

factors (a subjective and retrospective study), this is statistically insignificant. However, this highlights the need to further investigate the relationship between dosing and symptom relief through a larger prospective study.

## Head, neck and neuroradiology

### P-088 HONK chorea: 5 cases and 1 mimic

Georgia Priona<sup>1</sup>; Jessica Watts<sup>2</sup>; Bilal Sethi<sup>1</sup>; Alim Yucel-Finn<sup>1</sup>; Arnab Rana<sup>1</sup>

<sup>1</sup>University of Aberdeen, <sup>2</sup>NHS Grampian

Non-ketotic hyperglycaemic hemichorea-hemiballismus is an uncommon neurological presentation of type 2 diabetes. Examples of 5 different cases and 1 mimic are presented.

Non-ketotic hyperglycaemia is characterised by severe hyperglycaemia without significant hyperketonaemia or acidosis. It is one of the presentations of type 2 diabetes, and usually affects elderly patients. Hyperglycaemic non-ketotic coma (also sometimes abbreviated to HONK) may lead to death if untreated. Hemichorea-hemiballismus (HC-HB) may occur as an unusual complication of non-ketotic hyperglycaemia. The typical appearance on CT is of unilateral caudate and/or lentiform nucleus hyperattenuation, and on MRI there is unilateral T1 shortening. There is no surrounding oedema or mass effect.

The prevalence of diabetes and neuroimaging within practice suggests that Hemichorea-hemiballismus could well be encountered in a general radiology setting and our examples demonstrate that.

Our cases of Hemichorea-hemiballismus confirm previous studies in demonstrating that lentiform and caudate nucleus hyperdensity may or may not occur. Furthermore the lesion on imaging is consistently in the opposite hemisphere to the affected limbs.

The most common cause of hemichorea-hemiballismus is a vascular insult in the region of the striatum and subthalamic nucleus. Other causes include tumours, neurodegenerative disorders, encephalitis, drugs, systemic lupus erythematosus and hyperthyroidism. Acute treatment of non-ketotic hyperglycaemia is with fluid replacement and insulin with potassium. The movement disorder can be treated with sulpiride, haloperidol and tetrabenazine. Most patients recover fully within 6 months

### P-089 Integrating whole brain volume measurement with PACS

Barnaby Waters; Kal Natarajan; Gordon Mazibrada; Sonia Kumari; Vijay Sawlani

University Hospitals Birmingham NHS Foundation Trust

**Background:** Measurement of the effectiveness of pharmaceutical treatments for Multiple Sclerosis (MS) now involves measuring whole brain atrophy. These subtle changes in volume cannot be detected by visually reviewing 2D MRI datasets

**Objectives:** Safe and seamless integration of novel CorTechs NeuroQuant MR analysis software with Agfa IMPAX PACS.

**Content:** Description of the technical prerequisites and integration requirements with reference to the associated clinical safety, information governance issues and clinical benefits.

**Relevance/impact:** This work is relevant to neuroradiologists, clinicians, commissioners and pharmaceutical companies as it allows us to objectively determine the effectiveness of expensive MS treatments. It guides PACS teams in the safe integration with external analysis software.

**Outcomes:** We configured bidirectional DICOM integration of a dedicated NeuroQuant terminal (64bit OS, dual core, 4GB RAM, 500GB HDD, 100Mbps) with our clinical Agfa PACS. Clinicians transmit volumetric T1 weighted MR series to NeuroQuant from within their PACS Viewer. To improve information governance NeuroQuant was installed within the hospital IT network and the results archived only in PACS avoiding the need for anonymisation and reidentification. We have achieved seamless, automated, objective analysis of brain volume in a clinically safe PACS environment.

**Discussion:** In collaboration with CorTechs Labs, neuroradiologists and MS clinicians and supported by Novartis, the NeuroQuant pilot looks promising as a tool for measuring whole brain volume measurement in MS patients. In the future we hope to bring this into clinical use within our Trust and make it available to wider NHS Trusts.

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**P-090 Gadolinium-based contrast causing t1-hypersignals in human brain: A systematic review**

Zi-Yi Tew; [Kirsty McNeil](#); Kirsty Butt; Deirdre Cassidy; Conor Macdonald; Laura Young; Shona Matthews; Graeme Houston

*School of Medicine, University of Dundee*

**Introduction/objectives:** Linear and macrocyclic gadolinium-based contrast agents (GBCAs) are commonly used in MRI to investigate and assess tumours, inflammatory conditions and infectious processes. Recent studies reported an association between cumulative number of some GBCA's and signal hyperintensity in specific brain regions. This systematic review aims to collate and evaluate data from current research relating to T1-hypersignals in the brain and repeated GBCA exposure.

**Methods/materials:** Electronic databases (Pubmed, MEDLINE and Scopus) were searched for studies investigating the relationship between GBCA exposure with gadolinium accumulation and/or hypersignals in the brain using predefined inclusion/exclusion criteria. Eligible randomised control trials (RCTs), prospective and retrospective cohort studies were identified, and data was extracted by three reviewers. Risk of bias for each study will be independently assessed by two reviewers and discrepancies discussed.

**Results:** Initial search identified 424 abstracts for review, from which 6 articles met the inclusion criteria for full text review. T1-hypersignals were found to be present in both dentate nucleus and globus pallidus. Data to date showed significant relationship between T1-hypersignals with linear GBCA compared to macrocyclic GBCA and significant dose-dependent relationship between T1-hypersignals and GBCA administration.

**Outcomes:** Observations to date indicate that the number of GBCA administrations is associated with T1-hypersignal intensities found in the brain, in patients with normal renal function. This has been shown to be predominantly associated with linear GBCA, however the clinical significance of this observation is unclear. Further studies, including autopsy analysis and preclinical interrogation, are needed to add to our current understandings of this topic.

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**P-091 Identifying syringomyelia: A case report**

[Natali Levchenko](#); [Adriana Jakupaj](#); [Smita Kamat](#); [Carmen Martin-Marero](#)

*Whiston Hospital; Luton and Dunstable Hospital*

Syringomyelia can present as a form of neurological pathology as the result of the compression of the spinal cord. It is known from the literature that cases of syringomyelia are under-reported, especially in the elderly group of patients with decreased mobility. This case report showed the diagnostic process of detecting syringomyelia and the role of imaging in establishing the diagnosis. The patient was a 81-year-old male with the history of unsteadiness, frequent falls and widened base gait for the duration of two years. He was diagnosed with the thoracic syrinx following the admission after the fall with the prolonged lying, which resulted in the right upper-limb weakness. This patient also had the evidence of adhesive arachnoiditis on his previous computed tomography images of the head. There is the evidence in the literature that the chronic adhesive arachnoiditis is a rare condition, often complicated by syringomyelia. Therefore, it can be used as an indicator for the screening of syrinx. The syringomyelia is a treatable condition and the role of early diagnosis is important in order to stop the progression of the disease. This paper highlights the important role of diagnostic imaging as well as detailed history taking for establishing the diagnosis of syringomyelia at the early stage.

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**P-092 Case study: Acute spinal cord ischaemia syndrome (ASCIS)**

[Lorraine James](#); [Darren Hudson](#)

*InHealth Group*

ASCIS is a rare condition affecting the spinal cord which results in severe neurological symptoms within 12-72 hours, and overall prognosis for recovery is poor.

**Presentation:** 70 year old female developed neurological symptoms with associated loss of sensation in her left leg following total right knee replacement performed under epidural anaesthesia. An urgent MRI scan of her lumbar spine was requested to rule out possible causes for her symptoms, such as compression resulting from a haematoma.

**Findings:** MRI Scanning showed diffuse signal changes with her terminal cord, which with the addition of sagittal imaging of the cervical & thoracic spine, showed this to continue up as far as the level of T6. There was no associated cord compression or evidence of any haemorrhage or subdural collections. These appearances are characteristic of ASCIS which has been reported as a rare adverse side effect resulting from epidural anaesthesia.

**Outcome:** The patient showed mild improvement over the following 2 weeks and a brain scan was requested to ensure there were no other abnormalities related to her condition. This showed small vessel ischaemic changes in the white matter of both hemispheres, suggesting a history of pre-existing ischaemia which was not known about prior to surgery. An echocardiogram of her heart was also carried out following this which showed no evidence of cardiovascular disease, which can also be associated with ASCIS.

Patient continues to improve slowly and is now walking with the aid of a frame.

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### **P-093 A simple solution to reduce artefacts on post-surgical MRI scans**

[Sarah Prescott](#); [Erminia Albanese](#); [Jooly Joseph](#); [Harry Poole](#); [Rachel Bentley](#)

*University Hospitals of North Midlands NHS Trust*

Magnetic Resonance Imaging (MRI) is an invaluable tool for assessing many different neurological conditions. One of the problems with MRI is that the presence of metal can cause artefacts on the images, which degrade the image quality and reduce diagnostic power. Following surgery it is common for patients to have metal retained in their body which can cause problems for follow up imaging.

One such example is the use of surgical staples following tumour resection. It was noted that the staples currently used by our Trust resulted in a significant artefact on the follow up MRI images.

We investigated three different brands of staples to determine whether the extent of artefact could be reduced by changing the supplier. Images were acquired on a 1.5T scanner using three different brands of stainless steel staples attached to a uniform cylindrical phantom. For the staples currently used at our Trust a large susceptibility artefact was seen in the vicinity of the staples, whereas for the two alternative staples the artefact was minimal.

This information was shared with the neurosurgeon and neuroradiologist to enable them to make an informed choice on which staple would be the most appropriate to use for future patients. This investigation highlights the importance of ensuring good communication between the surgical team and MRI department.

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### **P-094 First seizures: Does computed tomography provide the answer?**

[Christian Burd](#); [Declan Johnson](#)

*St George's Hospital NHS Trust*

**Background:** The lifetime risk of a seizure is 8-10%. CT scans for first seizures have been shown to be significantly abnormal in 10%. Common abnormalities include cerebrovascular insults (26%) and tumours (12%). Where CT is negative MRI has been shown to reveal lesions in up to 22%.

**Aims:** To ascertain the number and types of causative abnormalities detected on CT for first seizures.

To assess the diagnostic yield of CT for first seizures.

To assess the benefit of additional MRI for first seizures.

**Method:** A retrospective search using the "Soliton" reporting software was undertaken. The inclusion criteria were a CT head performed for an unprovoked first seizure presenting to accident and emergency between 01/05/14 and 31/07/14.

Exclusion criteria were previous seizures, central nervous system disease, cancer, neurosurgery, alcohol excess, trauma and pregnancy.

The reports were reviewed and checked for a subsequent MRI.

**Results:** 68 patients fulfilling the criteria were identified. CT identified a lesion in 12 (17.6%). 3 unknown primary tumours were identified. The remaining cases comprised vascular abnormalities including a cavernoma, cerebral venous thrombosis and sub-arachnoid haemorrhage. 12 negative CT scans proceeded to MRI which identified 1 new lesion.

**Discussion:** Our study demonstrates CT in the emergency setting had a high yield in this selected group. Where the initial CT was negative, subsequent MRI provided limited additional information.

We recommend that CT is considered in all unprovoked first seizure admissions to the emergency department. Where CT is negative, subsequent MRI does not merit routine use.

### P-095 The utility of MRI for stroke in inpatients

[Paul Carruthers](#); [Paul Burn](#); [Richard Edwards](#)

*Musgrove Park Hospital, Taunton*

**Purpose:** To investigate the commonly held perception in our radiology department that "everyone gets an MRI for stroke, the diagnosis is obviously clinically and the scan does not affect management."

**Methods:** The radiology reports and images were retrospectively reviewed for inpatients >70 years who had undergone MRI for possible TIA or stroke (infarct), over a 6 month period. Patients were categorized into four groups depending on how suggestive the clinical presentation was of stroke/TIA: 'typical' (unilateral weakness), 'maybe' (dysphasia/dysarthria/sensory/inattention/ataxia), 'other' (collapse/absence/fainting/confusion) and 'TIA' (resolved unilateral weakness). The MRI scans were evaluated for presence/absence of infarct and the infarct pattern. The number of CT scans performed for the same population/indication over the same period, was also recorded.

**Findings:** There were 80 patients in our study. The ratio of CT to MRI scans performed was 8:1. Number of infarcts seen on MRI per clinical group: typical 22/22, maybe 10/23, other 3/24, TIA 1/11. Of the infarcts: 10 anterior territory (9 cortical/subcortical and 11 deep white matter), 8 posterior territory and 8 mixed territory (either both anterior/posterior or bilateral).

**Conclusion:** 1) Only a small proportion underwent MRI relative to CT. 2) For those with typical symptoms, MRI was not contributory to the diagnosis (100% positive for stroke). 3) For those with non-typical symptoms, MRI was helpful in determining diagnosis (28% positive for stroke). 4) A significant number of patients (22%) had mixed territory pattern infarcts. In these patients MRI may have a role in prompt investigations to search for an embolic source.

### P-096 CT Head in the setting of acute stroke. How are we performing?

[Hind Saffar](#)<sup>1</sup>; [Alexandra Kraus](#)<sup>2</sup>

<sup>1</sup>*Betsi Cadwaladr University Health Board, Wrexham Maelor*; <sup>2</sup>*Betsi Cadwaladr University Health Board, Ysbyty Gwynedd*

**Aim:** To assess the local compliance of our radiology department with the NICE guidelines; diagnosis and initial management of acute stroke published in July 2008.

**Standards:**

1) CT brain should be performed and reported in next scanning slot or at latest within 1 hour in the assessment of acute stroke according to the indications stated by the NICE guideline.

2) For all others CT brain should be performed within 24 hours of onset of symptoms.

Target: 100% compliance with NICE guidelines.

**Methodology:** Data collected retrospectively using the synaps system.

We collected the data of all the CT Brain performed to excluded stroke between 01.05.14 till 31.05.14.

Total of 223 CT Brain performed between 01.05.14 till 31.05.14.

69 CT brain was performed to exclude stroke.

**Result:** Out of 69, there were 17 CT Brain needed to be performed and reported within 1 hour. The main indications were, thrombolysis, on anti coagulation and low GCS.

52 out of 69 CT Brain needed to be performed and reported within 24 hour. Main indications were focal neurological symptoms.

**Conclusion:** We are doing well in terms of doing the scans and reporting them within the time frame. We suggest to indicate on the report that a verbal report was given to the referring clinician prior to generating the report on Radis PACS.

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**P-097 10 reasons to look again - important review areas in the interpretation of unenhanced emergency CT head**  
[Christopher Davies](#); [Raghavendra Kamanahalli](#); [Robin Proctor](#); [Sameer Shamshuddin](#)

*Royal Lancaster Infirmary*

**Aims / Objectives:** Unenhanced cranial CT is a robust tool for the diagnosis and triage of various traumatic and non-traumatic neurological emergencies. Although it is an efficient modality to rapidly diagnose serious intracranial pathologies such as infarct and haemorrhage, clinically significant findings can sometimes be subtle and thus overlooked. Often, a lesion can be identified to be present on the original unenhanced CT in retrospect following confirmation on subsequent contrast enhanced CT or MRI. However, a careful pattern based search can reduce perceptual and cognitive errors.

In this pictorial review we present a variety of commonly overlooked and subtle findings on unenhanced CT in a pattern based approach with reference to the clinical presentation and important anatomic review areas. The cases are selected from the anonymised database of 'Learning from Discrepancy Meetings' and the departmental Museum of teaching cases. The main purpose of this review is to educate the readers, particularly trainees and non-specialist Radiologists to develop a logical checklist and avoid potential pitfalls when interpreting emergency CT Heads.

**Conclusion:** We hope this pictorial review will enhance readers' knowledge and reinforce the significance of a systematic and pattern based approach in reducing diagnostic errors.

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**P-098 IAM reporting for the general radiologist- what not to miss!**

[Harriet Barber](#); [Philip Cook](#); [Nick Hollings](#); [Benjamin Rock](#); [Simon Thorogood](#)

*Royal Cornwall Hospitals NHS Trust*

**Aims/objectives:** To increase knowledge and awareness of the importance of these studies by:

Recapping the anatomy of the IAM (internal auditory meatus), CPA (cerebellopontine angle) and inner ear.

Demonstrating the common pathologies and highlight some of the more unusual findings on an MRI IAM study

Key review areas when reporting an MRI IAM study

**Content:** MRI of the IAM is a commonly requested study by ENT clinicians to investigate sensorineural hearing loss (SNHL), tinnitus and vertigo, and to exclude cerebellopontine angle (CPA) pathology.

It is often reported by general radiologists and is sometimes perceived as a simple and quick study to report. There is however more to review in this area than just the cranial nerves and this poster highlights some of the key areas that require analysis by all radiologists.

The poster will recap the anatomy of the IAM, CPA, and inner ear, demonstrate the common pathologies and some of the more unusual findings on a MRI IAM study as well as key review areas to bear in mind when reporting.

**Relevance/impact:** With the exception of specialist centres, many radiologists working in District General Hospitals are likely to report MRI IAMs. This poster gives a simple review guide to help improve and streamline the process of IAM reporting.

**Outcomes:** Greater knowledge and understanding of the relevance and importance of competent, thorough reporting of MRI IAMs.

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**P-099 Hiding in plain sight - differentials of the pineal region masses**

[Bhavana Lakshmana Das](#); [Menno van Watingen](#); [John Morlese](#)

*UHL NHS Trust*

Pineal region comprises of the pineal gland, posterior recess of the third ventricle, thalamus, quadrigeminal plate (tectum) and the splenium of the corpus callosum. Any lesion in this region can present as a pineal region mass.

Pineal gland is an unpaired gland deriving its name from its pinecone-like shape. It is found in the midline with similar intensity to the grey matter, ranging 10-14mm in size. It comprises of pineocytes(95%), astrocytes(5%) and fibrovascular stroma, histologically. Since the gland lacks blood brain barrier, it enhances following contrast. On CT, calcification is common and increases with age.

Pineal region masses are classified in to those arising from the pineal parenchyma, germ cell neoplasms, metastasis and lesions arising from the adjacent structures(astrocytoma, meningioma).Pineal region masses combined comprises 1-3% of all the intracranial masses, occurring more frequently in children, accounting for 3-8% of the intracranial neoplasms in the pediatric population.

Pineocytoma, pineal cysts and the germinomas are most commonly encountered lesions, less commonly pineoblastoma and teratoma. other types include astrocytomas, choriocarcinoma and endodermal sinus tumour. CSF dissemination is a common finding necessitating imaging of the entire craniospinal axis.

**Conclusion:** Masses in the pineal region have a relatively broad differential, because this region is complex anatomically with a variety of cell types. When the lesion is large, it can make the site of origin obscure and therefore diagnosis difficult. we provide the imaging features which combined with the knowledge of CSF and serum cytology will help narrow the differential diagnosis.

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#### **P-100 The use of adjunctive devices in the treatment of acutely ruptured intracranial aneurysms: A review of our experience over 5 years**

Anoma Lalani Carlton Jones<sup>1</sup>; Anthony Cox; Prem Rang<sup>1</sup>; Wen Ling Woo<sup>2</sup>

<sup>1</sup>The National Hospital for Neurology and Neurosurgery; <sup>2</sup>The Royal Free Hospital

**Background/purpose:** Device-assisted (balloon or stent-assisted) coiling has extended the scope of treatment of intracranial aneurysms. The risks of permanent procedure-related complications are not fully established in the acute setting. We present our experience with these devices when coiling acutely ruptured aneurysms, reviewing the nature and incidence of procedure-related neurological complications.

**Methods:** The records of 410 patients presenting with ruptured aneurysms from the period 10/2011 to 09/2015 were retrospectively analysed from the local neurointerventional patient database. Of these, the clinical, radiographic and angiographic records of patients treated with device assistance (balloon and/or stent assistance) were reviewed.

**Results:** 103 patients in this period underwent device assistance during their coiling procedure. Of these, 45 (43.6%) were treated with stent assistance, 50 (48.5%) balloon assistance, 7 (6.8%) both stent and balloon and 2 (1.9%) aneurysms received a double catheter technique.

Procedure-related complications occurred in 8.8% (4 of 45) of the procedures with stents versus 4% (2 of 50) in the procedures with balloon, and 14.2% (1 of 7) with both balloon and stent use. These included haemorrhagic and thromboembolic complications. One patient procedure-related death was encountered in a patient who underwent balloon-assisted coiling.

**Conclusion:** Overall the complication rate related to use of adjunctive devices is comparable to the literature, with the risk slightly higher with stenting versus coiling, although the significance of this may be affected by the overall small numbers having complications. Complications also appear more frequently than when coil embolisation alone is performed. Therefore judicious use of these devices is recommended.

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#### **P-101 Renal cell cancer metastases to the thyroid gland: A case report demonstrating a new thyroid ultrasound sign**

Emer McLoughlin<sup>1</sup>; Akhmid Aziz<sup>2</sup>; Steve Colley<sup>1</sup>

<sup>1</sup>Queen Elizabeth Hospital, Birmingham; <sup>2</sup>Russells Hall Hospital, Dudley

Renal cell carcinoma (RCC) is an unpredictable tumour that can metastasise to uncommon sites and is considered one of the more common neoplasms to metastasise to the thyroid gland, with a number of cases described in the literature. Metastatic thyroid tumors may represent the first manifestation of RCC or manifest as synchronous or metachronous metastasis of a known RCC.

We present a case of isolated metastatic RCC to a multinodular thyroid gland that demonstrates a unique thyroid ultrasound (US) appearance which we have termed the 'nodule within a nodule' sign. This ultrasonographic finding characterising renal cell metastases in a multinodular thyroid gland has not previously been described and correlates with histopathological findings.

### **P-102 No cancer patient should be alone: Supporting thyroid cancer patients**

[Mawya Khafaji](#); [Sarah Hagi](#); [Rawan Hafiz](#)

*King Abdulaziz University, Jeddah, Saudi Arabia*

**Background:** The use of radioactive iodine after total thyroidectomy includes radiation hazards to patients' contacts and general population. Although there are no reported hazards, 1 safety considerations should be met to follow the principle of radiation exposure of As Low As Reasonably Achievable (ALARA).

A study measuring radiation exposure to families of patients receiving radioactive iodine reported less exposure among contacts that received pre-treatment instructions.<sup>2</sup>

Patients reported that some health care providers relayed contradicting messages, did not address concerns, and neglected side effects.<sup>3,4</sup>

Emphasis on not bearing children <sup>1,5</sup> and consuming low iodine diets are addressed.<sup>6</sup>

We aim to share our experience in pre-treatment counseling.

**Methods:** Written and verbal counseling were provided with a family member that lives with the patient. Patients' data, occupation, and accommodation were obtained. They were advised about pregnancy and breastfeeding, dietary restrictions, hospital visits, handling wastes, and contact after discharge. They were given leaflets, and a radioactive substances instruction card covering the same issues. They were notified that radiation doses during their stay will be recorded by a radiation safety officer.

**Results:** 76 patients were candidates for counseling. Three were rejected as they were unable to receive treatment. Of the remaining 73, 16 (22%) received extra counseling: 10 had children below 2 years, 4 were working in medical fields, one was a nursery teacher and the last one lived in one room with the entire family.

**Conclusion:** Counseling sessions uncovered patients' special situations and directed them to take precautions. They served for radiation safety and optimising care.

### **P-103 Investigating the utility of stimulated diffusion weighted MRI for reducing radiotherapy induced xerostomia**

[Jonathan Wyatt](#)<sup>1</sup>; [Rachel Pearson](#)<sup>2</sup>; [Andrew Blamire](#)<sup>3</sup>; [Charles Kelly](#)<sup>1</sup>; [Jill Mckenna](#)<sup>1</sup>; [Jim Snell](#)<sup>1</sup>; [Hazel McCallum](#)<sup>1</sup>

<sup>1</sup>Northern Centre for Cancer Care, Newcastle upon Tyne Hospitals NHS Foundation Trust; <sup>2</sup>Northern Institute of Cancer Research, Newcastle University; <sup>3</sup>Magnetic Resonance Centre, Newcastle University

**Aims:** Xerostomia is a major side effect of head and neck radiotherapy treatment, due to radiation damage to the parotid glands. Gland sparing is possible with intensity modulated radiotherapy but which gland? Choosing the better functioning gland using data from stimulated Diffusion Weighted-Magnetic Resonance Imaging (DW-MRI) could reduce xerostomia. We have developed a lemon juice stimulated DW-MRI protocol using the radiotherapy planning set-up. This study aims to investigate the feasibility and utility of stimulated DW-MRI for radiotherapy planning.

**Methods:** 20 recruited head and neck patients will undergo stimulated DW-MRI during their radiotherapy planning MRI (1.5 T Magnetom Espree, Siemens). The Apparent Diffusion Coefficient (ADC) of each parotid gland before and after stimulation will be measured and the mean resting ADC (ADC<sub>rest</sub>) and stimulated change in ADC ( $\Delta$ ADC<sub>stim</sub>) determined. Each patient will undergo stimulated DW-MRI 6 weeks after radiotherapy. A xerostomia questionnaire will be completed at each session. The mean dose to each parotid gland will be determined from the treatment plan.

**Results:** 15 patients have been recruited so far. The protocol appears feasible, with < 15 minutes added to the scanning session and no compliance issues. The correlation between ADC<sub>rest</sub> and  $\Delta$ ADC<sub>stim</sub> and xerostomia score will be assessed. The correlation between the change in and pre- and post-radiotherapy and the mean dose to the parotid gland will be investigated.

**Conclusion:** Choosing to spare the better functioning gland will potentially reduce xerostomia. Stimulated DW-MRI has the potential to provide a quick and non-invasive method of determining the better functioning gland.

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#### P-104 Pictorial review of craniosynostosis

Georgia Priona<sup>1</sup>; Jessica Watts<sup>2</sup>; Bilal Sethi<sup>1</sup>; Alim Yucel-Finn<sup>1</sup>; Shona Olson<sup>1</sup>

<sup>1</sup>University of Aberdeen; <sup>2</sup>NHS Grampian

Craniosynostosis refers to premature sutural closure and fusion, resulting in abnormal head shape. We are presenting different examples from the more mild to the most severe forms.

Craniosynostosis can be divided into non-syndromic (85%) and syndromic. Non-syndromic is isolated and classified according to involved suture(s). This includes simple (single, 75-80%) or multiple sutures (20-25%). Consequences are an abnormal head shape however (usually) normal intelligence. It is normally sporadic. The other syndromic type involves multiple anomalies with frequent developmental delay. It is associated with craniofacial, skeletal, nervous system and other anomalies.

In this pictorial review we present different cases of plagiocephaly, scaphocephaly, brachycephaly with Harlequin eyes and sequale of copper beaten skull to the most severe forms such as, turricephaly and Pfeifer Syndrome.

Patients with more pronounced anomalies often present at time of birth. Craniosynostoses itself is an entity that causes concern to parents in early life. The main concern in most cases is the aesthetic appearance, although the most severe forms can be associated with extreme anomalies and developmental delay depending on the genetic background. Early and accurate diagnosis of such anomalies can be important in the management of such patients. Treatment includes cranioplasty.

Traditionally the diagnosis was made by plain radiography but in our institution the use of low dose 3D CT has become a more appropriate tool to establish definitive diagnosis. We reserve MRI for the syndromic cases and ultrasound is used in the pre and post natal period

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#### P-105 Referring criteria for paranasal CBCT scans, imaging protocols and findings

Veronique Sauret-Jackson; Amanda Smith; Faizuddin Azizi

*Cavendish Imaging Ltd*

**Introduction:** Cone Beam Computed Tomography (CBCT) is increasingly being used for ENT diagnostics and surgery planning. This study aims to demonstrate the appropriateness of CBCT to image the paranasal sinuses by retrospectively analysing the referring criteria, imaging protocols and radiological findings.

**Methods:** Thirty-five paranasal scans were analysed. The Accuitomo F170 (JMorita) CBCT scanner was used. The scanning parameters were 90kV, 5mA, 14x10cm and 17x10cm (diameter x height) cylindrical FOVs. The volumes were reconstructed using 0.250mm voxels and reported using Osirix.

**Results:** Referring criteria questioned rhinosinusitis, sinus pain and headaches, rhinolaryngoscopy findings, polyp presence and surgical planning. The CBCT scans have provided the radiologist with satisfactory imaging to provide the diagnostic answers to the clinician in all but two cases where further soft tissue imaging was recommended to exclude complications (potential sarcoidosis, fungal colonisation). Opacification within the maxillary antra, reactive sclerosis of the sphenoid sinus walls, polypoidal disease pathologies, inflammations, osteomas and cysts were identified. Non-united fractures, septum deviations, small bony spurs and cartilaginous aspects, ethmoid bulla, Agger nasi cells and accessory ostia to antra walls were also reported. The pathway of virtual rhinolaryngoscopy using Osirix was clear.

**Conclusion:** The diagnostic questions that were presented in this study could have been addressed with either conventional CT or CBCT imaging. The scanning parameters chosen were adequate for paranasal sinuses reporting with the already established benefit of lower radiation doses to the patient. This work provides additional guidance for best clinical practice to lower the radiation doses delivered to patients.

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