vulnerabilities in relation to training-load. Further research is needed to understand the lower QUS measurements in ballet dancers.

1. Vlachopoulos D, Barker AR, Williams CA, et al. The Impact of Sport Participation on Bone Mass and Geometry in Male Adolescents. Med Sci Sports Exerc 2017; 49(2): 317-26.

HEAD & NECK/NEURO

P023 4D Dynamic CT imaging of the eustachian tube - technique and future applications

David Shatti; Charlotte Jones; John Hamilton; Garrett McGann
Cheltenham General Hospital

Already established in imaging of dynamic tracheal collapse, 320-slice multi-detector CT offers the unique opportunity to view the post nasal space airway and Eustachian tube ostium during swallowing using up to a 16 cm field of view and up to seven rotations in the same position. A 2,240 image dataset is acquired during coached swallowing at low dose and then merged into 2- and 3D movies. We aim to show, by volume rendered movies, the changes that occur in the orifice and the length of the Eustachian tube in a variety of benign pathologies of the post nasal space and tubes. We believe that nasal endoscopy and other conventional ways of tube demonstration have been unable to demonstrate the dynamic changes observed. The mean DLP was a modest 115.2 mGy.cm. The technique with dose minimisation and outcomes are discussed with reference to 12 cases studied over a 30 month period.

P024 Imaging features of Gorlin-Goltz Syndrome

Catrin Sohrabi [1]; Radika Mistry [2]; Sundip Udani [3]
[1]Barts and The London School of Medicine and Dentistry; [2]Shepley Dental Practice; [3]Guy's and St Thomas' NHS Foundation Trust

Background: Gorlin-Goltz syndrome (GGS) is a rare multisystemic disease with an autosomal dominant trait. Diagnostic radiology for assessment includes orthopantomogram, skull and chest radiographs and computed tomography scans. A 20-year-old male was diagnosed with GGS following a nine-year history of multiple jaw cysts and known hydrocephalus at birth. Initial presentation was at his dentist, which revealed two hard swellings on the buccal surface of the alveolar bone in the left mandible. An orthopantomogram revealed large radiolucent cystic lesions affecting the developing adult dentition. Further investigations revealed cysts in the maxilla whilst skull and chest radiographs showed falx cerebri calcification and multiple bifid ribs respectively. There was no known family history of the disorder. Following diagnosis, the patient underwent cyst enucleation. Histology confirmed odontogenic keratocysts. DNA testing revealed a significant patched (PTCH) gene defect indicative of a GGS diagnosis.
Purpose: To highlight the importance of a multidisciplinary approach to providing accurate diagnosis and better patient care. To highlight the importance of different radiologic imaging in GGS diagnosis, and to present the key radiological findings; this is important since early detection facilitates timely treatment.
Summary: This case demonstrates the diagnostic imaging-driven evaluation of a patient presenting with GGS and a past history of hydrocephalus, and that was subsequently treated via cyst enucleation. It focuses on how different members of the multidisciplinary team are needed in managing the dento-alveolar aspect, as well as of the importance of dermatological, orthopaedic and clinical geneticist involvement.

P025 A guide to the petrous apex for the general radiologist

Jack Looker; Mirna Long; Tom Sulkin; Nick Hollings; Benjamin Rock
Royal Cornwall Hospitals NHS Trust

The petrous apex is routinely included on cross-sectional imaging of the skull. The paired triangular-shaped structures are directed toward the medial skull base. The petrous apex houses a number of vascular and neurological channels and has an intimate relation to the internal carotid artery, cavernous sinus and Meckel's cave. A variety of developmental, infectious, inflammatory, neoplastic and vascular pathologies may affect this region. The purpose of our review is to illustrate the anatomy of the petrous apex and clinically-important pathologies and normal variants which make the petrous apex an important review area to the general radiologist.

P026 Review of imaging in advanced head and neck cancer; compliance with NICE quality standard for use of PET-CT

Muhammad Imran Choudray; Edward Lightfoot; Aristotelis Poulios; Nicholas Spencer
Mid Yorkshire Hospitals NHS Trust

Background: Upper aerodigestive tract cancers commonly present late due to lack of symptoms in low-stage disease. Advanced imaging modalities, particularly positron emission tomography with CT (PET-CT), play a central role in accurate staging of advanced disease, contributing significantly to management planning and prognostication. This review was undertaken to evaluate use of the range of advanced imaging, both to measure local compliance with NICE quality standards, and to identify patterns of presentation, particularly in cases with advanced disease. Through retrospective review of 115 patients discussed in a specialist Head & Neck Multidisciplinary team meeting over a three month period in 2018, cases were identified that met the

criteria for PET-CT. This was to validate stage at diagnosis, and to review use of advanced imaging modalities, including, CT, MRI and PET-CT in this patient group.

Purpose:

- Provide a methodology for review of a NICE Quality Standard in Radiology
- Summarise the patterns of presentation in cases with high stage Head and Neck cancer
- Discuss imaging strategies in head and neck cancer, including case selection for PET-CT

Summary: The poster will describe our methodology for undertaking this review, including tabulated results for the range of imaging utilised. Alongside selected images, the patterns of presentation of advanced disease will be described. In addition to reporting our performance against the NICE Quality Standard, UKIO participants will be able to take away a handout to assist them to undertake a similar audit in their own centres.

P027 **Acute stroke referrals from Accident and Emergency (A&E): Are we scanning within the hour?**

Katy Marsh; Katherine Sharkey
St Helen's and Knowsley

In the UK, stroke is a leading cause of death and disability[3]. Under the NICE guidelines[4] and The National Stroke Strategy[2] patients with acute stroke symptoms should be imaged in 'the next slot, or within one hour, whichever is sooner'. Treatment within the golden hour results in better outcomes and reduced mortality and morbidity rates[1]. The aim of this audit is to investigate radiology's role in the diagnosis of acute stroke.

A retrospective audit was undertaken on the CT head pathway for acute stroke patients attending A&E in September 2018. Our trust uses "urgency code 2" to highlight these patients. The audit explored if the trust was complying with the NICE guidelines, by examining the speed of the pathway from when the order was placed, to a formal report. 52 scans were performed under the urgency 2 code, 45 of these patients presented with acute stroke symptoms.

Below shows the mean value of data collected. Order being placed to patient attending: 11 Minutes From attending to post processing the scan: 12 Minutes Time taken to report from examination: 35 Minutes TOTAL: From order placed to report: 58 Minutes To conclude the trust is complying with the NICE guidelines. Further months are currently being audited to ensure the sample is more representative. The variance between in and out of hours reporting is an area for improvement. However, this audit did not consider scans incorrectly requested under the wrong codes, this will also be explored.

1. Advani, R., Naess, H. and Kurz, M. (2017). The golden hour of acute ischemic stroke. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine, 25(1), pp1-5.
2. Department of Health (2007). National Stroke Strategy: Department of Health – Publications
3. Gov.uk (2018). New figures show larger proportion of strokes in the middle aged
4. NICE (2008). Stroke and transient ischaemic attack in over 16s: diagnosis and initial management: Guidance and guidelines - NICE

P028 **The use of 4dct in highlighting the location of parathyroid adenoma and comparison with ultrasound/nuclear scintigraphy - our experience**

Abul Haque; Changez Jadun
University Hospitals of North Midlands NHS Trust

Background: 4DCT is a relatively new modality of imaging being used to locate parathyroid adenomas. It is often used subsequent to Ultrasound and/or Nuclear Medicine (SestaMIBI) scans as a potential third modality of imaging to help provide further confirmation of the location of a suspected parathyroid adenoma[1]. This is particularly useful as increasingly surgeons are resorting to minimally-invasive surgery to resect these adenomas and 4DCT helps them carry out this surgery with increased confidence[2]. Sensitivity of Ultrasound and MIBI varies in the current literature but is generally between 75-80%[3]. Hence, this audit was carried out in our Trust to see if the use of 4DCT subsequent to Ultrasound and MIBI, increases sensitivity any further.

Methods: A retrospective audit was carried out that looked at all the cases of histologically-confirmed parathyroid adenoma in our Trust over the last five years, which had used 4DCT to pre-operatively help confirm the site. Using CRIS, we then established how many of these cases had also made use of Ultrasound and Nuclear scintigraphy beforehand. The percentage of true positives was then calculated to give us the sensitivity of the three methods combined.

Results: The combined use of Ultrasound, MIBI and 4DCT led to a sensitivity of 89% which is an increase of almost 10% compared to using only Ultrasound and MIBI.

Conclusion: A combination of Ultrasound, MIBI and 4DCT demonstrates almost 90% sensitivity in the detection of parathyroid adenoma and so we recommend that a combined approach be adopted by radiologists.

1. Christakis I. et al. (2017) The diagnostic accuracy of neck ultrasound, 4D-Computed tomographyand sestamibi imaging in parathyroid carcinoma. *Eur J Radiol.* ***95****, 82-88*
2. Wang T.S et al. (2011) Would scan, but which scan? A cost-utility analysis to optimize preoperative imaging for primary hyperparathyroidism. *Surgery* ***150****(6),1286-94*
3. Tublin M.E. et al. (2009) Localization of parathyroid adenomas by sonography and technetium tc 99m sestamibi single-photon emission computed tomography before minimally invasive parathyroidectomy: are both studies really needed? *J Ultrasound Med.* ***28****(2):183-90*

P029 **Repeatable accurate targeting of the lacrimal region for CBCT scanning**

Alexandros Leontaritis; Kane Roskell; Veronique Sauret-Jackson
Cavendish Imaging Ltd

Introduction: CBCT is an effective modality at minimising radiation and maximising anatomical detail of the lacrimal region. However accurate targeting of the region of interest (ROI) is vital for the radiographer to perform the correct scan. This work aims to produce an effective scanning protocol, including all essential anatomy in the smallest field-of-view.
Method: Twenty maxillofacial scans (10 males and 10 females, 20-40 years old) were randomly selected. The ROI was defined as the area covering both lacrimal ducts, sacs and caniculi. Various FOVs were applied over this ROI. This was completed by two operators to evaluate inter-operator variability.
Results: The largest FOV tested was 17cm-diameter x5cm-height but, on all scans, both ducts fitted within a FOV of 6cm-diameter x5cm-height. A 4cm-diameter x5cm-high volume was too small. To target the 6cm-diameter x5cm-height ROI accurately over the whole of the lacrimal anatomy, the smallest scout size used was 8cm by 8cm. The AP scout was centred on the patient's MSP. The vertical limits of the 5cm-high volume were the nasal bone and the base of the nasal spine. Laterally, the 6cm-diameter FOV was centred onto the inner-canthus. Both operators enclosed the ROI in these scans. The DAP of 1280mGy.cm2 used for the largest scan was reduced to 685mGy.cm2 with the 6x5cm FOV. The voxel size was 125 microns.
Conclusion: Using 8cmx8cm scouts, followed by a 6cm-diameter x5cm-height volume precisely positioned achieves a repeatable CBCT scan of the lacrimal region. This anatomically-specific protocol is a valuable aid to the radiographer.

P030 **A pictorial review of hypoglossal nerve palsy and its causes**

Hannah Marsh; Naomi Fenton; Susan Armstrong
University Hospitals Bristol

Hypoglossal nerve palsy is a relatively rare entity which has a characteristic radiological appearance, with unilateral intrinsic and extrinsic tongue muscle atrophy on the ipsilateral side of the causative lesion. Unilateral tongue atrophy should prompt the radiologist to search for pathology along the anatomical path of the ipsilateral hypoglossal nerve from the medulla oblongata to the oral cavity. It is therefore essential that the radiologist is familiar with the anatomy of the hypoglossal nerve in order to scrutinise its entire course for the causative lesion. MRI is the preferred modality for imaging a patient with hypoglossal nerve palsy as it allows both excellent visualisation of the unilateral tongue atrophy and identification and characterisation of the causative lesion. We review the segmental anatomy of the hypoglossal nerve, and present a pictorial review of our case series of hypoglossal nerve palsy, classified according to anatomical site.

Thompson EO & Smoker WR Hypoglossal nerve palsy: a segmental approach.(1994) Radiographics 14(5)

P031 **The implementation and benefits of multidisciplinary cone beam CT reviews for head and neck radiotherapy**

Joanna Barraclough; Alicia Drage; Clair Mckeown; Emmet Todd; Ruth Turrell
East Suffolk and North Essex NHS Foundation Trust

Background: At Colchester the position of head and neck patients is verified using online kV-kV bony match and check of neck flexion. Recently the department implemented weekly cone beam CT (CBCT) imaging to provide information about internal anatomy and external contour changes. The CBCT is acquired after the online match has been completed.
Method: The CBCTs are reviewed offline by radiographers and physicists with a view to identify problems such as change in contour due to weight loss, change to tumour in response to treatment or swelling caused by oedema or chemotherapy. This identifies those that need clinician review due to anatomical changes or further dosimetric calculation to assess the impact of shape change. All patients are reviewed by a clinician half way through treatment.
Results: We provide examples of issues identified by this process that resulted in a modification to the patient's treatment which may not have been spotted using kV imaging alone. These include significant tumour growth identified at the first fraction resulting in treatment suspension pending a new treatment plan and a reduction in tumour size as treatment progressed which resulted in a replan. We also show how dosimetric calculations using the CBCT dataset can be used to determine whether a change in patient contour due to weight loss is significant enough to merit further action.
Conclusion: The implementation of CBCT has facilitated the identification of internal anatomical changes that cannot be identified using kV imaging and has provided data for dosimetric assessment of shape change.

P032 **Our experience of head and neck VMAT commissioning**

Eleftherios Kazamiakis; Sarah Betts; Peter Anthony; Julian Phillips
Norfolk & Norwich University Hospitals NHS Foundation Trust

Background: The current technique implemented in the department for H&N patients is IMRT. This was due to the limited VMAT capacity. IMRT plans include 5-9 fields resulting up to 18 subfields.
Since the capacity issue was resolved it was decided to move to VMAT which provides shorter time on the machines, comparable PTV coverage, better OARs sparing and less MUs[1,2].

Method: 24 IMRT H&N patients, with varying laterality, were chosen to be re-planned. The scans were acquired by the GE LightSpeed and plans were produced with Varian's Eclipse v.13.7 using the AAA algorithm. The VMAT plans were qualitatively and quantitatively evaluated against the IMRT plans based on the Conformity Index (CI), MUs, PTV coverage and OARs sparing. The dosimetric accuracy of the VMAT delivery was validated with PTW's 1500 2D ion chamber array, with γ-analysis criteria of 3%/3mm and 2%/2mm.
Results: The plans selected for valuation had adequate PTV coverage and OAR sparing. The mean CI was found to be 0.519 for VMAT against 0.520 for IMRT. The MUs for VMAT were ~36.50% lower for bilateral and ~15.47% higher for unilateral patients. The pass rates for 3%/3mm were (97.5±2.9)% and for 2%/2mm (90.6±6.7)%.
Conclusion: VMAT plans were found to provide similar or on some cases better results on PTV coverage and OARs sparing, especially brainstem and spinal cord. VMAT QA results were within 95% pass rate for 3%/3mm local gamma assessment (departmental criteria). The technique was commissioned as it was found clinically appropriate for implementation.

1. Ezzell, G.A., Galvin, J.M., Low, D., Palta, J.R., Rosen, I., Sharpe, M.B., Xia, P., Xiao, Y., Xing, L. and Yu, C.X., 2003. Guidance document on delivery, treatment planning, and clinical implementation of IMRT: report of the IMRT Subcommittee of the AAPM Radiation Therapy Committee. Medical physics, **30**(8), pp.2089-2115
2. Stieler, F., Wolff, D., Schmid, H., Welzel, G., Wenz, F. and Lohr, F., 2011. A comparison of several modulated radiotherapy techniques for head and neck cancer and dosimetric validation of VMAT. Radiotherapy and Oncology, **101**(3), pp.388-393

P033 Knowledge-based planning for head and neck radiotherapy treatment planning

Joanne White [1]; Matthew Jones [2]; Richard Powis [1]; Andrew Bird [1]; Gareth Baugh [2]; Gareth Webster [1]
[1]Worcestershire Oncology Centre; [2]Arden Cancer Centre

Background: The presence of multiple critical organs at risk (OAR) proximal to treatment targets in head and neck (H&N) cancer, often results in complex radiotherapy treatment plans trading-off radiation dose to the tumour and nearby OARs. Plan quality and consistency can vary between and within radiotherapy centres, negatively impacting tumour control and OARs. Knowledge-based planning (KBP) is a proposed solution to increase plan consistency. We aimed to develop a local KBP tool for H&N radiotherapy treatment planning, investigating its impact on plan quality.
Method: Historical data from two radiotherapy centre RayStation databases were analysed using in-house IronPython scripts. Primary analysis focused on modelling achievable parotid gland dose plotting overlap between parotids and target against mean parotid dose[1,2]. This process was repeated for spinal cord and brainstem using minimum OAR-target separation and maximum OAR dose. Experienced planners participated in a blinded review of several plans with varying levels of agreement between current and modelled dose.
Results: KBP models identified several potential outlying plans based on OAR sparing; these same plans were identified in the blinded planner review as having sub-optimal OAR sparing. Results for spinal cord suggested that a more complex model is required to predict achievable cord doses. Statistical comparison yielded similarity between plans from the two centres.
Conclusion: KBP was successfully employed to identify H&N plans with sub-optimal OAR doses which could benefit from replanning. These findings prompted a review of local planning practices. KBP can be useful for cross-institutional plan evaluation.

1. Moore, K.L., Brame, R.S., Low, D.A., and Mutic, S. (2011). *Experience-based quality control of clinical intensity-modulated radiotherapy planning*. Int. J. Rad. Onc. Bio. Phys. **81**(2), 545-551
2. Powis, R., Bird, A., Brennan, M., Hinks, S., Newman, H., Reed, K., Sage, J., and Webster, G. (2017). *Clinical implementation of a knowledge based planning tool for prostate VMAT*. Rad. Onc. **12**, 81

P034 An evaluation of the information on Human Papilloma Virus (HPV) given to patients diagnosed with HPV positive head and neck cancers

Rebecca Jopson
University of Liverpool

Background: Incidence rates of Human Papilloma Virus (HPV) positive head and neck cancer (HNC) are increasing. There is a paucity of evidence on available patient information and education of health professionals to provide information following such a diagnosis, which is widely stigmatised as a sexually transmitted disease. Patient information was explored in a survey of health professionals involved in the care of patients with HNC.
Method: An online questionnaire was distributed to health professionals through the British Association of Head and Neck Oncologists website. The questionnaire explored the theme of patient information for HPV associated HNC and the knowledge and confidence of health professionals in providing patients with information.
Results: Twenty-four health professionals from six professions and five UK cancer alliances completed the questionnaire. On a scale of one to ten, mean confidence in providing HPV related information was 5.8. Forty-eight percent of participants did not know whether patients were routinely provided with information regarding HPV following a positive diagnosis; twenty-seven percent indicated that specific information was available within their trust, however fifty percent were unaware of the content of the information leaflets available. Fifty-nine percent of respondents stated that it was not documented when patients received information on their HPV diagnosis.

Conclusion: Inconsistencies exist in patient information on HPV available across the participating Cancer Alliances. A need was identified for the education of health professionals involved in the care of patients with HPV positive cancer. More effective record keeping of the information given is also required.

P035 **Characterisation of multiple sclerosis on the brain magnetic resonance images using texture analysis**

Simaa Hamid [1]; Mohmed Abuzaid [2]
[1]SUTS; [2]University of Sharjah

Multiple Sclerosis (MS) is the most common chronic autoimmune demyelinating inflammatory disease of the central nervous system, which can be diagnosed by magnetic resonance imaging (MRI) by evidence of multiple patches Wight of scar tissue in different parts of the central nervous system on T1 weighted images, T2 weighted image, and FLAIR. Texture analysis evaluates interpixel relationships that generate characteristic organizational patterns in an image, many of which are beyond the ability of visual perception.

The aim of this study was to characterize MS plaques in MR images using Texture analysis which facilitate pattern recognition that might not visible to the human eye. This study is an analytical study, which conducted at Modern medical Centre and Omdurman military hospital in a period from December 2015 to March 2018. The sample of this study consisted of 200 MR brain (T1, T2, and FLAIR) images selected conveniently from a patient with MS. Computer-based software Interactive Data Language (IDL) and stepwise linear discriminant analysis were used to generate a classification score and to select the most discriminant features that can be used in the classification of normal and abnormal brain tissues.

The results reveal that the MS areas were very different from the CSF, bones, white matter and gray matter. However, plaques can be identified and classified using textural analysis with high sensitivity of 90.9% for first order statistics and 96.9% using higher order statistics. In conclusion, the textural feature can be used with some confidences to pinpoint the areas of MS in brain images. Generation of image processing unit is recommended to decrease the misdetection rate.

1. Fazekas, F., Barkof, F., Filippi, M., Grossman, R.I., Li, D.K.B., McDonald, W.I., McFarland, H.F., Patty, D.W., Simon, J.H., Wolinsky, J.S., Miller, D.H.: The contribution of magnetic resonance imaging to the diagnosis of multiple sclerosis. Neur. 53, 44-456 (1999)
2. Barnett MH, Prineas JW (2004) Relapsing and remitting multiple sclerosis: pathology of the newly forming lesion. Ann Neurol 55: 458–468
3. Gay F (2007) Bacterial toxins and Multiple Sclerosis. J Neurol Sci 262: 105–112
4. Allen IV, McKeown SR. A histological, histochemical and biochemical study of the macroscopically normal white matter in multiple sclerosis. J Neurol Sci 1979;41:81-91
5. Griffin CM, Dehmeshki J, Chard DT, et al. T1 histograms of normalappearing brain tissue are abnormal in early relapsing-remitting multiple sclerosis. MultScler 2002; 8:211–216
6. Davies GR, Tozer DJ, Cercignani M, et al. Estimation of the macromolecular proton fraction and bound pool T in multiple sclera sis. MultScler 2004; 10:607–613.2
7. Bonzano L, Roccatagliata L, Mancardi GL, Sormani MP. Gadolinium-enhancing or active T2 magnetic resonance imaging lesions in multiple sclerosis clinical trials? MultScler. 2009; 15: 1043–1047. doi: 10.1177/1352458509106610 PMID: 19570818
8. Haralick RM, Dinstein I and Shanmugan K. Textural features for image classification. IEEE Trans Syst Man Cybern. 1973; SMC-3: 610–621
9. ang X. Texture information in run-length matrices. IEEE Trans Image Process. 1998; 7: 1602–9. doi: 10.1109/83.725367 PMID: 18276225
10. G. Castellano, L. Bonilha, L. M. Li, and F. Cendes, Texture analysis of medical images, Clinical Radiology, vol. 59, no. 12, pp. 1061–1069, 2004
11. M. M. Galloway, Texture analysis using gray level run lengths, Computer Graphics and Image Processing, vol. 4, no. 2, pp. 172–179, 1975
12. Chu A., Sehgal C.M., Greenleaf J. F., Use of gray value distribution of run length for texture analysis. Pattern RecognitionLetters, vol. 11, n° 6, p. 415-419, 1990
13. Galloway M. M., Texture analysis using grey levelrun lengths, Computer Graphics Image Processing,vol. 4, p. 172-179, July, 1975
14. Haralick R.M., Shanmugam K., Dinstein I., Textural features for image classification, IEEE Transactionson Systems, Man and Cybernetics, vol. 3, p. 610-621, 1973
15. Xu D., Kurani A., Furst J., Raicu D., RunLength Encoding For Volumetric Texture, International Conference on Visualization, Imaging and Image Processing (VIIP), p. 452-458, 2004

P036 **Audit of adequacy of clinical information provided on electronic requests for MRI brain for Hypoxic Ischemic Encephalopathy**

Syeda Saba Muneer Ahmed; Nadir Khan
Royal Stoke University Hospital

Background: Hypoxic Ischemic Encephalopathy (HIE) is one of the most common causes of cerebral palsy, with an incidence of 2 to 9 per 1000 live births[1]. MRI (magnetic resonance imaging) is the gold standard imaging technique for suspected HIE[2]. Accurate assessment of the imaging depends on its correlation with clinical history. Our QIP aimed to identify if adequate clinical information was being provided on the requests to diagnose HIE.

Method: A retrospective analysis of MRI requests from CRIS software was done to evaluate if requests made for MRI head for HIE entailed the following details: Gestational age at birth, date, duration and severity of hypoxic event and if therapeutic cooling was given. A total of 40 requests were studied, requested over three years (04/2015 to 04/2018).

Results: Analysis revealed that only half of the requests provided the gestational age at birth, date and duration of the hypotensive episode. Only one-sixth of the requests contained the severity of the hypoxic insult however, most of the requests specified whether or not therapeutic cooling was given.

Conclusion: Poor compliance was noted in providing details needed to facilitate accurate interpretation of images. Commonly identified reasons included lack of awareness among referring clinicians about the need to include above mentioned

information and limited character space on the electronic request. Presentation of the audit findings at the neonatal MDT meeting and discussion with the clinicians enforced the need to include clinical details. Educational posters were displayed in the neonatal wards to facilitate change and improve practice.

1 .Â Dodd KL, Hull J: Falling incidence of hypoxic-ischaemic encephalopathy in term infants.Â Br J Obstet Gynaecol1992; 99: 386â€"391
2. Barkovich AJ. The encephalopathic neonate: choosing the proper imaging technique.Â AJNR Am J Neuroradiol1997; 18: 1816â€"1820

P037 A rare case of an intracranial germinoma with granulomatous reaction mimicking a neuroinflammatory lesion

Philippa Lee; Sabrina Kalam; Victoria Singh-Curry; Michael Gonzalez
Imperial College London

Tumours of the pineal gland are extremely rare, comprising less that 1% of all intracranial tumours[1]. Of these lesions the most common are pineal germinomas, which account for 50% of cases and are typically seen in males in the 1st and 2nd decades of life cases[2].

Intracranial germinomas are typically midline lesions which are more likely to be found within the pineal region than any other intracranial locations. While the gonadal and extra-gonadal variants classically demonstrate granulomatous inflammation, this is rarely seen with intracranial germinomas and when present can mimic neuro-inflammatory lesions such as sarcoidosis. Thus pineal germinomas associated with granulomatous reactions can pose a significant diagnostic and clinical challenge.

We present the case of a young gentleman who presented with right upper limb ataxia, parasthesia and squint. An MRI head demonstrated a contrast-enhancing lesion in the left midbrain associated with granulomatous reaction. A surgical biopsy was initially avoided due to the eloquence of this area. Interval imaging revealed some reduction in the size of the mass following steroids. However, there was subsequent clinical and radiological progression and a stereotactic biopsy was performed. Histological analysis of the lesion confirmed it to be a germ cell tumour with an intense granulomatous reaction. This case highlights the importance of suspecting germinomas with all intracranial midline lesions associated with granulomatous reaction. When there is diagnostic uncertainty and atypical imaging features, histological analysis should be undertaken where possible. This presentation will outline the typical and atypical radiological appearances of intracranial germinomas.

1. Al-Hussaini, M., Sultan, I., Abuirmileh, N., Jaradat, I., Qaddoumi, I. (2009) Pineal gland tumors: experience from the SEER database. J Neurooncol. **94**(3), 351-358
2. Seilanian Toosi, F., Aminzadeh, B., Faraji Rad, M., Nekooei, S., Nahidi, M., Keykhosravi, E. (2018) Pineal and Suprasellar Germinoma Cooccurence with Vertebra Plana: A Case Report. Brain Tumor Res Treat. **6**(2):73-77

P038 Vessel wall MRI to identify vulnerable atherosclerotic plaque as a cause of acute ischaemia

Sundip Udani [1]; Pervinder Bhogal [2]
[1]Guy's and St Thomas' NHS Foundation Trust; [2]Department of Interventional Neuroradiology, The Royal London Hospital

Background: A 61-year-old man presents with alexia, dysphasia and ataxia. CT showed hypoattenuation consistent with acute infarction in the posterior circulation territory. MRI showed diffusion restriction. CTA showed only a non-stenotic, ulcerated plaque of the right V4 vertebral artery (VA)(Figure 1). Doppler, echocardiogram, and 24hr ECG were normal.

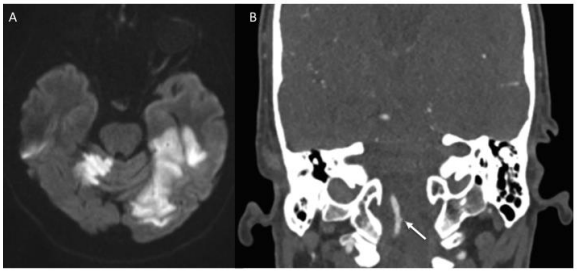

Figure 1. Neuroimaging (Diffusion Weighted MRI, CTA) following acute neurological symptoms DWI demonstrating acute ischaemic lesions in the right cerebellum, left parahippocampal and fusiform gyri and left occipital lobe (A). CTA demonstrating subtle irregularity of the right V4 VA (B). Vessel wall MRI demonstrated prominent eccentric enhancement of the V4 segment, correlating with the CTA abnormality, and consistent with atherosclerotic plaque (Figure 2). No abnormal intracranial enhancement was seen elsewhere.

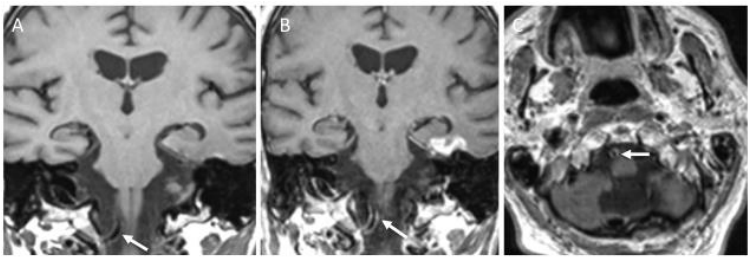

Figure 2. Vessel wall MRI imaging Blood suppressed vessel wall MRI coronal T1 weighted pre contrast (A), coronal T1 weighted (B) and axial T1 weighted (C) post contrast demonstrating eccentric enhancement of the medial wall of the right V4 segment VA. Vessel wall MRI can help identify active disease processes affecting the vessel wall including non-stenotic, atherosclerotic plaque and vasculitis (1,2). Purpose and summary: This case will highlight the importance of MRI black blood imaging techniques to identify a cause of acute ischaemia that is not evident on traditional imaging sequences. Understanding the pathophysiology and being able to apply this to patients will aid diagnosis and help tailor management. Overall the patient will benefit from accurate diagnosis and prevention of further acute ischaemic events.

1. Bhogal P, Navaei E, Makalanda L, Brouwer P, Sjostrand C, Mandell D and Lilja A. Intracranial vessel wall MRI. Clinical Radiology 2015; 71. http://dx.doi.org/10.1016/j.crad.2015.11.012 2. Yuan J, Usman A, Das T, Patterson A, Gillard J, Graves M. Imaging Carotid Atherosclerosis Plaque Ulceration: Comparison of Advanced Imaging Modalities and Recent Developments. 2016; 15. http://dx.doi.org/10.3174/ajnr.A5026

P039 Hippocampal help - the seahorse made simple

Sian Ebden; Stuart Baines; Shawn Halpin; Rhian Rhys
Royal Glamorgan Hospital

Its resemblance to a seahorse has earned the medial temporal lobe its name of the hippocampus (hippos - horse; kampos - sea monster). We review its complex anatomy and present a wide spectrum of hippocampal pathologies and describe how they can be recognised on CT and MRI along with their potential clinical presentations.

P040 What not to MISS on a CT head scan

Stuart Baines; Sian Ebden; Rhian Rhys; Carys Jenkins; Shawn Halpin
Cwm Taf University Health Board

Most of us report CT Heads on a daily basis. Extracranial pathology is often retrospectively visible. Remembering to check outside 'the box' may identify important incidental pathology before it becomes clinically apparent. We describe a simple method of review using the acronym MISSS. We will reveal the method in the presentation.

P041 Stuck in the middle

Stuart Baines; Sian Ebden; Shawn Haplin; Rhian Rhys
Cwm Taf University Health Board

Often underutilised, the sagittal multi-planar reformat (MPR) offers an optimal view of vital structures including the brainstem, hypothalamus and paramedian forebrain. We present several cases where the diagnosis of degenerative brain conditions is most easily appreciated on CT and MRI by studying the sagittal plane.

Silsby, M et al (2017) The midbrain-to-pons ratio distinguishes progressive supranuclear palsy from non-fluent primary aphasias. European Journal of Neurology. 24, 7: 956-065

P042 Imaging features in an adult with maple syrup urine disease

Catrin Sohrabi [1]; Sundip Udani [2]
[1]Barts and The London School of Medicine and Dentistry; [2]Guy's and St Thomas' NHS Foundation Trust

Background: Maple syrup urine disease (MSUD) is an autosomal recessive metabolic disorder that results in a pathological elevation of leucine, isoleucine, and valine amino acids that can lead to cerebral oedema. A 17-year-old female presented with reduced and painful vision, headaches lasting three days (exacerbated on bending forwards) and proptosis for over a year. On initial examination, the patient had mild to moderate papilloedema. A previous history of neonatal MSUD and Henoch-Schönlein purpura were noted. Brain MRI revealed widespread signal abnormalities through the cerebral and cerebellar hemispheres with significant associated generalised hemispheric swelling. Swelling involved the subcortical U fibres through the deep white mater of all lobes, as well as through the thalami and subthalamic nuclei. There was also crowding around the foramen magnum. To prevent neurological damage, the patient was commenced on IV 3mL/kg 3 % saline with acetazolamide. Food intake was carefully monitored and MSUD anamix junior, leucine exchanges, isoleucine and valine supplements were provided.
Purpose: To discuss the imaging features of MSUD in a 17-year-old female. To highlight the importance of close monitoring and diagnostic imaging in the management of MSUD. To review the literature on the potential negative and life-threatening downstream clinical manifestations of undertreated MSUD.
Summary: This case presents an adult patient diagnosed with neonatal MSUD who, despite receiving appropriate therapeutic treatment, manifested with widespread hemispheric swelling, intramyelinic and vasogenic interstitial oedema. Clinical management and radiological findings will be discussed.

P043 Changing the standard in the imaging of glioblastoma

Ifraax Abdi Osman
Glasgow Caledonian University

Background: Gliomas are tumours originating from glial or within the central nervous system. They are divide into four grades and the glioblastoma multiforme (GBM), or grade IV, is the most aggressive and common, with high morbidity and mortality[4]. An early diagnosis is, usually, difficult since there is no screening test for brain tumours and majority of the symptoms are related to the advanced phased of the tumours (e.g. seizures, memory loss, personality changes, losses in movement or sensations, cognitive impairments, language dysfunctions)[5]. Neuro-radiological imaging, in particular MRI, provide morphological information at high resolution and the advanced techniques have improved the results in the grading of the GBM, by adding biological and functional information[5-1]. Although, these techniques are not a substitute for a biopsy. The main improvement in the use of diagnostic imaging has been done for the treatment planning. Due to GBM complexity, the standard treatment (surgery follow by radiotherapy combined with chemotherapy) has been essentially unchanged for many years,

despite the great attention given to this tumour[4]. However, the use of imaging techniques, such as MRI functional and DTI, have improved the treatment response by providing information used to plan a more precise radiotherapy treatment and/or a more complete resection[1].
Purpose: An update of basic knowledge of GBM is necessary since recent developments in the use of diagnostic techniques have improved diagnosis and treatment.
Content: This poster will focus on presenting the multiple roles of MRI techniques in the diagnosis, treatment planning and response assessment for GBM.

1. Arribas Alpuente, L., Menéndez López, A. & Yayá Tur, R. Clin Transl Oncol (2011) 13: 240. https://doi.org/10.1007/s12094-011-0648-3
2. DUFFAU H.; 2010. Pre-surgery Brain mapping in neuro-oncology: what is the future?. Future Neurology 2010 5:3, 433-448
3. HOLLAND, E. C., 2000. Glioblastoma multiforme: The terminator. Proceedings of the National Academy of Sciences of the United States of America. 97(12), pp.6242-6244. Available from: 10.1073/pnas.97.12.6242
4. NANDU, H., WEN, P.Y. & HUANG, R.Y., 2018. Imaging in neuro-oncology. Therapeutic Advances in Neurological Disorders. 11
5. SARKAR, A.&CHIOCCA, E.A. 21 - Glioblastoma and malignant astrocytoma. In: Brain Tumors Elsevier Ltd, pp. 384-407

P044 Is Meckel's cave routinely evaluated by northern deanery radiology trainees?

Amar Chotai
Royal Victoria Infirmary

Background: Meckel's cave is a paired CSF-filled pouch in the posteromedial aspect of the middle cranial fossa. This study was undertaken after a subtle right Meckel's cave abnormality was missed on an MRI Brain by a trainee and consultant, with a history of prostate cancer and right facial numbness provided. This was discovered after a CT Brain examination, performed 3 months later, demonstrated a large, enhancing right cavernous sinus mass.
Aims: 1) Whether or not trainees are routinely evaluating Meckel's cave when reporting an MRI Brain examination; 2) whether or not trainees have knowledge about the rare possibility of intracranial metastases from prostate cancer; and 3) whether or not trainees have knowledge regarding the anatomy and function of the trigeminal nerve.
Materials and methods: Trainees (ST2 - ST5) were shown the axial T2 sequence of the brain in 4 stages (two minutes/stage): no history available (Stage 1); history of prostate cancer provided (Stage 2); and further history of right-sided facial numbness provided (Stage 3). If the correct diagnosis was not made, the trainee was asked to correctly identify Meckel's cave (Stage 4).
Results: 37 trainees participated in the study, with 10 correctly identifying the abnormality: none at Stage 1, one at Stage 2 and nine at Stage 3. Of the 27 trainees unable to identify the abnormality, nine subsequently identified Meckel's cave correctly (Stage 4). Conclusion: In conclusion, this study highlights that trainees are not routinely evaluating Meckel's cave and that the vast majority were unsure about.

BREAST

P045 The National Breast Imaging Academy: Progress update

Caroline Parkin; Mary Wilson; Megan Bydder; Soujanya Gadde; Lyndsay Kinnear; Paula Stavrinos
NBIA

The national breast imaging workforce is in crisis. Demands on the service continue to grow at a time when insufficient staffing levels are compounded by staff originally trained at the inception of the National Breast Screening Programme retiring en mass. Units are consequently struggling, merging and closing. In response to the problem, the National Breast Imaging Academy (NBIA) team developed a business case detailing a national plan to future proof the workforce. It covered strategies including (1) apprenticeships, (2) proposals for all tiers of radiographic staff (3) the development of a credential for Breast Clinicians and the recruitment of a national cohort of trainees to increase Breast Clinician numbers nationally, (4) the introduction of a national network of breast radiology fellowships, (5) the development of an "On Line Academy" providing technology enriched learning resources and (6) a new purpose built building in Manchester to act at the support centre and host site for multiple aspects of the proposed national plan. In February 2018 Health Educational England agreed to partially fund revenue aspects of the bid. The NBIA has since been collaborating with stakeholders to maintain momentum and make progress where possible. In this poster we describe our progress to date including how training pathways and resources have been developed, details of 2019 recruitment drives and a progress update in relation to capital funding. This initiative illustrates what can be achieved when a workforce in crisis comes together to find a way forward through collaboration and innovation.

P046 Invasive lobular carcinoma in a supernumerary breast: A case report

Harriet Conley; Sarah Doyle; Stephanie Jenkins
Plymouth Hospitals NHS Trust

Background: Breast cancer is the commonest cancer in the UK. Whilst the incidence of supernumerary breast tissue is reported as 0.2-6% of the population[1], a diagnosis of primary breast cancer in a supernumerary breast is rare, particularly in a site remote from the axilla. Breast cancer prognosis is strongly linked to early detection and treatment, and imaging has a crucial role in the appropriate pre-treatment work-up of this rare but important clinical entity. This is illustrated by our case of a 75-