

CT features of a lone peritoneal lesion are inaccurate on their own to rule out diagnosis of a new malignancy in those patients with a known cancer. Tissue diagnosis is vital to differentiate benign pathology, recurrence or a new malignancy.

**Conclusion:** US guided biopsy of peritoneal lesion is accurate and safe (1 minor complication).

Uroradiology, gynaecology and obstetrics

#### P-144 Influencing factors for false negative rate of renal calculi detection on US vs CTKUB

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**Objectives:** Evaluate factors associated with false negatives (FNs) in detecting renal calculi on ultrasound (US) compared with non-enhanced CT KUB to suggest possible ways of technique optimisation.

**Content:** Retrospective study of all US studies conducted between 01/01/2014 and 31/03/2015 with subsequent non-enhanced CTKUB (reference standard) within a year at our institution.

**Outcomes:** 220 patients were identified in total, 126 of which had calculi reported on CTKUB. Of these 126, renal calculi were missed on US in 32 patients (25%, False Negative Rate). The majority (75%) of calculi missed on US had a reported size of less than 10 mm (p-value = 0.0047). Operator (Sonographers vs Radiology Consultants vs Radiology Registrars), patient's age, patient's gender, and time between US and CTKUB were not statistically significant contributors to FNs.

**Discussion:** Our results show that US is suboptimal for identifying renal calculi, particularly those below 10mm in size. However, this should be weighed up against the radiation burden from CTKUB, especially when investigating young patients. Our data demonstrates that all operators may benefit in being made aware of potential limitations of US and potential pitfalls such as high echogenicity of renal sinus fat masking renal calculi.

Careful and thorough ultrasound imaging looking for features such as posterior acoustic shadowing and 'twinkling' artefact may be helpful. Other potential contributing factors to FNs not included in this study are patient's body habitus or cooperation, which could serve as an indicator for when CTKUB could be more appropriate.

#### P-145 Saving the graft: Ultrasonography appearances of renal transplant complications

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**Aims:** To review the ultrasonographic appearances of early and late renal transplantation complications.

**Relevance:** Renal transplantation is increasingly used as the primary therapy for end-stage renal disease. Due to its increasing frequency, increased survival rates, and associated complications, renal transplant ultrasound examinations make up an increasing part of on-call work. Timely management of complications is essential; radiologists performing the examination therefore require a thorough understanding of the associated anatomy, normal surgical sequelae and ultrasonographic appearances of these complications.

**Content:** In this pictorial review we present the anatomy of a healthy renal graft, review the normal post-surgical sequelae, and present ultrasonographic features of complications. We have reviewed all ultrasound examinations of renal transplants in the period November 2013 to November 2015 inclusive in a single tertiary referral centre. In current literature, complications may be considered within five categories: Perinephric fluid collections, including haematomas, seromas, urinomas, lymphocoeles or abscesses; diminished renal function due to acute tubular necrosis or rejection; vascular complications including arteriovenous fistulas, pseudoaneurysms and thrombosis or stenosis of renal arteries and veins; abnormalities of the collecting system; abnormalities of the renal parenchyma. Many patients within this cohort had repeat scans documenting the development of complications within a matter of only hours or days between examinations.

**Discussion:** Ultrasound is a non-invasive, readily available examination, which plays a critical role in the follow-up of renal transplantation. Recognising the appearances of complications allows early communication with clinical teams and ensures prompt intervention to ensure graft success.

### P-146 Complications following renal transplant: Experience from a specialist transplant centre

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**Aims:** To provide a pictorial review of the complications occurring post renal transplantation and to discuss the role of the Radiologist in imaging kidney transplants and managing complications.

**Content:** 166 kidney transplants have been performed at our centre this year. A multi-disciplinary approach is required to image and manage complications. This involves radiologists, sonographers, nuclear medicine physicians, transplant surgeons and renal physicians. The imaging modalities include renal scintigraphy (99m-Tc MAG3) which allows assessment of both perfusion and function, and ultrasound.

**Relevance:** Imaging of the transplanted kidney takes place if the transplant team have any concerns about the surgery or post-operative recovery and function of the graft. It is important the Radiologist is aware of the potential complications which can be divided into immediate (within the first three days), early (between three days and two months) and late (after two months).

**Outcomes:** 140 out of 166 patients had imaging assessment of the graft within the first three days. This consisted of 112 renal scintigraphy studies only, 28 ultrasound scans only and 23 patients having both scans. 79 patients overall (48%) developed complications (28 immediate, 42 early and 9 late). Acute tubular necrosis was the most common early complication. Complications were more common in deceased donor kidneys.

**Discussion:** The role of the Radiologist following renal transplantation can be divided into three parts: (1) recommendation of the correct imaging modality, (2) accurate interpretation and performing of imaging and (3) managing complications where appropriate.

### P-147 Bosniak classification of renal cysts - a reminder

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**Aims/objectives:** Renal cysts are seen as fluid filled lesions which vary in their complexity ranging from simple to complex. The Bosniak renal cyst classification was initially described in 1986 using CT scan findings. Whilst other imaging modalities are commonly used in the evaluation of renal masses, namely ultra sound and magnetic resonance imaging (MRI), CT (with and without contrast) remains the key diagnostic technique.

**Content:** Axial CT images accompanying each of the Bosniak classification categories:

Type 1:- Homogenous water content, no calcification, enhancement or wall-thickening.

Type 2:- Fine wall or septal calcifications. Hyper-dense cysts > +20 HU.

Type 2F:- Slightly thick wall, septae thicker than hairline, calcification which may be thick, no contrast enhancement.

Type 3:- Wall thickening/nodularity. Thick/irregular calcification. Contrast enhancement.

Type 4:- Irregular margins, prominent nodules, solid enhancing components.

**Relevance/impact:** The Bosniak renal cyst classification is a vital tool in helping the Radiologist come to the correct conclusion when faced with a renal cyst be it a simple one or more complex one. Whilst determining what constitutes a simple cyst or an obviously malignant one may appear somewhat straight forward, the challenge lies in those that are deemed more indeterminate i.e. the type 2F and 3 lesions. In depth knowledge of this classification system is of paramount importance for those who are involved in the routine reporting of renal lesions.

### P-148 Multiparametric prostate MRI- A district general hospital experience

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Currently the NICE guidelines state that Multiparametric MRI ( mpMRI) should be performed in individuals under active surveillance for prostate cancer. It is also indicated in individuals with a negative 10-12 core biopsy. According to the NICE guidelines, if a multiparametric MRI is negative there is no need for further biopsy, unless:

- the biopsy showed high-grade prostatic intra-epithelial neoplasia (HGPIN)
- the biopsy showed atypical small acinar proliferation (ASAP)

- abnormal digital rectal examination

We performed the audit to assess if multiparametric MRI was sensitive and specific enough to exclude the need for further biopsy.

**The aims audit were to:**

- a) Assess if we exclude cancer with Multiparametric MRI
- b) If positive on multiparametric MRI, do we correctly predict and localize the cancer.

**Inclusion criteria:**

- A) mpMRI
- b) post mpMRI biopsy

Data: Over a two year period, 131 patients were imaged and 48 had prostate biopsies and mpMRI.

**Results:**

a) MRI and Biopsy concordance:

- 1) Cancer diagnosis (not location)= 6
- 2) Cancer diagnosis + location= 28

b) MRI and TRUS biopsy Discordance:

- 1) +ve mpMRI, -ve TRUS biopsy= 9
- 2) -ve mpMRI, +ve TRUS biopsy= 5

Our sensitivity for detecting malignancy on mpMRI was 83.9

Our Specificity for detecting malignancy on mpMRI was 47.1

The positive predictive value was 76.5

The negative predictive value was 61.5

**Discussion:** At our institution we were reporting mpMRI to a required national standard. However, negative mpMRI does not exclude the need for sextant biopsy.

**P-149 Targeted prostate biopsies using MRI-ultrasound fusion technique**

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*Tallaght Hospital, Dublin*

**Purpose, materials and methods:** The purpose of this review poster is to discuss and review the role of MRI-Ultrasound fusion biopsy techniques in targeting lesions suspicious for prostate cancer.

**Background:** MRI has now become the main imaging modality in staging of prostate cancer. The advent of the widespread use of PI-RADS 1 and 2 has made triaging of patients for biopsy an intrinsic part of assessing patients with prostate cancer.

Traditionally non-targeted multiple core biopsies are performed when the patient has a suspicious lesion on MRI and/or significantly elevated PSA. However, when these biopsies are negative and there is a high PI-RADS 2 score on MRI, a targeted biopsy is becoming an essential tool to further assesses patients.

Fusion of MRI and ultrasound images has opened a new avenue in targeting tumours and will undoubtedly become more widespread in the future.

In this educational exhibit we discuss the role of MRI-Ultrasound fusion biopsy using cases as examples that we have had in our institution.

**Teaching point of poster:**

To discuss lesions that are appropriate for fusion biopsy.

To depict the technique of fusion biopsy including risks and complications.

To predict the expanding role that MRI Fusion techniques will have in the future, particularly with the adoption of PI-RADS 2 into the routine assessment of prostate cancer.

**P-150 Hiding places of prostate cancer in multiparametric MRI (mpMRI)**

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*Southend University Hospital NHS foundation Trust*

**Objectives:** Using our experience of over 500 patients who have undergone pre-biopsy mpMRI (T2, DWI +/- DCE) and subsequent transperineal saturation prostate biopsy, we aim to:

Illustrate the commonly overlooked areas in diagnosing prostate cancer with mpMRI.  
Emphasise technical factors that can contribute to suboptimal image interpretation.  
Demonstrate the use of mpMRI to direct further management.

**Content:** mpMRI can be used to determine the type of prostate biopsy to be undertaken (targeted vs. transperineal vs. transrectal), and predict biopsy outcome to the extent that biopsies may be avoided altogether. Tumour localisation within the prostate gland aids targeted biopsy and influences treatment (e.g. assessing suitability for nerve sparing surgery or radiation dose escalation).

Tumours with unusual appearances and those in uncommon sites hinder MRI interpretation, potentially leading to false-negative or – positive findings. Regions of the prostate which require careful scrutiny include the apex, anterior sectors and the central zone, particularly the peri-urethral zone. Infiltrating tumours or those within areas of inflamed prostate also pose a diagnostic dilemma.

It is also important to recognise that mpMRI has limitations. Technical challenges regarding DWI may lower tumour sensitivity due to anatomical distortion, inadequate suppression of benign prostate tissue and suboptimal ADC map windowing.

**Impact:** It is vital that radiologists are aware of the commonly missed locations of prostate cancer and the limitations of mpMRI, particularly in the context of a multidisciplinary team setting. This would serve to improve diagnostic accuracy, target areas for biopsy more precisely and direct appropriate management.

### **P-151 Multiparametric MRI prostate in the diagnosis and surveillance of prostate cancer in a district general hospital. Comparisons with histology results and outcomes over a 36 month period**

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*George Eliot Hospital*

**Aims:** To assess the value of Multiparametric MRI (MPMRI) Prostate in the diagnosis and surveillance of prostate cancer.

**Content:** Outcomes of every MPMRI Prostate performed in a district general hospital over 36 months was reviewed against histology results. We analysed for true negatives and positives, false negatives and positives and reviewed all follow up information for the patients. We also reported in with parameter the abnormality was noted (T2, Dynamic or Diffusion weighted images).

**Outcomes:** Total number analysed: 92 -six month period. (207 MRIs still to be reviewed to cover 3 years)

Data to date:

Number of participants not referred for a biopsy after MRI: 25

True positives: 31

True negatives: 11

Number of false negatives: 12

Average Gleason score of false negatives: 6

Number of false positives: 13

True positives in which parameter: T2: 26/31, Diffusion: 20/31, Dynamic: 11/31

**Discussion:** True positives were the most common outcome of the data analysed, giving promising results. Of the MRI results recorded as 'no obvious malignancy seen', 52% were in fact proven malignancies on biopsy. If the remainder of the data analysed (36 months) reflects this pattern, then there may be an indication for either repeat MRI, or a TRUS biopsy regardless of MRI result.

Further analysis including comparisons of biopsy mode (TRUS vs Template Biopsy) and patient outcome will be completed for all 36 months' worth of data. Comparing the reports of MRI Prostates with the opinion of our urology specialist radiologist may also show reporter error to be an issue.

### **P-152 Investigating the use of bilateral lower limb dopplers in pregnant patients with clinical suspicion of a pulmonary embolism**

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*Heart of England NHS Foundation Trust*

The use of bilateral USS dopplers in pregnant patients with suspected PE was investigated in a UK based trust. The current local guidelines advise that all pregnant patients with a suspected PE should first have bilateral lower limb dopplers to check for a DVT. The rationale being that the presence of a DVT would then obviate the need for a CTPA which is associated with a radiation dose to mother and foetus.

Data of pregnant patients who underwent bilateral leg dopplers with a suspected PE over a 2 year period, was collected. 150 patients were identified. 103 patients had both USS and chest scanning (CTPA and/ or VQ scan).

Only 1 patient had a DVT reported on USS out of a total 150 (0.67 %) and this patient was not further imaged. 86 patients had a CTPA, 20 had V/Q scans. 3 were imaged twice due to an inconclusive initial CTPA. There were 6 PEs reported. None of these patients had positive USS dopplers for a DVT (5.8%).

Rates of DVT picked up on USS Doppler in pregnant patients with a suspected PE are low (<1%). The increase in workload and cost is therefore not justifiable. These findings correlate with the RCOG guidelines which only recommend bilateral USS dopplers for use in pregnant patients with symptoms of a PE, who also have signs of a DVT. We recommend these guidelines are implemented into the trust.

### **P-153 VMAT with SIB vs brachytherapy for gynaecological radiotherapy**

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*Royal Cornwall Hospitals NHS Trust*

**Objective:** Radiotherapy for gynaecological cancers involves external beam irradiation to the whole pelvis followed by a brachytherapy boost. The purpose of this study was to assess dose reduction to OARs using a VMAT solution compared to four-field brick including a boost using either sequential VMAT boost or simultaneous integrated boost.

**Methods:** Ten patients previously treated using for cervical cancer were identified. Four plans were retrospectively produced for each patient (four field brick, VMAT phase one, VMAT boost, SIB) providing a phase one dose of 50.4Gy over 28 fractions. The sequential boost dose varied between patients. An averaged boost dose of 31Gy over 32 fractions was used for all SIB plans.

**Results:** Results demonstrated significantly improved dose homogeneity between the VMAT and four field phase one techniques ( $p < 0.01$ ) but failed to find significant reductions to the bladder and rectum. Dose to the bowel was reduced at all dose points ( $p < 0.01$ ). Comparing the VMAT and brachytherapy boost, significantly increased doses to OARs were identified in the VMAT boost (bladder  $p < 0.05$ ; rectum  $p < 0.01$ ; bowel  $p < 0.01$ ). Dose homogeneity was decreased using an SIB but OAR doses were also decreased ( $p < 0.05$ ).

**Conclusions:** VMAT improved dose homogeneity with overall reductions in doses to OARs. Comparing the feasibility of SIB or sequential EBRT boost instead of brachytherapy the SIB plan produced a better solution with respect to OAR doses. Whilst cervical surface doses with SIB to the high-risk CTV will not match brachytherapy a SIB may offer an alternative option for those patients who refuse/cannot access brachytherapy.

### **P-154 How accurate is MRI in identifying endometriosis and its extent?**

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**Aims:** MRI has been shown to be an accurate and cost-effective tool for the preoperative staging of deeply infiltrating endometriosis (DIE). At a recognised endometriosis centre an MDT was established in March 2014 to aid management of the condition. This MDT includes gynaecologists, radiologists, urologists, and colorectal surgeons. The severity of disease can be assessed on diagnostic laparoscopy. However MRI is a non-invasive tool that can help women in making a choice of different treatment options. The aim of our retrospective quality improvement project was to compare preoperative MRI findings and diagnostic laparoscopic results.

**Content:** Forty-five patients were included in this MDT between 07/04/14 and 03/01/15. Thirty-six patients who had DIE on MRI were included in the study. MRI findings, MDT results, histology and laparoscopic findings were collected for these patients. These were tabulated and analysed using Microsoft Excel.

**Impact/relevance:** MDT discussion of MRI and laparoscopic findings is vital to formulate management plan.

**Outcomes:** Twenty-five out of the 36 patients had surgery, 6 chose medical treatment and 5 are awaiting surgery. Due to the MDT a patient was identified as having diverticular disease and not endometriosis. Overall, approximately 80% of MRI findings correlated with laparoscopic findings. This was 92% for bladder endometriosis, 76% for recto-vaginal, 64% for rectal, 80% each for left and right endometrioma; and 83% for bilateral endometriomas.

**Discussion:** MRI is beneficial for localising and mapping DIE. It helps plan MDT approaches to surgical management and helps women to make an informed choice.

### P-155 Atypical adnexal lesions

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Pelvic lesions can be difficult to interpret by the registrar or non- GU radiologist. Some lesions have classic imaging characteristics which can help make a diagnosis but others are more complex. This poster review tackles the atypical benign and malignant lesions seen in the pelvis with helpful pearls and pitfalls to make an accurate diagnosis. Cases will be illustrated by MRI, PET-CT, CT and US from a large hospital trust and the poster will be produced by a dedicated gynaecological consultant radiologist.

### P-156 SCAR pregnancy

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**Aim:** Caesarean ectopic pregnancy is the rarest type of ectopic pregnancy estimated to occur in ~1:1800-2200. We are presenting MRI and ultrasound findings of 3 cases.

**Content:** Implantation takes place within the scar of a prior cesarean section, separate from the endometrial cavity. Within the scar, the blastocyst is surrounded by myometrium and fibrous tissue. The clinical presentation is varied and vaginal bleeding can present at any stage.

Complications include rupture resulting in severe haemodynamic compromise or infection secondary to retained products.

Our three cases represent imaging of different gestational ages of scar pregnancy.

One of these cases also demonstrates a late complication of retained products.

**Relevance impact:** The gestational sac is usually visualized within the anterior wall of the lower uterine segment. The diagnosis can be made by visualizing enlargement of the cesarean scar and a mixed mass or clear gestational sac at the site. A very thin layer of myometrium separates the maternal urinary bladder wall and the gestational sac; best seen on MRI. Prominent peritrophoblastic flow around the gestation is best appreciated on Doppler sonography.

**Outcomes:** Implantation and trophoblastic invasion into caesarean scar tissue may result in uterine rupture and hemorrhage, which can be life threatening.

**Discussion:** Although successful births have been described in literature, many recommend interruption of the pregnancy when the diagnosis is certain because of the significant risk of emergency hysterectomy associated with expectant management of a viable cesarean section scar pregnancy.

### P-157 Assessing the quality of the hysterosalpingogram (HSG) service of Pennine Acute Hospitals Trust

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*The Royal Oldham Hospital*

**Aims:** To assess the quality of the HSG service across the Pennine Acute Trust compared to reference limits from the Health Protection Agency.

**Background and targets:** According to NICE guidelines HSG is the first line investigation for tubal patency in women with no comorbidities. The Health Protection Agency has strict criteria to reduce unnecessary radiation doses in women of child bearing age.

Current targets are set at 100% for: Radiation dose (DAP) must not exceed 4 Gy<sub>cm</sub><sup>2</sup>, fluoroscopy time should not exceed 60s, 4 key images should be obtained (early uterine filling, late uterine/early tubal filling, late tubal filling, and free intra-peritoneal spill of contrast) and examinations should be reported within 7 days.

**Method:** A retrospective study was conducted of Trust wide HSG's over 2014. The above targets were analysed to determine if examinations were within National guideline limits.

**Results:** 307 patients analysed. 97% were within the dose limit of 4 Gy<sub>cm</sub><sup>2</sup>. 94% had an exposure time of equal or less than 60 seconds, of the remainder of cases 94% had over 4 images taken accounting for increased exposure time. 95% had at least 4 key images and 97% of examinations were reported within 7 days of the investigation.

**Outcome:** These results are very promising and show an effective and efficient service. This will be fed back to the radiology department. To insure that all targets are met (100%), radiographers will be asked to note any cases which exceed limits for further analysis and re-audited next year.

## Paediatrics

### **P-158 Renal scintigraphy in children – is the posterior view sufficient for accurate interpretation?**

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**Introduction:** Renal scintigraphy using DMSA is commonly used for detection of renal cortical abnormalities related to urinary tract infections in children. Current guidelines recommend posterior and posterior oblique views for image acquisition. However, performing renal scintigraphy on restless children can be challenging and is a practical problem for our nuclear medicine technicians. The purpose of this study was to evaluate the usefulness of posterior oblique views in image interpretation.

**Method:** Retrospective analysis of all paediatric DMSA renal studies performed during a 6-month period. All abnormal studies were evaluated by two experienced observers who recorded whether two views were required to make an accurate interpretation or whether a single posterior view would have been sufficient.

**Results:** Although 41 abnormal studies were identified on PACS, images were available for only 35. Both observers agreed that the second view (posterior oblique) was not required in any of the 35 patients.

**Conclusion:** Despite the small number of patients, our results indicate that a single posterior view is sufficient for accurate interpretation of renal DMSA studies in children. Obtaining two good quality views in restless children can sometimes be difficult and stressful for the patient, parents and staff involved. The results of our study suggest that all efforts should be made to obtain good posterior views even if the posterior oblique views cannot be obtained. This however, does not mean that posterior views should not be obtained when possible.

### **P-159 Paediatric renal cortical (DMSA) scans: Quality vs quantity?**

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*Royal Wolverhampton Hospitals Trust*

**Aims:** Evaluate local paediatric DMSA scan quality/protocol.

**Content:** Audit of our DMSA renograms against those from other sites using same protocol apart from dose, to evaluate local scan quality, scan times and assess if current ARSAC doses are too high.

**Relevance:** A recent CQC audit highlighted local DMSA injected doses for paediatric population DMSA renograms at our institution were lower than ARSAC recommendations. Although our doses were in line with ARSAC 1999 guidance and manufacturer summary of product characteristics, the CQC suggested these doses may produce inferior quality scans with increased scan times and increased patient discomfort levels. We were prompted to undertake a formal review of our procedures including scan protocol, injected doses and image quality and compared these with DMSA renograms from other sites.