

**ID: 1173**

## **Approach planning in the endoscopic management of Aqueduct lesions**

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the endoscopic management of hydrocephalus proved to be successful in well selected cases . the different lines of treatment varies from simple endoscopic ventriculostomy to aqueduct endoscopic procedures including cyst fenestrations and aqueductoplasty.

one of the keystones for the success of such procedures is the approach planning based on the individual endoscopic anatomy and pathology .

in this study we display the procedure and the results of 14 patients with aqueduct lesion,

4 with third ventricular cysts, 5 with distal aqueduct obstructions and 5 patients with proximal obstruction of the aqueduct , all procedures were performed with rigid ventriculoscope, the approach selection was based on the morphological variations of the ventricle system as investigated in the preoperative MRI, 5 patients received cranial aqueductoplasty through low frontal approach, 5 through a caudal fourth ventricular approach and 2 patients had a cyst fenestration with third ventriculostomy through a precoronal approach , lastly 2 patients received combined approaches , both low frontal and precoronal for cystostomy and ventriculoostomy.

the results were satisfying in 13 patients , no complications were observed , one patient received a shunt 3 months after the endoscopic procedures.

we conclude that a meticulous approach planning based on the MRI data of the ventricular anatomy is fundamental for the success of the endoscopic procedures in aqueduct lesions .

**ID: 1178**

## **Gliofibroma in a Patient with Neurofibromatosis Type 2**

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The authors report the first case of gliofibroma in a patient with Neurofibromatosis 2 (NF2). NF2 is an autosomal dominant disease where individuals most commonly develop bilateral vestibular schwannomas. Individuals are also predisposed to developing meningiomas and low-grade gliomas. Gliofibromas are rare bimorphic tumours containing glial and mesenchymal elements. Only 23 cases have been described in literature. All cases were sporadic with no genetic predisposition.

This is a case of a 13 year old girl who has NF2. A routine MRI scan for her NF2 showed a discrete well defined enhancing occipital lesion lying in the posterior horn of the right lateral ventricle. A repeat MRI scan a year later showed the lesion to have enlarged with increased surrounding oedema. The lesion was asymptomatic. A parietal craniotomy was performed followed by excision of the lesion.

Histology analysis of the tumour section showed glial tumour cells arranged in a lobular pattern separated by collagen bundles. Most of the tumour cells appear to be glial fibrillary acidic protein (GFAP) positive with only occasional neurofilament protein (NFP) immunoreactivity. These histological features are consistent with gliofibroma. To date, routine MRI imaging showed no recurrence of the lesion in the patient.

The possible relationship between gliofibromas and NF2 is intriguing. The occurrence of gliofibroma in this patient may be coincidence. However, the probability of this co-occurrence is extremely small as gliofibroma and NF2 are extremely rare. There is a higher likelihood that NF2 may be responsible for the lesion.

**ID: 1180**

**Stereotactic Radiosurgery as a Therapeutic Strategy for Intracranial Metastatic Prostate**

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**Objective:** Intracranial metastatic prostate carcinoma is rare. We sought to determine the clinical outcomes after Gamma Knife® stereotactic radiosurgery (GKSRS) for patients with intracranial prostate carcinoma metastases.

**Methods & Materials:** We studied data from 10 patients who underwent radiosurgery for 15 intracranial metastases (9 dural-based and 6 parenchymal). Six patients had radiosurgery for solitary tumors and four had multiple tumors. The primary pathology was adenocarcinoma (eight patients) and small cell carcinoma (two patients).

All patients received multimodality management for their primary tumor (including resection, radiation therapy, androgen deprivation therapy) and eight patients had evidence of systemic disease at time of radiosurgery. The mean tumor volume was 7.7 cm<sup>3</sup> (range 1.1 – 17.2 cm<sup>3</sup>) and a median margin dose of 16 Gy was administered. Two patients had progressive intracranial disease in spite of fractionated partial brain radiation therapy (PBRT) prior to SRS.

**Results:** A local tumor control rate of 85 % was achieved (including patients receiving boost, upfront and salvage SRS). New remote brain metastases developed in three patients (33%) and one patient had repeat SRS for tumor recurrence. The median survival after radiosurgery was 13 months and the one-year survival rate was 60%.

**Conclusions:** Stereotactic radiosurgery was a well-tolerated and effective therapy either alone or as a boost to fractionated radiation therapy in the management of patients with intracranial prostate carcinoma metastases.

**Key words:** SRS; intracranial metastatic prostate carcinoma

**ID: 1181**

## **Radiosurgery Achieves Long Term Control of Petroclival Meningiomas**

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**Object.** Because of their critical location adjacent to brain, cranial nerve, and vascular structures, petroclival meningiomas remain a clinical challenge. We evaluated outcomes in 168 petroclival meningioma patients who underwent Gamma Knife radiosurgery (GKRS) during a 21-year interval.

**Methods.** GKRS was used either as the primary or adjuvant management for 168 petroclival meningiomas involving the region between the petrous apex and the upper two-thirds of the clivus. The most common presenting symptoms were trigeminal nerve dysfunction, balance problems, diplopia and hearing loss. The median tumor volume was 6.1 cm<sup>3</sup> (range, 0.3-32.5 cm<sup>3</sup>) and the median margin dose was 13 Gy (range, 9-18 Gy).

**Results.** During the median follow-up interval of 72 months, neurological status improved in 44 patients (26%), remained stable in 98 patients (58%), and worsened in 26 patients (16%). Tumor volume decreased in 78 patients (46%), remained stable in 74 patients (44%), and increased in 16 patients (10%), all of whom underwent additional management. Eight patients had repeat radiosurgery, four underwent delayed resection, and four had fractionated radiation therapy. CSF diversion was performed in 7 patients (4%). Significant risk factors for tumor progression were tumor volume = 8 cm<sup>3</sup>, ( $p = 0.001$ ) and male gender ( $p = 0.02$ ).

**Conclusions.** In this 21-year experience, GKRS for petroclival meningiomas achieved freedom from the need for initial or further surgical resection in 98% of patients and was associated with a low risk of adverse radiation effects. We believe that radiosurgery should be the preferred initial option for patients with smaller-volume, symptomatic petroclival meningiomas.

**Key words:** petroclival meningiomas; Gamma Knife radiosurgery.

**ID: 1182**

## **REVIEW OF C1-C2 POSTERIOR SCREW FIXATION IN SEVEN PATIENTS WITH ATLANTO-AXIAL**

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Purpose: Retrospective review of indications, complications and results of C1 lateral mass-C2 pedicle posterior screw fixation in cases of atlanto-axial pathology.

### Method

Retrospective review of theatre log books, case notes and radiology.

Contiguous cases of atlanto-axial pathology in which C1 lateral mass-C2 pedicle screw fixation had been performed were identified and reviewed.

### Results

7 cases were identified in total, age range 15 to 84.

4 cases of type 2 odontoid fractures. All treated in Halo initially with subsequent failure to maintain alignment.

2 cases of degenerative vertebral pathology causing medically intractable C2 root pain.

1 case of VATER syndrome with gross reducible atlanto-axial subluxation and tetraparesis.

Operative time ranged from 185 to 300 minutes.

Post operative radiographs and CT (in 7 patients) demonstrated good implant placement.

There was 1 intra-operative complication (haemorrhage 1000 mls) requiring transfusion. No infections, misplaced screws, C2 symptoms.

4 odontoid fracture patients have maintained alignment, 2 patients with degenerative disease reported improvement in C2 root pain. Patient with VATER had no further episodes of tetraplegia and also reported a reduction in neck pain.

No patient has presented with hardware failure at 11 to 32 months of follow-up.

### Conclusion

C1 lateral mass-C2 pedicle posterior screw fixation was described by Goel and modified by Harms (1). We have retrospectively reviewed the indications, complications and results of this technique by a single surgeon.

The majority were performed for failure to maintain alignment in Odontoid fractures.

Good results were obtained with low morbidity.

It is a technically demanding technique

### Reference

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**ID: 1183**

**The clinical value of early postoperative MRI after lumbar spine surgery**

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**Objective:** MRI scanning has long been considered difficult to interpret in the early period following lumbar spine surgery, and hence of very limited value. We investigate the hypothesis that MRI scanning within six weeks of lumbar spine surgery cannot accurately diagnose neural compression in symptomatic patients

**Subjects:** A retrospective series of 32 consecutive patients who underwent early postoperative MRI following lumbar discectomy or laminectomy for continued, worsening or new symptoms of neural compression.

**Methods:** The neuroradiologists' reports were evaluated for the degree of neural compression identified (none, low, moderate or severe) and confidence level (low, medium, high). These MRI findings were then compared to the patients' subsequent course and findings of any surgery performed.

**Results:** 19 of 29 scans (66%) were confidently predictive of the correct treatment pathway (reoperation with positive finding or conservative treatment with a good outcome) whereas 3/ 3 (100 %) patients who had conservative management despite the MRI confidently suggesting compression had poor outcome. The MRI is highly likely to influence management: 11/14 (79 %) of patients with scans suggesting neural compression progressed to revision surgery and 18 / 18 (100 %) patients with no neural compression on MRI were managed conservatively.

**Conclusions:** Our data suggest that early MRI scanning after lumbar laminectomy or discectomy accurately detects neural compression at the surgery site in patients with continued or worsening symptoms.

**ID: 1186**

**Efficacy of autoclave sterilisation of surface-bound prions is abolished by partially impeding**

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Objective: To investigate the efficacy of autoclaving for sterilisation of steel surface-bound prions.

Methods: The infectivity of steel surface-bound Rocky Mountain Laboratory (RML) prions was assayed *in vivo* using 5mm steel suture material inserted into indicator transgenic mice<sup>1,2</sup>. These wires were either autoclaved inside fully heat- and steam-permeable bags or in Eppendorf tubes.

Results: Porous load autoclaving at 134°C for 20 minutes produced reliable sterilisation of prion-infected wires autoclaved in heat- and steam-permeable bags. Partially impeding heat and steam access to infected wires by placing them in Eppendorf tubes produced an increase in incubation period but all wires autoclaved in this way subsequently transmitted prion infection.

It was confirmed that heat and steam were able to enter Eppendorf tubes during autoclaving, by autoclaving tubes containing either urea crystals (which melt at 133°C) or anhydrous copper sulphate (which turns blue in the presence of steam).

Conclusions: Reliable sterilisation of RML prion-infected steel can be produced by autoclaving but is dependent on free steam and heat access. This has significant implications for larger autoclave loads consisting of human surgical instruments with complex surface topographies.

References:

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**ID: 1188**

**'Hoping for the best but expecting the worst'; Neurosurgical ethics and advance care planning**

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[As this is an abstract on neurosurgical ethics, the traditional structure for scientific, statistically-based papers was considered ill-suited to the presentation of the abstract.]

**Background**

In spite of the evident ethical issues in neurosurgery - from consent to interventions to research ethics - and the professionalisation of bioethics in the United Kingdom and North America, there are surprisingly few articles on neurosurgical ethics in the medical literature. This paper is a step towards filling the ethical lacuna in the neurosurgical literature.

**Objective**

The starting point of this topic, written by neurosurgeons and a clinical ethicist, is the following observation: although many intracranial procedures carry risks of serious morbidity and death, it is currently not common practice to discuss with patients what they would want should they lose the capacity to make decisions for themselves (i.e., what the Mental Capacity Act 2005 calls an 'advance decision').

**Method and Conclusions**

In this conceptual paper, we use argument-based reasoning to demonstrate the need for the initiation of such discussions before major intracranial operations. We also address anticipated counterarguments, such as the lack of time and the potential distress this may cause patients and their relatives. In addition to presenting the idea and defending it from likely attacks, we give concrete advice on how to broach this delicate but important subject with patients.

**ID: 1189**

## **Early MRI in the investigation of intracerebral bleed: a revisit**

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### Objective

To examine the role of MRI in the acute investigation of intracerebral haematoma (ICH).

### Methods

Prospective data was collected for all patients investigated by a single neurosurgeon for ICH over a 6 month period. Patients underwent MRI within 1 week of ictus as well as any other investigations deemed appropriate. The role of MRI was evaluated to determine whether it contributed to the diagnostic process and whether it was useful in diagnosing lesions that were occult on CT and angiography.

### Results

19 patients were investigated for ICH during the study period. Of these an underlying pathology was diagnosed in 15 patients. MRI was diagnostic in 4 patients whose lesions were occult on both CTA and DSA. MRI was more sensitive (86%) than either CT (46%) or DSA (78%).

### Conclusion

MRI should be considered a first line, acute investigation in the management and investigation of ICH. In this study it was the most sensitive investigation.

**ID: 1190**

**challenges and opportunities- moving paediatric neurosurgery to a children's hospital**

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Paediatric neurosurgery has evolved into a distinct subspecialty in recent years and has traditionally been provided in a children's ward at an adult neurosurgery unit.

Many centres now recognise the need for the provision of paediatric neurosurgery in the more appropriate setting of a children's hospital.

The authors explore the challenges and opportunities which arise in the first year of a devolved paediatric service,

with reference to case mix, multi-disciplinary team approach, outreach services and crossover between adult and paediatric services.

**ID: 1191**

**A feasibility study of Neighbourhood Tractography in the presence of paediatric brain tumours**

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**Aims**

The aims of this study were to determine if the method of Neighbourhood Tractography (NT) is effective in producing true representations of white-matter tracts in the presence of distorting intracranial tumours in a paediatric cohort. This is the first work that has assessed the feasibility and accuracy of this technique in the presence of neoplasms. We also looked at how the process can be simplified and automated for use by neurosurgeons without prior tractography experience.

**Background**

Diffusion tensor imaging (DTI) is a technique that measures the directional dependence of water diffusion in tissues to track white matter bundles in vivo. NT is a novel technique of using candidate seed points (classically in a 7x7 voxel region) and matching the resulting candidate tracts to a reference pathway. The technique does not rely on 'regions of interest' and so avoids the associated reproducibility issues.

**Methods**

This study applied the NT technique to DTI data from a cohort of 17 patients with a variety of tumours. Graphical representations of the corpus callosum, corticospinal, cingulate and arcuate tracts were produced along with measures of structural integrity (fractional anisotropy, mean diffusivity) and goodness of fit.

**Results**

Reconstruction of major white matter tracts were produced for all patients studied. Results showed significant differences in tract morphology depending on tumour characteristics and tract/site involvement when analysed with comparative statistical measures. Additionally, the presentation includes brief advice on how neurosurgeons can set up a NT system in their own department (or even on a home computer) and cautions regarding interpretation of tractography results.

**ID: 1192**

**Does the internet provide good information for patients undergoing lumbar microdiscectomy?**

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**Objective:** For patients undergoing a lumbar microdiscectomy, a common spinal operation, we investigated if the quality of information available on the internet is sufficient for patients to make informed decisions regarding their treatment.

**Methods:** We evaluated the internet to determine whether patients are obtaining accurate, current and reliable information. This was a retrospective study of the four most commonly used search engines ranked by frequency of use: Google® (73%) Yahoo® (17%) MSN/Live® (6%) and Ask Jeeves® (4%). The first 10 sites of each search engine were evaluated in response to the enquiry "lumbar microdiscectomy." All 40 websites were evaluated by three independent surgeons using a standardised quality assessment tool (DISCERN®).

**Results:** According to DISCERN®, the quality of websites was moderately reliable with a mean rating of 2.97 (range 1-5). The websites were relevant (78.9%), described the procedure (71.3%), identified clear aims (64.1%), and explained the potential benefits (69.6%) and risks (73.6%). However, we identified a number of important limitations. The websites were unbalanced with a financial bias (53.9%) and did not suggest alternative treatment options (52.4%). Moreover, only 52% of the websites described how the surgery would affect the patient's quality of life and only 37.9% of websites offered support for shared decision-making.

**Conclusion:** The quality of information available to patients undergoing a lumbar microdiscectomy was only satisfactory and perhaps could be improved by using reliable information leaflets or a national-led website. The internet cannot and should not be seen as a replacement for face-to-face discussion in the clinic.

**ID: 1193**

**Post-operative reduction in anti-epileptic drugs cost.**

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**Objective**

Evaluate the postoperative change in cost of anti-epileptic drugs in patients undergoing surgery for intractable epilepsy.

**Methods**

A retrospective cohort study of 46 patients who underwent surgery for intractable epilepsy during the period January 2003-May 2008. Clinical notes were accessed via the electronic patient record. Age, gender, operation, laterality, date of operation and pre- and postoperative anti-epileptic regimens were recorded. The recorded preoperative regimen was the last prescribed before undergoing surgery. The recorded post-operative regimen was the most current as of May 2008. The monthly cost of each drug was calculated using pricing in the British National Formulary 55 (March 2008 edition). The total cost of pre- and postoperative drugs were calculated and compared. Statistical significance was tested using Wilcoxon's signed ranks test. Correlations between date of operation, preoperative cost and postoperative saving were plotted and tested with Spearman's rank correlation coefficient.

**Results**

Median preoperative drug cost was £115.72 per month. Median post-operative cost was £47.55 per month. Median postoperative saving per patient was £28.55 per month ( $p=0.037$ ). There was no correlation between operation date and postoperative saving ( $p=0.221$ ). There was significant correlation between preoperative cost and postoperative saving ( $p=0.001$ ).

**Conclusion**

Surgery is associated with significant postoperative savings in anti-epileptic drugs cost. The saving is higher in patients with more expensive preoperative regimens.

**ID: 1194**

**current treatment practice for cavernous malformations: international survey**

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**Introduction**

From published case series of both conservative and actively treated cavernomas there would appear to be wide variation in worldwide clinical practice. This survey aims to quantify that uncertainty over optimum management.

**Methods**

We surveyed the following groups: ARUBA, ABN, SBNS, STICH II trialists, and the Joint Cerebrovascular Section of AANS/CNS.

We asked these professionals to complete a brief, web-based survey

(<http://research.ncl.ac.uk/nctu/cavortt/Questionnaire.php>), indicating what treatment they would recommend for various clinical scenarios involving a hypothetical adult with a cavernoma. We subdivided these scenarios by brain location of the cavernoma (lobar, deep, or brainstem) and mode of presentation (one haemorrhage, two haemorrhages or, epilepsy, or incidental).

**Results**

The 194 responses that were suitable for analysis were from a broad spread of countries: UK(60), USA(30), Germany(9), Spain(3), Canada(3), Italy(3), India(3), France(2), and we received single responses from 18 other countries.

Of the 194 responses, 41 were from neurologists and 153 were from neurosurgeons, who between them saw a median of 5 new cavernoma patients per year.

The treatment preferences were variable; surgery was advocated in 0-80% of cases, radiosurgery in 1-23%, conservative management in 2-92% and unsure in 7-25% depending on clinical scenario and cavernoma location. For example in patients with 2 haemorrhages from a brainstem cavernoma 59% of respondents advocated surgery, 14% radiosurgery, 7% were conservative and 20% unsure. The full range of results will be presented.

**Conclusion**

Considerable uncertainty exists amongst cerebrovascular experts as to optimum management of cerebral cavernomas. We thus argue for prospective studies to elucidate best treatment pathways.

**ID: 1196**

**WHAT ROLE CAN EGFR INHIBITORS PLAY IN THE MANAGEMENT OF PATIENTS WITH**

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The epidermal growth factor receptor (EGFR), is an important regulator of cell growth and survival. It has been shown to play a key role in the pathogenesis of glioblastoma multiforme (GBM). EGFR gene mutations can result in the production of mutant receptors such as the constitutively active EGFRvIII mutant. Such mutations, along with EGFR over-expression have been strongly associated with many GBM cases.

One novel experimental approach designed to target malignant glioma cells involves the use of EGFR inhibitors, such as gefitinib – a tyrosine kinase inhibitor (TKI). Studies have suggested that treatment regimens involving novel pharmacological agents such as gefitinib may decrease the morbidity and mortality of malignant glioma patients.

One of the key molecules downstream of EGFR is the mammalian target of rapamycin (mTOR). mTOR plays a crucial role in cellular growth and survival. It is possible that the use of an mTOR inhibitor such as sirolimus (rapamycin) or the structurally related temsirolimus, with or without concomitant use of an EGFR inhibitor, may be of use in the management of malignant glioma.

Other key molecules downstream of EGFR include phosphatidylinositol-3-OH kinase (PI3-K) and MEK. Gliomas often have mutant over-active PI3-K or unregulated PI3-K, due to a lack of the tumour suppressor, PTEN. Inhibitors of PI3-K and MEK, known as PI-103 and U0126 respectively, have been shown to have activity in glioma cells. From this study, I propose that the simultaneous use of PI-103 and U0126, or derivatives of these molecules, could be appropriate in a future clinical trial.

**ID: 1197**

## **Visual Field Deficits after Selective Trans-Sylvian Amygdalohippocampectomy**

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### **Objective:**

To identify and evaluate the incidence of visual field deficits (VFD) comparing different perimetry systems after selective Trans-sylvian Amygdalohippocampectomy (TAH) performed consecutively by one neurosurgeon and its significance for driving.

### **Design:**

An analysis of pre- and post-operative Goldmann perimetry charts using the I4e stimulus and postoperative Humphrey and binocular Esterman visual fields.

### **Subjects:**

Total of 39 patients, age range 5 – 55 years.

Mean follow-up of 2 years 7 months.

### **Results:**

26 patients (67%) had postoperative visual field deficits on Goldmann and Humphrey perimetry. 13 patients (33%) had no visual field deficits.

37 out of 39 patients (95%) passed the Esterman test for driving. 2 patients failed the Esterman test, one was seizure free and the other was still having some seizures.

34 patients (87%) were seizure free and classified as Engel 1. 4 patients (33%) had some seizures and were Engel 2. 1 patient was classified as Engel 3 but passed the Esterman test.

### **Conclusions:**

There is a low incidence of visual field deficits precluding driving after a selective TAH with excellent seizure control. Both Goldmann and Humphrey perimetry give similar patterns, although Humphrey perimetry is more standardised. The Esterman test should be performed in all patients who wish to drive.

**ID: 1198**

**The effect of alcohol misuse on outcome following Traumatic Brain Injury (TBI)**

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**Objective:** Alcohol is a leading risk factor for head injuries, but little is known about the effects an alcohol use disorder (AUD) may have on long-term outcome following TBI. Whilst piloting a data collection tool, we aimed to compare outcome using the Glasgow Outcome Scale (GOS) in patients with or without an alcohol-related injury (ARI), at discharge and 6 months. Secondly, we aimed to compare consistency of recorded risk factors for AUD in TBI patients across two data sources.

**Methods:** Data was collected retrospectively from case notes and the TBI database for 50 patients aged >16 years, who were admitted to NICU with a moderate/severe TBI between August 2007 and April 2008. Data on risk factors for TBI and AUD as well as GOS was recorded and analysed using Mann-Whitney, Kappa and Chi-squared where appropriate.

**Results:** There was no difference in outcome between patients with or without an ARI in this sample (n=37). In TBI patients with a non-ARI, 53% (n= 10) had a poor outcome (GOS 1-3) at 6 months, and 22% (n=4) had a poor outcome in the ARI group (Z= -1.880 p=0.60). Local demographic data followed worldwide patterns.

**Conclusions:** There was no difference in outcome at 6 months between those patients with an alcohol-related injury and those without. Differences may be seen in a larger sample. Poor documentation of the level of intoxication may have contributed to these results, and routine blood alcohol concentration (BAC) recordings would be beneficial for future research and potentially, treatment.

**ID: 1199**

**Traumatic brain injury admissions in a regional trauma centre from 2002 to 2009**

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**Objective:** To study the trends of adult traumatic brain injury (TBI) admissions to a trauma centre over 7 years.

**Method:** Admission details, TBI severity and GCS were obtained from the trauma registry for all patients admitted in the hospital between August 2002 to March 2009. Data was analysed using SPSS.

**Results:** 1554 TBI were recorded from the trauma data collection of 6037. 79.2 % were male (mean age: 39.7 years). The majority of admissions at 24.9 % were in the 2nd decade. Most admissions took place during weekend nights. There was increase in TBI incidence in all age ranges of patients, and an increasing trend in the number of patients presenting with all severities of TBI. The proportion of TBI in the severe, moderate and mild groups were 30.9%, 11.6% and 38.8% respectively (18.5% not recorded). The three commonest mechanisms of head injury were RTAs 48%, falls 27% and assaults 14%. There was a statistically significant difference in worse outcomes in presence of other injuries between the severe and mild TBI groups in all age groups

**Conclusions:** In line with the department's transformation into a regional trauma centre, this study reports a sustained increase across the seven-year period in the number of TBI admissions. These increases occurred across all age groups, among the male and female patient populations, and involved all severities and mechanisms. Conclusions drawn from our data can serve as comparisons for and guidance to new and developing regional trauma centres across the UK.

**ID: 1200**

**Single Unit Experience in The Surgical Management of Symptomatic Thoracic Disc Protrusion**

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**Objective:** To assess the efficacy of current surgical management and intraoperative strategies of thoracic disc protrusion and to review our experience in Oldchurch/Queen's Hospital.

**Methods:** A retrospective case study of patients operated for thoracic disc protrusion via the transthoracic or the posterolateral costotransversectomy/transpedicular approach between 2000-2009. Patients case notes and theatre logbooks were used.

**Results:** Eighteen patients were studied. Mean age was 54 years; mean follow up was eleven months. Average duration of symptoms was 5.35 months. All patients had at least one feature of myelopathy. Radiculopathy was present in 11 cases (61 %). Open thoracotomy was employed in ten patients, whilst a posterolateral approach was used in eight cases. Average length of stay was 12.8 days. Complications prolonging the length of stay were present in 4 patients. In all cases, progression of myelopathy was arrested, and significant symptomatic relief was achieved in 17 patients (94%). SSEPs were used in 10 cases, without significantly altering the complication rate, LOS or clinical outcome. In five cases of calcified disc protrusion, excision of the protrusion with resection of the adherent dura was employed. This did not alter the clinical outcome.

**Conclusion:** The use of transthoracic and posterolateral approaches in the management of thoracic disc protrusion yields very satisfactory results in terms of symptomatic recovery. The use of SSEPs does not significantly improve outcome. Excision of calcified discs with the adherent dura does not result in worse outcome but carries an increased complication rate. Considerations related with such an intraoperative strategy are discussed.

**ID: 1201**

**Patient experiences and satisfaction with awake craniotomy for brain tumours**

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**Objective:** Awake craniotomy is increasingly used to facilitate safe maximal resection of CNS tumours. Very little published data is available to determine patient experiences and satisfaction. This knowledge may lead to improvement in technique and enhance future patient care.

**Methods:** Full awake technique with conscious sedation. Questionnaire designed with reference to RCS guidelines. 4 areas of care explored – before admission, day of surgery, during surgery and after operation.

**Results:** 60 consecutive patients studied - 45 responses received. 42 of 45 patients reported they felt involved in decision making and related well to the surgical team. 41 felt they were given enough information but only 29 given written information. 39 related well to the anaesthetic team and 37 felt they had enough time on the day of surgery to ask questions. 23 remembered most of the time in theatre, 21 remembered only a little and 2 remembered nothing. 29 had no pain at any time, 11 had some minor discomfort and 1 reported significant pain. Only 6 patients reported any significant pain post-op. 11 were discharged on the day of surgery, 18 the next morning and 6 on day 2. 38 were happy at timing of discharge, 4 felt they were discharged too soon and 3 felt they were kept in too long. 36 felt they were adequately supported after discharge.

**Conclusions:** This study demonstrated high levels of patient satisfaction and provides surgeons with useful data for consenting patients. We identified no difference in levels of patient satisfaction comparing day-case patients with those admitted. We identified areas for improvement including provision of written information, enhancing post-discharge support and allowing more time for anaesthetic discussion before surgery.

**ID: 1202**

**Glioblastoma: Can we predict a patient's survival?**

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**Objectives:**

In 2008, subanalysis of the Stupp trial data was performed to identify new prognostic factors for survival in patients with glioblastoma multiforme (GBM). An online prognosis predicting "GBM Calculator" was made available on the EORTC website intended for use when counselling patients and to give neuro-oncologists guidance when giving individual patients' prognoses. We tested the calculator against actual local survival data in order to validate its use in our patients.

**Methods:**

All (n=85) local patients diagnosed with WHO grade IV Glioma in 2006 and 2007 and who subsequently died had their details entered retrospectively into the GBM Calculator. The survival from date of diagnosis was calculated and compared to the median predicted survival. Patients were excluded if they could not be stratified on the calculator. The actual and predicted survivals were compared with a Chi square analysis and displayed on Kaplan-Meier curves with 95% confidence intervals.

**Results:**

Within the first year following diagnosis the predicted median survival was significantly in excess of the actual survival ( $P < 0.0001$ ). Some local patients survived in excess of two years despite the most optimistic predictions of 16.31 months. Almost 90% of patients would have received a significantly over optimistic prediction of survival if this calculator was used during this period.

**Conclusions:**

Use of the GBM calculator would have misinformed the majority of our patients. This study would suggest that a unit contemplating the use of this potentially helpful tool should undertake a similar validation to insure that the information given to patients is accurate.

**ID: 1203**

**analysis of brain shift in deep brain stimulation**

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**Objective**

Brain shift is often considered a source of inaccuracy in functional neurosurgery. An image-guided approach requires a surgical technique that limits brain shift. The aim of this study was to quantify postoperative subcortical brain shift when using this approach. The effect of subcortical brain shift on clinical outcome was also analysed.

**Methods**

Images from 167 consecutive patients undergoing DBS electrode implantation were analysed. Accurate pre and postoperative stereotactic coordinates could be calculated from MRI for both anterior and posterior commissural points in 136 procedures allowing comparison between the two. The amount of pneumocephalus was also calculated.

**Results**

The mean scalar change in AC-PC length ( $\Delta$ AC-PC) was  $0.6 \pm 0.4$  mm. There was no statistically significant difference in  $\Delta$ AC-PC between subgroups when considering anatomic target ( $p=0.95$ ), age ( $p=0.64$ ), gender ( $p=0.59$ ), unilateral or bilateral implantation ( $p=0.15$ ), or degree of pneumocephalus ( $p=0.12$ ).

In 53 patients with Parkinson's disease undergoing bilateral STN DBS with at least 6 months of follow-up, the mean percentage improvement in UPDRS III score was 52% when comparing preoperative OFF drug and postoperative OFF drug ON stimulation. There was no correlation between magnitude of brain shift and clinical improvement in these patients ( $R^2 < 0.04$ ).

There was no symptomatic haemorrhage in any patient in this study.

**Conclusions**

The observed brain shift in this image-guided surgical approach was considerably less than that reported by series where MER was employed.<sup>1-3</sup> The magnitude of brain shift observed in this study appears to have no bearing on clinical results in those patients undergoing STN DBS for Parkinson's disease.

**ID: 1204**

**Boron Neutron Capture Therapy for newly diagnosed glioblastoma multiforme: An assessment**

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**Objective:** To assess the potential of Boron Neutron Capture Therapy (BNCT) with a 6 hour infusion of the boron carrier l-boronophenylalanine, as a fructose preparation (BPA-f), as first line therapy for newly diagnosed glioblastoma multiforme (GBM).

**Methods:** Patient survival data from a phase II study with BNCT was compared with data from two arms of a phase III study with conventional radiotherapy (RT) in the reference arm and RT plus concomitant and adjuvant temozolomide (TMZ) in the experimental arm. BNCT was also compared with small subgroups of these patients for which the methylation status of the MGMT (O6-methylguanine–DNA methyltransferase) DNA-repair gene was known. Differences in baseline characteristics, extent of salvage therapy and levels of severe adverse events were also considered in these comparisons.

**Results:** The results indicated that BNCT could offer a more effective treatment than RT alone and that it could be comparable with that for RT plus TMZ. When compared with a subgroup of patients with the unmethylated MGMT DNA-repair gene, that received RT/TMZ, a possible clinically relevant advantage of BNCT was suggested.

**Conclusions:** BNCT could offer prolonged survival for a proportion of patients with newly diagnosed GBM compared with the present standard treatment. BNCT is a single day treatment with mild side effects, which would offer an initial 6 weeks of good quality life, during the time when patients would otherwise receive daily treatments with RT and TMZ. It is suggested that the use of BNCT, with six hour infusion of BPA-f, should be explored in a stratified randomize phase II trial in which patients with unmethylated MGMT DNA-repair gene are offered BNCT in the experimental arm with RT plus TMZ as the reference arm.

**ID: 1205**

**Intramedullary enhancement and swelling of the cervical spinal cord. When is a tumour not a**

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**OBJECTIVES:** We present a series of six patients with cervical myelopathy and a swollen cervical cord associated with intramedullary contrast enhancement, in whom it was difficult to decide whether the lesion was due to cervical spondylotic compression, or an intrinsic glial tumour. We describe the key features and suggest a management plan.

**METHODS:** Retrospective review of six cases after 2 years follow-up, with cervical stenosis and MRI findings of high signal cord swelling and contrast enhancement, resembling an intrinsic cord tumour.

**RESULTS:** All cases presented with cervical myelopathy without acute trauma and MRI revealed swelling of the spinal cord with extensive signal change and contrast enhancement suggesting a possible diagnosis of intrinsic cord tumour. There was coexisting evidence of cervical spondylosis and cord compression. Serological and cerebrospinal fluid analysis excluded demyelinating or inflammatory aetiologies.

In all cases cervical decompression was performed without biopsy. All patients improved by a mean two years' follow up. Cord swelling and signal change improved with time, but enhancement persisted.

**CONCLUSION:** We present a group of patients with cervical cord swelling and enhancement in whom it was not clear whether the aetiology was one of intrinsic tumour or extrinsic spondylotic compression. We suggest that biopsy of the cord in these cases should be avoided in the first instance, and treatment should involve decompression of the cord and radiological surveillance thereafter. Biopsies should be reserved for those rare cases when decompression alone is insufficient to stop the progression of symptoms or radiological findings.

**ID: 1206**

**Accelerated forgetting in spatial maze tasks in humans with hippocampal resections**

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**Objective:** Recently research has highlighted a specific memory retention impairment in people with epilepsy, known as accelerated forgetting. Many traditional neuropsychological tests fail to capture accelerated forgetting, as they are often not designed to test long term retention of memories. In our research spatial memory is investigated in a virtual water maze, a dynamic sensitive test of spatial navigation. Patients with chronic epilepsy who were treated with transsylvian selective unilateral Amydalo-hippocampectomy are assessed in the long term retention of spatial memories.

**Methods:** 11 patients with unilateral selective Amydalo-hippocampectomies were assessed using a Virtual Morris Water Maze and compared to healthy controls. They were tested over sessions spaced 3-6 weeks apart.

**Results:** Participants were able to learn the task after extensive training, and repeated measures ANOVA showed no differences between groups. A one-way ANOVA with post hoc Bonferroni tests showed right sided surgery participants were significantly impaired in retention trials compared to control subjects,  $p < 0.05$ , providing strong evidence of accelerated forgetting.

**Conclusions:** People with right sided selective unilateral Amydalo-hippocampectomies are able to learn spatial navigation tasks, but are unable to retain the memory trace long term.

**ID: 1207**

## **Localisation of intracranial space occupying lesions with linear fiducial strips**

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### **OBJECTIVE**

Radio-opaque fiducials have been used for cranial localisation. These techniques have generally been superseded by image guidance which requires specialised equipment and training. Our aim was to develop a simple, accurate, repeatable method of cranial localisation for use in situations where stereotaxy or image guidance was either not appropriate or not available.

### **METHODS**

In this technique, rather than using a single fiducial, a series of CT or MRI compatible markers were used. Two such strips were affixed to the patient's head usually in a para-sagittal or para-coronal plane. Depending on the patient, this may require a very minimal, localised shave of strips of hair. After scanning, the surgeon uses the images to count along the fiducials in each plane (effectively reading an x and a y co-ordinate) for accurate localisation of the lesion. The location is marked with an indelible ink pen and the fiducial strips are removed.

### **RESULTS**

This technique has now been utilised successfully in 5 cases (4 tumours, 1 abscess). The operating surgeon was asked to classify the utility of the technique using modified McNab's criteria (excellent, good, useful, not useful). Four of the five were classified as excellent and one as useful. No other methods of localisation were required.

### **CONCLUSIONS**

We do not advocate this technique as a 'one-size fits all' approach to cranial localisation. Clearly, if 1-2 mm level of accuracy is required frame-based or frameless stereotaxy should be employed. This technique may have some advantages in situations where resources are scarce but access to CT scanning is available i.e. the developing world. This technique may also be applicable for use by trainees in the emergency setting.

TM Locate

**ID: 1208**

**Outcome results for the use of XLIF Cage in the management of acute thoraco-lumbar discitis**

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**Objective:** Management of acute bacterial discitis varies from conservative treatment with antibiotics and bed rest to aggressive debridement anteriorly and posterior fixation. The extreme lateral inter-body fusion (XLIF) technique is minimally invasive and provides direct access to the disc space lending itself to directly removing the source of infection, providing a microbiological diagnosis, and stabilizing the painful segment. It improves the speed of mobilization and reduces the length of hospital stay.

**Methods:** 7 patients over a 6-month period presented with thoraco-lumbar discitis. 6 patients underwent stand alone XLIF and one had XLIF with posterior fixation. Pre-operative back and leg pain was measured using the Visual Analogue Scale (VAS) and functional disability was measured using the Oswestry Disability Index (ODI). Outcomes were repeated at six weeks post operatively in 6 patients and 6 month post operative data is currently available for 2 patients. Samples of infected disc material were sent off for microbiological investigation in all cases.

**Results:** Pre-operative mean VAS score was 7.1 (5-8.2) for back pain and 4.3 (0.1-7.1) for leg pain. These had reduced to 3.5 and 1.68 at 6 weeks post operatively. Mean pre-operative ODI score was 64.3% (52-80%) this reduced to 45% (14-74%) at 6 weeks post operatively. In 5 cases, no growth or causative organism was cultured from disc material obtained during the procedure. Mycobacterium tuberculosis complex was isolated from one patient and staphylococcus aureus cultured from another patient. In two cases, bacterial DNA was found to be positive. Of these, Staphylococcus warneri/pasteuri was identified in one case. Patients were discharged back to the referring hospital within 3 days post-operatively.

**Conclusions:** Stand-alone XLIF is a minimally invasive technique that can be used to treat acute discitis. It allows direct debridement and stabilization of the painful level. It may help prevent post infection kyphosis and has a clinically significant effect on pain and disability. Although there is a low culture rate obtained from tissue samples obtained intra-operatively, this may be explained by the use of antibiotic treatment prior to referral. By allowing early mobilization of these patients after their procedure, hospital stay can be significantly reduced.

**ID: 1209**

## **The Use Of An Expandable Interbody Device (B-TWIN) For Back Dominant Lumbar Disc**

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### **Introduction**

Several surgical options have been utilised to treat patients with back dominant lumbar disc disease. The purpose of our study was to compare the outcomes in patients who underwent lumbar fusion with an expandable interbody device (B-TWIN) using different surgical techniques (PLIF, TLIF or posterolateral screws alone).

### **Method**

Observational study, retrospective analysis of prospectively collected data. Patients underwent a single level lumbar fusion. Group A: PLIF with B-Twin cage; Group B: TLIF with B-Twin cage and unilateral pedicle screw fixation and Group C: bilateral posterolateral screw fixation alone. Functional outcomes were assessed using: SF-36, Oswestry Disability Index (ODI), Distress and Risk Assessment Method scores (DRAM) and the visual analogue pain scores (VAS).

### **Results**

There were 32 patients, 24 female and 8 male. Average age was 45 (range 33-63). Average follow up was 12 months (range 2-36). Level of spinal fusion was 2 L3/4, 11 L4/5 and 13 L5/S1. Mean hospital stay was 5.8 days.

VAS improved in all 3 groups A 5.83 – 5; B 8 – 4.83; C 5.71 – 2.3.

ODI improved in all 3 groups A 0.5 – 0.35; B 0.51 – 0.44, C 0.42 – 0.16.

There was no statistical difference on comparison of the three groups.

There were no operative complications. One patient broke her interbody device during a fall in the first post-operative week requiring a subsequent procedure.

### **Conclusion**

Lumbar interbody fusions can safely be performed using an expandable interbody device. Good functional outcomes can be achieved in the majority of well selected patients.

**ID: 1210**

**Forty Consecutive Cases of Medico-Legal Cauda Equina Syndrome : A Single Expert Evidence**

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Methods : A prospective longitudinal study of forty consecutive people who were referred to a single neurosurgical expert with cauda equina syndrome (CES).

Results : Age: median = 35, mean = 47. Male:female 1.4:1. Level and pathology: L5/S1 PLID 17 (42.5%), L4/5 13 (32.5%), L3/4 3 (7.5%), L2/3 2 (5%), stenosis 5 (12.5%). First presentation = (i) unilateral radicular pain = 10 (25%) (ii) bilateral radicular pain = 13 (32.5%) (iii) incomplete cauda equina syndrome (CESI) = 14 (35%) (iv) bladder paralysis with incontinence (CESR) = 3 (7.5%).

39 primary breaches of duty of care: orthopaedics 18 (46%), GP 8 (21%), A&E 7 (18%), neurosurgery 4 (10%), nursing 1 (3%), ambulance 1 (3%).

8 neurosurgical breaches (4 primary, 4 subsequent): (i) 4 failures to admit; (ii) 2 failures to investigate; (iii) 2 drill plunging.

11 (27.5%) had iatrogenic injury: unrecognised EDH = 4; inadequate decompression = 3; drill injury = 3; dural tear = 1; unknown = 1: long-term bladder paralysis in all cases.

28 patients were previously working; 6 (21%) returned to normal/modified work; 22 (79%) did not work again.

33 had compressive lesions causing CESR. 29 (88%) did not recover function. 7 patients were operated on within 24 hours of CESR, 4 recovered bladder function, 3 did not.

Conclusion : A unique though highly selected group. 93% presented with treatable lesions; only 7% presented with bladder paralysis. 7 patients with CESR were decompressed within 24 hours, 4/7 recovered bladder function. No patient with CESR treated beyond 24 hours recovered bladder function.

**ID: 1211**

**Analysis of multiple serum angiogenic factors in patients with glioblastoma suggests that**

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**Objective**

Angiogenesis is a hallmark of glioblastoma and is considered an important target for new chemotherapy regimes. The profiling of patients, tumours and treatment monitoring is therefore vital to the potential success of anti-angiogenic therapy. We investigated the hypothesis that serum angiogenic protein profiles show distinct patterns that are prognostic for survival.

**Design**

Laboratory investigation of samples from the tumour serum bank at St George's University of London.

**Subjects**

A cohort of 36 patients with histologically proven glioblastoma who had serum samples taken at the time of diagnosis. Information about the patients included basic demographics, performance status at time of diagnosis, surgical and adjuvant treatment, and survival time.

**Methods**

Samples were simultaneously assayed using protein arrays for 48 factors implicated in glioblastoma angiogenesis. These data were then subjected to statistical analysis including cluster and multivariate analysis.

**Results**

Cluster analysis was used to group patients according to similarities of their serum angiogenic profile. This produced reliable clusters with median survivals of 48 and 32 weeks respectively, although this did not reach statistical significance ( $P = 0.10$ ). Multivariate analysis showed that established prognostic factors of young age, better presenting performance status, extent of resection and adjuvant therapy conferred significant survival advantage. The only serum protein independently associated with improved survival is Tissue Inhibitor of Metalloproteinase 1 (TIMP-1), with significance 0.01, lower levels of TIMP-1 predicted improved survival.

**Conclusions**

Serum analysis of angiogenic factors may be valuable as a prognostic marker in glioblastoma and this preliminary study reveals a possible role of TIMP-1 in this context.

**ID: 1212**

**Audit on the management of subdural haematomas in a neurosurgical unit: When is local**

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**Objective:** The notion of tertiary referring centre implies that a number of patients with acute or chronic subdural haematomas will be managed locally, to achieve effective resource allocation. Unfortunately there is a subgroup who will deteriorate and will need urgent transfer and surgical intervention. Our aim was to identify risk factors in this subgroup, that could refine and optimize our everyday decision process.

**Methods:** Retrospective record analysis of 339 patients events with subdural collections referred to our unit between January 2008- May 2009. We identified three groups. Patients managed conservatively in the local hospitals (I), patients admitted and operated as planned (II) and the group of patients who initially were managed conservatively but deteriorated acutely and required urgent transfer and surgical intervention (III).

**Results:** In 306 (90.2%), the initial management plan was not changed ( groups I, II). Nevertheless, group III accounted for 33 patients (9.7%) Anticoagulation/antiplatelet treatment ( $p < 0.026$ ), younger age ( $p < 0.046$ ), were significant predictors in favor of surgical management. GCS and midline shift on first referral, unilateral or bilateral haematoma were not found to be significant.

**Conclusions:** The well established decision process based on the radiological findings and GCS, though is successful in providing safe management in 90.2% of cases, it does prove to be insufficient for a subgroup of patients, rendering them prone to increased mortality/morbidity risks. Measures like lowering the threshold for neurosurgical admission, or local frequent imaging might be necessary for these patients. Implications on the additional workload versus safe management balance are discussed.

**ID: 1213**

**Long term outcome of Intrathecal Baclofen Pump implantation in patients with advanced**

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**Objective:**

To review the long term outcome in a group of severely disabled patients with Multiple Sclerosis (MS) following intrathecal Baclofen (ITB). Improved quality of life with reduced painful spasms and decreased spasticity are described as well as the complications of treatment.

**Method:**

A retrospective study of patients with advanced MS who underwent ITB therapy between 1996 and 2007 from a total group of 132 patients undergoing pump implantation.

**Results:**

40 patients with MS underwent ITB. Mean age at diagnosis of MS was 31 years (range 16-46), and age at implantation of pump 46 (range 28-61). The majority (36) were wheelchair or bed bound. The Expanded Disability Status Scale was 8.0 (range 6.5-9). The average pre-operative oral Baclofen dose was 61mg/day (range 0-100), one year post-operatively the average intrathecal dose was 209µg/day (range 24-449). The average Modified Ashworth Scale improved from 4.6 (range 3-5) to 1.0 (range 0-4) and the Penn Spasm Frequency Scale from 3.6 (range 1-4) to 1.1 (range 0-2). Four patients had problems with the catheter delivery system due to migration. Five pumps were replaced due to expiration of battery, one due to flipping (pump rotation) causing non-delivery of Baclofen and one due to thinness of skin over the implant area.

**Conclusions:**

ITB pump significantly improves the long term outcome in MS patients even with advanced disease. This series of patients provides an insight into the benefits of ITB in advanced MS where there is a sustained clinical improvement and low risk of complication.

**ID: 1214**

**The influence of aseptic non touch technique on external ventricular drain infection rates.**

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(Greater Manchester Neurosciences Centre)

**Objective:**

With the wide spread advocacy of Aseptic non touch technique(ANTT)in current practice, our aim was to see if mandatory training and utilisation of ANTT had any effect on CSF infection in patients post insertion of external ventricular drain(EVD).

**Methods:**

Data collected retrospectively for a period of four years from January 2005 to December 2008. ANTT was introduced as a trust wide policy in January 2007. A total of 252 patients were identified and electronic records accessed. We have defined an infection as positive organism culture in CSF or symptomatic raised white cell count which was treated with antibiotics.

**Results:**

The culture positive infection rates for each year were 2005, 28%; 2006, 28%; 2007, 17%; 2008, 34%. Compared to all the other years there was a significant drop in culture positive infection rates in 2007(17% in 2007 vs 30% other years; Chi2 p=0.046). The overall infection rate in 2007 was 35% compared with the other years of 45%(Chi2 p=0.199NS).

**Conclusion:**

ANTT may have an influence on the rate of culture positive infections in EVDs although overall infection rates in our centre were not significantly changed. With no further mandatory training the effect was not sustained. This decrease in positive cultures may be through a reduction in bacterial load contamination using the technique. Further research is warranted to fully elucidate the effect of ANTT in the management of EVDs.

**ID: 1215**

## **Intersegmental Decompression versus Laminectomy in the Surgical treatment of Lumbar**

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Background context: Facet preserving intersegmental decompression offers a significantly less morbid alternative than historical laminectomies.

Objective: To evaluate the clinical outcomes of patients who underwent intersegmental decompression for focal lumbar spinal stenosis in comparison to those who underwent laminectomy.

Design: Retrospective Observational study.

Subjects: 62 patients divided into 2 groups, Group A (intersegmental) 37 patients, Group B (laminectomy) 25 patients. Median age 64. Average follow up 38 months.

Methods: Patient selection criteria: Neurogenic claudication or mechanical radiculopathy with no or tolerable low back pain. Outcome Measures: Visual analogue score (VAS) score, walking distance, Oswestry disability index (ODI) and length of hospital stay. Operative data included number of levels decompressed and complications.

Results: VAS improved in both groups postoperatively. Back pain; (A) 7.1 – 2.9: (B) 7.3 – 3.3. Leg pain; (A) 6.8 – 3.2: (B) 8.7 – 3.5. Subgroup analysis of pre and postoperative ODI; (A) 43.7 – 26.8: (B) 50 – 26.3. Postoperative length of stay was significantly shorter in the intersegmental group (A: B= 3.5:5.0 days). In Group A, 26 had single level decompression, 6 patients 3 levels and 5 patients 2 levels. In Group B, 23 single level laminectomy, 1 had 2 levels and 1 had 3 levels. 4 patients required redo decompression, 1 in group A and 3 in group B. Surgical complications occurred in 12: 11 CSF leaks (Group A -5, Group B -6) and 1 wound infection (Group A).

Conclusion: Comparable functional improvements can be achieved with focal intersegmental decompression compared with historical laminectomy.

**ID: 1216**

**The adoption and evolution of Hemispheric surgery in a national neurosurgery centre to treat**

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**Aims:** To describe current indications, seizure control, complications and functional outcome following hemispheric surgery carried out in Beaumont Hospital for refractory paediatric epilepsy.

**METHODS:** Retrospective chart review of patients who underwent hemispheric surgery during 2008 with a minimum follow-up of 6 months.

**RESULTS:** 3 children, median age at seizure onset 4 months and median age at surgery 43 months. Etiology included Lennox-Gestalt Syndrome (1), Hemimegacephaly (1) and Rasmussen's encephalitis (1). Average post-operative stay was 14 days. Complications were limited to intraoperative bleeding in one patient requiring transfusion of 3 units of red blood cells. Postoperative complications included one central line infection. At follow-up of 6 months, 66% of patients are seizure free. A significant reduction was achieved in anticonvulsant medications in all three cases at six months.

**CONCLUSIONS:** The surgical treatment of intractable epilepsy has evolved in Beaumont Hospital as new technical innovations have been adopted. Hemispheric surgery is proving an effective and safe therapy for refractory epilepsy in Irish children.

**ID: 1218**

## **Prosthetic Disc Nucleus Restores Disc Height and Disc Hydration**

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**Introduction :** The PDN has been invented to treat moderate forms of degenerative disc disease. It is considered as an alternative that bridge the gap that exists between conventional discectomy and spinal fusion. It is intended to reduce back pain, maintain disc height and range of motion. It has the advantage of being less invasive and offering a more physiological method that preserves the existing disc structures. The aim of this study is to determine whether PDN increase or maintain disc height and disc hydration following implantation in the degenerate lumbar disc.

**Material :** Five patients underwent PDN device insertion between Jan 2002 – May 2005. The inclusion criteria were patients 18 to 65 years old with at least six months history of low back pain with or without leg pain due to degenerative disc disease at a single level from L2-S1 that is unresponsive to conservative treatment. We included only patients with disc height at the affected level of at least five mm. MRI of the lumbar spine is used to measure disc heights and disc hydration at scheduled times prior to and after implantation of the PDN device. These are measured at the implanted level and compared to the adjacent healthy disc. The mean pixel count is measured and used as an index of water content of the respected disc.

**Results :** In this study the overall disc height showed an increase following the implantation of the device from 8.48 mm pre-operatively to 10.44 mm at one year following PDN implantation. Disc hydration also showed improvement at one year post PDN implantation. Mean pixel count increased from 38.13 preoperatively to 94.85 at twelve months. Varying degrees of endplate remodelling is noticed in two of our patients.

**Conclusion :** In our series, we found the Prosthetic Disc Nucleus increase or maintain disc height and disc hydration following its implantation in a degenerative lumbar disc . Endplate remodelling is a major complication that can lead to a decrease in disc height and consequently it can have adverse effects on the clinical outcome.

**ID: 1220**

**The cerebral manifestations of a donor transmitted malignant B-cell lymphoma**

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A small number of cases of lymphoma transmission via transplantation have been reported previously. We present a follow-up case report of transmission of lymphoma 11 years after deceased donor renal transplantation from a male donor, found on postmortem examination to have an occult lymphoma. The female recipient underwent prompt transplant nephrectomy. However, 11 years later she presented with cerebral B cell lymphoma. The donor origin of the lymphoproliferative disease was supported by in situ hybridization for the human Y chromosome in the lymphoma. She had a dramatic resolution of the lesions with tapering of immunosuppression and Rituximab treatment.

**ID: 1222**

**THE NATURAL HISTORY OF CERVICAL MYELOPATHY.**

R. Murphy, I. Molinda, D. Kealy, L. McEvoy, M. Kelliher, C. Bolger.  
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**Introduction:** To document the natural history of cervical myelopathy in patients who were placed on a neurosurgical waiting list for an anterior cervical discectomy. Long neurosurgical waiting lists meant that patients had to wait months to years for surgery.

**Methods:** Retrospective observational study was carried out assessing Myelopathy Index, SF-36, Visual Analogue Scores, and Neck Disability scores.

**Results:** Sixty-four patients who were waiting for 3 months or more for anterior cervical surgery were selected from the waiting list at a University based spinal neurosurgical unit. There were 37 females and 27 males, median age of 45 years (range 31-85). Mean time that the patients were on the waiting list was 20 months. (Range 3-60 months). 44 (69%) reported a general decline in their overall condition, 19 (30%) reported no change while 1 improved. 55 (86%) patients stated that pain was their principal complaint. Deterioration in arm function affected 45 patients. 20 patients reported deterioration in walking. 34 (53%) experienced worsening of sensory abnormalities in the upper limbs, such as numbness, tingling sensations, or pins and needles. Myelopathy index remained static 23 to 24. Neck disability increased on average 37% to 43%. SF 36 physical health scores deteriorated markedly; physical functioning 52% to 45%, Role limitations (physical) 39% to 35%. SF 36 Mental health parameters worsened; emotional 39%-35%, vitality 36% to 32%, mental health 59% to 55%, social functioning 48% to 44%.

**Conclusion:** The majority of patients with cervical myelopathy tend to deteriorate subjectively and objectively while they await surgical intervention. Myelopathy indices remained broadly similar while there was a marked deterioration in patient's mental and physical health.

**ID: 1223**

## **Retropleural Transthoracic Approach for Complex Thoracic Spinal Pathology.**

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### **Object.**

Retropleural thoracotomy provides the shortest direct route to the anterior thoracic spine and avoids pleural cavity entry making it an ideal if infrequently used approach to access complex ventral thoracic and thoracolumbar spine abnormalities. We present a detailed description of our experience utilising this approach.

### **Methods.**

A retrospective review of the surgical pathologies in which this technique was used, the intra-operative and post-operative complications and length of post-op stay. Functional outcome and pain scores were also prospectively recorded using SF-36, Oswestry Disability Index (ODI) and visual analogue pain scores (VAS).

### **Results.**

14 patients underwent a retropleural thoracotomy between 2001 and 2008. There were 7 male and 7 female with a median age of 50 years (range 35 – 70). The surgical pathology included 13 thoracic discs and 1 Schwannoma. The surgical level was T8/9 (58%) followed by T10/11 (33%) and finally T11/12 (8%). The mean post-operative length of stay was 12.8 days (range ....). Intra-operative complications included 4 pleural tears during the approach. Chest drain was placed post-op. The tears were primarily repaired and the approach did not have to be abandoned. 2 patients had an intra-operative CSF leak (1 had intradural disc erosion). Post-operative complications: 1 pleural effusion, 1 patient had a pneumonia and a PE, 1 patient died from an unrelated respiratory tract infection of the lung (opposite to the side of the approach) 40 days after surgery. 2 patients had worsening of their neurological function immediately post-op both of which completely resolved. All patients were myelopathic pre-operatively.

### **Conclusion.**

Large calcified thoracic disc herniations can be a very challenging pathology. The retropleural transthoracic approach can be employed safely in this setting with acceptable morbidity for the patient.

**ID: 1224**

**“Long term survival of glioma patients with “salvage” intraarterial cisplatin chemotherapy”**

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**OBJECTIVE:** We report the survival of 27 glioma patients who received “salvage” intra-arterial cisplatin following recurrence after having received all possible treatment currently available.

**METHODS:** We identified 27 patients during the period of January 1998 till April 2008 who received intra-arterial cisplatin and retrospectively collected clinical and treatment data. Subgroups were formed according to initial histological grade and progression.

**RESULTS:** A mean of 3.3 treatments were performed (range of 1 -7).  
The overall survival was 50 months (range of 14 – 142).  
Survival from the first intra-arterial cisplatin therapy ranged from 1-19 months with a mean of 6.1. Eighteen out of the 27 patients survived more than 3 months following the start of administration of treatment. (N.B. 2 patients are still alive after 19 months each).  
The mean survival for patients with Glioblastoma Multiforme (GBM) was 5 months (range 2-9). Seven out of 9 patients lived more than 3 months.  
The mean survival of patients with initial grade 3 progressing to grade 4 was 8.3 months (range 2-19 months, 2 pts still alive). Seven out of the 10 patients lived more than 3 months.  
Grade 2 progressing to grade 4 patients had a mean survival of 4.75 months (range 1-17) with 4 out of 8 patients living more than 3 months.

**CONCLUSIONS:** Our 27 patients had a mean survival of 6.1 months after administration of cisplatin chemotherapy. The treatment, although invasive, is very well tolerated (cisplatin has little haematological toxicity and is suitable for patients pre-treated with chemotherapy). Although intra-arterial cisplatin chemotherapy is rarely used nowadays for glioma patients, our results are encouraging and warrant further investigation on a larger scale, probably with chemosensitivity testing.

**ID: 1225**

**SBNS Academic Committee Neurosurgical Research Census: Identifying and overcoming**

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**Background:**

Increased funding has been available from the NIHR for translational and clinical research over the last three years. Allocation of this funding to the neurosurgical community has been low, and we have no data to suggest why. There is no national network to inform, facilitate and centralise neurosurgical research in the UK. National translational and clinical research networks have been successfully established in the US and Australia. Formation of a research network specific to neurosurgery in the UK may increase awareness of the funding available, clarify the processes required to secure funding and improve research collaboration.

**Aim:**

A national census of all consultant neurosurgeons to gauge interest in research, awareness of the funding available and identify barriers encountered. Information from the census will contribute to the formation of an accessible and relevant national translational and clinical neurosurgical research network

**Methods:**

A short web based multiple choice questionnaire was designed by the Department of Neurosurgery and Department of Health Sociology at Southampton University. The questions were directed towards current research activity, impediments to research and access to funding. Results were analysed by the Health Services Research Group at the University of Southampton. Results will be presented graphically and using descriptive statistics.

**Results:**

Data collection is in progress.

**ID: 1226**

**Trauma network standards for referral of head injuries-can they achieved?**

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**OBJECTIVE:** Trauma networks have been developed in response to recommendations from the NCEPOD "Trauma:Who Cares?" report (2007) regarding regional planning for the effective delivery of trauma services. Adherence to local network guidelines regarding standards for emergency department (ED) head injury management and referral for neurosurgical opinion was audited. Standards included time to head CT from arrival in ED (60 mins) and time for neurosurgical opinion (30 mins)

**METHODS:** Head injury referrals to the neurosurgical registrar were audited for six weeks while a concurrent audit took place at referring EDs. Analysis of adherence to recommended standards was undertaken using completed referral proformas placed in on-call referral books and proformas completed in EDs.

**RESULTS:** Referrals occurred on 36 out of 40 days (90%) resulting in data for 70 patients. During this period 10 proformas were completed by referring EDs. Average time to performing CT head after ED arrival was 51mins (range 13-120mins) while mean time to neurosurgical referral after CT was 43mins (range 5-100mins). Definitive neurosurgical opinion was given in an average of 16mins (range 1-90, median 9mins). 86% (n=60) of opinions were given within 30mins. Imaging was not available for review in 8 out of the 10 referrals not opined upon within 30mins.

**CONCLUSIONS:** This study suggests that the majority of referrals can be imaged and opined upon within the pre-defined time frame. Delays usually involve obtaining CTs in referring EDs and difficulties with accessing imaging by neurosurgeons. It remains questionable whether it is necessary to opine on GCS 14-15 patients within 30mins.

**ID: 1227**

**Glia-derived quiescent cortical stem cells are activated following Traumatic Brain Injury in mice**

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**Introduction**

Adult neurogenesis is well characterised in the hippocampus. In mice, quiescent precursor cells have also been identified in brain parenchyma raising the possibility of potential neurogenesis outside currently defined stem cell niches. We investigated whether a source of potential endogenous stem cell reside in the cortex, and are activated only following Traumatic Brain Injury (TBI).

**Methods**

Utilizing the neurosphere assay, a surrogate test of stem/progenitor cell presence, the potential for neurogenesis was determined in both the hippocampus and the outer cortex (excluding the SVZ) in mice. Organotypic cortico-hippocampal slice cultures of Postnatal Day 8 (P8) mice were cultured on a deformable silicone membrane. The neurogenic potential was assessed following a 50% stretch injury. Moreover, the source of these cells was investigated.

**Results**

In uninjured tissue, the neurogenic potential is attenuated in older mice (Outer cortex, 5.8 $\pm$ 0.5 (P8) to 0.3 $\pm$ 0.2 (P15), t-test  $p < 0.001$ ; Hippocampus, 6.0  $\pm$ 0.7 (P8) to 3.1 $\pm$ 0.9 (P15), t-test  $p < 0.05$ ). Following a 50% stretch injury, the neurosphere forming potential of both hippocampus and outer cortex derived from organotypic slices, at an equivalent postnatal day 15, was greater compared to control tissue ( $P < 0.05$  2-way Anova). In the cortex, injured cells expressing the glial marker GFAP accounted for the majority of neurospheres formed (GFAP positive, 3.4 $\pm$ 1.0, GFAP negative, 0.71 $\pm$ 0.2,  $P < 0.05$ , student t-test).

**Conclusion**

TBI activates stem cells in the non-permissive cortex. Moreover, this neurogenic potential is derived mostly from GFAP expressing cells. This raises the possibility of an endogenous source of stem cells following TBI.

**ID: 1228**

**Auditory Brainstem Implants, a National Centre's experience**

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Objective: was to assess the functional outcome and impact on quality of life in neurofibromatosis type 2 (NF2) patients following insertion of an Auditory Brainstem Implant (ABI).

A retrospective cohort study.

Subjects: Between 2002 and 2009, 9 patients, out of a cohort of 23 NF 2 patients ( mean 25; range 11-43 yrs) were implanted with 24-electrode Nucleus device. Patients were selected for surgery based on disease status, personal motivation and degree of hearing loss. Intraoperative monitoring confirmed electrode contact ranging from a minimum 10 to a maximum 19, at the time of switch on electrode contact ranged from 4 to 19.

Results and Methods: All patients used their ABI for 10- 12 hours per day and continued use up to study date. This follow up ranged from 7 years to one month. Lip reading using implant showed significant improvement for single word assessment at one year post switch on. In 72% of patients, their perceived outcome of lip reading 'met or exceeded' their expectations, 80% of recipients had quality of life enhanced 'significantly' or 'enormously'. In hearing environmental sounds this outcome met expectations in 29% of patients, and exceeded expectations in 43%. Results were obtained during routine outpatient follow up and the quality of life survey was completed at home by all recipients.

Conclusions: The benefit of ABI insertion for patients with NF2 was clearly demonstrated, their quality of life improved due to both enhanced ability to lip read and perception of environmental sounds. It is the unique state of sensorineural deafness that makes measuring an improvement in it difficult.

Objective measurements are helpful but of even more relevance is the patients own perceptions, which this study attempts to explore.

**ID: 1229**

**Quality of studies published in spinal journals over three decades: Improving quality of**

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**Objective:** To determine the quality of studies published over a three-decade period in 4 prominent 'spinal journals', publishing on spine-related topics.

**Methods:** Retrospective Comparative study.

Computerised search of the Medline database was undertaken to evaluate the articles published in 4 specific 'spinal journals in 1983, 1993 and 2003. The number of RCTs, meta-analyses and other clinical trials were noted.

**Results:** From the 1735 articles evaluated, there were 74 (4.3%) RCTs, 8 (0.5%) meta-analyses and 175 (10%) other clinical trials. For the proportion of RCTs, the rank order of the journals was; Journal of Spine Disorders and Techniques (5.8%), European Spine Journal (5%), Spine (4.6%) and Spinal Cord (1.5%). For the proportion of meta-analysis, the rank order of the journals was; Journal of Spine Disorders and Techniques (1.4%), Spine (0.5%), European Spine Journal (0%) and Spinal Cord (0%). For the proportion of other clinical trials, the rank order of journals was; Journal of Spine Disorders and Techniques (20%), Spine (10%), European Spine Journal (10%) and Spinal Cord (3%). Overall, there were increases in the proportion of RCTs (2.2% to 5.4%), meta-analysis (0% to 0.6%) and other clinical trials (2.2% to 16%) and a decrease in the proportion of other articles published (96% to 78%).

**Conclusions:**

RCTs, meta-analysis and other clinical trials form a small proportion of studies published in these prominent 'spinal' journals. Over the three decades evaluated, there has been an encouraging increase in the proportion of these study types, which is comparable with other surgical specialities.

**ID: 1230**

## **Neurologists Vs the Neurosurgeons: who is the NICEst? The medical management of the**

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### **Objective**

Seizures and epilepsy are a relatively common occurrence in the Neurosurgical patient. Neurosurgeons can often be involved in the medical management utilising anti-epileptic drugs (AEDs). In the UK, clinical practice guidelines have been issued from both the National Institute for Health and Clinical Excellence (NICE) and Scottish Intercollegiate Guidelines Network (SIGN) in relation to epilepsy.

We sought to determine how well these guidelines are adhered to in relation to Neurosurgical patients with epilepsy/seizures.

### **Methods**

A telephone audit survey was conducted in all Neurosurgical and Neurology units in the UK. Respondents were asked about the management of patients in 2 clinical scenarios. They were also asked if they felt neurosurgeons fitted the criteria of an epilepsy specialist as defined by NICE.

### **Results**

We received 25 responses from the neurosurgical and 22 responses from the neurology communities. Management of the patient scenarios was considered in relation to the published guidelines. There was considerable disparity specifically in relation to AED used, duration of treatment and withdrawal of therapy between the guidelines and the management strategies pursued by both groups.

The majority of neurology and neurosurgical respondents did not feel that neurosurgeons meet the criteria as a "medical practitioner with training and expertise in epilepsy" as stated in the NICE guidelines.

### **Conclusions**

We conclude that these guidelines may not be applicable in specific neurosurgical patient settings. Further there may be a lack of awareness or support in both communities for these guidelines. The neurology communities' responses were more closely aligned to the guidelines and so they were deemed the "NICEst".

**ID: 1231**

**A surgical approach to the management of sphenoid wing meningioma presenting with**

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**Objective:** The management of sphenoid wing meningioma (SWM) with orbital wall involvement poses challenging treatment decisions. The difficulty is not from tumour resection, but from the removal of the lateral wall and its remodelling. 3D CT reconstruction views provide an excellent indication of the extent of bony involvement and aid in surgical planning.

**Subjects:** We present three patients, referred to our unit with unilateral eye proptosis, two with intact visual function, the other with mildly reduced acuity. MRI helped to confirm the intracranial extent of meningioma in each case. A one-stage orbitofrontozygomatic approach was performed with total tumour excision and lateral wall reconstruction. This approach exposed the fronto-temporal region, sphenoid wing, intracranial involvement, zygoma as well as the lateral wall of the orbit.

**Results:** In all cases the intracranial portion of meningioma was completely excised. The lateral wall was thinned out in each patient, in one case it was decompressed before reconstruction using a split calvarial graft. Two patients had small intraosseous residual volume remaining. In one patient some residual tumour was also found in the cavernous and sphenoid sinus. This responded well to stereotactic radiosurgery, two year follow up showing that the residual tumour size had not increased and that visual function remained intact. Each of the patients having an excellent clinical outcome on follow up.

**Conclusion:** SWM with lateral orbital wall involvement present a real surgical challenge not only due to their proximity to main vessels but also due to bony involvement. Removal of the lateral wall and its reconstruction is feasible using this approach.

**ID: 1232**

**Brain tissue oxygen monitoring can aid diagnosis of brain stem death in children**

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**Objective:** The accurate and timely diagnosis of brain death in children can be difficult. Clinical diagnosis of brain death may therefore be supplemented by ancillary investigations, such as electroencephalograms and cerebral blood flow monitoring. The usefulness of these investigations is limited by their poor specificity and sensitivity. We therefore investigated whether a newer tool, brain tissue oxygen (PbtO<sub>2</sub>) monitoring, can be utilised in the diagnosis of brain death in children. PbtO<sub>2</sub> monitoring is increasingly used in the ICU, and PbtO<sub>2</sub> measurements have been shown to be a sensitive tool in assisting diagnosis of brain death in adults.

**Methods:** We analysed prospectively collected data on all children who had PbtO<sub>2</sub> monitoring for management of an acute brain injury in the ICU of a large tertiary referral neurosurgical centre, between June 2006 and May 2008. We analysed PbtO<sub>2</sub> measurements in all children, and identified patients who had a clinical diagnosis of brain death.

**Results:** We reviewed the case notes of 85 children, 5 of whom were clinically diagnosed as brain dead. Four had suffered Traumatic Brain Injury, and one had pneumococcal meningitis. All five patients had a PbtO<sub>2</sub> of 0mmHg at the time of clinically diagnosed brain death, that was sustained for more than 30 minutes, and that was unresponsive to an oxygen challenge. No patients had a PbtO<sub>2</sub> of 0mmHg who were not clinically brain dead. No complications of PbtO<sub>2</sub> monitoring were documented.

**Conclusions:** This study provides preliminary evidence that PbtO<sub>2</sub> monitoring is a safe and reliable ancillary bedside test in the diagnosis of brain death. Its wider application will require evaluation of a larger number of patients to further assess its sensitivity and specificity.

**ID: 1233**

**How comprehensively is a patient's sciatica managed with analgesia before resorting to**

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**Objective:** Sixty percent of disc related sciatica recovers spontaneously in 3 months. A Cochrane review found no significant difference in pain scores in comparisons of surgical and non-surgical treatment at 4 years. This suggests optimising non-surgical management, such as analgesia, may reduce need for surgery.

**Methods:** We surveyed pre-operative analgesic history of patients attending for elective management of sciatica. Patients rated their severity of back and leg pain, and adequacy of current and previous analgesia, using a visual analogue scale (0/no pain-10/severe). The WHO pain ladder was used to benchmark analgesia use.

**Results:** Fifty patients were surveyed. The average severity of back pain was 3.7, and leg pain 4.8. Average efficacy of current analgesia was 4.3. Only 26% of patients took paracetamol, NSAIDs and a weak opiate. Side effects stopped some taking medications that improved their pain. However, many patients with inadequate pain control had not tried analgesics other than their current regimen, despite average scores of severity of back pain of 4.2 and leg pain of 5.3; higher than the whole cohort. Further, only 22% of all patients had tried gabapentin, and 18% a strong opiate; both can help in sciatica. Those with most severe leg pain (>5) were as likely as those with less severe leg pain (<5) to have tried gabapentin or strong opiates (47v45%).

**Conclusion:** The WHO analgesia ladder provides a framework for titrating pain control in sciatica, since evidence-based guidance is lacking. Nevertheless, prescribing in patients appears haphazard. Prospective studies are needed to ascertain whether guidelines, based on the ladder, can improve pain control, in turn decreasing the requirement for surgical symptomatic control.

**ID: 1234**

## **Intraoperative ICG Videoangiography as an aid to the Surgical Treatment of Spinal Vascular**

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**Objective:** Intra-operative Indocyanine Green (ICG) Videoangiography has become an established aid to cerebrovascular surgery. We describe the application of this technique in our series of microsurgically treated vascular malformations of the spinal cord.

**Methods:** Indocyanine green dye was administered as an intravenous injection and detected intraoperatively via an 800nm filter on the surgical microscope. No special vascular access was required.

**Results:** 14 patients underwent surgery for vascular malformations of the spinal cord from Sept 2007 to June 2009. 11 were type 1 spinal dural AVFs, 2 were type 2 intramedullary lesions and one a probable type 4 perimedullary fistula. Two of the type 1 lesions were of a low flow subtype. In this sub-group obliteration of the fistula could most easily be demonstrated with the ICG technique. In type 2 and 4 lesions the ICG angiogram is used to delineate the nidus or fistulae and correlate with the pre-operative digital subtraction angiogram intra-operatively. Two rapidly deteriorating patients were explored surgically when diagnostic spinal angiography proved technically impossible. In these cases the ICG angiogram provided intraoperative direction on surgical strategy. No patient suffered a complication of dye administration. Intra-operative video is presented to illustrate the technique.

**Conclusions:** ICG Videoangiography is a time-efficient and safe alternative to intra-operative spinal angiography. It provides useful information on intra-procedural changes in haemodynamics and completeness of treatment.

**ID: 1235**

## **Determining learning approaches of Neurosurgical SpRs in the UK**

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### **Objective:**

Seminal work on approaches to learning describes three approaches<sup>1</sup>. The deep, surface and strategic approaches.

A different model in the workplace environment has been reported<sup>2</sup>. The deep approach, the surface approach is separated into 2 distinct approaches termed surface rational and surface disorganised. The strategic approach was not evident.

### **Methods:**

We developed an inventory of 30 items. These were distributed to SpRs in each Neurosurgical unit in the UK. Data was analysed using SPSS.

Principal component extraction with oblique rotation was used to examine the underlying factor structure. Reliability was assessed using Cronbach's measurements.

### **Results:**

60 inventories were returned giving a 37.5% response rate.

A 3 factor solution was found. These corresponded to, deep, surface rational and surface disorganised approaches.

This analysis retained 15 from the original 30 items.

Cronbach's reliability scores for the revised 15 item learning approaches inventory ranged from 0.65 for the deep approach to 0.79 for the surface rational approach.

The revised inventory was used to determine the learning approaches of Neurosurgical SpRs in the UK.

Mean score of learning approaches (out of 5) for all trainees in the study were 4.05 for deep approach, 3.22 for surface rational and 2.85 for surface disorganised.

Possession of a higher degree did not significantly alter learning approach scores. Successful completion of the exit exam resulted in a higher score on the deep approach.

### **Conclusions:**

This study validated a 15 item learning inventory to determine the learning approaches of Neurosurgical trainees in the UK.

Findings from this study support the workplace model of learning approaches.

Neurosurgical registrars in the UK predominantly utilise a deep approach to learning.

### **References:**

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**ID: 1236**

**Traumatic Brain Injury, it's changing demographics over six years**

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**Objectives:** To compare current data collected on traumatic brain injury (TBI) with data published in The Phillips Report collated in 2003 and determine new trends in causes and outcomes of TBI.

A prospective study.

**Design and Subjects:** The National Report on Traumatic Brain Injury (Phillips Report) was published 2008, this seminal study was commissioned to plan future TBI service development in the Ireland. Our audit compared a twelve week snapshot of patients from 2009 with that same time period in the Phillips report (2003).

**Methods:** All cases of traumatic brain injuries logged with Neurosurgical Advice Service (NAS) and admitted to Neurosurgical Unit (NSU) were included in the study. Demographic data such as age, gender, nationality and admission date were documented. ICD 10 codes for reporting external morbidity was used to assess the causal factors in an event of injury

**Results:** Over 250 cases from each period were compared. Changes were recorded in the manner of injury. While fall remains to be the most common cause of TBI, the percentage has decreased from 60% (2003) to 49% (2009). TBI caused by assault showed the most significant increase from 20% (2003) to 29% (2009). Changes in age profile were also recorded. The median age at time of registration was 45 years (range <1 to 94 years) in 2003 but fell to 26 years (range <1 to 91 years) in 2009. Four cases of assault on women resulting in NITU admission was also reported, which represent an increase from 0% (2003).

**Conclusions:** More people are being admitted, surviving high velocity road traffic accidents, violence against women has come to the fore while alcohol and falls remain constant. Irish society continues to change reflected in the pattern of traumatic brain injury sustained by our population.

**ID: 1237**

**Body CT is non contributory and delays diagnosis in patients with GBM**

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**Objectives:**

1. To determine whether unnecessary scans were performed on patients with a radiological diagnosis of GBM.
2. To compare radiological diagnosis with histological diagnosis.

**Design:**

We retrospectively reviewed the minutes of 51 neuro-oncology MDT meetings from 2008 and 2009. Data was collected on all new referrals with radiological diagnoses of malignant primary brain tumours or brain metastases. A regional radiology database was used to identify those patients who underwent CT scans of the chest, abdomen and pelvis. Histological diagnoses were obtained for patients that underwent surgery. Microsoft excel was used for data storage and analysis.

**Results:**

A total of 265 patients were identified. 33% of patients with a radiological diagnosis of GBM underwent staging body CTs. 94% of body scans in GBM patients revealed no additional relevant pathology. 89% of body CTs in patients with brain metastases demonstrated significant pathology. When compared to histological diagnosis the accuracy of radiological diagnosis for GBM was 92%, metastatic disease was 83%, and for primary brain tumours as a whole was 97.2%. Times from diagnosis to MDT discussion for GBM patients were significantly lower in those that did not have a body CT (average of 9.7 days for those with CT and 6.5 days for those without, t test  $p=0.046$ ).

**Conclusions:**

The ability of our neuro-oncology MDT to correctly differentiate primary from metastatic brain tumours on radiology alone is high. Despite this, many patients with primary brain tumours undergo unnecessary staging CT scans that contribute little to their management and significantly delay their discussion in the MDT. More robust triggers for these investigations should be identified and addressed.

**ID: 1238**

**The impact of electromagnetic navigated shunt placement on failure rates: A two centre pilot**

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**Objective:**

Up to 40% of shunts fail in the first year. The role of catheter position on failure rates has not been demonstrated. We conducted a prospective study of navigated shunt placement compared to standard blind shunts in two European centres, to assess impact on failure rates.

**Methods:**

All patients undergoing de novo ventriculoperitoneal shunts were included, excluding slit ventricles. The first cohort underwent standard shunt placement using anatomical landmarks. Both centres subsequently adopted electromagnetic navigation for routine shunts forming the second cohort. On postoperative CT catheter position was graded from 1 -3 (1, optimal position free floating in CSF; 2, touching choroid or ventricular wall; 3, intraparenchymal). Episodes of shunt revision were recorded. Shunts were followed for minimum 6 months or until failure.

**Results:**

There were 41 blind shunts and 34 navigated shunts, including adults and children. 74% of navigated shunts were grade 1 versus 37% of blind shunts ( $p=0.0014$ ). There were no grade 3 placements in the navigated group, 8 in the blind group and 75% of these failed. 9 of 14 shunt failures in the blind group occurred within 4 weeks. 2 shunt failures occurred within 4 weeks in the navigated group, reducing the 30 day revision rate from 22% to 5.9% ( $p=0.0485$ ). Shunt failures within 30 days were due to proximal obstruction in 78% of blind shunts (7/9) and 50% of navigated shunts (1/2)

**Conclusion:**

Using image guidance in shunt surgery can eliminate poor shunt placement, resulting in a significant reduction in early shunt revisions rates.

**ID: 1239**

**What do patients want most from a neurosurgical outpatient appointment? Results of a**

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**OBJECTIVES:** Our neurosurgical clinics are subject to time pressure with an average of 30 patients in a 3 hour period. With two doctors present this gives an average of 8-10 minutes per patient. In order to provide a more satisfactory service we wanted to identify which factors contribute most towards patient satisfaction and how effectively we were meeting the expectations of our patients. **METHODS:** Patients were invited to anonymously fill out the questionnaire immediately following the appointment. A five point scale was used to score the outpatient service overall and according to how well it fulfilled each of 11 criteria. Using the same scale they then scored the relative importance of each criterion. The doctors were blind to the study. **RESULTS:** 65 patients completed the questionnaire. 58 % rated overall satisfaction as excellent, 34 % as very good and 8 % as good. The criteria considered the most important were how well the doctor listened, the clarity of the plan for subsequent management, the opportunity to ask questions and the availability of investigation results. There was a noticeable overlap between these and criteria patients were most satisfied with. The criteria considered least important were examination of the patient, giving a diagnosis, apologising for delays and delay in consultation. There was a similar overlap between these and the ones patients were least satisfied with. The exception was the criterion 'availability of results' which was scored low but was in the group considered most important. **CONCLUSIONS:** Knowing the importance attached to elements of a consultation can focus improvement. Quality of communication and future planning is considered more important than offering a diagnosis or overall clinic efficiency.

**ID: 1240**

## **The Use of Solitaire Stent in the Treatment of Intracranial Aneurysms**

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### **Objective**

To report our initial experience with stent placement for cerebral aneurysm treatment

### **Subjects/Methods**

We report our series of 17 Solitaire (4mm x 20mm) stents in 16 aneurysms in 16 patients. These include 9 stents deployed in the context of subarachnoid haemorrhage (3 pre-planned / 6 intraprocedural thrombotic complication salvage) and 7 elective aneurysm treatments (stent pre-planned)

### **Results**

The stent was successfully deployed in 15/17 cases (88 %) in vessels ranging from internal carotid artery (6 mm) to A2 segments (1.5 mm). We saw 2 stent displacements in 1 patient, early in series, one successfully retrieved without complication and one displaced into the aneurysm sac after detachment, both without clinical sequela. No thromboembolic complications were seen in relation to any stent. Two patients, both admitted with poor grade subarachnoid haemorrhage, died at 12 days and 14 days post-procedure, respectively. The aneurysm was completely occluded immediately in 14/16 cases (88%) and at 6 month angiographic follow-up in 3/5 (60%). The stent was successfully deployed to recanalise a vessel compromised by thrombus developing intraprocedurally in 6 cases with excellent angiographic results and no clinical sequela, obviating the need for intravenous Reopro in all cases. We also describe a novel application of the Solitaire stent in the treatment of 2 very wide-necked aneurysms.

### **Conclusions**

In our experience, the Solitaire™ AB stent offers a significant step forward in the treatment of intracranial aneurysms in terms of its ease of positioning, deployment and retrieval, range of suitable vessel diameters and safety profile.

**ID: 1241**

**Attitudes to current neurosurgical training in the United Kingdom**

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**Objective:** This survey was undertaken to explore the expectations of trainees and consultants with regard to current training and the impending 48-hour working week.

**Methods:** Information was collected via questionnaires distributed at SBNS Conference (April 2009), online via the BNTA mailing list and within certain neurosurgical units.

**Results:** 126 surveys were distributed at SBNS. 35 were returned (12 were blank/void). 15 surveys were collected from the 3 units (4 incomplete). Overall, 34 valid questionnaires were analysed (12 consultants and 22 trainees). 17 units were represented. 27% of trainees identified themselves as currently being of the SHO grade. 17 units were represented. Consultants and registrars reported spending an average time of 14.8 months as an SHO (range: 6-42 months). 62% surveyed felt SHO training has deteriorated compared to previous training. 66.6% of these were trainees. 57% identified the rota as a key factor compromising training. 77% overall felt there is less exposure to practical procedures now. All trainees felt they receive less exposure to practical procedures compared to previous training. 18% of trainees rated themselves as currently receiving only 'occasional' senior support.

**Conclusions:** This survey has quantifiably demonstrated significant apathy among the neurosurgical community to training issues. Feedback from trainees demonstrated cynicism and disillusionment. Feedback from consultants demonstrated discrepancies with expectations of procedural competencies. Analysis of exposure to practical procedures provided little correlation with self-expectations of competency by the end of SHO training.

**ID: 1242**

**catheter complications of intrathecal Baclofen pump in children : 10 years practice**

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**Background:** Intrathecal Baclofen infusion via implanted pump is an effective and reversible treatment for spastic children, but the effectiveness of the system can be compromised by catheter-related complications.

**Aim:** evaluate types and the rate of catheter complications and estimate catheter performance based upon complication-free survival period. And assess risk factors lead to catheter complications.

**Patients and methods:** Medical records were examined for 23 patients with known catheter complications, in a previously placed intrathecal Baclofen infusion pump.all cases were operated with experienced neurosurgeon. A complication of the delivery system was suspected whenever its clinical efficacy was lost or an intermittent effect was encountered. Cerebral palsy was the cause of spasticity in 21 cases and while primary dystonia presented 2 cases. The mean age was 12.3 years.

Subcutaneous technique was used in 9 cases while subfascial technique was used in 14 cases. Touy needle was used in lumber catheter insertion in 19 cases and partial laminectomy was used in 4 cases due to severe spinal deformity.

**Results:** Catheter migration was found the most common complications (43.5%). followed by catheter fracture after spinal operations (17.2%) "that were managed by cervical insertion of the catheter". Other complications including disconnection, broken connector and kink were having the same frequency (8.7%). The average of catheter complication-free survival was 20.1 months, 34% of patients have second experience with complications in average of 24.9 months complication free period. There is a trend of an association between catheter migration and using subcutaneous technique.

**Conclusions:** Catheter migration is the most frequent complication and it is more likely to happen with subcutaneous pump implantations. The posterior cervical approach for catheter insertion is alternative for patients who had iatrogenic catheter breakdown during spine operations. Complications rates and complications free survival time improved as physicians gain experience.

**ID: 1243**

**Neurosurgical intensive care unit mortality: single centre one year experience**

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Objective: to audit deaths in the neurosurgical intensive care unit at the National Hospital for Neurology and Neurosurgery to ascertain whether these deaths could have been predicted as well as examining different surgical and intensive care variables that could have influenced outcome.

Methods: admission notes of all patient deaths in one year period (June 2007 - May 2008) were reviewed retrospectively for the demographic variables as well anaesthetic and surgical factors. All deaths were stratified into having potentially reversible or non reversible factors.

Results: out of a total of 870 admissions to the neurosurgical intensive care unit, 62 (7%) patients died. Only three deaths were following elective admission. Diagnosis was variable but in accordance with the expected distribution for a neurosurgical unit with vascular brain injury predominating. Fourteen deaths were predicted on admission whilst death was predicted in 59 patients during ICU admission overall from a combination of anaesthetic and surgical factors (number of systems supported, neurological status and co existent morbidities). Fifty eight patients eventually required support for three or more systems. Forty one patients had Do Not Resuscitate status applied after discussion with the next of kin; and 14 had brain stem testing. Finally fourteen patients had potentially reversible factors.

Unexpected/elective admission deaths will be case presented

Conclusion: 95% of deaths were predictable during the course of admission. Overall mortality rate is comparable to other units.

**ID: 1244**

**A novel MR-DTI segmentation technique for tumour delineation and diagnosis**

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St George's Univeristy of London and St George's Hospital, London, UK

Abstract e mailed to Suzanne Murray directly (BNRG 2009 Prize Presentation)

**ID: 1245**

**A web-based referral system for neurosurgery. Comparison with the traditional paper-based**

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**Objective:** Neurosurgical referrals are notoriously difficult to track and review due to the poor quality of the paper-based recorded information. We have recently introduced a web-based referral system to a number of our referring hospitals. We compare this system to the paper-based one.

**Methods:** We analysed retrospectively all the paper-based referrals made to our unit in March 2009 from the whole of our catchment area and compared them to a year's referrals through the web-based system (three hospitals). We investigated the patterns of information recorded in both systems and identified the advantages and shortcomings of each.

**Results:** 196 patients were referred using the online system, between the 1st April 2008 and the 1st June 2009, while 483 patients were referred in total to our unit in March 2009 using the traditional method. There were significant problems with legibility of recordings. Several fields of information were missing (24% of referrals had no radiological finding, 36% of referrals had not documented details of the admitting team, 21% of referrals had not documented a contact telephone number/bleep). In comparison 100% of documentation was achieved with the online referral system. However, there was approximately 50% penetrance in the best performing trust in spite of multiple campaigns and significant delays in responding to the referrals.

**Conclusion:** The traditional paper-based referral system does not provide an acceptable level of documentation. A web-based referral system, allows unprecedented insight in the process, and has significant advantages. However, there are significant difficulties in overcoming cultural barriers.

**ID: 1247**

## **The use of Gliadel® wafers in recurrent high grade glioma**

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### **Introduction**

Recent literature demonstrates the safety of Gliadel and TMZ and NICE guidelines (September 2007) approved radiotherapy (RT) and concomitant, and adjuvant, temozolamide (TMZ), and RT and Gliadel for primary HGG. It was not clear as to whether these were mutually exclusive, but it is commonly perceived to be the case and in consequence, all Gliadel procedures at our centre are carried out in patients with recurrent HGG after RT, however this is associated with a high complication rate<sup>1</sup>. Due to lack of data, there are currently no NICE guidelines for Gliadel in recurrent HGG.

### **Methods**

Retrospective case note review for audit

### **Results**

30 patients with a diagnosis of recurrent HGG received Gliadel between January 2004 and January 2009. All had previously undergone radiotherapy. Mean age at diagnosis was 50 (25 - 66). Mean time from diagnosis to recurrence was 85 weeks (12 - 330) and mean post Gliadel survival 61 weeks (0 – 260, three patients alive to date) with 12 month survival at 37%, however 26% suffered complications. There was no relationship between longevity or high KPS, and age at diagnosis.

### **Conclusions**

Compared to a recent trial of 32 recurrent HGG patients treated without Gliadel with 12 month survival at 26%<sup>2</sup>, our results demonstrate clear survival advantage. We suggest that the increased complication rate is off-set by the increased survival.

### **References**

- 1 Uff C, McGregor D, Levy S et al Complications arising from Gliadel® use in secondary high grade glioma.. BNOS, Hull, 24-26th June 2009 (Poster)
- 2 Happold C, Roth P, Wich W et al ACNU-based chemotherapy for recurrent glioma in the temozolamide era. J Neurooncol 2009; 92:45-48

**ID: 1248**

**Medical students value an integrated approach to neuroscience training.**

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**Objective**

An integrated approach to neuroscience training is often advocated in undergraduate medical curricula. This involves integrating basic (normal anatomy and function) with clinical neuroscience, which is believed to enhance learning. This study observes which educational opportunities medical students find most beneficial to their learning and understanding of aspects of clinical neuroscience.

**Method**

Questionnaires were administered to students (n=163) after four weeks of clinical neuroscience training. Students ranked on a Likert scale the degree to which various sessions had helped them to "learn and understand aspects of clinical neuroscience". Sessions included were problem-based learning (PBL), expert-patient teaching, seminars and lectures, bedside teaching (integrated), and outpatient clinics and operating theatre sessions (clinical).

**Results**

Comparative analyses indicated significantly fewer students attended clinical sessions (outpatient and theatre) than attended other sessions ( $p < 0.001$ ). Students reported that expert-patient and bedside teaching were significantly more helpful than outpatient and theatre sessions ( $p < 0.001$ ). These sessions were also rated as significantly more helpful than PBL ( $p < 0.001$ ). There was no difference between PBL and either clinics or theatre ( $p = 0.16$ ).  
( $\chi^2$  test, \*Wilcoxon)

**Conclusions**

Students valued sessions with a more integrated approach to a greater degree than clinical sessions. PBL was reported as less helpful than more didactic methods. This may help to inform future planning of undergraduate neuroscience curricula and allocation of educational resources. Tailoring training to students' needs may help to enhance specialty recruitment.

**ID: 1250**

**The role of Oxyhaemoglobin in cerebrospinal fluid in diagnosis of CT negative suspected**

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**Objective:** To determine the prevalence of cerebrovascular abnormalities in the cases of suspected subarachnoid haemorrhage (SAH) where CT scan and cerebrospinal fluid (CSF) bilirubin were negative but CSF oxyhaemoglobin was positive.

**Methods:** All cases of suspected SAH between January 2004 and December 2005, and between January 2007 and March 2009 with negative CT scans and CSF bilirubin, but positive CSF oxyhaemoglobin were included. All the CSF samples were analysed with spectrophotometry according to the National Guidelines(2003). Retrospective review of patient's records and radiological imaging.

**Results:** 27 patients fulfilled the inclusion criteria. 21 patients received digital subtraction angiography (DSA), 4 patients CT angiography, and 2 patients magnetic resonance angiography. Aneurysm was demonstrated in one patient with DSA and this was treated by endovascular coiling.

**Conclusion:** While Oxyhaemoglobin positive CSF has a low probability of being aneurysmal in origin this cannot be excluded. If there is any doubt patients should undergo angiography.

**ID: 1251**

**Seasonal variation in presentation of traumatic extra-axial haematoma**

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**OBJECTIVES**

To investigate the presentation (demographics, mechanism of injury, date of presentation) of patients undergoing craniotomy for acute traumatic extra-axial haematoma i.e. acute subdural haematoma (ASDH) and extradural haematoma (EDH).

**METHODS**

Theatre logbooks were examined for 2-year period from June 2007 to June 2009. All patients who underwent craniotomy for acute traumatic extra-axial haematoma were included. Using the available electronic records the following data were collected retrospectively: age, sex, mechanism of injury, side of haematoma, season of presentation.

**RESULTS**

105 patients were included (72 ASDH, 30 EDH and 3 ASDH+EDH). The age ranges were ASDH (1-93) and EDH (1-65). In the ASDH group 69.4% were male compared to 83.3% in the EDH group. Nearly half of the ASDH group (35 patients) had sustained their injuries by falling: the EDH group had a relatively greater proportion of assaults and road traffic accidents. There was a difference in seasonal presentation between the conditions: 70% of the EDH group presented in the spring or summer months whereas this was true for only 43.1% of the ASDH group. Using the chi squared Poisson heterogeneity test, the seasonal distribution of EDH was significant with  $p < 0.05$ .

**CONCLUSIONS**

The presentations of ASDH and EDH are distinct with significant differences in epidemiology. ASDH is predominantly a disease of the more elderly, with lower energy injuries and is apparently more common in the autumn and winter months. Conversely, EDH is a condition of younger men who tend to have more violent traumatic insults with a clustering of presentation around the spring and summer months.

**ID: 1252**

**Central Nervous System (CNS) complications of Ear Nose Throat (ENT) infections – Case**

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**Aims** – To highlight CNS complications of ENT infections and to outline management of these.

**Methods** – Descriptive study of cases referred to the Paediatric Neurosciences Department at our hospital over the period November 2007 to April 2009.

**Results** – Fifteen cases - 7 males (age 8-14 years – mean age 12 yrs) and 8 females (3-14 years – mean age – 10 yrs). 6 cases had sinusitis and 9 cases had mastoiditis as primary ENT infection. They had combination of CNS infections, 13 patients with cerebral and/or subdural abscess, 5 patients with macroscopic evidence of osteomyelitis, 12 with venous / venous-sinus thrombosis and 4 patients with evident cerebral infarction. Common clinical presentation was headache, high temperature, vomiting, lethargy, agitation, altered sensorium, focal neurological deficits and focal seizures.

In addition to emergency and supportive care specific management included -1) Drainage of ENT and/or CNS abscess. 2) Broad spectrum antibiotics – 6 weeks IV and 2-6 weeks oral. 3) Steroids for cerebral oedema. Other treatments for complications included: Anticoagulation for venous thrombosis for 3-6 months, Seizure management. Early surgical drainage, It is our experience that early surgical drainage of both ENT and intracranial sepsis, multidisciplinary team support with neurology and neuro-rehabilitation input from the beginning was the key to optimum outcomes in this complicated group of patients. 6 out of 15 patients had significant morbidity.

**Conclusions** - CNS complications from ENT infections are not uncommon and outcome is variable. It is our impression that there are increasing numbers of children presenting to Neurosciences services with CNS complications of ENT infections. Confirmation of this will involve multi-centre study. There are number of possible reasons for this increase including – less optimal use of antibiotics in primary and secondary care for ENT infections.

**ID: 1253**

**New “TRICKS” (Time Resolved Imaging of Contrast Kinetics Sequence) magnetic resonance**

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**Objective**

Conventional catheter angiography is the gold standard investigation to evaluate suspected spinal vascular malformations but has significant drawbacks and potential morbidity. TRICKS (time resolved imaging of contrast kinetics sequence) magnetic resonance angiography provides dynamic information of the spinal vasculature. We describe our experience with this technique in spinal vascular malformations.

**Methods**

A retrospective analysis of prospectively collected data in 24 patients with suspected spinal vascular malformations. All patients underwent TRICKS MRA and selective catheter angiography. TRICKS images were reviewed by two neuroradiologists blinded to the catheter angiography results.

**Results**

Catheter angiography revealed 14 spinal dural AVFs, 5 spinal AVMs, 2 negative angiograms and 3 non-diagnostic studies that were later confirmed to have spinal AVMs at surgery. TRICKS was positive in 23 of 24 patients with one false positive and no false negatives. In the dural AVF group, TRICKS identified the side and precise segmental level in 8 and was accurate to within one segmental level in 6. Follow up TRICKS was performed in 9 of 12 post-operative dural AVF cases and revealed an absence of early venous filling in all. In the AVM group we found that because there were multiple feeders, it was difficult to accurately identify the number and levels of all feeders vessels.

**Conclusions**

TRICKS sequence is useful in identifying the approximate location of feeding vessels in suspected spinal vascular malformations. This allows shorter angiography procedures with reduced contrast load and radiation exposure. It may have a role in diagnosing low flow fistulae that are otherwise occult on MRI and assessing surgical success post-operatively.

**ID: 1254**

**Current practice in the treatment of cerebral aneurysms in a national neurosurgical centre post**

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**Objective:** The aim of this study was to assess current practice in the treatment of cerebral aneurysms in our unit post ISAT.

**Methods:** A retrospective analysis of patients who underwent clipping or coiling of cerebral aneurysms in the year 2008 was performed. Collected data included patients' age, sex, aneurysm location, aneurysm size and WFNS grade (if post haemorrhage) and a chart review was performed to assess periprocedural complications.

**Results:** 244 aneurysms were treated. 149 (61%) were coiled and 95 (39%) were clipped. The mean age of coiled patients was 53.3years (range 28-85 years). The mean age of clipped patients was 51 years (range 25-74 years). 97 patients were post subarachnoid haemorrhage. The male to female ratio was 42:58 in the clipped group and 37:63 in the coiled group. The periprocedural complication rate was 13.42% in the coiled group and 18.94% in the clipped group. 31 of the coiled patients were less than 40 years of age.

**Conclusion:** Although endovascular coiling is well established in the treatment of cerebral aneurysms, there remains a significant role for clipping (as our current practice demonstrates). Recent data has shown the long term benefits of clipping patients under the age of 40 and this should be further addressed.

**ID: 1255**

## **Surgical disconnection of anterior cranial fossa dural arteriovenous fistulas**

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### **Objective**

Anterior cranial fossa dural arteriovenous fistulas (DAVFs) are rare entities with a frequent propensity to haemorrhage. The few available literature reports have generally advocated management using microsurgical disconnection, although there is a current vogue for treatment via endovascular embolisation. Our aim was to assess the outcome of microsurgical disconnection in this group of patients.

### **Methods**

Patient demographics were obtained from a prospective database. Retrospective review of medical records and radiological imaging was performed.

### **Results**

6 patients with anterior cranial fossa DAVFs were treated with microsurgical disconnection over a 3 year period. In all cases, a low bifrontal craniotomy was used to expose and disconnect the fistula. 1 patient required revision craniotomy to fully disconnect the fistula. There were no other complications. Disconnection of cortical venous reflux (CVR) was confirmed in all cases by postoperative digital subtraction angiography (DSA). During the follow-up period ( 10-47 months, median 22.5 months) there have been no episodes of haemorrhage or recurrence.

### **Conclusion**

Microsurgical disconnection provides a safe, effective method in the management of anterior cranial fossa DAVFs. Our results together with review of literature shows that the probability of successful disconnection is greater than with transarterial embolisation, and it also avoids the small but significant risks to vision associated with the latter. In our view microsurgical disconnection remains the treatment of first choice for these lesions despite the technical feasibility of endovascular approaches.

**ID: 1256**

**An analysis of General Practitioners perceptions of pre and post-operative factors affecting**

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**Objective:** Not all patients with disc related sciatica referred to neurosurgery require operation. Better understanding General Practitioners' (GPs) expectations when referring patients, and post-operatively, would streamline outpatient assessment, improve non-operative and post-operative care, so improving patient outcomes.

**Method:** All GPs in the county were surveyed about referring patients with sciatica. We examined decision making processes, expectations of surgical management, and routine advice given post-operatively.

**Results:** 272 GPs responded (53%). GPs referred patients after an average of 8 weeks, seeking diagnostic confirmation (90%) and radiology (98%). Many patients will not require surgery, yet only 48% GPs expected to receive analgesia advice, 95% expecting operative management, whether the referral was urgent or routine. On a scale of 1 to 5 (5=never) GPs felt sciatica surgery was as good as analgesia at relieving radicular pain (2.6v2.2), better at improving sensory loss (2.5v3.9), and twice as likely to improve urinary hesitancy in sciatica and urinary incontinence in Cauda Equina Syndrome. Urinary incontinence with CES was thought equally likely as sciatica to be relieved by surgery. Post-operatively, most GPs advised return to office work or driving at 5-6 weeks, and recreational sport at 9-12 weeks. There was no consensus, or sometimes no opinion (23%), on return to sexual activity.

**Conclusion:**

This analysis identifies areas where GPs referral goals, and expectations from surgery, may contrast to neurosurgical practice. This risks 'conflict' and suboptimal patient care. These are areas for improved two-way communication and teaching, perhaps aided by prospective study of post-operative recovery.

**ID: 1257**

**Chronic injury reduces the production of new neurons from endogenous stem cells in the adult**

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**Objective:** Despite overwhelming evidence for the presence of stem cells in the adult brain, these cells do not produce neurons after brain injury. This is true even in the permissive niche of the hippocampus where new neurons, important for memory consolidation, are normally produced throughout life. We wished to examine the hypothesis that the injured environment reprograms these stem cells and see if this was reversible.

**Methods:** We isolated neural stem cells from normal cortex and from the sclerotic hippocampus in 5 patients undergoing epilepsy surgery. Stem cells were either grown as free-floating spheres in an ideal environment or within a 3D tissue (Hi-Spot?) generated from the hippocampus or cortex, and their ability to generate neurons quantified using BrdU and Neu-N immunohistochemistry.

**Results:** We show that stem cells from the uninjured cortex and the sclerotic (injured) hippocampus generate new neurons with equal efficiency when grown under ideal free-floating conditions. Interestingly, the numbers of newly-born neurons generated by matched stem cells grown in sclerotic hippocampal Hi-Spots were significantly lower ( $5.9 \pm 1.4$  cells /mm<sup>2</sup>) than those of the cortical Hi-Spots ( $23.7 \pm 3.9$  cells /mm<sup>2</sup>) ( $p < 0.001$ ).

**Conclusions:** These results strongly implicate the microenvironment in defective hippocampal stem cell function in areas of chronic brain injury, and importantly from the viewpoint of brain repair, show that the effect is reversible.

**ID: 1258**

**High Field Intraoperative MRI (1.5T) in Neurosurgical Operations –early single Centre**

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**OBJECTIVE**

To analyse the contribution of high field (1.5T) intraoperative MRI in Neurosurgical procedures and share our early experience of its use in neurosurgical procedures.

**METHODS**

Retrospective analysis of data of all operative cases performed in IMRI suite during the first six months. 17 patients had surgery in IMRI suite; 9 Brain Tumour, 2 Pituitary adenoma and 6 epilepsy patients. We divided surgical procedures in to three time periods; Anaesthetic, Surgical and Scanning time. All time periods were recorded.

**Results**

Total 28 MR scans were performed. 8 Scans were performed prior to surgery and 20 scans were performed intraoperatively in IMRI suite .The average scanning duration was 28+/- 7 mins ,Average surgical time varies depending on the surgery. Average time for pituitary surgery was 40+/- 5 mins , brain tumour 120+/- 15 mints and epilepsy surgery was 240+/-40mins .

Intraoperative scans were done once surgeon was satisfied with their resections single intraoperative MR scans were performed in tumour and pituitary cases but in epilepsy surgery two intraoperative scans were done.

No further resection was done in tumour and pituitary cases but in epilepsy surgery hippocampectomy was performed following intraoperative scans.

**Discussion**

IMRI is helpful in planning of neurosurgical procedures, however it is time consuming and primarily determined by imaging protocol.

**Conclusion**

Our initial experience demonstrates its useful modality to plan and teach neurosurgery. Patient outcome benefits cannot be known until prospective studies are conducted.

**ID: 1259**

**Is Age the most significant predictor of outcome in patients undergoing surgery for Chronic**

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**Objective:** Current controversies remain in the management of chronic subdural haematomas (CSDH). We undertook this study to evaluate long term outcome of surgical intervention for CSDH and assess contributing factors.

**Methods:** We performed a retrospective audit of clinical notes for patients receiving surgical intervention for CSDH from April 2004 to March 2006. Longer term outcome was assessed by General Practitioner questionnaires to obtain current clinical status using Glasgow Outcome Scale (GOS).

The variables studied included age, sex, GCS on admission, presenting complaints, anticoagulation medication, type of surgery (Burr Hole vs. mini- craniotomy) and GOS score.

**Results:** Notes were available and reviewed for 90 patients. There were 38 females and 52 males ranging from 35 to 92 years (average 71years). Of the 90 GOS questionnaires sent out to the GPs; relevant data was obtained in 71 cases (79%). Of the 71 cases, 51 patients (72%) had a good outcome (GOS 4 and 5) and 20 patients (28%) had a bad outcome (GOS 1, 2 and 3).

Comparing the outcome groups, the only significant predictor is the advanced age of the patient ( $p=0.015$ ). The average age of patients with a good outcome was 68years and with a bad outcome was 78years. For patient above 75 years of age, odds of having a bad outcome was three time greater (OR=3.62, 95% C.I. 1.19, 10.97). No other contributing factors significantly affected outcome.

Nineteen patients (21%) developed a clinically significant recollection. Recollection was independent to patient and surgical factors.

**Conclusion:** Age significantly impacts on the long term morbidity and mortality of patients undergoing surgical intervention for chronic subdural haematoma.

**ID: 1262**

**Are preoperative coagulation studies in elective neurosurgery necessary?**

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**Objective:** To evaluate validity of routine pre-operative coagulation testing in elective neurosurgical patients. Discriminated criteria for coagulation screening in elective neurosurgery are currently not defined. No study has specifically looked at UK neurosurgical patients.

**Method:** A retrospective study over the preceding 12 months elective neurosurgical patients, encompassing 788 operations. Cases were collated from the operative database. All non elective operations, as defined by CEPOD criteria, were excluded. All pre-operative haematological investigations were reviewed, with focus on activated partial thromboplastin time ratio (APTT<sub>r</sub>), international normalized ratio (INR) and platelet count. Abnormality was defined using our laboratory range. Findings were considered in view of NICE 'Preoperative tests' guidelines 2003 and the British Committee for Standards in Haematology 2008.

**Results:** 684 (87%) had preoperative INR and APTT ratio tests, 29 (3.7%) had INR only. 75 (9.5%) patients did not have pre-operative coagulation testing, the majority of whom underwent peripheral nerve decompression. 19 (2.4%) patients were shown to have abnormal clotting (4 had abnormal INR and APTT ratio, 6 INR and 9 APTT ratio). Six were known to be on Warfarin and eight had an INR or APTT ratio of 1.3 (upper normal 1.2). Three were normal on repeat testing, two were alternatively anticoagulated. In addition 15 patients had low platelets.

**Conclusion:** All abnormal coagulation results were predictable. This demonstrates that blanket coagulation testing in elective neurosurgery is unnecessary. Individual patient history indicates the need for coagulation screening. We believe that NICE guidelines should be modified to reflect this.

**ID: 1263**

**Intravenous Interleukin-1 Receptor Antagonist achieves experimentally neuroprotective**

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**Objective:** Interleukin-1 (IL-1) is implicated in experimental ischaemic brain injury. Its naturally occurring antagonist (IL-1RA) is highly neuroprotective and can be administered therapeutically, showing few adverse effects and inhibiting the systemic acute phase response. A single dose regime pilot study showed that it penetrates cerebrospinal fluid (CSF) at experimentally-therapeutic concentrations, but this was achieved rather slowly. Determining the optimal protocol for rapid IL-1RA delivery in subarachnoid haemorrhage (SAH) is essential before testing biological efficacy.

**Design:** An open-labelled dose-ranging pharmacokinetic study

**Subjects:** 25 patients with SAH and external ventricular drains inserted for clinical reasons.

**Methods:** Patients received intravenous (IV) IL-1RA as a bolus followed by a 4 hour infusion.

**Pharmacometric analysis** of pilot data enabled identification of the administration regime that could achieve experimentally-therapeutic CSF IL-1RA levels within 30 min. Patients were allocated to five regimes, using IV boluses of 100 to 500 mg and IV infusions ranging from 1 to 10 mg kg<sup>-1</sup> h<sup>-1</sup>.

Plasma and CSF sampling was performed as informed by a D-optimal design. Analysis was done using nonlinear mixed effects modelling.

**Results:** IL-1RA plasma and CSF concentrations fell within predicted intervals. The regime leading to experimentally-therapeutic CSF concentrations of IL-1RA within 40 minutes was 500mg bolus followed by IV infusion at 10 mg kg<sup>-1</sup> h<sup>-1</sup>.

**Conclusion:** Experimentally neuroprotective CSF concentrations in SAH patients was achieved within a reasonable therapeutic time window. Pharmacokinetic analysis suggests IL-1RA transport across the blood-CSF barrier is passive. Identification of this delivery regime allows further efficacy studies of IL-1RA in SAH.

**ID: 1265**

## **Neurophobia and undergraduate neuroscience training**

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### **Objective**

Neurophobia is described as a fear of clinical neuroscience in medical students. The study examined the influence of clinical neuroscience training (CNT) on neurophobia and the role of anxiety, to inform curriculum planning.

### **Method**

A prospective cohort study was performed using questionnaires administered to students (n=163) at a neuroscience lecture before and after CNT. A questionnaire was devised based on previous research to assess students' reported interest, knowledge, skills, confidence and perceived difficulty in a range of specialties. The State Trait Anxiety Inventory was used to measure anxiety. Comparative analyses were performed to examine how perceptions of neuroscience differed from other specialties, and changes before and after CNT. Correlational analyses were performed between neuroscience perceptions and anxiety.

### **Results**

Before training neuroscience was ranked most difficult ( $p < 0.001^*$ ) and most interesting ( $p = 0.002^*$ ). After training, neuroscience was reported as less difficult ( $p = 0.006^*$ ) but still more difficult than other specialties ( $p < 0.001^*$ ). Self-reported knowledge and confidence in neuroscience increased after training ( $p < 0.001^*$ ) but were still lower than other specialties ( $p = 0.006^*$ ). There were significant negative correlations between state anxiety and some aspects of neurophobia, which although reduced remained significant after training.  
(\*Wilcoxon)

### **Conclusions**

Neurophobia was present in students before neuroscience training. Training has potential to reduce neurophobia but did not eliminate it. Anxiety was associated with some aspects of neurophobia. Earlier educational intervention may be warranted to prevent neurophobia and enhance specialty recruitment.

**ID: 1266**

## **Infrascanner in Head Injury patients: Preliminary Experience**

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### **Introduction**

Infrascanner is a near infrared (NIR) based, non-invasive, portable device to detect intracranial hematomas. We are the first unit in the UK to trial it.

### **Purpose**

To evaluate and correlate Infrascanner findings vs. CT scans in head injury patients.

### **Design**

Prospective, double blind study in a tertiary neurosurgical unit.

### **Method**

Patients admitted to our hospital with head injury (GCS 13-15) requiring a CT scan were studied. Children (<16), ventilated patients, aggressive patients, those with large scalp hematomas or lacerations were excluded.

The Infrascanner operator and the neuroradiologist reporting the CT were both blinded. Data was collated and subjected to statistical analysis.

### **Results**

66 patients (M: F 52:14, age range 18-94 years) were included since January 2009 ( 32 -assaults (49%), 21 - falls (31%), 8 -RTA (21%), 5- other causes). All patients had a CT scan of the head and an Infrascanner within 24 hours following admission.

CT scan showed various types of hematomas in 25/66 patients (prevalence 37.8%). The Infrascanner detected the hematoma in 19/25 patients (sensitivity of 76%). Subsequent analysis showed all the undetected hematomas to be outside its detection range ( i.e > 2.5 cm from brain surface & < 3.5cc volume).

CT scans were negative for hematomas in 41/66 patients; the Infrascanner correlated with this in 34/41 patients (specificity of 82.9% ). The calculated PPV & NPV were 75% and 85.7% respectively.

### **Conclusion**

The Infrascanner is envisaged as a screening adjunct in pre-hospital and acute clinical settings. Findings in our study compare well with published literature.

**ID: 1269**

**Atypical Presentation of an Extra-osseous Ewing's Sarcoma of the Spinal Cord.**

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ATYPICAL PRESENTATION OF EXTRA-OSSEOUS EWING'S SARCOMA OF THE SPINAL CORD.

**ABSTRACT**

Case reports of spinal cord primitive neuroectodermal tumours (PNET) in adults are rare in the literature. We report the presentation of a sixty-three year old woman who presented with an atypical extra-osseous primitive neuroectodermal tumour (PNET)/Ewing's Sarcoma of the lumbar spinal cord, confirmed both radiologically and histopathologically, with no further identifiable evidence of primary or metastatic disease.

**ID: 1272**

**Postoperative posterior fossa CSf leak: Dural closure**

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King's College Hospital, London, UK

**Objective:** To determine the effect of type of dural closure on the rate of CSF leak following posterior fossa surgery.

**Methods:** A retrospective review of all patients who underwent posterior fossa surgery 2006-2007. Patients were identified from discharge summary coding. Data was collected directly from operative notes. For analysis type of dural closure was grouped into vicryl only, vicryl + substitute (autologous patches, 9 different manufactured replacements and tissue glues) and left open.

**Results:**

154 patients underwent 167 operations. There were 11 postoperative CSF leaks (6.6%). In the leak group, 45% (5) were closed with vicryl only, 45% (5) were closed with vicryl and a substitute. In the no leak group, 16% (24) were closed with vicryl only, 31% (49) closed with vicryl and a substitute, 10% (11) had a substitute only, 3% (5) were left open and 2% (3) were left open with a substitute layed over. Using vicryl suture alone lead to a 17% (5/29) wound leak rate, however, using vicryl suture and a dural substitute, there was only a 9% (5/54 cases) wound leak rate (paired t-test,  $p=0.12$ ).

**Conclusion:**

Using dural substitutes in posterior fossa surgery reduces the rate of CSF leak from the wound. This supports previous published recommendations to use dural substitutes and not to consider vicryl only closure as "watertight". Based on the variety of dural substitutes used in this study alone it is can be concluded that using any combination of substitutes will reduce the risk of CSF leak.

**ID: 1273**

**Preoperative balloon embolisation of the Vertebral artery as an adjunct to resection of cervical**

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(National Hospital for Neurology and Neurosurgery, London, UK)

**Objective:** Radical resection of extradural spinal tumours improves prognosis. The authors report on the management of extradural spinal tumours in the cervical region with preoperative angiography, balloon embolisation of the vertebral artery, and particle embolisation of the vascular supply to the tumour.

**Methods:** Patients with extradural tumours in the cervical spine, who underwent preoperative embolisation of the vertebral artery with detachable balloons, and selective particle embolisation of the vascular supply to the tumour, were included in this study. Surgical results, survival and procedural complications were evaluated.

**Results:** 10 patients with large or recurrent tumours in the cervical spine underwent radical excision after balloon embolisation of the vertebral artery between 2002 and 2008. The tumours included 4 chondrosarcomas, 1 chordoma, 1 each of haemangiopericytoma, aneurysmal bone cyst, malignant peripheral nerve sheath tumour, Pancoast's tumour and metastatic tumour. 4 patients underwent multiple procedures and all patients needed stabilisation of the spine after tumour resection. The average surgical blood loss after the embolisation was only 450 ml. Only 2 patients had procedure-related complications in the form of transient ischaemia and both resolved spontaneously. 5 patients died due to tumour progression or systemic metastases, at a mean of 18 months after the procedure. 5 patients are still alive, at a mean followup of 49 months.

**Conclusions:** Radical resection of spinal tumours in the cervical spine can be achieved with the aid of preoperative vertebral artery embolisation, which is a safe technique with no permanent sequelae; thereby increasing the overall survival.

**ID: 1274**

**ICG Angiography: quality assurance for neurovascular surgery**

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Addenbrooke's Hospital, Cambridge, UK

**Objective:**

To describe the utility of indo-cyanine green (ICG) fluoroscopic angiography for vascular neurosurgical practice

**Methods:**

A retrospective review of all patients surgically treated for neurovascular disease , since the introduction of a microscope with capabilities of fluoroscopic angiography. Video recordings of ICG-angiography were analysed and correlation was made with post-operative clinical assessments.

**Results:**

50 patients were included in the study over a 6 month period. 46 were treated for aneurysm, 2 for dural fistulae and 2 by EC:IC bypass for carotid occlusion. Video recordings were available for analysis in only 27 patients, due to microscope availability. ICG angiography confirmed vessel patency peri-operatively in 24/25 aneurysm patients and no lag time to fill in 1/2 EC:IC patients. Post-operative neurological deficits were noted in only 1/24 aneurysm patients in whom no ICG abnormality was noted. In 1 aneurysm patient, poor flow in the distal vessel was associated with a transient post-operative deficit. Post-op neurological deficit was evident in the EC:IC bypass patient, in whom there was a delay in transit time, and retrograde filling of the graft.

**Conclusions:**

ICG angiography provides a reliable peri-operative quality assurance for clip placement in surgically treated aneurysms and graft patency in revascularisation patients.

**ID: 1275**

**Management of children with optic pathway and chiasmatic-hypothalamic tumours –**

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"(Alder Hey Children's NHS Foundation Trust, Liverpool, L12 2AP)" and "(Clatterbridge Centre for

**Background**

Optic pathway and chiasmatic-hypothalamic gliomas (OPCHG) are rare tumours, mainly presenting in childhood. Due to their location they are difficult to treat through surgery alone and often require combination therapy to achieve disease control. We present our experience in management of 60 of these unusual tumours.

**Methods & patients**

Patients were identified from the Neuro-oncology database. Casenotes were retrieved and retrospectively reviewed. Data was collected regarding presenting symptoms, visual function, endocrine function, NF1 genotype, tumour size and location, neuroradiological imaging characteristics, histopathological findings, treatment (surgery, chemotherapy & radiotherapy), and control/relapse rates.

**Results**

Sixty patients were treated at AlderHey Children's Hospital between 1996 & 2008. Mean age at diagnosis was 7.9 years (range 3-months to 16½ years, median 6 years), with equal sex distribution. Follow-up ranged from 6-months to 13 years (mean 6.1 years, median 6.2 years). Treatment strategies included observation, and combinations of surgery (biopsy or debulking), chemotherapy and or radiotherapy. Tumour control rates and outcomes are reviewed.

**Conclusions**

Good long-term survival and functional outcomes can be achieved in children with OPCHG. Tumour control has been achieved through surgery or chemotherapy or radiotherapy in varied combinations. Surgery via a midline transcallosal approach can safely debulk the centre of third ventricular tumours whilst preserving hypothalamic and visual function. Due to high rates of long-term survivors we recommend observation or chemotherapy for initial treatment. Surgery has roles for diagnosis, tumour control, relief of mass effect, and optic decompression. We prefer to limit radiotherapy to older children due to late effects.

**ID: 1276**

**The use of SonoWand (3D-ultrasound) in intra-operative image guidance and clipping of**

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**Objective:**

To assess the benefit of 3D intra-operative structural and doppler ultrasound (SonoWand) in cerebral aneurysm surgery.

**Design:**

A prospective cohort study over four months.

**Subjects:**

Patients with aneurysmal grade I/II subarachnoid haemorrhages (SAH) not amenable to coiling.

**Method:**

All patients underwent CT angiography (CTA) pre-operatively for localisation and guidance. At dural opening, 3D ultrasound imaging and Doppler of the operative field was acquired to plan trajectory and dissection. This was updated intra-operatively regularly with Doppler flow to assess vessel patency pre and post-clipping. Post-surgery neurological state, vasospasm and 3 month Modified Glasgow Outcome Scores were recorded.

**Results:**

A case series of eight males, mean age 53, was collected over four months. There were three MCA, two pericallosal and three ACOM aneurysms. Ultrasound demonstrated the position of the vasculature tree and aneurysms throughout surgery, accounting for shifts due to CSF leakage. There was no post-operative deterioration of pre-existing neurology, vasospasm and all made a good recovery with no incidences of stroke at three months.

**Conclusion:**

Intra-operative 3D-ultrasound imaging is cost effective and user friendly. It allows for real-time structural neuronavigation. It is a valuable adjunct to aneurysm surgery, allowing aneurysm localisation and assessment of parent and daughter vessel patency pre and post-clipping.

**ID: 1277**

**Prospective evaluation of the “Wallis” lumbar interspinous dynamic stabilization system.**

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(Department of Neurosurgery, Beaumont Hospital, Dublin, Ireland)

**Objective.**

The “Wallis” implant is indicated to stabilize symptomatic degenerative lumbar spine segments, relieving low back pain related to instability and thus delaying the need for irreversible, more invasive surgical management. The purpose of this study was to provide the first objective clinical evaluation of the “Wallis” lumbar dynamic stabilization system.

**Methods**

An independent prospective observational study was carried out utilising SF-36, Oswestry Disability Index (ODI) and visual analogue pain scores (VAS). Surgical pathologies in which this technique was used, the intra-operative and post-operative complications and length of post-op stay were recorded.

**Results.**

102 patients underwent Wallis insertion between June 2007- May 2009, Median age 51.5 (range 28-108). 94% of patients completed questionnaires and were followed up at 3, 6 and 12 month time points. ODI scores decreased from pre-op 39 to 27 at twelve months ( $p<.0016$ ). VAS back pain scores decreased 59 to 36 ( $p<0.0001$ ). Leg scores decreased 50 to 39 ( $p<0.0002$ ). SF 36 scores improved significantly, physical functioning 46 to 59, physical health 30 to 54 and social functioning 47 to 68. 50% of patients believed their health to be better 12 months post-op. Pre-operatively 28% of patients were employed and working with 26% off work due to back problems. This rate increased steadily with 42% employed at 12 months. Two implants were removed, one due to non-benefit with subsequent arthrodesis and one due to infection. One superficial wound infection occurred.

**Conclusions.**

The Wallis dynamic stabilization system provides a superficial and easily reversible surgical procedure with a lower complication rate than conventional athrodesis. Used in patients with painful degenerative lumbar conditions their quality of life objectively approached values of the age- and gender-matched general population.

**ID: 1278**

**Recruitment for STICH II- A missed opportunity?**

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Greater Manchester Neurosciences Centre

**Introduction:**

STICH II is a multicentre randomised trial investigating early surgery for lobar intracerebral haemorrhage(ICH). Recruitment is difficult, such that in 31 months 75 participating centres have only randomised 187 patients. Despite our commitment, we have not been able to recruit to this trial. The aim of this study was to determine the number of patients eligible for STICH II in Greater Manchester.

**Methods:**

Retrospective analysis of prospectively collected data over a 12 month period. All patients with a diagnosis of lobar ICH were identified. The scans and clinical features were also reviewed by two neurosurgeons to identify patients eligible for STICH II.

**Results:**

414 patients were referred with a primary diagnosis of ICH. 90 had a lobar ICH. Scans were available for 82. 53 met the radiological criteria for STICH II. Only 12 were accepted by the on-call neurosurgeon. Retrospective review by the two neurosurgeons identified 16 patients who could have been randomised. Of the 37 in whom equipoise did not exist, extreme age and/or lack of mass effect explained 31, whilst significant co-morbidity explained the other 6.

**Conclusions:**

The number of patients eligible for STICH II is small. Lack of randomisation would appear to be because of a lack of surgical equipoise. Despite this, based on these figures for a regional neurosurgical centre serving a population of 3.2 million it would be possible to recruit 300 patients per year in the UK.

**ID: 1279**

## **Radiotherapy for Atypical Meningiomas**

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Historically, adjuvant radiotherapy has been inconsistently used following surgical resection of WHO grade II/atypical meningiomas. With increased use of interval MR imaging and also access to stereotactic radiosurgery for growing tumour remnants/recurrences, there is a need to further clarify the role of such adjuvant radiotherapy for WHO grade II meningiomas.

We exploited the variable pattern of referral following surgery re adjuvant radiotherapy by individual consultant neurosurgeons within a large teaching hospital to explore any demonstrated benefit of such radiotherapy.

We searched the neuropathology tumour database and identified the case notes of 78 patients with a histological diagnosis of WHO grade II/atypical meningioma.

The mean age was 56 (range 19 to 84), with mean follow-up of 43 months (range 6 to 88 months). Forty three per cent of patients were female. A tumour remnant was left in 36% of patients. Thirty nine per cent overall underwent post-operative radiotherapy. As anticipated, there was a significant benefit with respect to disease recurrence/progression from surgery that did not result in leaving a tumour remnant ( $p < 0.005$ ). The use of radiotherapy however demonstrated no significant difference in terms of reducing subsequent disease recurrence/progression.

We suggest that the routine use of radiotherapy in all operated patients with WHO II meningiomas should not occur. It will likely require larger numbers to clarify any overall benefit in patients with tumour remnants undergoing radiotherapy. It may be that radiosurgery to tumour remnants may be a more appropriate course in such patients.

**ID: 1280**

**Early changes in the distensibility of the atheromatous carotid artery following aggressive**

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**Background**

Vascular distensibility and stiffness are closely related to cardiovascular and cerebral vascular outcomes. Decreased carotid distensibility has been associated with an increased atheroma burden. Magnetic resonance imaging (MRI) is a powerful tool for the non-invasive assessment of vascular anatomy and physiology. We report a double blind study using phase contrast imaging techniques to compare changes in carotid distensibility in subjects with carotid stenosis randomised to either high or low dose atorvastatin.

**Methods and results**

Subjects with moderate carotid stenosis and demonstrable inflammation as determined by ultra-small superparamagnetic iron oxide (USPIO) enhanced MRI were imaged at 1.5 Tesla before and 12 weeks post randomisation to either high (80 mg) or low (10 mg) dose atorvastatin. Real-time brachial blood pressure measurements were made during sequence acquisition and a central aortic pulse pressure was derived from off-line radial artery tonometry performed before imaging. Fasting serum lipid levels were measured at 0 and 12 weeks.

There was a statistically significant increase in the distensibility coefficient and compliance coefficient of both the common carotid artery and the internal carotid artery in the group randomised to high-dose atorvastatin.

**Conclusions**

Phase-contrast MRI is both robust and feasible in the non-invasive assessment of changes in vascular distensibility over time with pharmacological intervention. High-dose statin therapy led to a significant improvement in the distensibility of the stenosed carotid artery and these changes were apparent after only 12 weeks therapy.

**ID: 1281**

**Reliability of clinical examination in diagnosing cauda equina syndrome**

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Objective:

To assess the predictive value of clinical symptoms and signs in Magnetic Resonance Imaging (MRI) positive Cauda equina syndrome (CES)

Design: Retrospective, Observational.

Method:

Clinical files and MRI scans of 80 patients who underwent urgent MRI scans for suspected cauda equina syndrome were reviewed. Common presenting clinical symptoms and signs were assessed against a positive MRI scan. To prevent overestimation of statistical significance for small data, Yates Chi Square test was used to assess the significance of each clinical symptom and sign for a positive MRI scan.

Results:

Of 80 patients with a clinical suspicion of CES, 15 patients had MRI confirmed cauda equina syndrome and underwent urgent surgery. Back pain, unilateral sciatica, bilateral sciatica, bladder incontinence, bladder retention, perianal sensory loss and previous surgical interventions were not statistically significant to suggest a cauda equina syndrome. We found that saddle anaesthesia is the only sign, which was statistically significant (p value of 0.03) to predict a CES.

Conclusion:

In our study, no clinical symptom or sign apart from saddle sensory deficit, could be relied upon to confirm CES. Hence those presenting with features of CES should undergo an urgent MRI scan for a definitive diagnosis.

**ID: 1282**

**Is it appropriate for GPs to refer patients with presumed acute lumbar spinal pathology directly**

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**Background:** the policy concerned with GP referrals of patients with presumed acute lumbar spinal pathology to the on call neurosurgical or orthopaedic team varies between centres in the UK. We debate whether it is appropriate for GPs to have direct access to tertiary referral centres for this type of referral.

**Methods:** a MS access database of urgent referrals to the on call neurosurgical team at NGH was analysed over a period of 9 months from Aug. 2008 and April 2009. The analysis was undertaken using SPSS.

**Results:** 2672 emergency referrals were recorded over a period of 10 months, of which 355 (13.2%) were made by GPs. 143 referrals out of 355 (40%) were about patients with symptoms including low back pain, unilateral or bilateral sciatica, acute foot drop, urinary hesitancy, retention or incontinence. Out of the 143 patients referred, 11 (7.7%) underwent surgical intervention within 48 hours from the time of referral, 4 of them having radiological evidence of cauda equina compression and 7 of lateral disc protrusion.

**Conclusions:** Only 7.7% of the total number of patients referred with a working diagnosis of acute lumbar spinal pathology underwent surgery within 48 hours. We suggest that these patients are referred for assessment and the initial investigations to the local A&E department, acting as a filter for the tertiary referral centre.

**ID: 1283**

**Spina bifida - Chiari II - hydrocephalus complex: long-term cognitive and functional outcome**

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**Objective**

Long-term in outcome spina bifida - Chiari II - hydrocephalus complex is poorly understood. Neurosurgical outcome measures are crude, and neuropsychological testing is an increasingly important tool in outcome assessment. Cognitive function, health, disability and lifestyle were investigated in a cohort of prospectively followed adults.

**Methods**

Patient interviews were conducted to ascertain clinical history (number of ventriculoperitoneal shunts; foramen magnum decompression) and current status (progressive; stable; chronic; under investigation; pending surgery). Validated lifestyle and hydrocephalus questionnaires were administered. Cognitive function was assessed via the Repeatable Battery of Neuropsychological Testing (RBANS).

**Results**

Twenty-one patients were assessed; mean age 33 years (range: 19–45). All had myelomeningocele closure at birth. Seventeen were shunted before 6 months; one by 18 months; one at 20 years. Fifteen had less than 5 shunt revisions; one patient had over 100 shunt procedures. Four have functioning ETV; 17 functioning VP shunts. Eight had foramen magnum decompression: seven had stabilisation of symptoms; one had improvement. Patient status was classified as stable (n=14), progressive (n=2), chronic (n=2) and under investigation (n=3). Only eight are living independently. Seven are ambulant independently or with walking aids. Eleven drive a car. Four are in paid employment; five do voluntary work. All patients demonstrated significant impairment (averaging 7th percentile) in at least 1 cognitive domain, most commonly working memory. Average IQ was 80.

**Conclusion**

Despite intervention in childhood and adequate cerebrospinal fluid diversion the prognosis for independent living into adulthood without symptoms is poor. All patients have elements of cognitive impairment.

**ID: 1284**

**Analysis of 4751 Emergency Referrals at two Neurosurgical Centres - Were they all necessary?**

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**Objective:** EWTD compliance of the neurosurgical rotas in the UK is a serious problem in the absence of appropriate staffing levels. The predominant issue with compliance is the rest requirement for an on-call rota. We analysed the out-of-hours activity of the registrars via a continuously maintained database at two centres in the Northern Deanery.

**Methods:** Similar MS Access databases maintained at Newcastle General (NGH) and James Cook University (JCUH) hospitals were pooled and analysed. A total of 4751 referrals over the past two years from both centres were studied. The analysis was undertaken using SPSS (Ver 13.0). Out-of-hours was defined as the time period between 2100 and 0800 hours for the purpose of this study.

**Results:** The patterns of activity out-of-hours were similar at both centres. Out of hours activity accounted for nearly 12 and 16 percent of all referrals at NGH and JCUH respectively. Approximately 28 and 56 percent referrals out-of-hours came from hospitals within the same trust at NGH and JCUH respectively. A&E and medicine accounted for nearly 70% of out-of hours referrals at both centres. Nearly 80% of the referrals related to acute head or spinal trauma, intracerebral haematomas and hydrocephalus-related presentations. 7% of out-of-hours referrals at both centres related to newly diagnosed brain tumours, 7% and 14% of referrals related to non-specific diagnoses, usually simply seeking advice.

**Conclusions:** The majority of the out-of-hours referrals for the registrars were bona fide emergency neurosurgical cases, which are important for both service provision and training. Establishing better referral pathways for newly diagnosed tumours and guidelines for seeking neurosurgical advice within the parent hospital is desirable. This may help to reduce the out-of-hours workload but this alone is still unlikely to ensure EWTD compliance for on-call rotas.

**ID: 1285**

**Co-morbidity is the strongest pre-treatment prognostic factor for survival of patients with**

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**Objective:** Patient's age and clinical performance status are common entry criteria for glioma trials and are widely accepted as the best predictors of survival in patients with glioblastoma multiforme (GBM). The aim of our study was to assess the effect of co-morbidity on overall survival of GBM.

**Design:** Prospective observational study.

**Subjects:** 91 patients (58 men, 33 women) consented for the study with an average age of  $59.5 \pm 1.0$  (mean  $\pm$  standard deviation) years, 63.7 % had Karnofsky score = 70, 67% underwent craniotomy and excision of their tumour, 56% underwent postoperative radiotherapy and 19.8% chemotherapy.

**Outcome measures:** Co-morbidity was measured by the Charlson Index calculated by adding assigned weights for 19 co-morbidity conditions. Survival time was expressed in weeks from the time of diagnostic surgery and a Cox proportional hazard model was used for survival analysis.

**Results:** Overall median survival was 30 weeks. 53.8% of patients had Charlson index 2 indicating no associated co-morbidity. Age, Karnofsky score, Charlson index, extent of surgery and adjuvant oncological treatment were all strong predictors ( $p < 0.01$ ) of survival in univariate analysis. In multivariate analysis of pre-treatment factors Charlson index was the strongest predictor of survival with hazard ratio 1.3806 (95%CI 1.0669 to 1.7865,  $p = 0.0147$ ), followed by age and Karnofsky score with hazard ratios 1.0301 (95%CI 1.0056 to 1.0552,  $p = 0.0163$ ) and 0.9949 (95%CI 0.9718 to 1.0107,  $p = 0.6744$ ) respectively.

**Conclusions:** Assessment of co-morbidity should be incorporated into further glioma trials. The Charlson Index is a simple tool that can aid GBM management decisions in MDT settings.

**ID: 1288**

**Early decompressive craniectomy for traumatic brain injury may lead to a shorter stay in**

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**Objective:** The effectiveness of decompressive craniectomy (DC) is yet to be proven. DC has the advantage of lowering ICP, but can have serious complications. The aim of this pilot study was to evaluate the outcome of patients undergoing DC for raised intractable ICP following head injury at King's College Hospital.

**Method:** From the patients recently admitted to intensive care following traumatic brain injury we reviewed 10 consecutive patients who underwent DC for raised intractable ICP. We excluded all patients who required initial evacuation for intracranial haematomas, as well as those whose records were incomplete or whose initial scans were not available.

**Results:** In those 10 patients we found that mean ICP dropped from  $34 \pm 2.8$  preoperatively to  $21.1 \pm 1.1$  mmHg postoperatively. Early DC (<24 hours) correlated significantly with a reduced length of stay in ICU (rpb=0.72, p=0.019). However, there was no correlation between the time of DC and GOS. While younger patients (<40 years old) tended to have marginally lower ICP values postoperatively (r=0.67, p=0.05), there was no correlation between the age of the patient and the timing of DC. There was no correlation between age and GOS (p>0.05). Lower values of ICP following DC were associated with higher GOS at an average of 20.5 months after the operation, however, this did not reach statistical significance (rpb=0.65, p=0.06). Finally, there was no correlation between GCS prior to surgery and GOS post-operatively (p>0.05).

**Conclusions:** While the results of the present pilot study are limited by the sample size, the reduced stay in ICU after early DC might have important clinical and financial implications. These preliminary results encourage further investigations with a larger sample.

**ID: 1289**

**A personal relational-database for neurosurgeons for recording their practice**

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**AIM**

In future it would be incumbent for neurosurgeons to maintain a robust record of their practice including details about outcomes. Our objective was to develop an intuitive, comprehensive, flexible and easily searchable database. While currently there are many simple custom made databases available, our aim was to develop a relational database.

**Method**

We used FileMaker Advanced 10.0 on both Apple Macintosh and Personal Computer to develop the database. The database has separate tables for recording patient demography, admission details, diagnoses, surgical interventions which, were all linked to each other (relational database). The diagnosis and surgical intervention tables allow entering ICD codes from drop-down menus. The surgical intervention table allows entering generic data regarding outcome as well as operative photos and video clips. New custom fields can easily be added to the developed database. The database was designed and developed by neurosurgeons without help from IT professionals.

**Results**

We were successful in developing a relational database for recording data regarding personal neurosurgical practice. The relational design of the database allows for each admission to be recorded with as many number of diagnoses (sah, hydrocephalus) and as many operations that the patient had undergone on that admission.

**Conclusion**

As neurosurgeons face new obligations of revalidation, advances in technology could be used to undertake them efficiently.

**ID: 1291**

## **Serum Albumin Predicts Survival In Glioblastoma Multiforme**

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### **OBJECTIVE**

Serum albumin has been shown to correlate with outcome in several cancers, but whether it is a useful prognostic marker in glioblastoma multiforme (GBM) is unclear. We examined if preoperative serum albumin predicted survival in patients with GBM.

### **METHODS**

685 patients with histologically proven GBM were identified from the regional cancer registry. Patient demographics, treatment details, and most recent preoperative blood results were collected. Serum albumin (normal range 30-50 g/L) was available for 549 patients and classified as low (<30 g/L, n=82), lower-normal (30-40 g/L, n=371) or upper-normal (40-50 g/L, n=96). Survival was estimated using the Kaplan-Meier method and compared with the Log-rank test. Multivariate analysis was performed using a Cox regression model.

### **RESULTS**

Albumin levels were normally distributed with range 15-49 g/L and mean 34.6 g/L. Median survival was significantly shorter in patients with low serum albumin compared with normal (2.3 vs. 5.6 months,  $p<0.001$ ) and patients with serum albumin in the lower-normal range had significantly shorter median survival than those in the upper-normal range (5.1 vs. 8.8 months,  $p<0.001$ ). Of patients receiving adjuvant radiotherapy (n=263/549) those with upper normal serum albumin (n=78) had significantly longer median survival (11.0 vs. 7.2 months,  $p<0.001$ ). Multivariate Cox regression showed that age (Hazard Ratio 1.025,  $p<0.001$ ), debulking surgery (HR 0.72,  $p<0.001$ ), radiotherapy (HR 0.46,  $p<0.001$ ), chemotherapy (HR 0.60,  $p<0.001$ ), and serum albumin (HR 0.97,  $p<0.01$ ) were independent predictors of survival.

### **CONCLUSION**

Serum albumin level appears to be an independent predictor of response to treatment and overall survival in patients with GBM.

**ID: 1294**

**Premature Removal of External Ventricular Drains at the NHNN-A Six Months Review.**

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Premature Removal of External Ventricular Drains (EVD) at the National Hospital for Neurology and Neurosurgery (NHNN), Queen Square London-A Six Months Analysis.

Charles Ugwuanyi, Varinder Alg, C. Akhunbay-Fudge, Laurence Watkins.

**Introduction**

External Ventricular Drainage (EVD) is a temporary diversion of cerebrospinal fluid into a closed outside system. It is often an emergency procedure and is the commonest neurosurgical procedure accounting for more than 160 cases per annum at NHNN.

Various methods are employed in anchoring the bactiseal catheter to the scalp

**Study Objective**

To examine the methods of anchoring bactiseal catheter and associated complications.

**Methods**

44 out of 76 cases over a six months period (Dec 2008-May 2009) were selected. Four methods (I-IV) of anchoring tunnelled bactiseal tubes were examined. Parameters studied were indications and anchoring methods for initial EVD and revised EVD and also associated complications.

**Results**

There were 26 males and 18 females (M: F=1.44) and mean age was 56.6years. Commonest indication for initial EVD was subarachnoid haemorrhage with intraventricular extension in 22(50%). Method II (simple stitch anchor) in 29(65.91%) cases was the commonest employed at initial EVD insertion, while III (360 degrees anchored loop) was exclusively used in the revised cases 18(40.9%). The commonest indication for revision was premature removal in 13 out of 18 (72.2%). This was in cases that initially had I and II methods.

Further revisions were in six (13.63%) cases but not due to premature removal.

Ventriculitis was the commonest associated complication 12(27.27%) and 10 of these (83.33%) were in previously revised cases.

**Conclusion**

Method III is more secure with less risk of dislodgement and should be recommended in the first instance to reduce revisions as well as its added risk of ventriculitis.

**Key words-** External Ventricular Drains, Premature Removal, Anchoring methods, Revision, Ventriculitis.

**ID: 1295**

**Percutaneous balloon compression for trigeminal neuralgia: a single centre experience**

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**Objective:** This study was undertaken to review the results of percutaneous balloon compression in a series of 25 patients at a single neurosurgical centre over a 10-year period.

**Methods:** A retrospective case-note review of 25 randomly selected patients undergoing balloon compression for trigeminal neuralgia over the last 10 years was undertaken. The study period was from Feb 1991 to Feb 2009. The duration of balloon inflation was noted along with any postoperative complications. Recurrence interval of symptoms and need for repeat procedures was also analysed.

**Results:** A total of 59 balloon compressions were undertaken in 25 patients. 12 patients had left-sided symptoms with 3 patients having symptoms bilaterally. 58% of the patients had initial symptoms in both V2 and V3 distributions. 14 (56%) patients overall needed repeat intervention for symptom recurrence. The average number of balloon compressions per patient was 3.5. The recurrence interval for symptoms was between 2 weeks to 4 years. The timing of balloon compression varied between 5min – 20min. The most common interval was 7 min (used in 43% of patients). 2 patients eventually achieved resolution of their symptoms through microvascular decompression.

**Conclusions:** Percutaneous balloon compression is an effective method for trigeminal neuralgia, though there is notable recurrence with a variable pain-free interval. There is little consensus currently on the optimal time for balloon compression but the 7-minute duration used for the majority of patients in this study indicates that this is a valid parameter to use.

**ID: 1297**

## **Telephone logs of Specialist Registrars in Neurosurgery**

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### **Objective**

To assess the magnitude and patterns of telephone call times in the work schedule of Specialist registrars (SpR) in neurosurgery.

### **Design**

Observational and retrospective.

### **Materials and Methods**

Telephone logs of the handheld telephone sets carried by the eight neurosurgical SpRs in one unit were obtained from the hospital switchboard to cover the period between 01.10.07- 31.03.08 and this formed the primary data. Ringtime was added to the talktime for outgoing calls. Monday to Friday, 8am – 5pm was considered as regular hours and the rest as other hours.

### **Results**

During this six month period the total number of calls was 22783 of which incoming calls numbered 12071 while there were 10712 outgoing calls. The maximum number of incoming calls/ day/ SpR was in the range of 39 to 78 while the range for outgoing calls was 36 to 102. The mean number of telephone calls received by the on call SpR in a 24 hour period was 36, while the number of calls made during the same period was 33. On an average, each call lasted 1.7 minutes. Typically, the on call SpR spent 137 minutes on the telephone (69 calls), while the mean time spent on telephone calls on non on call days was significantly less at 24 minutes (18 calls). 67% of the calls happened out of regular hours.

### **Conclusions**

Time spent on the telephone by the on call neurosurgical SpR is not small. The cause is multifactorial. In an era of working time directives, targets and litigation, the time spent on the telephone is a significant work component and would have a bearing on timelines.

**ID: 1298**

**Idiopathic intracranial hypertension: Lumbo-peritoneal shunts versus Ventriculoperitoneal**

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**Aims:** Idiopathic intracranial hypertension is an uncommon but important cause of headache that can lead to visual loss. This study was undertaken to review our experience in the treatment of idiopathic intracranial hypertension by neuro navigation assisted Ventriculo-peritoneal shunts with programmable valves as compared to lumbo-peritoneal shunts.

**METHODS:** A retrospective chart review was conducted on 25 patients treated for idiopathic intracranial hypertension between 2001 and 2009. Age, sex, presentation, method of treatment, duration of treatment and failure rates were recorded.

**RESULTS:** 72% were treated initially with lumbo-peritoneal shunts. Failure rate was 11% in this group. Neuronavigation assisted Ventriculo-peritoneal shunts were used to treat 28%. In this group the failure rate was 14% .

**CONCLUSIONS:** Idiopathic intracranial hypertension causes significant short- and long-term morbidity. Our experience indicates a greater efficacy for lumbo-peritoneal shunts over neuro-navigation assisted Ventriculo-peritoneal shunts with programmable valves. A prospective study is needed to establish the indications for treatment and the efficacy of the treatment options used.

**ID: 1299**

**Establishing neurosurgery 'Wiki' sites: Neuropaedia, Paediatric Neurosurgery**

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**Aim**

"Wiki" is a very productive Internet technology allowing collaboration over the web. An example of the "wiki" is the "Wikipedia". The "Wiki" technology allows web-users to add content to the wiki sites by typing-in using an on-line word processor. Our aim was to develop an encyclopaedia of neurosurgery and a textbook of paediatric neurosurgery harnessing the Wiki technology through an International collaboration.

**Method**

We registered two "Wiki" sites from the "Wiki" service provider PBWIKI.com. The sites were set-up so that only registered users (neurosurgeons or trainees) could enter the sites. The access is free. The users are granted 'reader' or 'writer' privileges. Those with the 'writer' privileges are able to add new content to the web-sites. When any content is added or changed the editors are automatically informed of this. The editors of the sites check the content of the sites.

**Results**

We have established two 'Wiki' sites: "Neuropaedia" at [neuropedia.pbwiki.com](http://neuropedia.pbwiki.com) and the Electronic Textbook of Paediatric Neurosurgery at [neurosurgeon.pbwiki.com](http://neurosurgeon.pbwiki.com). There are the first neurosurgery Wikis that have been established on the web. There are currently 36 international neurosurgeons registered as 'writers'.

**Conclusion**

Neurosurgery Wikis have an enormous potential and allow international collaboration and publication of up-to-date educational material at a very modest cost. In future there will be widespread use of high quality wikis by the neurosurgery community.

**ID: 1300**

**Who gets an out-of-hours MRI scan – predictions based on a statistical model**

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**Objective:** Out-of-hours MRI scans for suspected cauda equine syndrome are a common occurrence in neurosurgical units. If the probability of having an out-of-hours MRI scan can be accurately predicted on the basis of symptoms and their duration, this may prove to be of benefit in reducing emergency referrals and transfers. We analysed the data available at our centre for MRI scans performed for suspected cauda equina syndrome and attempted to establish a statistical model.

**Methods:** Retrospective observational study. 62 records of MRI scans performed for 'emergency' spinal conditions were identified from the MRI scanner logs over eight months. 29 of these were for suspected cauda equina syndrome. Detailed review of the hospital records was undertaken for these cases. The demographics, duration of the symptoms were recorded. The data were analysed using SPSS (ver 13.0).

**Results:** No association was found between an out-of-hours MRI scan and immediate operation (Chi Sq  $p=0.63$ ). The duration of sciatica, age of the patient, mobility and duration of bladder symptoms were used to derive a binary logistic regression model which was accurately able to predict whether a patient would have an out-of-hours MRI scan or not in approximately 88% of cases. The overall model Chi square was 13.4,  $p=0.02$  which was a good fit for the data.

**Conclusions:** Statistical modelling could be useful method of predicting patients who would be scanned out-of-hours and can be used to limit the numbers of emergency admissions to the receiving neurosurgical unit. Our model is based on a small sample and further modelling based on greater number of patients would be of benefit.

**ID: 1301**

**Testing of practical skills in neurosurgery national selection**

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**Objectives:**

The neurosurgical national selection board is aiming to develop skills assessment methodologies that will be predictive of future technical aptitude in potential neurosurgical trainees

**Methods:**

Over the last 2 years, skills assessments have formed part of the national selection centre for neurosurgical trainees. The stations have generally been based upon global assessment rating scales and have included a suturing model, a mock up of a frameless stereotactic biopsy using the Brainlab autopilot biopsy system, evaluation of microscopic skills with bead transfer and an assessment of stereoscopic vision. Some of the assessments counted towards final scores others have been pilots. The results have been studied for distribution of scores, associations with seniority and associations between tests using linear regression analysis.

**Results:**

Results for suturing, biopsy and microscope show a normally distributed spread of scores with biopsy and microscope showing a wider spread of scores. The suturing model has consistently been shown to correlate well with level of seniority/experience. The other tests do not show significant correlation with seniority and are therefore testing more innate rather than learnt skills. There are a variety of significant correlative associations between the tests but they do not all consistently correlate implying that they are testing different aspects of technical skills.

**Conclusions:**

Our developing skills assessments have shown some correlation with the suturing model, a well validated test of learnt practical skills. However, these individual tests are clearly testing other technical abilities and time will tell which are most predictive of future technical aptitude.

**ID: 1302**

**Cancellous bovine bone substitution material like Tutobone is an efficient alternative to**

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**Objectives** – This study was undertaken to assess the post operative radiological fusion rates in patients who had anterior cervical surgery using either autologous bone or 'Tutobone'.

**Methods** – Case note review and review of post op cervical spine X rays done at two subsequent follow ups. This was a retrospective, observational study. Data were derived from a database of all anterior cervical surgeries performed at our centre over the past 10 years. Exclusion criteria included incomplete notes, undocumented diagnoses, complex cervical surgery, only discectomy with no fusion implant.

**Results** – An analysis of 152 patients who had anterior cervical discectomy and fusion with either tutobone (n=92) or autologous bone(n=60) is presented. These groups were well matched in terms of age, sex, preoperative symptoms and duration of follow up. Significantly greater number of patients in whom autologous bone was used had more than one level surgery (?2, p = 0.01). The median follow-up time was 1 year. The type of implant, age and the number of levels operated had no significant impact on the fusion and the median time to fusion was no different in the two groups (12 vs 10 months) on a survival model (Log rank test, p=0.24).

**Conclusion** – From our data there is no evidence to suggest that autologous bone leads to significantly better or faster fusion and alternatives such as tutobone may be used with similar results.

**ID: 1303**

**Spontaneous intracerebral haemorrhage in children: a retrospective analysis**

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**Objective**

Spontaneous intracerebral haemorrhage is much less common in children than in adults. We reviewed our recent experience of such cases in children under the age of 18 years.

**Methods**

A retrospective review of all cases of spontaneous intracerebral haemorrhage admitted under the lead author between June 2008 and June 2009 was performed. Perinatal haemorrhages were excluded. Medical records were reviewed to assess symptomatology, management and follow-up at 6 and 12 months.

**Results**

Five cases were identified, aged between eight and thirteen years. Typical presentation was s headache (100%) followed by a change in conscious level (80%). Bleeding was lobar in 4 cases and cerebellar in one. Arteriovenous malformations were the commonest cause (60%). 3 out of 5 patients needed emergent surgical intervention. All patients underwent cerebral angiography at some stage and all survived with little/no disability at follow-up.

**Conclusions**

Spontaneous intracerebral haemorrhage in children is usually due to a vascular malformation and has a good prognosis. We formulate an action plan based on our experience of such cases.

**ID: 1304**

**Spontaneous Regression of Partially Resected High Grade Posterior Fossa Pilocytic**

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Objective: We report a case of Spontaneous regression of a high grade large posterior fossa pilocytic astrocytomas in a fifteen months following forty percent debulking in twenty months old child .

Method: Pubmed and Medline and google and reference neurosurgical text book were utilized to for literature review for similar cases .

To our knowledge this is the first case of recurrence of High grade pilocytic astrocytoma over this very short period of time .

Conclusion : Such an outcome should be put in the back of our mind when dealing with these tumours .

**ID: 1305**

**Out of hours MRI scanning for cauda equina syndrome (CES): what is the positive pick-up rate**

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**Objective:**

Emergency MRI scanning services are subject to out-of-hours regulations. Regional neurosurgical centres are routinely relied upon to provide such a service in patients presenting with suspected acute CES.

The aims were twofold; first, to assess the positive 'pick-up' rate of these referrals; what percentage led to an emergency operation. And second, to identify the final diagnosis of those patients with a 'negative' scan result.

**Methods:**

All patients who were admitted in 2008 for an out-of-hours emergency MRI for possible CES were identified. Radiological results were analysed in relation to the presenting symptoms and signs. Patients who were returned to their referring hospitals because of no radiological proof of CES were traced and final diagnoses identified via communication with their referring physician and general practitioner.

**Results:**

33 patients were admitted for an out-of-hours MRI during the study period.

10 were proven to have acute CES and underwent an emergency operation. The male:female ratio was 1:1 and the average age 38.9 (34-46). 80% had all of radiculopathy, paraesthesia and sphincter disturbance; 2 patients had paraesthesia and sphincter loss in the absence of radiculopathy. 80% had acute back and leg pain. All had a lumbar disc prolapse on MRI and underwent a decompressive laminectomy and discectomy.

23 patients had a 'negative MRI'. The male:female ratio in this group was 1:2.3 and the average age 53.1 (19-81). In this group there was a 70% incidence of incontinence, 60% paraesthesia, 40% radiculopathy, and 35% incidence of back and leg pain.

While a small proportion of these remained undiagnosed (13%), eventual diagnoses fell into 4 categories:

- Neurological: Guillain-Barré, Multiple Sclerosis, transverse myelitis, central pontine myelinolysis.
- Malignant: sacral metastasis, sacral Ewing's sarcoma, rectal carcinoma.
- Psychiatric: functional disorder, dissociative personality disorder.
- Other: sacral fracture and rhabdomyolysis.

**Conclusions:** The positive pick up rate for out-of hours MRI for suspected CES was 30%. The eventual diagnosis in those with a 'negative' scan is varied but potentially serious and appropriate referrals should be made to investigate other neurological, malignant, psychiatric or other aetiologies.

**ID: 1306**

**management of aneurysmal sah (Subarachnoid haemorrhage) - snapshots six years apart**

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**Objective:** To report our experience and the continuing relevance of surgical treatment of aneurysmal subarachnoid haemorrhage.

**Methods:** It was a retrospective and observational study of the management of patients in 1998-99 and 2005-06 admitted with SAH.

**Results:** In the two year period between 1998 and 1999, 97 patients with ruptured aneurysms were treated. 54 (56%) of these patients had clipping while 43 (44%) underwent coiling. In the two year window between 2005 and 2006, the number of treated patients with aneurysmal SAH was 121. Among these 70 (58%) had an endovascular procedure alone while 49 (40%) patients underwent clipping. Two patients (2%) had both modalities. A small number of patients who were not treated due to the poor grade have not been included. The outcome in the coiled and clipped groups was comparable.

**Conclusion:** Despite advances in endovascular treatment of ruptured cerebral aneurysms, use of innovative methods like stents and onyx and ever increasing expertise of the interventional neuroradiologists, surgical treatment still remains as an important option.

**ID: 1308**

**Paediatric Neurosurgery in its Infancy: Cases from the King's College Hospital Reports**

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King's College Hospital, founded by Robert Bentley Todd in 1840 near the Royal College of Surgeons on Portugal Street, served the slums stretching from Seven Dials to the Strand and from Drury Lane to Chancery Lane. When Lord Lister was recruited to King's College London in 1877 his techniques in antiseptic surgery were put to the test as "having two or more patients in one bed" was considered routine. Lister brought with him as his first House Surgeon William Watson Cheyne, his pupil, assistant and exponent of Listerian methods. In the King's College Hospital Reports, 1893-1900, we find 3 cases of paediatric brain abscesses.

In this pre-imaging and pre-antibiotic era it makes humbling reading to see how Mr (and later Surgeon Rear Admiral Sir) William Watson Cheyne describes in meticulous detail the symptoms and signs of an 11 year-old boy with suppurative meningitis, and of another 8 year-old boy with a mastoid abscess, both of whom underwent trephining. The recordings of their pulse, pupillary function, optic disc blurring, nausea and conscious level give an excellent account of the natural history of their condition, showing the advanced level of understanding of raised intracranial pressure pathophysiology at the end of the 19th century, an advance from only some years previously, as evidenced in other London hospital records.

Another case of a temporosphenoidal abscess is described by Mr Burghard showing a similar understanding of the principles of detailed observation and surgical abscess drainage.

While all 3 cases were eventually fatal, clinico-pathological correlation from post-mortem examination and its discussion in the King's College Hospital Reports shows the drive and determination to advance learning in this era of London medicine. The importance of such cases and the contribution of Watson Cheyne's generation to British medicine and neurosurgery is discussed.

**ID: 1309**

**Oxford Head injury Evaluation and Audit Database (OxHEAD): First Year Experience**

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The Oxford Head injury Evaluation and Audit Database (OxHEAD) is one of the first comprehensive multi-disciplinary prospective head injury databases to be established in the UK. The database has been up and running at the John Radcliffe Hospital in Oxford since September 2007. It includes data at multiple stages of the patient pathway from point of injury to hospital discharge and follow-up at one, three and five years. Its primary function is to identify the problem of head injuries in the Oxford region, its management including the timing of investigations, transfer and neurosurgical intervention, and to monitor trends in outcome. All patients who are admitted to the John Radcliffe Hospital (via A&E or transfer from a district general hospital) for management of a head injury are screened for eligibility for inclusion. A part-time research nurse obtains consent for recruitment and collects data on an Access database which is stored on a secured network shared drive. The database has full ethics approval by National Research Ethics Service (NRES). In this paper, we aim to present the design of our database, preliminary results, and discuss the challenges faced in establishing a regional or national prospective head injury registry.

**ID: 1310**

**posterior fossa tumours in children: time to diagnosis**

"M. A. J. White, E.J.St George, J. Brown"

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**POSTERIOR FOSSA TUMOURS IN CHILDREN:  
TIME TO DIAGNOSIS**

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**Introduction**

Paediatric posterior fossa tumours are common, responsible for approximately 70% of all childhood brain tumours. Initial presenting symptoms can be intermittent and vague delaying recognition until late in tumour progression.

**Aims**

To determine the time interval between the first attributable symptom and radiological diagnosis in these paediatric tumours, comparing our findings with those in the established literature.

**Methods**

A retrospective case note review was performed of all children (n=49) with posterior fossa tumours admitted in the last 5 years (m 23 /26 f). Median age-6 (5 mths – 16 yrs).

Pathology included medulloblastoma (n=16), pilocytic astrocytoma (n=14), ependymoma (n=5), brainstem glioma (n=4) and others (n=3).

Patients with tumours not confined to the posterior fossa and notes with inadequate clinical information were excluded (n=6)

**Results**

The mean time interval between symptom onset and radiological diagnosis was 224 days and between symptom onset to review by first physician was 62 days (1 -365 days). The mean time interval between first physician review and radiological diagnosis was 162 days (6 hrs – 730 days)

The most common presenting symptoms were headache, nausea & vomiting, ataxia and oculomotor deficits. Most patients had seen an average of 2 specialists prior to ultimate diagnosis, tending to concentrate on specific individual symptoms.

**Conclusions**

To improve delays in diagnosis of this tumour group, more education/information may be required at several levels including parents, GP, A&E, and tertiary specialties. A protocol to identify these tumours in children with prolonged symptoms may be helpful as too often individual symptoms are the focus rather than the patient as a whole.

**ID: 1312**

**Surgical issues in the use of intra-ventricular pentosan polysulphate in human prion disease**

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**Objective:** Intra-ventricular pentosan polysulphate is an experimental treatment for human prion disease. Insertion of intra-ventricular catheters and the associated subcutaneous pump involves adherence to prion related surgical guidelines. This can pose technical challenges to the surgeon and surgical complications have been previously reported<sup>1</sup>. Since the initial description of this technique in 2005, five patients have undergone this procedure in our neurosurgical unit, thereby making it the largest series in the UK. We describe the technical demands of this procedure and problems that can arise in the short and long term.

**Methods:** The case notes of the five patients who had undergone this procedure were reviewed. Feedback from the operating surgeon was obtained and the relevant radiological images were reviewed.

**Results:** The following technical issues were observed: 1) High transmissibility of the involved pathogen requires exclusive use of disposable surgical instruments. The basic nature of such surgical kit poses difficulties in performing this procedure and an additional brain biopsy. 2) The ventricular size is variable and the catheterisation of the frontal horn can pose difficulties. There were no immediate complications noted in our 5 cases. One patient had developed bilateral subdural hygromas as a delayed complication.

**Conclusion:** Despite these operative limitations, complications were minimised as an experienced surgeon performed these procedures. Brain tissue can also be obtained for diagnostic purposes. Subdural hygroma appear to be a late complication.

**References :**

1. Bone I, Belton L, Walker AS, Darbyshire J. Intraventricular pentosan polysulphate in human prion diseases: an observational study in the UK. *Eur J Neurol.* 2008 May;15(5):458-64

**ID: 1313**

## **TRENDS IN PUBLICATIONS ON NEUROSURGICAL EDUCATION AND TRAINING IN SEVEN**

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### Introduction

The neurosurgical training system has undergone major changes in the UK and internationally. The European Working Time Directive has challenged traditional methods of education and training. The international neurosurgical community has responded intensely with discussion groups, presentations and publications.

The aim of this study is to identify a trend in neurosurgical publications focused in education and training and to identify the degree to which the concerns and suggestions of the neurosurgical community are reflected in the neurosurgical literature.

### Methods

Medline was searched setting time limits from 1989 to 2009. Seven major representative journals were selected. Keywords used were any of the three: education, training and residency. Retrieved abstracts were analysed. Papers that met the study's criteria were studied.

### Results

510 articles were retrieved during the initial search. Subsequent analysis showed that 186 articles fulfilled the criteria of the study. The total number of papers which focused on education and training were recorded per journal: Journal of Neurosurgery - 37 (0.38%), British Journal of Neurosurgery - 15 (0.66%), Neurosurgery - 56 (0.6%), Acta Neurochirurgica - 33 (0.36%), Surgical Neurology - 39 (0.89%), JNNP - 1 (0.01%) and The Journal of Clinical Neuroscience - 5 (0.18%).

### Conclusion

From 1989 to 1999 there was limited number of publications. A wave of increased publications were identified from 2000 to 2004; a second bigger wave was identified from 2004 to 2008. Journals with the biggest percentage of published articles on education and training were Acta and the BJN.

Overall the percentages were low. More publications submitted from the Neurosurgical community in the UK and abroad will reflect the intense current thinking and will help overcome successfully the international educational crisis.

**ID: 1314**

## **The Brain at Altitude - Preliminary Results from Xtreme Everest and Hypoxic MRI Studies**

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### Objective:

The pathophysiology of High Altitude Headache (HAH) and the neurocognitive effects of hypobaric hypoxia are poorly understood. The objective of this study was to comprehensively investigate the cerebrovascular system at rest and during exercise at altitude and to correlate changes with headache incidence and neurocognitive performance.

### Methods:

198 volunteers and 24 investigators were studied during an ascent to Everest Base camp (5300m). A subgroup of 14 investigators were studied up to 7950m. Headache (modified Lake Louis Score) and basic physiological data were recorded daily. Specific neurological investigations included brain blood flow velocity measurements using Transcranial Doppler (with concurrent 2D Ultrasound measurement of middle cerebral artery (MCA) calibre), regional cerebral oxygenation saturation (during rest and exercise) using Near Infra Red Spectroscopy, digital retinal imaging, pupilometry, saccade assessment and complex neuropsychological tests. Anthropomorphic (n=20) and angiographic (n=7) MRI studies have subsequently been performed.

### Results:

190 volunteers and all 24 investigators reached base camp. Retinal vessel distension correlated with headache incidence. Cerebrovascular blood flow and oxygenation were assessed up to 7950m. Marked changes in MCA calibre were observed. MRI studies demonstrate similar effects with acute hypoxia. Anthropomorphic studies imply compartmental volumes may be important in determining predisposition to HAH.

### Conclusions:

Further genetic studies and cross modality analysis are ongoing. The results to date demonstrate that the development of headache at high altitude is likely to be related to cerebrovascular adaptations (not oedema as current literature suggests) and such mechanisms are likely to have a role in clinically relevant headaches.

**ID: 1315**

**Brain biopsy in non-neoplastic neurological disease.**

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**Introduction**

Patients with non-neoplastic neurological disease undergo diagnostic brain biopsy when other means of obtaining a definitive diagnosis have been exhausted. The threshold for requesting a diagnostic brain biopsy is variable, reflecting variations in the perceived risk of the intervention & its diagnostic utility.

**Objective**

To review the indications for, complications & outcome of diagnostic brain biopsies performed 2003-2008.

**Methods**

Subjects were retrospectively identified using theatre log books & histopathology reports. Case records were analysed jointly by a neurologist & neurosurgeon.

**Results**

54 biopsies were performed in 51 patients in whom the preoperative working diagnosis was not clearly malignancy; representing 12.5% of all (431) brain biopsies. The indications included focal lesions (atypical cystic & ring enhancing 6%), less specific diffuse change (white matter changes 49%, white & gray matter changes 6%, extensive oedema 4%, multiple spontaneous vascular events 6% & leptomeningeal enhancement 16%), atypical cerebral atrophy (6%) & progressive/acute neurological decline with unremarkable parenchyma (8%). The diagnostic yield was 69% (52% truly diagnostic, 17% suggestive). Combining clinical, radiological and biopsy information, a confident diagnosis was achieved in 84%; demyelinating disease (20%) & vasculitis (16%) were the most common. Biopsy changed management in 61%. Complications: transient worsening paresis (n=1 (1.8%)) & CSF leak requiring repair (n=1(1.8%)). In retrospect, biopsy was difficult to justify in only 2 patients (4%).

**Conclusion**

Brain biopsy for non-tumoural conditions carries little risk & may have significant implications for diagnosis and patient management in carefully selected cases.