

used in the evaluation of patients with malignancy. Melanoma has the potential to metastasize to a wider range of anatomical sites than most neoplasms. As melanoma is usually FDG avid, FDG PET/CT can be utilised in a number of clinical scenarios in which melanoma metastases are suspected. These include initial staging of high risk patients being considered for surgery, restaging patients with potentially surgical resectable lesions and equivocal lesions on other imaging modalities. From our database of > 5000 PET/CT scans carried out for oncological indications we present a range of cases illustrating these points. KEY LEARNING POINTS: 1. FDG PET/CT is vital for staging melanoma accurately.

2. Melanoma may metastasise to surprising locations and FDG PET/CT can sensitively detect these unsuspected lesions.

P114

A quality comparison study between 2 post processing algorithms for bone SPECT images

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AIM: To compare SPECT bone scintigraphic image quality generated after applying ASTONISH (Philips proprietary iterative reconstruction resolution recovery software) and Filtered Back Projection (FBP) reconstruction algorithms.

METHOD: 115 consecutive patients were scanned using Philips Brightview dual-headed gamma camera. Both ASTONISH and FBP images were produced for each patient generating two image datasets. Two assessors independently scored the quality of images: 1 as poor, 5 as excellent scored for image quality in four anatomical regions; a system piloted by the two assessors for consistency. Each SPECT bone scan was compared, with the third researcher subsequently scoring then reviewing the quality assessment and matching it to the appropriate algorithm. The quality data comparison of the two independent assessors was then analysed.

RESULTS: Review of images was concordant between all 3 observers in 97% cases: 104 cases (90%) ASTONISH generated better images; in 4 cases (3.5%) FBP was better; and in 4 cases (3.5%) both images were scored equally. For 3 cases (2.5%) the assessors were discordant but 2 scored the ASTONISH images as superior.

CONCLUSION: The ASTONISH reconstruction algorithm produces a far superior quality image when compared to FBP in SPECT Bone Scintigraphy with excellent interobserver agreement.

P115

MRI Visible FePt - nanoparticles for catheter localization in 1.5T

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PURPOSE: MRI provides valuable capabilities as superb soft tissue contrast, multiple contrast mechanisms, arbitrary

plane orientation and no exposure of any radiation. However the need of compatible instruments and devices localization is a fundamental problem during interventions. Therefore a robust, save and efficient method based on FePt nanoparticles is proposed for catheter localization. During MRI acquisition these markers appear as signal void due to their susceptibility artefact.

MATERIALS/METHODS: Six markers of a solvent with 5% FePt nanoparticles and nail polish was directly applied to a catheter using a micropipette and a scalpel for shaping. The overall performance has been tested using 0.9% NaCl solution phantoms in a clinical 1.5T MRI system (Signa, GE Medical Systems, Milwaukee, WI, USA) with a standard headcoil.

RESULTS: Different sequences, parameters and catheter orientations in respect to the main magnetic field showed proper visualization results. Overall the markers showed good device to background contrast in all phantom experiments. Handling tests showed that the increased diameter of the catheter by the markers is negligible for handling and mechanical performance. CONCLUSION: The catheter is a key device for cardiovascular interventions and visualization during imaging is required. We have demonstrated that FePt Nanoparticles are suitable for MR guidance, due to their good visibility, minimal size, absence of RF heating and no need for major adjustments to use the markers in different field strengths. However the susceptibility artefact dependency has to be taken into account. Further reliability qualification is required before any clinical evaluation. This work is in progress.

P116

Alternating reconstruction and registration for digital breast tomosynthesis

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PURPOSE: The demand for detecting changes associated with malignancy has become a necessary for mammography, and digital breast tomosynthesis (DBT) plays an auxiliary role to produce a more accurate comparison for temporal datasets using the added depth information. The aim of this project is to obtain an enhanced reconstructed volume, which advantages the registration accuracy concurrently by alternating the reconstruction of a pair of DBT acquisitions with their temporal registration.

MATERIALS/METHODS: Three experiments were performed. Firstly, a 3D toroid phantom was created, and then affine transformed, to simulate a pair of DBT data. Secondly, the same transformation was applied to an uncompressed 3D breast MRI. Lastly, we applied our method on a pair of DBT simulations with real in-vivo breast compressions. Two sets of limited angle X-ray acquisitions were created at different times using typical DBT geometry. We solved this combining problem by alternating an incomplete reconstruction optimisation for each

acquisition at each time point with the affine registration of the two current estimates. After each registration, and before next reconstruction iteration, we updated the first reconstruction using the affine transformation of the second. This outer-loop of reconstruction followed by a registration was repeated. The reconstruction and registration were solved by nonlinear-conjugate-gradient and hill-climbing optimisation respectively.

RESULTS: Compare to traditional method of registering two reconstructed volumes sequentially, we obtained better reconstructions and smaller mis-registration error (8.6mm vs 4.6mm).

CONCLUSION: The results show that our alternating method improves both registration accuracy and reconstruction quality compare to perform the two tasks sequentially.

P117

The effect of automatic exposure compensation algorithms in the technical evaluation of full field digital mammography X-ray units - work in progress

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PURPOSE: For clinical breast imaging, automatic exposure compensation (AEC) algorithms are used to optimise the exposure. Technical evaluations of the units are undertaken by Physics using a breast phantom. The breast phantom can confuse the AEC algorithm creating non-clinical exposure factors.

MATERIALS/METHODS: Technical evaluation tests, according to NHSBSP 0604, were undertaken on four Siemens and two Hologic digital mammography X-ray units. Tests were then repeated using different AEC options to determine the effect on the reported results.

In addition tests were also undertaken using differently shaped breast phantoms

RESULTS: When using the recommended breast phantom, the effect of AEC algorithm is to increase post mAs by between 15% to 85% depending upon field size selected. Effect of phantom shape is still being explored, but initial results indicate that this is significant.

CONCLUSION: Full field digital mammography X-ray units in the UK breast screening program undergo a technical evaluation to determine if they meet the relevant European standard. The AEC option used can greatly influence the exposure factors chosen that impacts on the dose and image quality results obtained by the technical evaluation. This can influence whether of not the unit meets the required standards.

P118

Introduction of volume ultrasound for the assessment of gallbladder function. Our early experience

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PURPOSE: Volume ultrasound (VU) is a new technique in diagnostic imaging offering exciting clinical applications such

as multiplanar reconstruction and volumetric analysis. VU has been utilised in our institution to assess gallbladder function (GF) and diagnose gallbladder dysmotility. This poster aims to describe the technique and demonstrate how patient management is influenced by VU-assessed GF.

MATERIALS/METHODS: Case records of all VU GF assessments performed at Freeman Hospital (April 2006 - June 2010) were reviewed and correlated with test findings and subsequent clinical management. Ejection fraction of <35% was regarded as abnormal GF. Fisher's exact test was used to test significance.

RESULTS: 17/51 (33%) patients had abnormal GF. There was no significant difference in the proportion experiencing abdominal symptoms during the test between normal and abnormal GF groups. 13/17 (76%) patients with abnormal GF vs. 8/34 (24%) with normal GF underwent cholecystectomy (p=0.001). In the abnormal GF group 5/13 (39%) who underwent surgery reported symptom improvement. This proportion was similar in the normal GF post-cholecystectomy group. 1/17 (6%) patients with abnormal GF underwent further investigations vs 10/34 (29%) with normal GF (p=0.075). 1/17 (6%) with abnormal GF vs. 18/34 (53%) with normal GF were discharged without surgery (p=0.002).

CONCLUSION: VU is routinely utilised in the assessment of GF in our institution. Clinicians appear to act on the results of the test, with those found to have abnormal function more likely to proceed to surgery. Those with abnormal GF underwent fewer subsequent additional investigations. Symptom improvement rate was similar in both groups.

P119

Does radiology department contribute in nosocomial and cross infection incidents within a hospital?

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PURPOSE: The purpose of this study was to investigate if X-ray cassettes used during portable radiography could be a potential source of causing nosocomial and cross infection within the hospital environment.

MATERIALS AND METHODS: The study involved the swabbing of X-ray cassettes in a Radiology Department of a local hospital in Pakistan. The X-ray cassettes used during mobile radiography in Intensive Care unit (ICU), emergency and inpatient were considered for this research. Fifty cassettes were swabbed to look for any bacterial contamination, also for the presence or absence of methicillin-resistant *Staphylococcus aureus* (MRSA). A mapping exercise was completed following the location of an X-ray cassette typically used in mobile radiography. The exercise noted the level of direct contact with patient's skin and other possible routes of infection.

RESULTS: Results revealed that there were large levels of growth of samples taken from cassettes and developed in the Microbiology Department of the hospital. The mapping