a significant amount of blurring for audit purposes. 25% of these were recalled for Technical Recall examinations. A comparative analysis of the compression factors was undertaken for blurred images versus non blurred images per patient. The results demonstrated a 57% drop in compression factors for the blurred images compared to the non blurred side. In over 47% of the images, this was a difference of over 10 Newtons.

Conclusion The results demonstrated that this was significant in 3 members of Mammography staff. The audit was discussed at Team meetings and discussed as a learning exercise with the 3 individual staff to improve overall image quality, standardise compression factors, reduce Technical Recalls and improve the service user experience.

1.Hogg, P Kei Ma, W Kelly, J Millington, S (2015) A method to investigate image blurring due to mammography machine compression paddle movement *Radiography* 21 36-41. 2. Brittle, D Howard,D Kelly, J Kei Ma, P (2014) Extra patient movement during mammographic imaging: an experimental study. *British Journal of Radiology*

p104 **What is the impact of delayed double reading of symptomatic mammograms?**

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Aim To examine the consequences of double reporting symptomatic mammograms at one large District General Hospital in the North of England.

Method In a retrospective observational study, data from patients attending the one-stop diagnostic breast clinic from January - December 2012 were reviewed. The number of discrepant reads, number of additional cancers detected and volume of work generated by double reading were determined and an estimate of the economic cost of second reading made. The number of cancers not detected at initial presentation was determined during a 3 year follow-up period (December 2012 -- 2015). Results 1790 patient cases were reviewed. 231 malignancies (prevalence 1.3%) were reported by the first reading radiologist. Out of

1761 (98.4%) cases which were second read, 4 (0.2%) were discrepant. After consensus discussion three cases were recalled for additional mammography (n=2), ultrasound (n=2) and tissue sampling (n=1); no additional malignancies were detected. The economic cost of delayed second reading was estimated at over £6500 and the additional time requirement estimated at approximately 300 hours. Delayed second reading failed to identify 8 cancers that presented during three year follow-up.

Conclusion Despite the perception that the rapid access breast clinic is a 'uniquely chaotic environment' which might make it 'difficult for single reading radiologists to detect every small, subtle, unexpected and incidental cancer', at this site, cold second reading of symptomatic mammograms did not increase cancer detection and required additional human, time & financial resource which might be better spent reading asymptomatic (family history / annual surveillance)

p105 **The impact of image blurring on lesion detection performance in full field digital mammography (FFDM)**

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Purpose: Image blurring is a known phenomenon in FFDM, but no research has quantified its impact on lesion detection performance. This study investigates the detection of malignant masses and microcalcifications using FFDM with varying magnitudes of simulated blurring.

Method: Seven observers (15±5 years' reporting experience) evaluated two image sets for three conditions; each set consisted of 124 cases (62 normal; 62 abnormal). Abnormal cases contained malignant masses and microcalcifications; these were confirmed as malignant by biopsy. Images were evaluated for 3 conditions - without blurring (0mm), and two magnitudes of simulated blurring (0.7mm & 1.5mm), introduced by mathematical simulation. A free-response observer study was conducted to compare lesion detection performance in blurred and non-blurred images. Equally weighted jackknife alternative free-response receiver operating characteristic (wJAFROC) analysis was used for statistical analysis. Test alpha was set at 0.05 to control probability of Type I error.

Results: A statistically significant difference was evident for the detection of masses ($F(2,22) = 6.01, P=0.0084$) and microcalcifications ($F(2,49) = 23.14, P<0.0001$). Statistical differences were found between multiple pairs for masses (0.0mm v 0.7mm, and 0.0mm v 1.5mm) and microcalcifications. No difference was detected between 0.7 mm and 1.5 mm for masses. The observer averaged wJAFROC figures of merit are 0.905(0.859, 0.952) [0 mm], 0.869(0.814,0.924) [0.7 mm] and 0.862(0.810,0.915) [1.5 mm] for masses, and, 0.899(0.859,0.939) [0 mm], 0.813 (0.757,0.870) [0.7 mm] and 0.745(0.679,0.812) [1.5 mm] for microcalcifications.

Conclusion: A mathematical simulation of image blurring caused a statistically significant reduction in lesion detection performance; this could have implications

p106 **Hot legs: Bone scan lower limb metastases in breast cancer**

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Background Our staging for breast cancer currently includes CT Chest/Abdomen/Pelvis and a whole body bone scan. Some centres only use CT. We were interested to review bone scan abnormalities in the femora and below as these sites are not normally covered on a standard staging CT scan. Lesions in the femur can be at risk of pathological fracture.

Method 188 consecutive whole body bone scans were reviewed retrospectively from November 2015 -- November 2016.

Results 188 patients.

133 were normal (no metastases).

30 had skeletal metastases but no lower limb metastases.

25 had lower limb metastases, 14 of which were seen on standard staging CT. 11 were not seen on staging CT as it only extends as far as the proximal femur.

Of the lower limb metastases: 22 were Femoral, 1 Knee, 1 Tibial, and 1 in the soft tissues of the thighs.

1 had a distal femoral metastasis (not seen on standard staging CT) but none elsewhere.

Excluding osteoarthritis there were 7 incidental abnormalities seen. These included 5 hot spots associated with knee and hip replacements, 1 case of shin splints, and 1 case of bilateral femoral head osteonecrosis.

Conclusion A significant number of breast cancer patients have lower limb metastases (13.3% in this study). These are not always covered on a standard staging CT alone. In this study, 11/25 (44%) of lower limb metastases were not covered, one of whom did not have any other skeletal metastases. For complete staging, a bone scan or extended CT is required.

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 ¹ It allows clear visualization of the mediastinal compartments and spaces². 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.