



P102 Early low rectal tumour staging - a multi-modal pictorial review

Carl Bradbury; Ingrid Britton

Univeristy Hospitals of North Midlands

Early low rectal cancers prove difficult to provide accurate Radiological staging. The prognosis of low rectal tumours is different to that for higher tumours (Taylor et al, 2008). Surgical improvements have generally been made for both mid and upper rectal cancers; whereas low rectal lesions have been treated by abdominoperineal excision; which leads to high morbidity and permanent stoma (Christensen et al, 2011). There is a surgical challenge of ensuring a clear resection margin whilst attempting to maintain the anal sphincters (Weiser et al, 2009 & Rullier et al, 2013). Considering this, the provision of accurate information about the location and extent of the rectal tumour is essential for optimising the resection and retaining the anal sphincter function; low rectal cancer management proves an exceptional challenge due to the poor oncological outcomes and permanent stoma rates (Battersby et al, 2016); hence accurate radiological staging is of utmost importance to guide the appropriate management.

The poster will present high quality MRI, endo-rectal ultrasound images, histology slides and endoscopic appearances of a variety T0, T1, T2 rectal tumours staged using the MINSTREL proforma (MINSTREL, 2016). The images will be presented in rows for each of the tumour stages detailed above and each slice of the multi-modal imaging/investigations will correspond to demonstrate the stage of the tumour. Each rectal cancer T stage example will be gold standard verified through the histology report. The poster will be presented as a cross-modality and cross-speciality teaching atlas; of verified low rectal cancer cases.

Battersby, N.J., How, P., Moran, B., Stelzner, S., West, N.P., Branagan, G., Strassburg, J., Quirke, P., Tekkis, P., Pedersen, B.G. and Gudgeon, M., 2016. Prospective validation of a low rectal cancer magnetic resonance imaging staging system and development of a local recurrence risk stratification model: the MERCURY II study. *Annals of surgery*, 263(4), pp.751-760. Christensen, H.K., Nerstrøm, P., Tei, T. and Laurberg, S., 2011. Perineal repair after extralevator abdominoperineal excision for low rectal cancer. *Diseases of the Colon & Rectum*, 54(6), pp.711-717. MINSTREL (2016). MINSTREL CRF. Retrieved: <http://minstrelstudy.co.uk/downloads/study-crf-v2.pdf> accessed at 08.30am on 19/10/2017. Rullier, E., Denost, Q., Vendrely, V., Rullier, A. and Laurent, C., 2013. Low rectal cancer: classification and standardization of surgery. *Diseases of the Colon & Rectum*, 56(5), pp.560-567. Taylor, F. G., Swift, R. I., Blomqvist, L., & Brown, G. (2008). A systematic approach to the interpretation of preoperative staging MRI for rectal cancer. *American Journal of Roentgenology*, 191(6), 1827-1835. Weiser, M. R., Quah, H. M., Shia, J., Guillem, J. G., Paty, P. B., Temple, L. K., ... & Wong, W. D. (2009). Sphincter preservation in low rectal cancer is facilitated by preoperative chemoradiation and intersphincteric dissection. *Annals of surgery*, 249(2), 236-242.

P103 The cascade stomach revisited in the 21st century - what has changed?

Carl Bradbury; Nagammapudur Balaji

University Hospitals North Midlands

Background: Routine audit highlights discordance between the endoscopic appearances and the barium meal appearances of the presence or absence of a hiatal hernia. One area of disagreement is defining the appearance of a cup and spill stomach versus the presence of a hiatal hernia. Literature identifies a cup and spill stomach as the variant of the shape and topography of the stomach; cited often as a Radiological feature (Burdan et al, 2012). A cascade stomach is thought to be associated with symptoms of dyspepsia; with the shape of the stomach a risk factor (Miwa et al, 2015) and association of cascade stomach with Oesophageal reflux has been identified in previous studies (Kusano et al, 2012; Kusano et al, 2016); thus there is a close correlation of the symptomology of hiatal hernia and a variance in the topography of the stomach.

Purpose: To highlight the variances in topography of the stomach, a cross-modality pictorial review will demonstrate barium meal, CT and endoscopic features which may account for the false positive presence of a hiatal hernia during endoscopic evaluation.

Content: A small audit of Barium meal examinations which suggest the presence of a cup and spill stomach will be co-presented with the pictorial review. Summative findings explain that varying configurations of the cascade configuration (Classic, Reverse, Antral) may warrant a revised radiological classification of this uncommon but interesting anatomical variant of the stomach configuration. Endoscopic diagnosis of large hiatus hernia should be correlated with fluoroscopy to exclude a variance in topography.

1. Burdan, F., Rozylo-Kalinowska, I., Szumilo, J., Zinkiewicz, K., Dworzanski, W., Krupski, W. and Dabrowski, A., 2012. Anatomical classification of the shape and topography of the stomach. *Surgical and radiologic anatomy*, 34(2), pp.171-178. 2. Kusano, M., Hosaka, H., Moki, H., Shimoyama, Y., Kawamura, O., Kuribayashi, S., Mori, M. and Akuzawa, M., 2012. Cascade stomach is associated with upper gastrointestinal symptoms: a population-based study. *Neurogastroenterology & Motility*, 24(5), pp.451-455. 3. Kusano, M., Hosaka, H., Yasuoka, H., Kawamura, O., Kawada, A., Kuribayashi, S., Shimoyama, Y., Mizuide, M., Tomizawa, T., Ishihara, S. and Sagawa, T., 2016. New endoscopic classification of cascade stomach, a risk factor for reflux esophagitis. *Journal of gastroenterology*, pp.1-7.

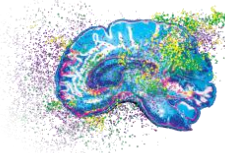
URORADIOLOGY/GYNAECOLOGY/OBSTETRICS

P104 A review of genitourinary fluoroscopic studies

Michelle Ooi; Alistair Cowie; Syahminan Suut

Salford Royal Foundation Trust

Introduction: Fluoroscopy has evolved from the early days of poor quality images on fluoroscopic screen requiring dark radiography room and red goggles for eye adaptation. It has improved substantially in our modern world both in quality and speed of image processing. It seems to be superseded in many respects especially by computed tomography (CT) scan, eg: CT



nephrogram, CT loopogram and CT cystogram. Nevertheless, fluoroscopy should not be forgotten as it remains an important genitourinary dynamic test proving to be an effective modality.

Purpose: This article aims to educate its readers on different fluoroscopic studies used in genitourinary (GU) radiology, highlighting its important role as a dynamic test in diagnosis and treatment of various genitourinary conditions.

Summary of content: This article will contain spot films of GU fluoroscopic studies clearly demonstrating more than 10 different conditions. It covers a range of diagnostic and therapeutic procedures performed using fluoroscopy: nephrostomy, nephrostogram, percutaneous nephrolithotomy, ureteric stent insertion, loopogram, cystogram and micturating cystogram, urethrogram, and hysterosalpingogram. Several pathologies seen on the above mentioned fluoroscopic studies will be discussed.

P105 The accuracy of multi-parametric MRI in diagnosis of benign and malignant prostate lesions in Srinagarind hospital

Chalida Aphinives; Chayanon Chiporncharoenpong; Kulyada Somsap; Vallop Laopaiboon

Khon Kaen University

Background: MRI was used to detect the prostate cancer, however different techniques showed various sensitivity and specificity. This study aimed to determine the diagnostic accuracy among various parameters of multiparametric MRI in detecting of prostate cancer.

Material and methods: Radiographic findings of 28 patients underwent prostate MRI and transrectal ultrasound guided biopsy was retrospectively reviewed. Multiple parameters, including apparent diffusion coefficient (ADC), dynamic contrast enhanced MRI (DCE-MRI), Cho/cit and (Cho+creat)/cit ratios, were evaluated.

Results: ADC was significantly lower in malignant lesions at peripheral zone ($p < 0.01$). If lesion sized more than 1cm at peripheral zone, (Cho+creat)/cit ratio was significantly higher in malignant lesion ($p < 0.01$). DCE-MRI combined with Cho/cit ratio showed the greatest accuracy of 83.3%. Combination of all three parameters showed no significant improvement in accuracy.

Conclusion: Combined parameters improved the diagnostic accuracy of prostate cancer.

1. Barentsz JO, Richenberg J, Clements R, et al. European Society of Urogenital Radiology. ESUR prostate MR guidelines 2012. *EurRadiol* 2012; 22:746-757
2. Sadha V, Baris T, Naira, et al. Overview of Dynamic Contrast-Enhanced MRI in Prostate Cancer Diagnosis and Management. *AJR*:198 June 2012; 1277-1288
3. Maartan de Rooij, Esther H. J. Hamoen, et al. Accuracy of multiparametric MRI for prostate cancer detection: A meta-analysis. *AJR* February 2014; 202

P106 Can MRI-based prostate volume-adjusted PSA density be used to reduce the number of unnecessary prostate biopsies? A single-centre retrospective study

Timothy Guest; Oliver Byass

Hull and East Yorkshire Hospitals NHS Trust

Background: NICE recommends prostate biopsy for men with raised PSA or abnormal DRE in the investigation of prostate cancer^[1]. Prostate biopsy is expensive & invasive, with a complication rate of ~2.5%². Therefore, any alternative non-invasive test is worth considering. Several studies have documented a correlation between MRI-based prostate-volume (PV) adjusted PSA-density & Gleason grade on histology^[3,4]. The authors investigated whether a safe PSA-density cut-off value could be demonstrated, thereby reducing the number of unnecessary prostate biopsies.

Method: We retrospectively analysed 199 patients undergoing prostate MRI from June 2016 to May 2017, of whom 111 underwent subsequent prostate biopsy (mean age 63.6 years, range 37 - 79 years; mean PSA 6.9 ng/ml). PSA, PI-RADS score and Gleason grade were acquired from the local RIS and patient record system. MRI-based prostate measurements were obtained individually from PACS, and PV-adjusted PSA-density calculated thereafter.

Results: Biopsy revealed high-grade prostate cancer in 35 patients (32%), low-grade prostate cancer in 30 patients (27%) and no prostate cancer in 46 patients (41%). Increasing PSA-density correlates with increasing Gleason grade on histology, with an average PSA-density for Gleason 3+3 cancers of 0.16 ng/ml/cm³, compared to 0.33 ng/ml/cm³ for Gleason 5+4 cancers. A PSA density cut-off of <0.1 ng/ml/cm³, would result in 30% fewer prostate biopsies. However, 1 case of clinically significant prostate cancer would have been missed.

Conclusion: Whilst adjusted-PSA density does correlate with Gleason grade, a safe PSA-density cut-off, below which prostate biopsy can be avoided, has not been established.

1. National Institute for Health and Care Excellence (2014). Prostate cancer: diagnosis and management (NICE clinical guideline 175). Available at <https://www.nice.org.uk/guidance/cg175/chapter/1-Recommendations>. [Accessed 21 March 2018]
2. Pinkhasov GI, Lin YK, Palmerola R et al (2012). Complications following prostate needle biopsy requiring hospital admission or emergency department visits – experience from 1000 consecutive cases. *British Journal of Urology* 110(3), 369-374
3. Karademir I, Shen D, Peng Y et al (2013). Prostate Volumes Derived From MRI and Volume-Adjusted Serum Prostate-Specific Antigen: Correlation With Gleason Score of Prostate Cancer. *American Journal of Roentgenology*. 2013;201: 1041-1048.
4. Peng Y, Shen D, Shu Liao et al (2015). MRI-based prostate volume-adjusted prostate-specific antigen in the diagnosis of prostate cancer. *Journal of Magnetic Resonance Imaging*. 2015; 42: 1733-1739



P107 The feasibility of apparent diffusion coefficient measurement as non-invasive biomarker for aggressiveness of prostate cancer: Correlation with gleason score

Manal Wahba

Cairo University

Objective: Our aim was to find the correlation between apparent diffusion coefficient (ADC) measurement and Gleason score (GS) in patients with prostate cancer.

Materials and methods: Forty consecutive patients of prostate cancer were prospectively enrolled in this study. All patients underwent MRI examination of the prostate including DWI at b values of 0, 300, and 600 sec/mm². MRI examinations were performed before TRUS or at least 3 weeks after. ADC measurements of prostate cancer were obtained and correlated with the GS.

Results: There was a significant negative correlation between ADC values of prostate cancer and Gleason score (P value < 0.001). The mean ADC value of GS 4+3 (0.781 × 10⁻³ mm²/s) was significantly lower than ADC value of GS 3+4 (0.812 × 10⁻³ mm²/s). Receiver operating characteristic (ROC) curve analysis was performed to assess the accuracy of ADC measurement in prediction of tumor aggressiveness. An ADC value < 0.7725 indicated high grade tumor with GS > 7, whereas an ADC value > 0.8620 indicated low grade tumor with GS < 7. Both values reported sensitivity and specificity of 100%.

Conclusion: ADC measurement can be used for assessment of the aggressiveness of prostate cancer and discriminating low and high grade tumors.

1-Anwar S.S.M, Anwar Khan Z., Shoaib Hamid R, et al. Assessment of apparent diffusion coefficient values as predictor of aggressiveness in peripheral zone prostate cancer: comparison with Gleason score. ISRN radiology, 263:4-17 2. Caivano R., Rabasco, P., Lotumolo A, et al. (2013) Comparison between Gleason score and apparent diffusion coefficient obtained from diffusion-weighted of Prostate cancer patients. Cancer investigation 31.9: 625-629. 3.De Cobelli F, Ravelli S, Esposito A, et al. (2015) Apparent diffusion coefficient value and ratio as noninvasive potential biomarkers to predict prostate cancer grading: comparison with prostate biopsy and radical prostatectomy specimen. AJR Am J Roentgenol. Mar; 204(3):550-557. 4. Donati O.F., Mazaheri Y., Afaq A, et al. (2014) Prostate Cancer Aggressiveness: Assessment with Whole-Lesion Histogram Analysis of the Apparent Diffusion Coefficient. Radiology. Apr;271(1):143-152

P108 Reflections on the setting up a new MR-ultrasound fusion prostate biopsy service in a tertiary centre and evaluation of the first 32 cases

Luke Wheeler

University Hospital of Wales

Background: The MR-US fusion biopsy technique aims to provide superior accuracy to the cognitive biopsy technique. This is performed with real time correlation of the high-resolution MR image with the fused ultrasound image. Published data is lacking as to the best MR-US fusion platform and technique and also there is uncertainty as to the added value of MR-US fusion over the cognitive technique.

Method: The MR-US fusion prostate biopsy service commenced at our institution in April 2016 - the first such service in Wales and one of the first in the UK. Setting up the service required multi-disciplinary input including assistance from the vendors specialists and overseas training of the practitioner. The first 32 cases performed have been evaluated - correlating the ultrasound appearance and biopsy result with the initial PIRADS lesion score.

Results: 32 patients with 33 prostatic lesions were targeted with MR-US fusion biopsy. Of 13 PIRADS 5 lesions, 11 (85%) were positive for significant cancer. 5 of 9 (55%) PIRADS 4 lesions and 5 of 11 (45%) PIRADS 3 lesions were positive. 20/33 (60%) lesions were non-visible on ultrasound, with 12 of these (60%) positive for cancer. **Conclusion:** There are significant challenges to setting up a successful MR-US fusion biopsy service. We have achieved this and shown a high positive biopsy rate in the most concerning prostatic lesions for malignancy (PIRADS 5) on multiparametric prostate MRI. A drawback is the small number of prostatectomy specimens for use as a gold standard.

P109 Prostate MRI pre-biopsy - implementation of a new pathway at the University Hospital of Wales (UHW), Cardiff

Alex Powles; Luke Wheeler

University Hospital of Wales

Background: For a long time, trans-rectal ultrasound (TRUS) has been the primary imaging modality used to assess the prostate in patients with an abnormal digital rectal examination and/or raised PSA. Its main use is at time of biopsy to ensure the prostate is adequately sampled. Recent evidence from the PROMIS Trial^[1] has shown that multi-parametric MRI, that is using a combination of structural and functional imaging, is more sensitive than TRUS-guided biopsy at picking up clinically significant prostate cancers.

Aims and methods: At UHW a new pathway was introduced in late 2015 such that all patients undergoing TRUS-guided biopsy have a prior MRI. We conducted a retrospective study correlating MRI reports with the histology from biopsy to look at two main questions:

1. How good are we at detecting cancer with MRI?
2. What has been the impact of MRI pre-biopsy on potential targeting of tumours?

Results: Looking at 100 consecutive cases over a 5-month period in 2016 we found that the sensitivity of MRI for detecting clinically significant cancers, as defined by PIRADS, was 89% with a negative predictive value of 95%. Of the 100 MRI reports, there were only 3 false negatives.



16 of the 100 cases underwent targeting at biopsy, with a quarter of these being upstaged by acquiring extra samples from the suspicious areas highlighted by MR.

Conclusion: The sensitivity and negative predictive value of MRI for detecting clinically significant prostate cancers is excellent. For anterior tumours, MRI is crucial pre-biopsy to ensure appropriate sampling.

1. Ahmed, H.U. et al. (2017) Diagnostic accuracy of multi-parametric MRI and TRUS biopsy in prostate cancer (PROMIS): a paired validating confirmatory study. *Lancet*, 389 (10071), 815-822.

P110 Value of CT and MR imaging with raised CA-125 and no ovarian mass on examination or US

Sabrina Alam; Bhavana Das; Yvette Griffin

University Hospitals of Leicester NHS trust

Background: CA-125 is a biomarker for screening, diagnosis and monitoring of treatment of ovarian cancer. It has low specificity, being raised in benign, malignant gynaecological and non-gynaecological diseases. Our aim is to assess the value of CT and MR with raised CA-125 and no ovarian mass on examination or US.

Method: Our RIS system was searched with keywords 'raised CA-125' on CT and MR requests between January 2016 to December 2018. All patients' RIS notes, US in preceding 6 months, subsequent CT and MR, relevant blood and histology reports were reviewed. Patients with palpable abdomino-pelvic mass or mass on baseline US were excluded.

Results: 90 patients had raised CA-125. Of these, 27 were excluded (17 had ovarian mass on US, 10 had palpable mass). Of 29 patients with prior US, 25 had CT and 4 had MR. These showed causes for raised CA-125 in 24/29 (83%) of patients. Of these, 17/29 (59%) were additional findings not demonstrated on US. All 34 patients with no history of palpable mass and no prior US underwent CT. All of these cases showed causes for raised CA-125. Pathologies included benign and malignant gynaecological disease, heart failure, liver disease and cancers including cholangiocarcinoma, gastric cancer, colon cancer and metastatic breast disease.

Conclusion: CT and MR demonstrated alternative pathology in a significant number of patients in those with a raised CA-125 in the absence of a pelvic mass on examination or on US. CT and MR are therefore of value in this subset of patients.

1. Pushparajasekaran, A, Freeman, S, Moyle P L, Addley H C (2016) Raised CA -125 and the spectrum of radiological observations - What the radiologists should know. *ECR*. [online] Available at URL <http://www.myESR.org> [Accessed 9 February 2018]. 2. Menon U, Gentry-Maharaj A, Hallett r et al. (2009) Sensitivity and specificity of multimodal and ultrasound screening for ovarian cancer, and stage distribution of detected cancers: results of the prevalence screen of the UK Collaborative Trial of Ovarian Cancer Screening (UKCTOCS). *Lancet Oncol*, 10, 327-40. 3. Moss E L, Hollingworth J, Reynolds T M (2005) The role of CA125 in clinical practice. *J Clin Pathol*, 58, 308-312.

P111 The diagnostic potential of diffusion weighted and dynamic contrast enhanced MR imaging in the characterisation of complex ovarian lesions

Manal Wahba; Sally Emadaldin; Marie Grace

Cairo University

Purpose: Our aim was to evaluate the diagnostic potential of diffusion-weighted (DW) and dynamic contrast enhanced MR (DCE-MR) imaging in the diagnosis and characterization of complex ovarian lesions.

Methods: We prospectively evaluated 59 patients with 65 complex ovarian lesions detected at US. MRI examinations were performed using a 1.5T MRI machine. Masses were classified as benign (n=30), borderline (n=7) and malignant (n=28). Regions of interest were drawn and parameters were calculated such as apparent diffusion coefficient (ADC) values for the diffusion as well as maximum absolute enhancement (Simax), maximum relative enhancement (MRE), time to peak (Tmax) and wash-in-rate (WIR) for the dynamic parameters.

Results: There was a significant difference in ADC values ($P < 0.001$), Simax ($P < 0.05$), MRE% ($P < 0.001$), Tmax ($P < 0.001$) and WIR ($P < 0.001$) between benign and borderline/invasive malignant groups. A cut-off ADC value ≤ 0.95 had a PPV of 81.8% for prediction of borderline/invasive malignant lesions; a cut-off Tmax ≤ 141 sec had a specificity of 86.7% and PPV of 86.7% for predicting malignancy.

Conclusion: The addition of DW and DCE-MRI to the conventional MRI has improved its diagnostic value. They provide additional information for the tumor behavior. Thus, they are recommended to be added to the routine conventional MRI to help characterization of indeterminate masses.

1-Aliya Q.(2009) Diffusion-weighted Imaging in the Abdomen and Pelvis: Concepts and Applications. *RadioGraphics* . 29:1797-1810. 2-Hongju S, Shahid M , Jamal R, et al.(2011) Role of FDG PET/CT in Staging of Recurrent Ovarian Cancer. *RadioGraphics*.31:569-583. 3-Spencer JA and Ghattamaneni S. (2010) MR Imaging of the Sonographically Indeterminate Adnexal Mass *Radiology* 256 (3): 677-694. 4-Thomassin-Naggara I, Daraï E, Cuenod CA. et al. (2009) Contribution of diffusion-weighted MR imaging for predicting benignity of complex adnexal masses. *Eur Radiol* 19: 1544-1552. 5-Vargas HA, Tristan B, Sala E.(2013) MRI of Ovarian Masses. *Journal Of Magnetic Resonance Imaging* 37:265-281. 6-Whittaker C, Coady A, Culver L et al.(2009) Diffusion-weighted MR Imaging of Female Pelvic Tumors: A Pictorial Review. *RadioGraphics* 29:759-778.

P112 Inter-fractional uterine and cervix motion during radiotherapy for cervix cancer

Gillian Lewis; Sheela Macwan

Sheffield Hallam University

Background: Studies have shown that the positional change of the uterus during radiotherapy for cervix cancer can be significant^[1,3]. This investigation quantified the inter-fractional movement of the uterus and cervix in patients with cervical cancer undergoing radiotherapy treatment and assessed the relationship between uterus and cervix positional change and



bladder volume.

Method: 85 retrospective CBCT images from 11 pre-operative cervix cancer patients who had undergone radiotherapy were fused with the planning CT scans. The change in the uterus and cervix positions on the CBCT scans compared to the planning CT scans was quantified. Changes in position were correlated with changes in bladder volume using linear regression.

Results: The range of movement of the uterus was 0.02 cm to 3.61cm in the superior/inferior direction (mean 0.71cm). In the anterior/posterior direction (AP) it was 0.03 cm to 2.59 cm (mean 0.72 cm). The cervix had a range of 0.01cm to 2.26cm (mean 0.48cm) in the AP direction and the change in uterine angle was 0o to 23 o (mean 6.68 o). A significant correlation was found between uterus and cervix positional change bladder volume change.

Conclusion: Inter-fractional uterus and cervix movement can be substantial and can vary from patient to patient. Despite the use of a full bladder drinking protocol large variations in bladder volumes between fractions can occur and this can impact on the position of the uterus and cervix.

1. Ahmad, R., Hoogeman, M.S., Bondar, M., Dhawtal, V., Quint, S., De Pree, I., Mens, J.W., Heijmen, B.J. (2011) Increasing treatment accuracy for cervical cancer patients using correlations between bladder-filling change and cervix and uterus displacements: proof of principle. *Radiotherapy & Oncology*. **98**(3), 340-346.
2. Buchali, A., Koswig, S., Dinges, S., Rosenthal, P., Salk, J., Lackner, G., Böhmer, D., Schlenger, L., Budach, V. (1999) Impact of the filling status of the bladder and rectum on their integral dose distribution and the movement of the uterus in the treatment planning of gynaecological cancer. *Radiotherapy & Oncology*. **52**(1), 29-34.
3. Taylor, A., and Powell, M.E.B. (2008) An assessment of interfractional uterine and cervical motion: implications for radiotherapy target volume definition in gynaecological cancer. *Radiotherapy & Oncology*. **88**(2), 250-257.

P113 Benign ovarian lesions: A pictorial review

Sian Ebdon; Jane Pollitt; Carys Jenkins; Kate Gower Thomas

Cwm Taf University Health Board

Background: Ovarian abnormalities are common, both as symptomatic and incidental findings. For many Radiologists who do not have an interest in Gynaecological imaging, interpretation can be daunting. Ultrasound characterisation of ovarian lesions is vital in order to risk stratify patients and MRI is more commonly used as a problem-solving tool in indeterminate lesions.

Purpose: Through a series of interesting clinical cases and selected radiological images, we will demonstrate characteristic features of a variety of ovarian lesions using both ultrasound and MRI. These will include characteristically benign entities, such as stromal tumours, as well as more indeterminate lesions for example, cystadenomas. Illustrating the key features will increase confidence in ascertaining which can safely be disregarded and those that require further follow up investigation. This will ultimately help prevent unnecessary additional imaging.

Summary: We present a pictorial review of selected cases to display ovarian lesions that are both benign, and more radiologically indeterminate. Important features will be highlighted to help guide the necessity for further assessment.

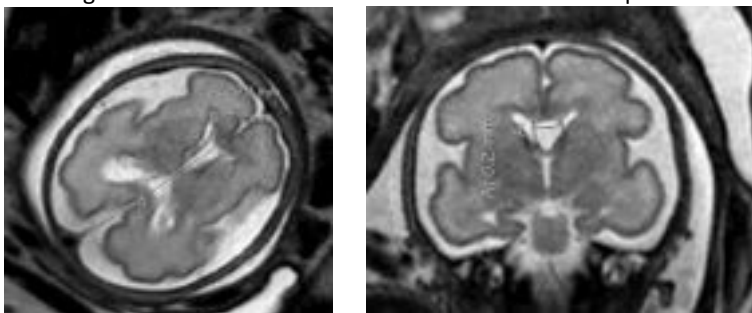
P114 The normal cavum septum pellucidum during foetal development

Vivien MacRow-Wood; Elspeth Whitby

University of Sheffield

Background: The Cavum Septum Pellucidum (CSP) is a cavity found in the foetal brain. Its visualisation is part of practice guidelines for performing the mid-trimester foetal ultrasound (US) scan^[1] and an absent/abnormal CSP prompts further investigation. To date, our literature search uncovered no current papers which studied the size of the CSP on MRI in the normal foetal population. MRI studies examining the abnormal CSP used existing US measurements as a benchmark for normative size. This study aims to establish the normal size on MRI and creating a standardised approach to its measurement in a clinical scenario.

Method: This is a retrospective study using data collected in routine clinical practice on over 300 normal foetal brains. The width and length of the CSP is measured in the coronal and axial planes following a set of specific repeatable anatomical boundaries.



Results: Initial scatterplots show that the width of the CSP on the coronal and axial plane stays fairly constant throughout gestation. Their values are comparable to each other and to major ultrasound studies - indicating their interchangeability if either view cannot be obtained. As yet no comparable studies for length have been found, however the initial graph of axial length to gestational age shows a clear trend of increasing as gestation increases.



Conclusion: As this study is still ongoing, these results are taken from a preliminary analysis. Further work will be undertaken for more precise statistical analysis as well as prospective follow-up on the patients to confirm their normal developmental outcome.

1. Salomon L, Alfiric Z, Berghella V, Bilardo C, Hernandez-Andrade E, Johnsen S et al. Practice guidelines for performance of the routine mid-trimester fetal ultrasound scan. *Ultrasound in Obstetrics & Gynecology*. 2010;37(1):116-126.

P115 MRI volume-derived estimated fetal weight in the mid-pregnancy fetus: A comparison with current US standards

Emily Skelton; Jacqueline Matthew; Lisa Story; Alice Davidson; Chandni Gupta; Dharmindra Pasupathy; Mary Rutherford

King's College London

Background: An accurate estimated fetal weight (EFW) is essential for the delivery of good quality antenatal care. Current ultrasound (US) methods are susceptible to limiting factors (operator and technical) which can induce errors of up to 15%^[2]. With the growing popularity of fetal magnetic resonance imaging (MRI), it has been suggested that volume-derived EFW may be a more accurate alternative to US methods, although current literature has yet to explore its applicability to the mid-pregnancy fetus.

Method: Data were collected as part of the iFIND project (ISRCTN = 16542843). All participants gave written informed consent. 25 healthy mid-pregnancy (mean gestational age = 24 completed weeks of pregnancy) paired fetal US and MRI scans were retrospectively selected and EFW was calculated using US biometry-derived Hadlock^[3] and MRI volume-derived (Baker^[1] and Kacem^[4]) formulae. The intra and interobserver variability of each method was assessed, as well as the systematic and random errors.

Results: Compared to US biometry-derived EFW, Baker and Kacem MRI volumetry methods consistently and significantly under-measure EFW by a maximum of -13.6% ($p < 0.001$) in the mid-pregnancy fetus. However, there is excellent intra and inter-observer agreement in the MRI volume method suggesting a high reproducibility in the technique with no proportional bias ($p > 0.05$).

Conclusion: The Baker and Kacem formulae should be interpreted with caution in relation to the clinical management of the mid-pregnancy fetus. Whilst our study demonstrates less variation within the MRI volumetry methods than US biometry-derived EFW, refinement of the MRI volume-derived EFW formula specific to the mid-pregnancy fetus is needed to compensate for varying fetal density at earlier gestational ages, and to provide additional description for interpretation of fetal lung, brain and liver volumes in growth-restricted fetuses.

1. Baker P.N., Johnson I.R., Gowland P.A., Hykin J., Harvey P.R., Freeman A., et al. (1994) Fetal weight estimation by echo-planar magnetic resonance imaging. *Lancet*. 343(8898), 644-645.

2. Dudley N. (2013) A review of ultrasound fetal weight estimation in the early prediction of low birthweight. *Ultrasound*. 21(4),181-186.

3. Hadlock FP, Harris RB, Sharman RS, Deter RL, Park SK. (1985) Estimation of fetal weight with the use of head, body and femur measurements — a prospective study. *Am J Obstet Gynecol*. 151, 333-337.

4. Kacem Y, Cannie MM, Kadji C, Dobrescu O, Lo Zito L, Ziane S, Strizek B, Evrad AS, Gubana F, Gucciardo L, Staelens R, Jani JC. (2013) Fetal weight estimation: comparison of two-dimensional US and MR imaging assessments. *Radiology*, 267(3), 902-910.

P116 Is fetal MRI more accurate than ultrasound in the second trimester assessment of non-central nervous system anomalies? A systematic review

Emily Skelton; Lisa Story; Jacqueline Matthew

King's College London

Background: Early detection is essential to allow appropriate and timely management of a fetal anomaly^[1]. Although ultrasound (US) is the preferred obstetric imaging modality, advances in fetal magnetic resonance imaging (MRI) technology have demonstrated its usefulness in the diagnosis of central nervous system (CNS) anomalies^[2]. However, the value of second trimester fetal MRI in the diagnosis of non-CNS anomalies has yet to be fully explored.³

Method: A systematic review of available literature was performed (10-year period). Inclusion criteria were; non-CNS abnormalities suspected/diagnosed using US, gestational ages between 14-28weeks, MRI performed after US, and outcome by postnatal clinical findings/post-mortem. A modified QUADAS-2 tool was used to assess methodological quality for each included study, and individual patient data was also used to assess agreement with US and additional findings.

Results: In most cases, MRI completely agreed with US findings. It diagnosed oro-facial anomalies more completely than US, particularly cleft lip and palate. MRI also provided more additional findings, particularly in relation to anomalies of the thorax, although US was better than MRI in the diagnosis of talipes.

Conclusion: MRI has a similar accuracy to US in the diagnosis of non-CNS abnormalities. MRI is also more likely to detect additional findings, which may have an impact on patient counselling and management. This review was limited by the methodological quality and small sample sizes of included papers, therefore more evidence is required to further assess the usefulness of fetal MRI in comparison to US in the detection and diagnosis of non-CNS anomalies.

1. National Institute for Health and Clinical Excellence. Antenatal Care: Guidelines CG62. 2018.

2. Rossi C A, Prefumo F. (2014) Additional value of fetal magnetic resonance imaging in the prenatal diagnosis of central nervous system anomalies: a systematic review of the literature. *Ultrasound in Obstetrics and Gynaecology*. 44(4).

3. We J S, Young L, Park I Y, Shin J C, Ah Im S. (2012) Usefulness of additional fetal magnetic resonance imaging in the prenatal diagnosis of congenital abnormalities. *Archives of Gynecology and Obstetrics*. 286(6), 1443-1452.



PAEDIATRICS

P117 The neonatal chest X-ray: Common conditions and tips for non-paediatric radiologists**James Ross; James Halls**[The Great Western Hospital NHS Foundation Trust](#)

Background: Neonatal respiratory distress is a common cause of admissions to special care units, affecting up to 7% of term newborns. The chest radiograph is the first line imaging test in the assessment of the neonate with respiratory distress and the ability to interpret it is key for prompt diagnosis and appropriate management. Radiologists without a specialist interest in paediatric radiology may feel unfamiliar with common lung abnormalities and their radiographic appearances.

Purpose: This poster is designed as an educational aid to increase confidence in neonatal plain film reporting for all levels of radiologist from trainee to consultant. It will describe the basics of neonatal film reporting and differences compared to adult films. Common neonatal conditions including transient tachypnea of the newborn (TTN), meconium aspiration syndrome (MAS), neonatal pneumonia, pneumothorax and surfactant deficiency disease (RDS) will be described with typical radiological appearances and basic pathophysiology, with reporting tips and pitfalls to avoid. Neonatal lines and tubes will be displayed including umbilical catheters, ET tubes, chest drains and ECMO lines with advice on associated complications/misplacement.

Summary: Content will be set out as a display of high quality plain radiographs, annotated to explain the basics of reporting and pathophysiology flanked by important learning points and take home messages.

Arthur R. (2001) The neonatal chest x-ray. *Paediatric respiratory reviews*. 2 (4), 311-323. Liszewski, M.C. (2017) Respiratory distress in neonates. Underlying causes and current imaging assessment. *Radiol Clin N Am*, 55, 629-644. Pramanik A.K. (2015) Neonatal respiratory distress: a practical approach to its diagnosis and management. *Pediatr Clin North Am*. 62 (2), 453-69. Reuter, S. et al (2014) Respiratory distress in the newborn. *Paediatrics in Review*, 35 (10), 417-429.

P118 Vacuum immobiliser use for infant CT and MRI - is this the end of 'feed and wrap'?**James Ross; James Halls**[The Great Western Hospital NHS Foundation Trust](#)

Background: Cerebral imaging with CT and MRI is commonly used to evaluate brain injury and development in neonates and infants within our institution. Traditionally, such imaging has required the use of a 'feed and wrap' technique to allow the scan to occur when the infant is sleeping following a feed or occasionally sedation. We now routinely use a vacuum immobilisation device that cocoons the infant and provides significantly improved image quality without the necessity for 'feed and wrap' or sedation. The technique has many advantages over the traditional 'feed and wrap' technique such as absence of motion-degradation, improved scan times and absence of repeated studies.

Purpose: The poster will be of interest to both radiologists and radiographers, particularly those with an interest in paediatric imaging. It will demonstrate at length the safe usage of the vacuum immobilizer device; before, during and after a scan. We will describe the many benefits that we have observed and highlight the advantages the technique has over both the use of sedation and the traditional feed and wrap technique.

Summary: This poster will be an educational visual display, utilising many images, explaining the contrasting techniques being discussed together with examples of the disparity in typical image quality from MR and CT studies and a summary of the benefits of immobilisation compared with traditional 'feed and wrap'.

1.Golan A. (2011) Imaging in the newborn: infant immobilizer obviates the need for anesthesia. *Isr Med Assoc*. 13(11):663-5 2.Ibrahim T. (2015) 'Feed and wrap' or sedate and immobilise for neonatal brain MRI? *Archives of Disease in Childhood - Fetal and Neonatal Edition*. Published Online First: 30 June 2015. doi: 10.1136/archdischild-2015-308847 3.Mathur, A.M. (2008) Transport, monitoring, and successful brain MR imaging in unsedated neonates. *Pediatr Radiol*. 38, 260-264.

P119 Procuring a new device for reducing intussusceptions in paediatric patients**Angela Staley; Vanessa Waspe**[Nottingham University Hospital](#)

Aim: The old equipment was no longer supported by clinical engineering so a suitable replacement was required to prevent patients being transferred to other centres for this procedure.

Method: A risk assessment was performed to demonstrate the need for new equipment, and presented at the medical equipment planning group (MEPG). Paediatric centres contacted to find what devices are used elsewhere, and internet research carried out. Manufacturers who recommended their product for the procedure were contacted for advice and to arrange demonstrations. A suitable device was sourced, and purchased. Training competencies were developed with Clinical Engineering and the manufacturer prior to the equipment being implemented. Application training was provided for the Consultants and radiographers. Cascade training provided for rotating and new staff.

Results: Robust training program implemented. Radiologists completed competencies and found equipment easy to use. Radiographers completed competencies and found equipment easy to set up as catheter packs provided contain all the equipment needed to use with the new machine. Ongoing audit shows short reduction times and reduced recurrence of intussusceptions.

Conclusion: Thorough research prior to procurement ensured correct equipment for procedure chosen. Correct procurement process followed ensured swift approval to proceed. Support and advice provided to other centres that had purchased the equipment and those who were looking to procure.