



P054 Degree apprenticeships – The whys and the wherefores in diagnostic radiography

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Background: The Integrated Degree Apprenticeship (IDA) for Diagnostic radiography was published in 2019 and Higher Education institutes are currently preparing for delivery of this programme.

Purpose: The aim of this poster is to explore the rationale for degree apprenticeships within education in general and also in relation to diagnostic radiography.

Summary: This poster will consider a brief of history of radiography education, that has led to current degree level pre-registration qualification. An overview of the political landscape that led to the implementation of the apprenticeship levy will be discussed along with a summary of the subsequent development of degree apprenticeships in healthcare. This will conclude with a brief overview of the IDA in diagnostic radiography.

P055 A rare case of a biopsy-proven solitary cardiac metastasis in a young patient with rectal adenocarcinoma

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Patients with inflammatory bowel disease are at increased risk of colorectal neoplasia. Malignant transformation of chronic perianal lesions to squamous cell carcinoma or adenocarcinoma is a very rare but known complication, especially in patients with Crohn's disease^[1]. Colorectal cancers tend to metastasise to lymph nodes, liver or lungs, although rectal cancers more commonly metastasise to the thorax than colonic tumours^[2]. Metastasis to the heart is rare, especially in rectal cancer^[3], with only a few cases described in the literature. We describe a case of a young female with Crohn's disease who developed a rectal adenocarcinoma within a chronic peri-rectal fistula tract. The patient underwent chemo-radiotherapy and post-treatment pelvic MRI demonstrated a partial response. Interval routine post-treatment CT revealed a large necrotic mass arising from the interventricular cardiac septum. The patient was admitted to hospital shortly after the CT with tachycardia and pyrexia and was treated empirically with antibiotics for suspected endocarditis. Cardiac MRI confirmed a large right ventricular mass invading the cardiac septum with a mobile component prolapsing into the tricuspid valve. PET-CT demonstrated intense uptake of the cardiac mass with no other areas of pathological uptake. Cardiac biopsy was performed as imaging findings were concerning for a solitary metastasis. Endomyocardial biopsy proved metastatic adenocarcinoma consistent with the primary rectal histology. This case presented a diagnostic challenge due to the unusual location of metastasis with no other evidence of metastatic disease. Cardiac biopsy is high risk, but multi-modality imaging findings provided sufficient concern to prove this rare metastasis.

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2. Hemminki, A., Hemminki, K., Riihimäki, M., Sundquist, J. (2016) Patterns of metastasis in colon and rectal cancer. *Sci Rep* 6, 29765.
3. Ayyala, S. S., Kannarkatt, P. T., Kovacs, J. E., Terrigno, N. J. and Urcuyo, D. M. (2017) A Rare Case of Atrial Metastasis From a Rectal Adenocarcinoma. *J Clin Med Res*, 9(10), 886-888.

GI UPPER AND LOWER AND HEPTOBILIARY

P056 Outcomes of radical radiotherapy (55Gy/20#) for oesophageal carcinoma at Clatterbridge Cancer Centre NHS Foundation Trust, UK (CCC) between Jan 2014 and May 2016

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Where chemoradiotherapy is contraindicated, a definitive treatment for oesophageal carcinoma is radical radiotherapy (RT). At CCC, standard dose fractionation is 55Gy/20#. We performed a retrospective audit to assess outcomes. Patients (pts) were identified who received this treatment between Jan 2014 and May 2016. Clinical records including letters, histology and imaging reports were used. 26 pts were identified. Median age was 72 years; 15 were SCC, 11 were adeno; 2 were T1, 13 were T2, 11 were T3; 12 were node positive. For RT technique, 18 had 3D CRT (69%) and 8 had VMAT (31%). Median volume of GTV was 37 cm³ and of PTV was 217 cm³. All pts completed RT treatment. Symptomatically, 19 had response (73%), 5 had no response (19%), and 2 had unknown response to dysphagia (lost to follow-up). Radiologically at first imaging within 6 months of RT: 3 had complete response (12%), 5 had partial response (19%), 9 had stable appearances (35%), 4 had no response (15%), and 5 had unknown response (19%). Overall, 10 had no radiological recurrence (38%), 13 had radiological recurrence (50%), and 3 had unknown recurrence status (12%) as no subsequent scan. Median overall survival (OS) was 11 months (range 3 to 50 months). 1-, 2- and 3-year OS rates were 46%, 23%, and 12%. Median disease-free survival was 7 months (range 3 to 38 months). 1-, 2- and 3-year disease free survival rates were 35%, 15%, 4%. Pearson correlation coefficient for GTV and OS was -0.3 (p = 0.13).



P057 Adhesional small bowel obstruction: Are early abdominal radiographs useful in deciding who needs surgery?

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Background: Adhesional small bowel obstruction (aSBO) is a common cause of emergency surgical admission, carries significant morbidity and mortality, constituting major indication for emergency laparotomies. Gastrografin(GG) has been demonstrated to help identify which patients will need surgery. However there are no clear guidelines on if and when an AXR will guide management. Variation in frequency/timing of AXRs is observed. 4-6hrs post-GG film plus a 12-16hrs one are frequently advocated. We aim to evaluate the impact of these x-rays on patient management.

Methods: Retrospective analysis of all patients presenting with adhesional SBO confirmed by CT on same or previous admission between August-October 2019. Data extracted from electronic medical records, noting time Gastrografin administration, AXRs; time of bowel opening; further imaging/management.

Results: 26 patients with adhesional small bowel obstruction received Gastrografin and were included in the study: AXRs were performed at 4-6hrs in 24 (92%) cases and after 12 hours in 34% of cases. 19 (73%) patients the obstruction resolved and were discharged without further treatment: 14 (53%) in <12hrs, 3 (11%) in 12-24hrs & 2 (8%) in 24-36hrs. Of the 7 (27%) patients who failed to open bowels, 5 (19%) had a laparotomy & 2 (8%) died, as not-fit-for-surgery.

Conclusions: This study has demonstrated that regardless of x-ray findings, it is opening of bowels after gastrographin administration, that guides further management, not the findings. It is recognised that AXRs risk exposure to unnecessary radiation and stretch NHS resources. Recommendation is that imaging be performed at least 12hrs post-GG.

1. Branco, B.C. et al., 2010. Systematic review and meta-analysis of the diagnostic and therapeutic role of water-soluble contrast agent in adhesive small bowel obstruction. *Br J Surg.* 97:470-8.
2. Ceresoli, M. et al., 2016. Water-soluble contrast agent in adhesive small bowel obstruction: a systematic review and meta-analysis of diagnostic and therapeutic value. *Am J Surg.* ;211(6):1114-25.
3. Di Saverio, S. et al., 2013. Bologna guidelines for diagnosis and management of adhesive small bowel obstruction (ASBO): 2013 update of the evidence-based guidelines from the world society of emergency surgery ASBO working group. *World journal of emergency surgery: WJES.* 8(1):42 4.

P058 Congestive hepatopathy (nutmeg liver): Let us think beyond Budd-Chiari

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Background: Perfusion changes in liver secondary to hepatic venous congestion leads to the 'nutmeg liver' appearance. This is classically associated with Budd-Chiari syndrome, the main pathophysiology of which involves partial or complete occlusion of hepatic veins. However, there are other conditions leading to hepatic venous congestion which can give rise to similar appearance. The important ones among these are related to cardiopulmonary diseases like pulmonary embolism, congestive heart failure, etc. The pathophysiology of nutmeg liver appearance in these cases is secondary to increased central venous pressure causing passive hepatic congestion. It is important for radiologists to be aware of these causes and be able to actively look for these when encountered with the nutmeg liver appearance.

Purpose: The aim of this pictorial review is to demonstrate the various causes of nutmeg liver appearance. We aim to include Budd-Chiari syndrome, pulmonary embolism, congestive heart failure and pulmonary artery hypertension and to guide Radiologists to look for causes other than Budd-Chiari syndrome which could cause similar appearances.

Summary: We aim to give a description of the pathophysiology of congestive hepatopathy. The main content of this poster would be CT and MR images of various causes of congestive hepatopathy with appropriate explanation and pointers. We aim to show appearances of liver in conditions like Budd-Chiari syndrome, pulmonary embolism, pulmonary artery hypertension and congestive heart failure.

P059 The effectiveness of abdominal x-ray in the cause of non-traumatic abdominal pain in emergencies

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Background: Abdomen x-rays (AXR) are a commonly requested radiographic examination for non-specific acute abdominal pain. However, recent evidence indicates that one in three patients are discharged from A&E without a diagnosis for their abdominal pain, questioning the role of abdomen x-ray in this clinical pathway.

Method: A literature review of studies and guidelines, dated from 1964 to 2018, was conducted, looking at AXR's effectiveness. The algorithm was constructed based on BMJ best practice guidelines and was coded with Python 3.6.

Result: Despite the documented ineffectiveness of AXR for supporting a definitive diagnosis or leading to a correct treatment alternation and the advancement in CT and ultrasound, there was no dramatic decrease of the AXR used. Only 32% of AXR requests adhered to the Royal College of Radiologists guidelines, which may contribute to the high rate of further imaging and insignificant findings. Since abdominal pain is a symptom for all the justified and most of the unjustified indications, a way to help referrers to distinguish differential diagnoses is urgently required.



Conclusion: The conflicting evidence-base reflects the complexity of the use of AXR, and the issues around guidelines and departmental cultures. More research on this topic is required in the context of the resource usage and radiation risk involved in AXRs. An algorithm was constructed using BMJ Best Practice guidelines to assist referrals for acute abdominal pain. However, this study suffered from a few limitations. The algorithm has not been used clinically; further testing is needed.

P060 Gastrointestinal stromal tumours (GIST): Role of imaging in diagnosis, staging and response assessment – A pictorial review

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Background: Gastrointestinal stromal tumours (GIST) are mesenchymal tumours that arise from the gastrointestinal (GI) tract. They most commonly occur in the stomach but can also be found throughout the GI tract. Radiological manifestations of GISTs are highly varied and treatments include surgery and tyrosine kinase inhibitors such as imatinib. Measuring tumour size using computed tomography (CT) is an unreliable method of assessing response to imatinib and the Choi response criteria for GIST (assessing size and attenuation characteristics) is more commonly used¹. Functional imaging using positron emission tomography (PET) can also be used in the initial staging of selected cases and in assessing treatment response of these tumours.

Purpose: The purpose of the poster is to provide an educational pictorial review for radiology trainees and general radiologists of the different radiological manifestations of GISTs and the different locations where these tumours can occur in the GI tract. The poster will provide insight into staging, complications of GIST such as bleeding, assessing tumour response following imatinib using the Choi response criteria and also highlight the role of PET-CT in selected cases.

Summary: Pictorial review of selected cases to illustrate the CT and PET imaging features of GISTs to guide initial diagnosis, staging and assessment of treatment response.

1. Choi, H., Charnsangavej, C., Faria, S., Macapinlac, H., Burgess, M., Patel, S., Chen, L., Podoloff, D. and Benjamin, R. (2007). Correlation of Computed Tomography and Positron Emission Tomography in Patients With Metastatic Gastrointestinal Stromal Tumor Treated at a Single Institution With Imatinib Mesylate: Proposal of New Computed Tomography Response Criteria. *Journal of Clinical Oncology*, 25(13), pp.1753-1759.

P061 Actionable reporting of emergency CT abdomen and pelvis

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Background: Audit exploring whether emergency CT abdomen and pelvis are 'actionable' reports. The Royal College of Radiologists (RCR) presented standards for actionable reporting. Reports should answer the clinical question posed by the referrer, accurately describe findings and diagnoses, with appropriate advice on next step of patient management.

Method: The first 75 Emergency CT abdomen and pelvis with contrast from the beginning of August 2019 were evaluated. We assessed whether: the report answered the clinical question; a tentative or differential diagnosis was given when an abnormality was described, next step advice was given and whether this advice was appropriate. Registrar reports were used for data analysis. Reports were deemed to have answered the clinical question if was explicitly or indirectly addressed. If there was no Registrar report, Consultant report was used. If neither Registrar nor Consultant provided next step advice, the report was deemed 'normal' and therefore 'appropriate' with regards to next step advice.

Results: 100% of all reports answered the clinical question. Of these 85% explicitly answered the clinical question. 98.7% of all reports provided tentative diagnosis. 81.8% of scans that provided next step advice were deemed to be appropriate.

Conclusion: Largely, we are meeting targets as per RCR standards, however there is scope for improvement. Overall, we are performing best in the domain of answering the clinical question (explicitly or indirectly). Followed by providing a (tentative) diagnosis. The area with most room for improvement is providing appropriate next step advice.

1. RCR. (2018) Standards for interpretation and reporting of imaging investigations. 2nd ed. BFCR (18)1 London, Royal College of Radiologists.

P062 All that glitters is not gold – A case report of peritoneal amyloidosis

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Introduction: Imaging is done on patients for various reasons. These images may show mass lesions of varying nature from benign, inflammatory, metabolic or malignant. Without histological assessment, it is difficult to comment on the definitive diagnosis.

Case report: We report a case of 66-year-old man with history of haematuria and raised PSA. CT KUB with triple phase and MRI prostate were done but no cause of haematuria was identified except for incidental findings of multiple foci of small soft tissue lesions with calcifications within the peritoneal cavity, presacral region at S1 and the left par spinal region at T11. MRI prostate showed similar finding at S1 suggestive of soft tissue lesion with calcification. PET was recommended as significance of the findings were unclear. PET showed moderate avidity within these foci. CT guided biopsy of the par spinal lesion was



recommended as the significance of these lesions were uncertain. Up to this stage, the first differential diagnosis was malignancy. The final diagnosis of amyloidosis was made histologically.

Conclusion: Amyloidosis includes a group of diseases where there is extracellular deposition of amyloid. The deposition may be systemic, organ-limited or localized. Localised amyloidosis is uncommon. Imaging characteristics are nonspecific and can lead to clinical suspicion of malignancy. Learning points: Unusual calcifications should not be disregarded as benign or non-significant. Amyloidosis can mimic malignancies and hence biopsy is mandatory. All that glitters are not gold and all that look abnormal on imaging is not cancer.

1. Krishnan J, Chu W, Elrod JP, Frizzera G (1993) Tumoral presentation of amyloidosis (amyloidomas) in soft tissues. *American Journal of Clinical Pathology* 100(2): 135-144 (PMID: 8356946).
2. Czeyda-Pommersheim F, Hwang M, Chen SS, Fuhrman C, Bhalla S (2015) Amyloidosis: modern cross-sectional imaging. *Radiographics* 35: 1381-1392 (PMID: 26230754).
3. Urban BA, Fishman EK, Goldaman SM et al (1993) CT evaluation of amyloidosis: spectrum of disease. *Radiographics* 13: 1295-1308 (PMID: 8290725).

URORADIOLOGY GU / ENDOCRINE

P063 Comparison of inter-observer variability (IOV) in prostate IGRT using 3D-CBCT fiducial or soft tissue registration

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Background: Knowledge of IOV is essential when calculating clinical target volume (CTV) to planning target volume (PTV) margins in prostate radiotherapy. With daily IGRT, set-up error is corrected and other sources of uncertainty become more important. Our aim was to quantify IOV for prostate RT when using 3D-CBCT fiducial match (FM) or prostate soft tissue (ST) match.

Methods: This retrospective study included low/intermediate risk patients completing 60Gy/20 fractions. Patients either had FM or ST for registration. Anonymised CBCT images for 1 fraction per patient were: set to acquisition position, re-registered (either FM or ST) and analysed. Observers were blinded to match values. Vertical, longitudinal and lateral values recorded. Two-way ANOVA was performed and plotted using Modified Bland Altman limits of agreement (LoA), and descriptive statistics reported.

Results: A total of 6 patients with FM, and 6 patients with no markers were analysed. Each image set was registered by 10 observers i.e. 120 registrations. IOV CBCT-FM, 95% mean LoA was ± 1.7 mm, ± 2.2 mm and ± 0.7 mm in vertical, longitudinal and lateral axes. No statistical significance (<0.05) was found within the FM group in vertical, longitudinal or lateral axes ($p=0.27$, $p=0.82$, $p=0.21$). For CBCT-STs, 95% mean LoA was ± 2.6 mm, ± 3.1 mm and ± 0.7 mm. Statistical significance was found in ST group on vertical axis only ($p=0.04$) but not lateral or longitudinal axes ($p=0.07$; $p=0.43$).

Conclusion: IOV is larger when registering to ST than FM. When attempting to reduce PTV margins, IOV should be understood and applied to margin calculation.

P064 Leiomyoma of the urinary bladder: A pictorial assay of a rare tumour

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Introduction: Bladder leiomyoma is the most frequently encountered benign mesenchymal vesical tumour and, in itself, constitutes less than 0.5% of all tumours of bladder origin. The body of literature describing the condition is very scarce with less than 250 cases being reported over the last century. Here, we present three cases of vesical leiomyoma and review the literature pertaining the condition. Clinical presentation: The mean age of presentation is 52 years (23 to 77 years) with a literature discrepancy regarding gender distribution although a female to male ratio of 3:1 has been reported. Lesions can be intravesical, mural, or extravesical. While the vast majority of extravesical and mural lesions are asymptomatic, the presentation of intravesical neoplasms may include haematuria, urinary frequency, mass effect, or bladder outflow obstruction.

Radiological features: On ultrasonography, leiomyoma is a typically smooth-walled, homogeneously hypoechoic, solid neoplasm with a thin echogenic surface. On computed tomography, it appears as a hypodense lesion with poor to moderate enhancement characteristics. Magnetic resonance imaging is superior to ultrasound and computed tomography and helps in differentiating between benign leiomyomas and malignant leiomyosarcomas. Leiomyoma has a low to intermediate signal intensity on T1 and low signal characteristics on T2 weighted sequences. Contrast enhancement is variable and is usually absent in degenerating lesions.

Treatment: Treatment of bladder leiomyoma is surgical resection. While transurethral resection of bladder tumours is generally preferred for small-sized neoplasms with intravesical localisation, partial cystectomy and segmental resection are preferred for larger lesions.