Seizure prophylaxis in gliomas (SPRING): a phase III randomised controlled trial comparing prophylactic Levetiracetam versus no prophylactic anti-epileptic drug in glioma surgery

M.D. Jenkinson¹, C. Watts², A.G. Marson³, R. Hill⁴, K. Murray⁴, L. Vale⁵, H. Bulbeck⁶, R. Grant⁷

¹The Walton Centre, Liverpool, UK, ²University of Birmingham NHS Trust, Birmingham, UK, ³University of Liverpool, UK, ⁴Scottish Clinical Trials Research Unit, Edinburgh, UK, ⁵Newcastle University, UK, ⁶Brainstrust, Isle of Wight, UK, ⁷NHS Lothian, Edinburgh, UK

Objectives. There is no consensus regarding the need for prophylactic anti-epileptic drug (AED) in seizure-naive newly-diagnosed glioma patients. Data regarding prophylactic AED use are scant and inconclusive from older, small studies that enrolled patients with brain metastases, benign tumours and gliomas. A definitive randomised controlled trial (RCT) is needed to determine whether the policy of prophylactic AED therapy reduces the risk of first seizures in this population.

Design. Multi-centre RCT.

Subjects. Inclusion criteria: (i) seizure-naive, (ii) supratentorial glioma suitable for surgery (biopsy/resection), (iii) age ≥16 years; (iv) Karnofsky performance status > 60.

Methods. Patients are randomised 1:1. Levetiracetam 500mg bd for 2 weeks, increased to 750mg bd thereafter for 1 year. Non-blinded. No placebo. Primary Outcome: one year risk of first seizure. Secondary outcomes: time to first seizure, time to first tonic-clonic seizure, mood, fatigue, quality of life, progression free survival, overall survival and incremental cost per QALY. Estimate of 1 year seizure rate in glioma after surgery is 20%. Based on a reduction in seizure rate to 10% a total of 806 patients will be recruited.

Results. Grant awarded by NIHR. Feasibility questionnaire demonstrated prophylactic AED rarely used. Neurosurgeons willing to randomise. 15 UK centres have expressed interest in participating.

Conclusions. SPRING will establish class I evidence for the use of seizure prophylaxis in glioma surgery. The trial will open to recruitment in January 2019.
Objectives. Seizures are a common presenting symptom in patients with low grade glioma (LGG). Exact mechanisms of epileptogenesis are unknown and the influence of radiological and histological characteristics are not well studied, particularly after the 2016 WHO reclassification of gliomas. We aimed to define predictors of seizure development and outcome in patients with LGG.

Design. Retrospective single institution case series.

Subjects. 63 patients who underwent resection of supratentorial LGG in a single institution, 45 presented with seizures.

Methods. Retrospective analysis of patient records to assess seizure outcome and other demographics including radiological variables, tumour characteristics, type of surgery and histology based on the 2016 WHO update.

Results. After surgery, 33 patients (73%) who presented with seizures were Engel class I at median follow up of 43 months. Complete and near total resection were associated with improved Engel class compared to subtotal resection. Awake craniotomy gave improved seizure outcomes compared to under general anaesthesia (84% vs 65%). Molecular genetics did not predict seizure outcome. Updated histology did not predict seizures at diagnosis, only tumour heterogeneity on initial MRI (p=0.043). Tumour volume at presentation impacted EOR but not seizure outcome.

Conclusions. Seizure outcome is directly related to EOR. Tumour histology based on molecular genetics did not predict seizure development or outcome. Use of awake craniotomy results in greater EOR and improved Engel class.
Improved prediction of surgical resectability in patients with glioblastoma multiforme using an artificial neural network

A. Marcus¹, H.J. Marcus², S.J. Camp³, D. Nandi³, N. Kitchen², L. Thorne²

¹Queen Elizabeth Hospital, Woolwich, London, UK, ²The National Hospital for Neurology and Neurosurgery, London, UK, ³Charing Cross Hospital, London, UK

Objectives. In managing a patient with glioblastoma multiforme (GBM), a surgeon must weigh up whether sufficient tumour can be removed so that the patient can enjoy the benefits of decompression and cytoreduction, without impacting on the patient’s neurological status. In a previous study we identified the five most important anatomical features on a pre-operative MRI that are predictive of surgical resectability and used them to develop a grading system. The aim of this study was to apply an artificial neural network (ANN) to improve the prediction of surgical resectability.

Methods. A prospectively maintained database was searched between February and August 2017 to identify all adult patients with supratentorial GBM that underwent resection. Pre-operative MRI scans were scored using the aforementioned grading system and post-operative scans assessed to determine the extent of resection. Performance of the standard grading system and ANN were then evaluated by analysing their Receiver Operator Characteristic curves; Area Under Curve (AUC) and accuracy were calculated and compared using the t--test with a value of p<0.05 considered significant.

Results. In all, 47 patients were included, of which 18 (38.3%) were found to have complete excision. The AUC and accuracy were significantly greater using the ANN compared to the standard grading system (0.87 vs. 0.79 and 0.81 vs. 0.77 respectively; p<0.01 in both cases).

Conclusions. An ANN allows for improved prediction of surgical resectability in patients with GBM.
Verbal fluency test in patients with a newly diagnosed brain tumour

K. Zienius¹, P. Brennan¹, R. Grant²

¹Centre for Clinical Brain Sciences, University of Edinburgh, UK, ²Edinburgh Centre for Neuro-oncology, Edinburgh, UK

Objectives. Utility of a simple 1-minute cognitive screening tool, verbal fluency test, as a potential risk assessment tool for GPs for a suspected brain tumour

Design. Case-control prospective study: patients with new diagnosis of brain tumour with a history of headache and patients referred for direct-access-CT for headache without brain tumour.

Subjects. 102 brain tumour patients: 34.3% HGG, meningioma 21.6%, cerebral metastases 17.6%, LGG 11.8%, others (pituitary, schwannoma, haemangioblastoma) 11.8% and CNS lymphoma 2.9%.

Methods. Group differences analysed with independent t-test.

Results. Mean age was similar across both groups. There were more females in the control group. Tumour patients obtained significantly lower scores on all fluency test measures, however the largest effect size difference was observed for semantic total and phonemic total scores (Cohen’s d = -0.89 and -0.44, respectively). Brain tumour patients named on average 4.6 animals less (95%CI -6.7, -3.13) (p<0.001) than controls. On a letter P task, there was a 2 word-mean difference (95%CI -3.4, -0.73) (p=0.003) for the groups. Forty-eight (47.1%) tumour patients and 22(23.4%) controls had subjective memory disturbance. Tumour patients performed equally on both fluency tasks regardless of memory complaints (p>0.5).

Conclusions. Semantic test is more reliable to discriminate patients with a brain tumour. In contrast to patients without a brain tumour, subjective memory impairment is not associated with a reduced performance on verbal fluency tasks.
Objectives. Develop a model to identify incidental meningiomas at risk of observation failure

Design. Retrospective study (2007-15)

Subjects. 385 patients. Mean age 62.6 yrs.

Methods. Observation failure was defined as: new symptoms, MRI progression (absolute growth rate 2 cm$^3$/year or absolute growth rate 1 cm$^3$/year+relative growth rate 30%/year) or loss of treatment options. A prognostic model was developed using MRI and patient comorbidity.

Results. Over a median of 36 months, 44 (10.9%) meningiomas failed observation. Median time to failure was 33 months. Model parameters were based on statistical and clinical considerations and included: increasing tumour size (HR=2.17 [95% CI=1.53-3.09], p<0.001), peritumoural signal change (HR=1.58 [95% CI=0.65-3.85], p=0.313), FLAIR/T2 hyperintense meningiomas (HR=10.6 [95% CI=5.39-21.0], p<0.001) and proximity to neurovascular structures (HR=1.38 [95% CI=0.74-2.56], p=0.314).

Patients were stratified based on the model into low, medium and high-risk groups and rates of failed observation at 5-years were 3%, 28% and 75% respectively. Low-risk patients had small meningiomas, free of all risk factors. After 5-years of follow-up the probability of failure plateaued in all risk groups. Older patients with comorbidities were 15-times more likely to die than to receive intervention at 5-years following diagnosis, regardless of risk group.

Conclusions. Most meningiomas remain clinically and radiologically stable. Stratifying follow-up according to risk-group has the potential to reduce the cost to healthcare.
Intramedullary spinal cord tumours - a single centre 10 year retrospective review

O. Richards, E. Goacher, C. Derham

Leeds General Infirmary, Leeds, UK

Objectives. To identify clinically relevant predictors of progression free survival by retrospectively analysing the anatomical location, pre- and post-operative function and histology in intramedullary spinal cord tumours from a single neurosurgical centre over 10 years.

Design. Retrospective review

Methods. 49 patients were identified from a surgical database. Variables collected included pre- and post-operative Frankel Grade and Modified McCormick Scale assessments, tumour histology, extent of resection and length of follow up. Chi-Squared, Kaplan-Mier Survival and Mann-Whitney U-Tests were completed.

Results. There was a statistically significant relationship between identification of the tumour plane and extent of resection (p<0.01), along with the extent of resection and recurrence (p<0.01). Compared to the other histological subtypes, ependymoma’s demonstrated a significantly greater extent of resection (p=0.02). There was a significant relationship between the grade of tumour and progression free survival (p<0.01). We did not find a significant relationship between pre- and post-operative neurological function and survival.

Conclusions. Tumour plane and the extent of tumour resection are significant determinants of progression free survival. Ependymoma, whilst being the commonest histology in our series were also the most resectable. Whilst complete resection reduces the rate of recurrence, tumour grade is the most important predictor of outcome.
TP1-1

Endovascular versus surgical management of pericallosal artery aneurysms, single centre experience

M.S. Draz, A.K Toma, S. Bezouich, P. Grover

The National Hospital for Neurology and Neurosurgery, London, UK

Objectives. Comparing surgical versus endovascular management of pericallosal artery aneurysms

Design. Retrospective case series

Subjects. Patients managed in our unit for pericallosal artery aneurysms

Methods. Patients medical and radiological records were reviewed collecting data about presentation, management, complications. Clinical outcome was assessed by mRS at 3,6&12 months. Imaging were reviewed to report aneurysm size and treatment outcome.

Results. Average follow up period 3.3 years SD ±3.5. 38 patients had SAH&19 were incidentally discovered. Initial CT showed SAH in 21 patients, IVH in 3,ICH in 3 IVH and ICH in 9. 33 patients treated using endovascularly, 13 patients conservatively and 2 by surgical clipping. 33% of endovascular group had stroke caused by approach related complications. 41.3% of the patients had mRS (0-2) at 3 months period. Increased to 46.5% at 12 months. Average imaging follow up was 1.5 years (SD ±1.6). 36.3% of endovascular group showed aneurysm remnant filling or recurrence.

Conclusions. Pericallosal artery aneurysms are complex in nature and both management modalities are challenging. Complications were high in endovascular group. Surgical intervention should be considered in selected patients where complex intervention is required.
TP1-2

Treatment of dural and direct caroticocavernous fistulas via the transorbital approach

M. Ilyas, A. Rennie

The National Hospital for Neurology and Neurosurgery, London, UK

Objectives. To analyse the outcome of this novel approach in patients with Caroticocavernous fistulas (CCFs) and to compare it with the commonly used transvenous pathway.

Design. Retrospective analysis of patients with CCFs treated using the transorbital approach

Subjects. 10 patients were identified following review of inpatient databases and collection of information for those treated offsite

Methods. Analysis of Angiography findings and follow up imaging alongwith review of outcomes from patient records (Using TO approach, coils were used over liquid embolic due to risk of reflux of liquid from perforators)

Results. No failure to puncture No orbital hematoma requiring drainage/canthotomy Occlusion rate 100% Commonest symptoms of eye pain and proptosis (all subjects) with chemosis, ophthalmoplegia and reduced visual acuity (fairly common) in the patients studied improved significantly post the TO procedure with transient 3rd and 4th Nerve palsy being the only complication

Conclusions. Transorbital approach (TO) is a safer, acceptable alternative to the catheter transveous approaches for CCFs (dural and direct) With greater numbers and experience, TO could be considered as a 1st line approach
TP1-3

Final phase of recruitment and statistics analysis plan for Dex-CSDH trial

E. Edlmann¹, A. Koliass¹, E. Thelin¹, D. Gatt², Y. Al-Tamimi², K. Owusu-Agyemang³, N. Suttner³, P. Holton⁴, D Bulters⁴, A Allison¹, S Bond¹, S Tarantino¹, C Davis-Wilkie¹, B Pantaleo¹, C Turner¹, PJ Hutchinson¹, Dex-CSDH collaborative group, BNTRC

¹Department of Academic Neurosurgery, Cambridge, ²Department of Neurosurgery, Sheffield Teaching Hospitals NHS Trust, ³Institute of Neurosciences, Queen Elizabeth University Hospital, ⁴Wessex Neurological Centre, University Hospital Southampton NHS Foundation Trust

Objectives. Review recruitment progression and statistical analysis plan for Dex-CSDH trial.

Design. A UK multi-centre, randomised, double-blind, placebo-controlled trial of dexamethasone versus placebo for CSDH.

Subjects. Symptomatic, adult CSDH patients admitted to a participating neurosurgical unit.

Methods. Trial participants receive a 2-week course of dexamethasone in addition to standard care, including surgery. The primary outcome measure is the modified Rankin Scale (mRS) at 6 months. An mRS of 0-3 requires the patient to be independently mobile and we have considered this a favourable outcome, with scores 4-6 (non-mobile) as unfavourable. The primary analysis will be performed on an intention-to-treat basis, estimating the absolute difference between the two treatment arms in the proportions achieving a favourable outcome. Secondary analysis will be done with an ordinal analysis of mRS scores and proportional odds logistic regression of the original mRS score adjusting for baseline covariates (age, GCS).

Results. 629/750 patients (84%) have been recruited to the Dex-CSDH trial which is on-going as of 20-06-2018. Recruitment progress and follow-up at time of presentation will be reviewed alongside full statistical analysis plan.

Conclusions. The Dex-CSDH trial is drawing close to target following excellent recruitment across 22 UK centres. Transparent communication of the statistical analysis plan is essential prior to unblinding of the data. Up-to-date recruitment and primary endpoint completion rates will also be reviewed.
**TP1-4**

**In vitro induced cytokine response of astrocytes modelling conditions in human traumatic brain injury**

E.P. Thelin¹, C.E. Hall², A. Frostell³, T. Tajsic¹, K.L.H. Carpenter¹, P.J.A. Hutchinson¹, R. Patani², A. Helmy¹

¹University of Cambridge, Cambridge, UK, ²University College London, London, UK, ³Karolinska Institutet, Stockholm, Sweden

**Objectives.** The objective of this study was to investigate how in vitro astrocyte cultures respond to cytokine pro- and anti-inflammatory cytokine concentrations, corresponding to those seen in the aftermath of human TBI, by analysing downstream cytokine generation.

**Design.** In vitro study

**Subjects.** Human induced pluripotent stem cells (iPSC)-derived astrocytes

**Methods.** The astrocytes were exposed to levels of TNF (1-10,000 pg/ml), IL-6 (100-1,000,000 pg/ml), Interleukin-1β (IL-1β, 1-10,000 pg/ml), Interleukin-4 (IL-4, 1-10,000 pg/ml) and Interleukin-10 (IL-10, 1-10,000 pg/ml). Following 24, 48 and 72 hours, culture supernatant was extracted and analysed using a human cytokine/chemokine 39-plex luminex assay (ThermoFisher).

**Results.** The astrocyte secretome revealed concentration-, time- or concentration*time-dependent production of downstream cytokines (12, 8 and 2 cytokines, respectively p<0.05). IL-1β and TNF exposure generated the most downstream cytokine production, while IL-6, IL-4 and IL-10 did not generally induce a robust response.

**Conclusions.** iPSC-derived astrocytes exposed to cytokine concentrations reflecting those in TBI generate an increased downstream cytokine production, especially when exposed to IL-1β and TNF. This is in contrast to our previous work on neuronal cultures where IL-1β only produced a few downstream cytokines [1]. More work is needed to better understand how different cells in the CNS respond to the neuroinflammatory milieu after TBI alone and in combination.
Demographics, presentation and clinical outcomes after traumatic bifrontal contusions: a systematic review

N.V.d. Zande¹, S. Manivannan², F. Sharouf², D. Shastin², M. Abdulla², P. Chumas³

¹Isala Hospital, Zwolle, Netherlands, ²Department of Neurosurgery, University Hospital of Wales, ³Leeds General Infirmary, Leeds, UK

Objectives. Traumatic bifrontal contusions (TBC) form a recognised clinical entity among patients with moderate to severe traumatic brain injury (TBI). This study aims to systematically review current literature on demographics, management and predictors of outcomes of patients with TBC.

Design. PRISMA based systematic review.

Subjects. See results

Methods. A multi-database literature search (PubMed, Cochrane, OVID Medline/Embase) was performed using predefined selection criteria (PROSPERO: CRD42018055390), and risk of bias was assessed using an adapted form of ROBINS-I tool.

Results. Of 275 studies yielded by the literature search, 6 articles met the criteria for inclusion; all of which were level III evidence. Total cohort consisted of 407 patients; predominantly male (n=4; 284/386 patients) with average age 45 years (range: 7 – 81). Falls (45.5%) and road traffic accidents (44.7%) were the commonest mechanisms of injury with an average presentation GCS of 9.2 (n=3, 119 patients). GCS on admission of ≤13.1 and contusion volume at day 2 post injury of ≥62.9cm³ were associated with increased risk of deterioration needing surgical interventions (n=1, 7 patients). The majority of patients underwent surgery; the average GOS was 3.9, at an average follow up duration of 12.9 months (n=5, 295 patients).

Conclusions. The currently available evidence on the management of TBC is scarce. Larger multicentre well-designed studies are needed to further delineate the factors behind acute deterioration, and develop algorithmic approaches to management.
Objectives. In humans the effect of spinal cord injury (SCI) on spinal cord blood flow (SCBF) is poorly understood. We imaged SCBF intraoperatively using laser speckle contrast imaging (LSCI).

Methods. We recruited 4 patients without SCI and 22 patients with SCI. Inclusion criteria for SCI patients are: AIS A–C, 18–70 yrs old, surgery within 72h of injury. In the SCI patients, we monitored spinal cord perfusion pressure and microdialysis from the injury site for 24h postoperatively. Mean patient follow-up after SCI was 7m.

Results. LSCI signal is dampened by cerebrospinal fluid, but not dura. In patients without SCI we observed intact autoregulation, as well as SCBF variation with cardiac cycle, respiratory cycle and arterial pCO2. In SCI patients three pathological SCBF patterns were seen: necrosis-penumbra, patchy-perfusion and hyper-perfusion. Increase in MAP (>20mmHg) increased overall injury site SCBF, but in 5/22 SCI patients there was a local steal effect where SCBF increased in some regions but decreased in others. In 7 SCI patients there was diastolic ischaemia, with regions only perfused in systole, but not diastole. Low injury site SCBF correlated with low spinal cord perfusion pressure, low tissue glucose, high tissue lactate and less improvement in combined sensory AIS score at follow-up.

Conclusions. LSCI can be used to visualise SCBF non-invasively with high spatial-temporal resolution. We observed pathological SCBF patterns after SCI and some unanticipated SCBF responses to blood pressure changes.
Extended Glasgow Outcome Scale – when would you rather die?

S. Hasan, C. Uff

The Royal London Hospital, London, UK

Objectives. Extended Glasgow Outcome Scale is the primary outcome measure in trials involving neurotrauma patients. Conventional dichotomization characterises unfavourable outcomes as upper severe disability or worse, however RESCUE-ICP changed this to consider upper severe disability as a favourable outcome. As the recent consensus meeting in Cambridge proved, opinion of what constitutes acceptable recovery can vary widely between individuals.

Design. To survey patients with brain injury and compare them to the opinions of staff routinely involved in the care of such patients.

Subjects. Patients with brain injuries, neurosurgery staff and ITU staff.

Methods. GOS-E sheets were given to neurotrauma patients and asked to circle the outcome they considered unfavourable and therefore would rather not survive. This was compared to the same question posed to neurosurgery staff members, and ITU staff members.

Results. 47 responses collected (11 patients, 23 neurosurgery staff, 13 ITU staff). Mean GOS-E score deemed unfavourable and therefore not worth survival was 3.81, mode 3 (Patient mean 3.63, mode 3. Neurosurgery mean 3.73, mode 4. ITU mean 4.07, mode 5. p > 0.05).

Conclusions. What constitutes unfavourable outcome varies between each group of people questioned. Patients who have experienced brain injuries were more likely to feel that upper severe disability was an acceptable outcome when compared to the staff that care for them. It is imperative we take this in to consideration when recommending treatment strategies in an acute setting.
Decompressive craniectomy for paediatric traumatic brain injury: a systematic review

A.R. Tang¹, M. Ardissino¹, K. Tsang²

¹Imperial College School of Medicine, London, UK, ²Charing Cross Hospital, London, UK

Objectives. Managing raised intracranial pressure (ICP) in traumatic brain injury (TBI) has been the centre of debate. Recent publications (such as RescueICP) have helped our understanding of the role of decompressive craniectomy (DC) in adults but no such data is available for the paediatric population. We aim to assess the current literature on the role of DC in this group of patients.

Design. Systematic review of this subject.

Subjects. 260 paediatric patients within 12 studies were included within our criteria.

Methods. A comprehensive search of the MEDLINE and EMBASE databases led to the screening of 212 studies, with 12 studies included. We collected data on age, GCS at presentation, treatment protocols and their short- and long-term outcomes.

Results. Nine studies looked at ICP as an outcome and these all reported that it was successfully controlled by DC (69.4-100% reduction, p<0.05). Only two studies looked at mortality, both found that it was lower in the DC group (p<0.05). The 6-12 month outcome, based on the Extended Glasgow Outcome Scale (GOS-E) and a range of other pre-defined daily activities, were overall positive, or superior to those of medically treated (p<0.05) in 10 of the studies. One study suggested no difference in outcome.

Conclusions. The currently available evidence appears to supports the beneficial role of DC in the treatment of children with refractory high ICP (>20 mmHg) and a GCS score of <8 at the time of presentation. However the quality of each of these studies is poor and further research is required.
TP1-9

Vestibular dysfunction in acute traumatic brain injury

K. Tsang¹, H.J. Marcus¹,², H. Paine¹, M. Sargeant², E. Sykes², M. Saviour², J. Arthur², A. Sawhney², S. Wolstenholme¹, K. Collins¹, N. Morroney¹, S. Rakkar-Thomas¹, A. Hussain¹, Q. Arshad¹,², B. Jones¹, R. Smith², M.H. Wilson¹, B.M. Seemungal¹,²

¹Imperial College Healthcare NHS Trust, London, UK, ²Imperial College, London, UK

Objectives. Vestibular dysfunction following traumatic brain injury (TBI) is a major cause of morbidity and unemployment and has impact on the patient’s ability to rehabilitate. Chronically, up to a quarter of TBI cases have cryptogenic dizziness and imbalance, possibly due to chronic brain adaptation that masks the diagnosis. Establishing the spectrum of vestibular diagnoses in acute TBI – when they may be more obvious – may aid diagnosis in chronic TBI cases.

Design. Prospective audit of referrals to specialist neuro-otology team.


Methods. All cases were screened by the therapists for vestibular symptoms and/or signs and referred for specialist neuro-otological review.

Results. Of 111 patients screened, 96 had features of vestibular dysfunction. Of 96 cases, SYMPTOMS (i.e. subjective report) included: - imbalance (58.3%) - headache (50%) - dizziness (40%) Of 96 cases, SIGNS (i.e. examination) included: - gait ataxia (75.5%) - broken smooth pursuit (61.2%) - positive Hallpike (51%) - positive head impulse test (18%). The data indicate that BPPV affects 49% and headache with migraine-like features affect 40.8%. Acute peripheral unilateral vestibular loss affects 18% TBI cases.

Conclusions. Vestibular dysfunction in TBI is common, typically involving peripheral and central structures, often in the same case, and requires specialist neuro-otological management.
TP1-10

Non tumour brain biopsies in Alder Hey paediatric neurosurgery

L.v. Tonder¹, M. Foster¹, D. Hennigan¹, R. Kneen², A. Iyer², C. Parks¹, S. Burn¹, C. Mallucci¹

¹Department of Neurosurgery, Alder Hey Hospital, Liverpool, UK, ²Department of Neurology, Alder Hey Hospital, Liverpool, UK

Objectives. To review the utility of non-tumour brain biopsies in Alder Hey Children’s NHS Foundation Trust Paediatric Neurosurgery Department

Methods. Operative records were searched for “biopsy”. Case notes were reviewed for referral source, histology, surgical complication and outcome. Tumour, epilepsy and non-brain biopsy cases were excluded.

Results. 83 “biopsy” cases were identified between 2008 and 2017. 31 tumour, 5 epilepsy, 2 infections and 28 non brain/other biopsies were excluded. 17 brain biopsies for non-tumour causes were seen. 15 patients were referred by neurology, 2 by rheumatology. 14 underwent a craniotomy/mini-craniotomy, 3 had burrholes. 4 biopsies were non diagnostic, 2 were abnormal but inconclusive for diagnosis. Diagnoses included: 3 demyelinating lesions, 2 normal brain tissue, 1 neurosarcoïdosis, 1 autoimmune encephalitis, 1 definite Rasmussen’s Encephalitis, 1 possible Rasmussen’s Encephalitis, 1 systemic lupus erythematosus associated CNS vasculitis, 1 inflammatory infiltrate (secondary to hydrocephalus/ventriculitis), 1 patient developed a late wound infection. No other surgical morbidities/mortalities were recorded. 11 of these cases had a change in management or the treating team were reassured due to the result of the biopsy (i.e. were able to start immunomodulatory drugs in the absence of infection).

Conclusions. 65% of brain biopsies were diagnostic. 71% of biopsies either changed management or reassured the treating team about a line of management. The procedure is low risk with 0.06% morbidity and 0% mortality.
TP1-11

**MS-STAT2: A phase 3 trial of high dose simvastatin in secondary progressive multiple sclerosis**

E. Williams¹, N.A. John¹, J. Blackstone², W. Brownlee¹, C. Frost³, J. Greenwood⁴, J. Chataway¹, on behalf of the MS-STAT 2 Team⁵

¹Queen Square MS Centre, UCL, London, UK, ²Comprehensive Clinical Trials Unit, UCL, London, UK, ³London School of Hygiene and Tropical Medicine, UCL, London, UK, ⁴Institute of Ophthalmology, UCL, London, UK, ⁵A full list of co-authors will be given on the final presentation.

Objectives. Disease modifying treatment for secondary progressive multiple sclerosis (SPMS) represents a major unmet need. We outline here the rationale for the MS-STAT2 trial – a phase 3 study of simvastatin in decreasing clinical progression in SPMS. MS-STAT2 will be a landmark study not only for patients with SPMS, but also for the area of drug repurposing and academically led clinical trials as a whole.

Design. Multicentre, double blind, parallel group randomised placebo-controlled trial. It follows the positive outcome from the phase 2 MS-STAT1 trial, which demonstrated a 43% reduction in the annualised rate of brain atrophy compared to placebo.¹

Subjects. 1180 patients with SPMS with an expanded disability status scale (EDSS) score of 4.0-6.5. Patients need to show evidence of disease progression over the preceding 2 years.

Methods. Subject will be recruited at 28 sites across the UK, and randomised to simvastatin 80mg or matched placebo and assessed every 6 months over the 3-year trial.

Results. The primary outcome measure is time to 6 month confirmed disability progression, based on change in Expanded Disability Status Scale (EDSS) scores compared to baseline. Secondary outcomes include assessments of cognition, walking, upper limb function and vision. Sub-studies will include advanced imaging outcomes, ocular coherence tomography and fluid biomarkers.

Conclusions. MS-STAT2 is set to be a pivotal trial for SPMS. Recruitment has now commenced and further sites are welcome.

TP1-12

Anti-IgLON5 disease and the role of immunotherapy. Case report and review of the literature

L. Clayton¹, T. Saifee²

¹Royal London Hospital, London, UK, ²National Hospital for Neurology and Neurosurgery, London, UK

Objectives. A 71 year old lady presented with recurrent episodes of acute-on-chronic type 2 respiratory failure. She had a two year history of progressive gait instability, dysphagia, bilateral ptosis and obstructive sleep apnoea. Investigations lead to the diagnosis of anti-igLON5 disease and she was treated with steroids and IVIg. During one admission she developed a subacute complete ophthalmoplegia. She was treated with IVIg showing an unequivocal response with resolution of the eye movement disorder. Despite the good response to immunotherapy she later presented in severe respiratory failure and died. The aetiology of anti-IgLON5 disease is debated and is suggested to be one of cell surface antibody–mediated neurodegeneration, with a highly specific cell surface antibody and strong HLA association, alongside pathological findings consistent with a neurodegenerative process. So far, the clinical response to immunomodulatory therapy has been regarded as poor, however, review of the literature suggest that many patients do show response to immunotherapy, with 18/27 (67%) patients described showing some clinical improvement. Despite this, mortality remains at 40%. The resolution of the ophthalmoplegia after IVIg in this case suggests that some disease activity is potentially reversible. The potential that early immunotherapy could prevent neurodegeneration, coupled with the known high mortality would suggest that immunotherapy should be considered early in anti-IgLON5 disease.
Trigeminal microvascular decompression for short-lasting unilateral neuralgiform headache attacks: a prospective, open label single centre study

G. Lambru¹, A. Levy¹, S. Lagrata¹, L. Zrinzo², M. Matharu¹

¹Headache Group, Institute of Neurology, London, UK ²Department of Functional Neurosurgery, Institute of Neurology, London, UK

Objectives. To assess outcomes of trigeminal microvascular decompression (MVD) in patients with medically refractory short-lasting unilateral neuralgiform headache attacks (SUNHA)

Design. Uncontrolled open-label single centre prospective study

Subjects. Medically refractory SUNHA patients with MRI evidence of ipsilateral trigeminal neurovascular conflict

Methods. Participants underwent trigeminal MVD. Primary outcome was headache freedom. Secondary outcomes included change in headache frequency, severity and duration as well as adverse events

Results. The study cohort consisted of 33 patients (18M, mean age 59.6 yrs). At mean follow-up of 26 months (± 15.05, range: 6-61), 24 patients (72.7%) obtained a significant headache improvement: 22 (66.7%) became headache-free post-operatively and remained so at the final follow-up and two patients reported an overall 90% improvement, with reduction in attack frequency, severity and duration. Nine patients did not respond to trigeminal MVD. No serious surgical complications were noticed. The following adverse events were reported: mild-to-moderate wound site neuropathic pain (4 patients), transient facial numbness (1 patient), vertigo (1 patient), development of new daily persistent headache (1 patient), lingual numbness and transient mild hearing loss (2 patients) and worsening of pre-existing tinnitus (1 patient). Eighteen patients reported no adverse events.

Conclusions. This study provides evidence that trigeminal MVD may be a safe and effective treatment for medically refractory SUNHA patients.
Analysis of adverse events in the management of chronic headache by occipital nerve stimulation

S. Miller, L. Watkins, M. Matharu

The National Hospital for Neurology and Neurosurgery, London, UK

Objectives. To analyse long-term adverse events of occipital nerve stimulation (ONS)

Design. Prospective open-label observational study

Subjects. 134 patients with refractory headaches implanted between 2007-2014 in a single specialised centre

Methods. Information was collected on ONS device, implantable pulse generator (IPG) site and adverse event rates. The impact of implanter experience and the association between IPG site and adverse event rates was also explored

Results. Mean follow up was 46 months (6-108 months). A total of 139 adverse events were recorded in 75 patients (56%). A total of 59 additional surgeries were needed in 39 patients. A significant difference was seen in the rates of adverse events recorded between 2007-2010 and 2011-2014 (60.7% vs 42.6%, p=0.002). A significant reduction in ONS revision was seen over time (25.7% vs 5.9%, p=0.002). Analysis of adverse events with IPG site showed those with abdominal implants recorded higher adverse event rate that those with an IPG in the chest (65.8% vs 40.3%, p=0.004).

Conclusions. In specialist centres, adverse event rates of ONS can be much lower than reported in the literature. Our results suggest implanter experience and IPG site both have an effect on adverse event rate.
A national review of trigeminal neuralgia management

A. Borg¹, C.S. Hill²,

¹The National Hospital for Neurology and Neurosurgery, London, UK, ²Queen's Hospital, Romford, UK

Objectives. Review the management of Trigeminal Neuralgia (TN) in England. Investigate whether there are significant differences in activity, procedure type, readmission and mortality rates amongst neurosurgical units treating TN.

Design. Review of data published by the Neurosurgical National Audit Programme (NNAP).

Subjects. All patients with TN who were admitted under a neurosurgeon in England between April 2014-April 2017.

Methods. The NNAP iNeurosurgery interactive benchmarking tool was used to analyse activity. Admissions, unplanned readmission and mortality rate were recorded at trust and consultant level for percutaneous ablation, microvascular decompression (MVD) and stereotactic radiosurgery (SRS).

Results. There were 2871 admissions with TN in 25 centres. These included 821 admissions for percutaneous ablation, 1316 for MVDs and 218 for SRS. There was one death following SRS, 3 following MVD and no deaths within 30 days of percutaneous ablative procedure. The number of MVD procedures performed by a single consultant ranged from 1–122 over the 3-year period. Fourteen consultants performed a single MVD and eighteen consultants over 25. There was high variability in the proportion of procedures carried out, even amongst units with access to radiosurgery.

Conclusions. There is wide variability amongst centres in the management of TN. There is no consensus regarding which first line procedure is offered to patients. A national collaborative audit is desirable to establish whether this variability affects patient rated outcomes.
Long term outcome of percutaneous balloon compression for trigeminal neuralgia

D. Bhargava, P. Franceschini, P. Eldridge, J. Osman-Farah

The Walton Centre for Neurology and Neurosurgery, Liverpool, UK

Objectives. Percutaneous balloon compression (PBC) can be offered to medically refractory patients with trigeminal neuralgia who are unsuitable for microvascular decompression. Its associated with up to 4% risk of anaesthesia dolorosa which increases with duration and severity of compression and is more common with repeat procedures. We audited our outcomes for this procedure over last 7 years.

Design. Retrospective audit of prospectively collected data

Subjects. All patients undergoing PBC at our centre

Methods. Theatre and radiology records reviewed to identify patients. Case notes and radiology reviewed for history, diagnosis, details of procedure, immediate symptom relief, complications, further procedures and last follow up. Descriptive, comparative Kaplan Meir analysis undertaken.

Results. Total 93 patients (4 b/l), 165 procedures. Average follow up 36 months. 24 patients had MS, 17 patients had atypical pain. All except 4 patients had good immediate pain relief. No patient developed anaesthesia dolorosa, 2 patients had transient diplopia, 1 maxillary hematoma and 1 infection. 56 experienced recurrence, 43 needed further surgical intervention. 25 PBC twice, 11 thrice, 4 four times and 1 five times. Average time to first recurrence= 32 months. 85% pain free at 1 year and 70% at 2 years.

Conclusions. PBC is an effective procedure. With conservative approach, this procedure can be safely repeated.
Percutaneous electrical nerve stimulation (PENS) therapy for refractory primary headache disorders: a pilot study

M.W. Weatherall1, D. Nandi2

Department of Neurology, Stoke Mandeville Hospital, Aylesbury UK, 2Imperial College Healthcare NHS Trust, London, UK

Objectives. Primary headache disorders are common, but many patients are refractory to medical treatment. PENS therapy involves the stimulation of one or more individual nerves or dermatomes using needle probes. We assessed whether a ‘single shot with single probe’ strategy would benefit patients with refractory headache disorders, including chronic migraine (CM), and chronic cluster headache (CCH).

Design. Service evaluation of 36 patients treated with PENS therapy between September 2012 and June 2016. Follow-up data was available for 33 patients.

Subjects. 16 patients with CM, nine with CCH, and one with hemicrania continua. Secondary headaches comprised occipital neuralgia, cervicogenic headache, and trigeminal neuropathy.

Methods. PENS was given using Algotec® disposable 21 gauge PENS therapy probes (8 cm) to the occipital nerve ipsilateral to the pain (or bilaterally in cases of bilateral pain). Stimulation was delivered at 2 Hz/100 Hz, at 3 cycles/second, between 1.2-2.5 V depending on patient tolerability, for 25-28 minutes.

Results. 6/9 patients with CCH improved significantly after the first session. In all patients with CCH, PENS therapy was well tolerated, with no significant adverse events reported. One patient with CCH reverted to episodic cluster. Only four patients with CM experienced any benefit.

Conclusions. PENS therapy shows potential as a relatively non-invasive, low-risk, and inexpensive component of the treatment options for refractory primary headache disorders, particularly chronic cluster headache.
New insights in post-traumatic cluster headache through a cohort study

E. O'Connor¹, L. Grangeon², T. Ngoc³, M. Matharu¹, L.L. Akijian⁴

¹Headache Group, UCL Institute of Neurology and The National Hospital for Neurology and Neurosurgery, London, UK, ²Headache Group, UCL Institute of Neurology and The National Hospital for Neurology and Neurosurgery, London and Department of Neurology, Rouen University Hospital, 76031, Rouen, France, ³Mathematics Institute of Orsay, Paris Sud University, Orsay, France, ⁴The National Hospital for Neurology and Neurosurgery, London, UK

Objectives. To investigate the characteristics of post-traumatic CH (PTCH) and compare its severity to primary Cluster Headache (CH)

Design. A retrospective cohort study was conducted in a tertiary headache centre between 2007 and 2017.

Subjects. Patients diagnosed with chronic or episodic CH that developed within 7 days of head trauma were assessed. A control cohort of 553 CH patients with primary CH and no history of head trauma were collected simultaneously.

Methods. Demographics, mechanism of head trauma, clinical characteristics and response to treatment were recorded. Multivariate analysis was performed using logistic regression and the Elastic net algorithm for variable selection.

Results. 26 PTCH patients were identified. We found a significant association between PTCH and familial history of CH (OR 2.32; 95% CI, 1.4 - 3.8), chronic form (OR 1.53; 95% CI, 1.0 – 2.2), parietal location (OR 3.9; 95% CI, 2.5 – 6.1), and the presence of eye oedema (OR 1.53, 95% CI, 1.0 – 2.2). PTCH patients were at a higher risk of being intractable to acute (OR 2.1, 95% CI, 1.0 – 4.6) and preventive (OR 4.9, 95% CI, 3.0 – 8.2) treatment and of suffering from chronic migraine (OR 5.59; 95% CI, 3.0 - 10.4).

Conclusions. This is the largest series of PTCH described to date. We demonstrated that PTCH is more severe and more likely to be chronic. It has marked dysautonomic features with a higher risk of intractability to treatment. Also it is more commonly associated with chronic migraine and a family history of CH.
Lactate/pyruvate ratio in traumatic brain Injury: assessing prognostic impact and defining therapeutic strategies

M.R. Guilfoyle, A. Helmy, J. Donnelly, M.G. Stovell, I. Timofeev, M. Czosnyka, K. Carpenter, P.J. Hutchinson

Addenbrooke's Hospital, Cambridge, UK

Objectives. Microdialysis permits online bedside monitoring of cerebral metabolism following traumatic brain injury (TBI). Here we have examined the prognostic utility of microdialysis parameters and the relationships between cerebral chemistry and other neuromonitoring modalities.

Design. Retrospective analysis of prospectively collected data.

Subjects. 619 TBI patients requiring neurocritical care and multi-modal monitoring. Median age 37 years; 76.3% male.

Methods. Microdialysis parameters (glucose, pyruvate, lactate) were registered with cerebral perfusion pressure (CPP), PRx (a measure of autoregulation), and brain tissue oxygen tension (PbtO2). Prognostic strength against Glasgow Outcome Scale (GOS) was assessed with proportional odds logistic regression. Relationships between monitoring variables were examined using generalized additive models with per-patient random effects.

Results. Mean Lactate/Pyruvate Ratio (LPR) over the first 3-7 days following injury was an independent predictor of ordinal GOS at 6 months (p<0.05). Significant non-linear associations were observed between LPR and glucose, CPP, and PRx (p<0.001 to p<0.05). There was a robust linear relationship between lactate and pyruvate within individuals, but the gradient was highly variable between patients.

Conclusions. Derangements of cerebral chemistry are independently associated with outcome following TBI. The current findings support targeting LPR as an additional goal in neurointensive care management, and suggest a possible tiered therapeutic approach.
Traumatic injury to brain across London – a 4-month study of all CT positive brain injuries referred to the London neurotrauma units

M. Wilson, on behalf of the P.L.N. Group

Imperial College, London, UK

Objectives. To investigate the demographics of traumatic brain injury (TBI) in London.


Subjects. All patients who suffered head injury resulting in acute blood on CT during 4 months of study.

Methods. Data was collected from King’s, George’s, the Royal London, Queens Romford, Imperial College Hospitals NHS Trusts and Great Ormond Street Hospital and the respective Trauma Units for each region between Sept 2016 and Jan 2017.

Results. 1889 TBI episodes were reported. 776 of the 1280 (60.6%) admitted to trauma units (TUs) and 492 of 652 (75.4%) of those admitted directly to major trauma centres (MTCs) were male with mean age being 69.0 and 53.2 at TU and MTCs respectively. The commonest mechanism of injury presenting to both TUs and MTCs was falls < 2m and the most common age bracket of presentation was 80 to 90 years of age. 67% of patients were managed at TUs and this was under a plethora of non-neurosurgical specialities but in all networks less than 10% were admitted under care of the elderly. In TUs 38.9% of patients were on anticoagulants/antiplatelet agents (19.7% at MTCs). Admissions at TUs fell into two groups – short stays (usually young) and prolonged stays (usually old).

Conclusions. TBI is a disease increasingly of the elderly who fall <2m. Two thirds of TBI patients are managed in trauma units by non-neuroscience based specialities. Many are anticoagulated. Proposals have been made to address many of the issues raised.
TP2-3

Long-term survival and five year hospital resource usage following traumatic brain injury in Scotland from 1997-2015: a population-based retrospective cohort study

J.J.M. Loan¹, N.W. Scott², J.O. Jansen³

¹Institute of Neurological Sciences, Glasgow, UK, ²University of Aberdeen, Aberdeen, UK, ³University of Alabama at Birmingham, Alabama, USA
TP2-4

The impact of social deprivation upon global traumatic brain injury outcome

T.J Humphries¹, R. Singh², S. Ingram¹, S. Sinha³

¹University of Sheffield (Medical School), Sheffield, UK, ²Osborn Neurorehabilitation Unit, Department of Rehabilitation Medicine, Sheffield Teaching Hospitals, Sheffield, UK, ³Department of Neurosurgery, Sheffield Teaching Hospitals, Sheffield, UK.

Objectives. The aim of this study was to assess the impact of social deprivation upon global TBI outcome.

Design. The study was a prospective observational study.

Subjects. 1332 consecutive adult TBI patients were recruited into the study. 131 study participants were lost within the study.

Methods. All patients were assessed by the acute TBI team at the point of their injuries. Both injury and demographic data was collated at this point including: age, gender, medical comorbidities and GCS. The measure of social deprivation used, was the Indices of Multiple Deprivation (IMD) Score. The outcome measure, conducted at 12 months post-injury, was the GOSE. Univariate analyses were conducted prior to the final Multinominal Regression, between the GOSE score and injury factors.

Results. With regard to the representation of IMD deciles, the study population and the general population are two independent groups, but the standard deviation is sufficiently similar for them to be considered pooled (equal variance) (t-test p=0.139). Within the univariate analyses statistically significant relationships were noted between IMD and GOSE (p=<0.00). There was no relationship noted between IMD and GCS at the time of injury (p=0.409), or medical co-morbidity (p=0.682). The multinominal regression revealed a significant relationship between between worsening GOSE and IMD, Age, Medical Comorbidity and GCS (p=<0.00).

Conclusions. There is a statically significant relationship between increasing social deprivation and worsening global TBI outcomes.
TP2-5

Traumatic brain injury services in the UK - A neurological deficit

J. Hersheson¹, R. Greenwood²

¹Department of Neurology, Royal London Hospital, London, UK, ²Regional Neurological Rehabilitation Unit, Homerton Hospital, London, UK

Objectives. TBI is a major global cause of mortality and disability in all age groups1. UK services in acute and later outpatient settings are inconsistent and fragmented. There is a clear need for individualised management strategies that account for the interaction between underlying brain pathology and the physical, psychological and behavioural sequelae of TBI. Neurologists are perhaps best placed to navigate this complexity, in concert with neuropsychology and rehabilitation specialists, however their involvement in delivering TBI care has been hitherto lacking. To deliver credible and effective improvement to TBI care across the spectrum of pathology and severity, neurologists must develop expertise in assessment and management.

Design. We present a survey of current TBI services across UK neuroscience centres to document the extent of neurology involvement in delivering these services.

Subjects. UK neurosciences centres

Methods. Telephone survey of trauma centres, neuroscience head injury units, head injury CNSs and neurology SpRs

Results. There is wide variation in the involvement of neurologists in TBI assessment and management in neuroscience centres. A minority of neurology SpR programmes allow for adequate exposure to patients in the acute and rehabilitation setting.

Conclusions. The role of neurology in delivering TBI care in the UK must be re-evaluated and neurologists must engage with local assessment and management, supporting services provided by neurosurgery, trauma and rehab.
Using stem cells following TBI

A. Ahmed¹, S. Gajavelli², B. Coles³, A. Pringle³, M. Bullock²

¹Wessex Neurological Centre, Southampton, UK ²University of Miami, Miami, USA, ³University of Southampton, Southampton, UK

Objectives. While no treatment strategies in Traumatic Brain Injury (TBI) are available, stem cells have emerged as putative therapeutic candidates. Endogenous stem cells can be activated following injury to provide local trophic support and exogenous stem cells can be transplanted to integrate with the host tissue. We present both functional and histological data in both stem cell transplantation and endogenous activation after TBI.

Methods. Adult rodents underwent a unilateral TBI. We stereotactically injected human stem cells into the injury penumbra. We also modulated the Sonic Hedgehog signaling pathway to alter endogenous stem cell characteristics. In both experiments, brains were histologically assessed and behavioural analysis performed.

Results. In the cell transplantation experiments, cells survived and followed white matter tracts. Motor performance was better compared to injured controls. In the endogenous cell experiments, endogenous stem cells were activated after injury, and were modulated following alteration of Sonic Hedgehog signaling. This was accompanied by improvements in motor performance compared to controls.

Conclusions. Stem cell therapy offers a potential treatment for TBI. Strategies to harness these cells include transplantation of cells into the injured site. Alternatively, there is the potential to harness the brain’s own endogenous stem cells for repair by modulating regulatory pathways. Both strategies result in improved functional performance post-injury.
Objectives. The aim was to capture interdisciplinary expertise from a large group of clinicians, reflecting practice from across the UK and further, to inform subsequent development of a national consensus guidance for optimal management of Idiopathic Intracranial Hypertension.

Design. Consensus guideline critically reviewed by the Association of British Neurologists, British Association for the Study of Headache, the Society of British Neurological Surgeons and the Royal College of Ophthalmologists.

Subjects. An initial UK survey of attitudes and practice in IIH was sent to a wide group of physicians and surgeons.

Methods. Between September 2015 and October 2017 a specialist interest group including neurology, neurosurgery, neuro-radiology, ophthalmology, nursing, primary care doctors, and patient representatives met. A comprehensive systematic literature review was performed to assemble the foundations of the statements.

Results. Over twenty questions were constructed: One based on the diagnostic principles for optimal investigation of papilloedema and twenty-one for the management of IIH. 3 main principles were identified: 1, to treat the underlying disease; 2, to protect the vision and 3, to minimise the headache morbidity. Statements presented provide insight to uncertainties in IIH where research opportunities exist.

Conclusions. In collaboration with many different specialists, professions and patient representatives we have developed guidance statements for the investigation and management of adult IIH.
The expanding burden of idiopathic intracranial hypertension

S.P. Mollan¹, M. Aguiar², F. Evison³, E. Frew⁴, A. Sinclair⁵

¹Queen Elizabeth Hospitals, Birmingham, UK, ²Health Economics Unit, Institute of Applied Health Research, University of Birmingham, ³Department of Informatics, University Hospitals Birmingham NHS Trust, ⁴Health Economics Unit, Institute of Applied Health Research, University of Birmingham, ⁵Metabolic Neurology, Institute of Metabolism and Systems Research, University of Birmingham, Birmingham, UK

Objectives. To quantify the hospital burden and health economic impact of Idiopathic Intracranial Hypertension.

Design. Observational cohort study.

Subjects. All those within England with a diagnosis of Idiopathic Intracranial Hypertension were included.

Methods. Hospital Episode Statistics (HES) national data was extracted between 1st January 2002 and 31st December 2016. Those with secondary causes of raised intracranial pressure such as tumours, hydrocephalus and cerebral venous sinus thrombosis were excluded.

Results. 23,182 new IIH cases were diagnosed. 52% resided in the most socially deprived areas. Incidence rose between 2002 to 2016 from 2.3 to 4.7 per 100,000 in the general population. Peak incidence occurred in females aged 25 (15.2 per 100,000). 91.6% were treated medically, 7.6% had a cerebrospinal fluid diversion procedure. Elective caesarean sections rates were significantly higher in IIH (16%) compared to the general population (9%), p<0.005. Admission rates rose by 442% between 2002 and 2014, with 38% having repeated admissions in the year following diagnosis. Costs rose from £9.2 to £50 million per annum over the study period with costs forecasts of £462 million per annum by 2030.

Conclusions. IIH incidence is rising (by greater than 100% over the study), highest in areas of social deprivation and mirroring obesity trends. Re-admissions rates are high and growing yearly. The escalating population and financial burden of IIH has wide reaching implications for the health care system.
Correlation of lumbar puncture opening pressure with 24 hours intraparenchymal ICP monitoring: the effects of position on ICP


The National Hospital for Neurology and Neurosurgery, London, UK

Objectives. Lumbar Puncture opening pressure in lateral decubitus has been considered the gold standard method of intracranial pressure (ICP) measurement for many years. The use of continuous intraparenchymal ICP monitoring is more recent and there is no consensus regarding what can be considered normal ICP with this method of measurement. A conversion factor between lumbar puncture opening pressure and 24hours ICP monitoring could provide a better insight on the interpretation of ICP. This study investigates the differences between 24hours ICP and ICP in lumbar puncture position.

Design. Single centre prospective observational study.

Subjects. Fifty-four patients (42F:12M, mean age 38±12 years) were included.

Methods. Patients investigated with 24hours ICP monitoring who underwent a short exercise battery during the monitoring period were included. The exercise battery was standardised; patients were asked to stay in a supine, sitting, standing and lumbar puncture position for 2 minutes each. Mean ICP and pulse amplitude were calculated for each position.

Results. The mean 24 hours ICP was 4.9mmHg (±6.9SD) and the mean ICP in lumbar puncture position was 14.1mmHg (±8.9SD). The average increase in lumbar puncture position was 9.1 mmHg (±5.9SD). Patients with normal lumbar puncture position ICP (<12 mmHg) had an average 24hours ICP of 1.4mmHg (±2.81SD).

Conclusions. Our results suggest that ICP measured in lumbar puncture position is on average 9.1 mmHg higher than 24hours ICP results. Larger studies will be needed to confirm these findings.
The effect of acetazolamide on intracranial pressure: primary study with prolonged continuous intracranial pressure monitoring

S. Thompson¹, H. Chan², L. Thorne¹, L. Watkins¹, A. Toma¹

¹The National Hospital for Neurology and Neurosurgery, London, UK, ²Queens Medical Centre, Nottingham, UK

Objectives. Acetazolamide has frequently been used as a first-line treatment for idiopathic Intracranial Hypertension (IIH) and other disorders which lead to a non-acute rise in intracranial pressure (ICP). The effect of acetazolamide has been observed through lumbar puncture, however the effect of acetazolamide on ICP has not been studied in continuous ICP measurement.

Design. A retrospective study of a prospectively built ICP database

Subjects. All patients with continuous ICP monitoring demonstrating 24hrs on and 24hrs off acetazolamide were included in the study.

Methods. Patients median ICP and median pulse amplitude over 24hr monitoring period on and off Diamox was assessed.

Results. 12 patients (9F, 3M) underwent ICP monitoring with data collected during the same admission. 8 patients had IIH, 1 Chiari Malformation, 3 new diagnostic ICP procedures. 10 patients saw a reduction in ICP while on acetazolamide. Overall, patients experienced a Median reduction of 1.14mmHg (Mean 1.16mmHg, Range 4.24 to -4.445mmHg). Patients (n9) who were on ≥1g of acetazolamide per day experienced a median reduction in ICP of 1.595mmHg (Mean 1.91mmHg, Range 4.24-0.5mmHg).

Conclusions. Our data suggests acetazolamide can reduce ICP quickly following commencement, however this reduction was relatively small. The effect seems greater with a higher dose. Larger numbers of patients are required to gain a greater understanding into the significance of acetazolamide on ICP, particularly the affect at larger doses.
Venous sinus stenting for IIH: what are the long-term outcomes?

H. Asif, C. Craven, L. Thorne, L. Watkins, A. Toma

National Hospital for Neurology and Neurosurgery, London, UK

Objectives. Idiopathic intracranial hypertension (IIH) is associated with dural venous sinus stenosis (DVSS). This is increasingly treated with endovascular insertion of stents. Clinical and manometric improvements after stent placement have been described. However, there is little data reporting further need for CSF diversion, complication rates and sustained improvements in ICP.

Design. Single centre case series.

Subjects. Twenty-four IIH patients underwent stent insertion on discovery of DVSS with medical management ongoing.

Methods. Clinical notes, radiographic reports and 24-hour ICP monitoring data before and after stent placement was collected.

Results. After 1089.2+/−107.1 days, 6 patients remained symptomatic and went onto require CSF diversion, 75.0% did not require CSF diversion. One patient developed stent thrombosis requiring VKA anticoagulation for 3-months, this patient also developed new stenosis proximal to the stent at 2 years. A second patient developed in-stent stenosis requiring balloon angioplasty at 2 years and subsequent repeat stenting at 3 years. Eleven patients had 24-hour ICP monitoring at baseline and a mean of 231.9+/−129.5 days after DVSS stent placement. The mean reduction in ICP was 7.92+/−1.80mmHg (p<0.01) and PA was 2.84+/−0.84mmHg (p<0.01).

Conclusions. DVSS stenting is a viable endovascular therapy for IIH with modest long-term patency and ICP reduction. However, a quarter of stented patients required subsequent CSF diversion to manage their symptoms.
TM3-6
Symptomatic intracranial arachnoid cysts: a centre series

A. Perera¹, D. Rajashekar¹, E. Pereira², A. Shtaya²

¹Atkinson Morley Neurosurgery Centre, St George’s University Hospital NHS Trust, London, UK, ²Molecular and Clinical Sciences Research Institute, St George’s, University of London. London, UK

Objectives. To study the presentation, management and outcomes of symptomatic intracranial arachnoid cysts

Design. Retrospective records review

Subjects. All cases coded as intracranial cysts

Methods. Patients admitted between Jan-2012 and Sep 2017. Of 56 cases, only 24 were arachnoid cysts. Median age 57 (range 8-81). Mean 49.1±5.0 years, 8 males and 16 females.

Results. Males were significantly younger (34.3 ± 9.1 vs 56.5 ± 5.2 year-old, p=0.03) and outnumbered females. Mean size of cysts was 58.8±6.1mm (range 18.5-126 mm). Five were located frontally, one fronto-temporal and another fronto-parietal, two parietal and two parieto-occipital, two within third ventricle, one intraventricular, one supra sellar and one intra sellar while eight were posterior fossa. 12 patients had headache, five presented with cognitive and memory issues, five had visual problems, four with limb weakness and two had cerebellar signs. Eight had open fenestration, five endoscopic fenestration, four had aspiration with reservoir, two aspiration only, two marsupialisation, two received ICP monitor and one had no treatment. One reservoir was aspirated three times and another open fenestration had another surgical fenestration. Two had transient infection, two needed VP shunts and one had cysto-peritoneal shunt. mRS (0-2) improved significantly after the treatment (62.5% pre-surgery to 91.7% post-surgery, p=0.016)

Conclusions. Symptomatic arachnoid cysts are more common in young males. In the literature, the most common location is middle cranial fossa which is not the case in symptomatic arachnoid cysts as in our series. Although intervention is variable, they are associated with very good outcomes
Clinical and radiological outcomes in patients with an arachnoid web

A. Chawira, N. Buxton, T. Pigott, A.R. Brodbelt

The Walton Centre, Liverpool, UK

Objectives. Arachnoid webs can be challenging to diagnose. The aim of this study was to examine clinical and radiological outcomes in symptomatic patients undergoing arachnoid band division surgery between 2007 and 2017.

Design. Retrospective single-centre observational study.

Subjects. 1046 patient operative records were examined. 15 patients (4 female, 11 male) met the inclusion criteria.

Methods. Examination of notes, images, and operative reports. Clinical outcome was stratified into ‘worse’, ‘same’, or ‘better’.

Results. Median age was 62.4 years (26 – 84 years). Median radiological follow up was 6 years and median clinical follow-up was 2 years. Median duration of pre-operative symptoms was 31 months (4-288 months). Arachnoid bands were identified on myelography or on MRI and confirmed intraoperatively. In the follow-up period, 6 (40%) patients demonstrated a reduction in the volume of their syrinx based on sagittal T2-weighted MR images, with 8 (53.3%) patients experiencing either improvement in their symptoms or stability post-operatively. Radiological improvement or stability (n=12) was associated with clinical stability (33.3%, n=4), improvement (25%, n=3) and worsening (41.7%, n=5).

Conclusions. Arachnoid webs can be difficult to diagnose and a high index of suspicion is required. Patients with imaging evidence of syrinx improvement may continue to deteriorate. It may be that there is a role for shunt insertion in these patients.
Use of adjustable anti-gravity devices in NPH patients with delayed post-shunt deterioration

J.P. Funnell¹,², C.L. Craven², L. D’Antona², L. Thorne², L.D. Watkins², A.K. Toma²

¹UCL Medical School, London, UK, ²The National Hospital for Neurology and Neurosurgery, London, UK

Objectives. A subset of idiopathic Normal Pressure Hydrocephalus (NPH) patients respond to VP shunt insertion temporarily. Adjustable anti-gravity devices are designed to control position-induced CSF drainage changes; we aim to assess to effect of using these devices to achieve controlled overdrainage in temporary shunt responders.

Design. A single-centre retrospective study of patients undergoing VP shunt valve revision from an adjustable differential pressure valve with fixed anti-siphon (ProGAV + Shuntassistant) to a system incorporating an adjustable anti-siphon valve (ProGAV + ProSA) (April 2013-April 2018).

Subjects. 21 patients diagnosed with temporary shunt-responsive NPH who improved on high volume shunt reservoir tap (10M: 11F). Mean age at first VP shunt insertion was 74.5 +/- 7.87 years.

Methods. Medical records were retrospectively reviewed for demographics, interventions and clinical outcomes.

Results. Mean duration until revision with a ProSA valve was 31.5 +/- 16.8 months (mean +/- SD). Mean follow up was 31.4 +/- 15.9 months. Of 20 patients with sufficient follow-up, 12 made objective improvements in walking and/or neuropsychological test outcome. 15 patients made subjective improvements in mobility or cognitive impairment.

Conclusions. VP shunting with adjustable differential pressure valves and fixed antigravity devices may not drain sufficient CSF for optimum management of low pressure hydrocephalus. Addition of adjustable anti-gravity devices at lower shunt settings in temporary shunt responders may improve outcome.
Neurosarcoïdosis presenting with normal pressure hydrocephalus: case series


National Hospital for Neurology and Neurosurgery, London, UK

Objectives. Neurosarcoïdosis is a rare condition with a high mortality. Early recognition of symptoms is important to enable prompt interventions. We report a case series of NS with ventriculomegaly that presented with symptoms resembling normal pressure hydrocephalus (NPH).

Design. Case series.

Subjects. Patients with ventriculomegaly on MR imaging and diagnosis of confirmed or probable NS.

Methods. Analysis of medical records for presenting clinical features, neuroradiology, intervention and clinical outcomes in patients with ventriculomegaly and confirmed or probable NS.

Results. Four patients (2M:2F) aged 49.0 ± 3.01 years (mean ± SD) were identified. Three had definite NS and one probable. Three presented with gait disturbance and one with memory impairment. MR Imaging (with gadolinium) demonstrated ventriculomegaly with leptomeningeal enhancement. One patient underwent 24-hour ICPM, with a median ICP of 3.47mmHg and pulse amplitude of 4.35mmHg. CSF showed mild increase in chronic inflammatory cells in the absence of infection. Patients underwent medical management plus ventriculoperitoneal shunt insertion (with adjustable valves set to 5cmH2O and anti-siphon devices). There was a propensity for transient development of slit-like ventricles but without other features of over-drainage. All patients showed symptom improvement following CSF diversion at mean follow-up of 27 months.

Conclusions. NS can present similarly to NPH. Early combined treatment of CSF diversion and medical management is effective for symptom management.
Objectives. External ventricular drain (EVD) dislodgement is common and can lead to significant morbidity and mortality. UK trial data suggests dislodgement as high as 12%. This study aimed to establish the range of methods used nationally and determine the most secure method in a porcine model.

Design. Survey and experimental study.

Subjects. 23 neurosurgical units surveyed. Porcine cadaver experimental model.

Methods. Survey distribution was made through the British Neurosurgical Trainee Research Collaborative. 15 securement methods were tested on the porcine model and peak pull-out force before EVD failure was measured. Failure was defined as catheter displacement 1 cm from the insertion site, catheter fracture or suture fracture.

Results. Nationally, five EVD securement methods were in common use. There were considerable differences in peak pull-out force between methods. The most secure methods were a construct consisting of anchoring suture, further multiple sutures around a coil of catheter followed by either a soft (25.85N, 95% CI 24.95N-26.75N) or hard plastic flange (29.05N, 95% CI 25.69N-32.41N). Individually, anchoring sutures, soft flanges, VentriFix and staples were least secure, whilst multiple sutures and hard flanges were most secure.

Conclusions. An anchoring suture followed by a coil of catheter and a flange is the most secure method for securing EVDs, withstanding up to 8.2 times the force of a single anchoring suture. It is easily employed and may decrease the likelihood of EVD dislodgement and associated complications.
Update on intracranial pressure in space and at altitude - translation to clinical practice

M.H. Wilson

Imperial College Hospital, London, UK

Objectives. To review latest research in intracranial pressure (ICP) and cerebral haemodynamics in extreme environments including altitude and microgravity.

Design. Review of recent literature / non-published studies

Subjects. Subjects exposed to microgravity and hypobaric hypoxia. Patients who are exposed to lower body negative pressure with concurrent ICP monitoring.

Methods. This presentation is an overview of studies that demonstrate many extracranial factors that influence ICP and cerebral blood flow / venous drainage. In particular, the alterations that occur in microgravity and the relationship with idiopathic intracranial hypertension (IIH), and the potential use of lower body negative pressure to reduce ICP in both IIH and trauma scenarios. A summary study of correlation between central venous pressures and intracranial pressures will be presented.

Results. In addition to the influences on ICP, the more recent understanding of impact brain apnoea and cardiovascular sequelae will also be discussed.

Conclusions. Our understanding of basic physiology can be improved by studying changes that occur in extreme environments. This overview explains why further physiological research is needed.
Memory impairment in epilepsy

U.C. Wieshmann¹, A. Chawira², S. Keller², G. Baker²

¹The Walton Centre, Liverpool, UK, ²University of Liverpool, Liverpool, UK

Objectives. Memory impairment is an extremely common complaint in people with epilepsy (PWE). The purpose of our cross sectional study was to identify factors associated with self-reported memory impairment in PWE.

Methods. 514 PWE and 52 controls completed the Liverpool Adverse Event Profile, a 19 item questionnaire which includes items on memory and depression and provided clinical data on age, sex, medication, seizure onset, frequency and severity. For memory impairment, sleep disturbance, depression and seizure type scores were dichotomised into minor deficits (Likert scores 1 and 2), and major deficits (Likert scores 3 and 4).

Results. In univariate analysis we found significant associations for mono vs polytherapy (χ²=14.85, p<0.001); minor/major depression (χ²=29.41, p<0.001); minor/major sleep disturbance (χ²=65.34, p<0.001); seizure freedom/persistence (χ²=14.40, p<0.001), the number of seizures in the last four weeks (p<0.001, U=17530.50, z=-5.11, but not sex, mean age of onset, mean duration of epilepsy or seizure type. Multinomial logistic regression revealed that sleep disturbance (p<0.001), AED poly therapy (p=0.004), depression (p<0.001) all retained significance whereas seizure persistence did not (p=0.377). Applying ANOVA to examine mean age with memory deficit outcomes, older age was significantly linked to poorer memory (F=3.34, p=0.002).

Conclusions. Sleep disturbance, poly therapy and depression are potentially treatable factors associated with self-reported memory impairment in PWE.
Epilepsy surgery outcomes in a paediatric population – a single centre 10 year experience

O. Pope, A. Chadwick, C. Pringle, V. Josan

Royal Manchester Children's Hospital, Manchester, UK

Objectives. To analyse the efficacy of epilepsy surgery in reducing the burden of seizures in a paediatric population - a single centre 10 year experience.

Design. Single centre retrospective review of medical records

Subjects. 74 consecutive paediatric patients who underwent epilepsy surgery between 2008-2017 by one neurosurgeon at a single centre.

Methods. Seizure history, pre-operative investigations, surgical interventions, seizure outcomes, complications and long term anti-epileptic drug (AED) use were evaluated. Seizure outcomes at 1 year post surgery to the last available follow up (up to 5 years) were documented and classified using the Engel System. Engel I and II were classified as a good seizure outcome and Engel III and IV were classified as a poor seizure outcome.

Results. The mean duration of follow up was 41 months. 62.2% of patients achieved seizure freedom (Engel I) at their latest follow up, with 82.4% of patients achieving a good seizure outcome (Engel I/II). 13.5% of patients achieved worthwhile improvement (Engel III) and only 4.1% of patients had no worthwhile improvement in seizure burden (Engel IV). More favourable outcomes were observed in children with temporal lobe epilepsy. Post-surgery AED use was reduced or discontinued in 41.4% of all patients; 41.4% of the 29 patients with AED data at their 5 year follow up were completely free of AEDs.

Conclusions. Epilepsy surgery is an efficacious treatment with low morbidity and no mortality that is underutilised in children with medically intractable seizures.
Why do some patients fail to respond to VNS? – a retrospective analysis of cardiac based seizure detection (CBSD) therapy

B. Wysota, S. Samarasekera, P. Hamilton, I. Soryal

Queen Elizabeth Hospital, Birmingham, UK

Objectives. To identify predictors of poor response to cardiac based seizure detection (CBSD) VNS therapy

Design. Data was collected retrospectively for patients with epilepsy who had VNS Aspire SR implanted between June 2014 and June 2017. 51 patients who reached a therapeutic level of stimulation were included. We compared those who achieved significant seizure reduction (at least 50%) with the remainder to identify potential factors predicting response.

Subjects. 51 patients achieving therapeutic stimulation (1.5mA) with the VNS Aspire SR

Methods. We reviewed patients’ electronic records over the period between June 2014 and June 2018

Results. 38 (75%) patients achieved significant seizure reduction. The following factors applied equally to both responders and non-responders: patient age, duration of epilepsy prior to VNS insertion, seizure type, the presence of a causative structural abnormality and the presence of a carer. Co-existing learning disability and/ or non-epileptic attacks were commoner among poor responders. Polytherapy (3 or more AEDs) and non-compliance with medical treatment were also commoner among the poor responders; none of these factors was statistically significant.

Conclusions. Factors potentially predicting response to resective surgery (including patients’ age and duration of epilepsy) do not necessarily predict response to VNS therapy. The presence of a learning disability and the extent of seizure refractoriness may influence response to VNS therapy; a larger study is needed to assess their significance.
Changes in whole brain connectomes with simulated laser interstitial thermal therapy (LITT) using seizure free and non-seizure free ablation cavities in mesial temporal sclerosis: a graph theory approach

N. Vakharia¹, M. Manchini², B. Vos³, K. Li³, A. McEvoy¹, R. Sparks⁴, S. Ourselin⁴, S. Duncan¹

¹The National Hospital for Neurology and Neurosurgery, London, UK, ²Wellcome EPSRC Centre for Interventional and Surgical Sciences (WEISS), University College London, London, UK, ³Department of Clinical and Experimental Epilepsy, University College London, London, UK, ⁴School of Biomedical Engineering and Imaging Sciences, St Thomas’ Hospital, King’s College London, London, UK

Objectives. LITT is a novel means of focal lesioning. Improved seizure free outcome has been associated with the extent to which the mesial hippocampal head is ablated, but not overall ablation volume. We question whether specific changes in structural network connectivity exist in patients that achieve seizure freedom.

Design. Retrospective

Subjects. 25 MTS patients after LITT with 2 year outcome.

Methods. Ablation cavities from 11 seizure free and 14 non-seizure free patients were combined to generate group masks. In 12 separate pre-operative patients with MTS (6 right), weighted normalized connectomes were generated with $1 \times 10^7$ streamlines. To simulate ablations the group cavity masks were excluded from the connectomes prior to normalization. Differences in connectomes were assessed by graph theory metrics.

Results. Greater node strength (str) in non-seizure free patients were present in the ipsilateral basal temporo-occipital cortices in both right and left MTS. Str and local efficiency were relatively maintained in the ipsilateral thalamus of seizure free cavities. Betweenness centrality in non-seizure free cavities were greater in ipsilateral temporal poles in right and left MTS.

Conclusions. Differences in network connectivity are present following simulated LITT for MTS between seizure free and non-seizure free ablation cavities. LITT ablation cavities may be pre-operatively modelled to ensure the ablation cavity includes important structures and non-essential or inhibitory connectivity is spared. Prospective validation is required.
TP3-5

Structural connectivity driven stereoelectroencephalography (SEEG) electrode targeting in suspected pseudotemporal and temporal plus epilepsy

M.D. Costanza¹, V.N. Vakharia²,³, K. Li²,⁴, M. Mancini⁵, S.B. Vos²,⁵, B. Diehl²,³, J. Winston²,³, A.W. McEvoy²,³, A. Miserocchi²,³, M. Scerrati¹, F. Chowdhury³, R. Sparks⁵, S. Ourselin⁶, J.S. Duncan²,³

¹Universita’ Politecnica delle Marche, Azienda Ospedaliera Umberto I di Ancona, Italy, ²Department of Clinical and Experimental Epilepsy, University College London, London, UK, ³National Hospital for Neurology and Neurosurgery, London, UK and Chalfont Centre for Epilepsy, ⁴The First Affiliated Hospital of Xi’an Jiaotong University, Xi’an, Shaanxi, People’s Republic of China, ⁵Wellcome EPSRC Centre for Interventional and Surgical Sciences (WEISS), University College London, London, UK, ⁶School of Biomedical Engineering and Imaging Sciences, St Thomas’ Hospital, King’s College London, UK

Objectives. One third of patients with drug resistant focal mesial temporal lobe epilepsy (MTLE) fail to achieve long-term seizure freedom following temporal lobe resections. Reasons for failure may include ictal onset outside the temporal lobe (TL), termed “pseudotemporal lobe epilepsy” (pTLE), with propagation from strongly connected neighboring areas or temporal plus (TL+) epilepsy, when the epileptogenic zone primarily involves the temporal lobe and also extends to neighboring regions. In such cases the perisylvian and orbito-frontal (OF) cortices, cingulum and temporo-parieto-occipital junction may be implicated. Stereoelectroencephalography (SEEG) is a procedure in which electrodes are stereotactically placed within predefined brain regions to delineate the SOZ and allows evaluation of deep anatomical structures adjacent to the TL. SEEG electrode contacts sample from a core radius of 3-5 mm. It is unclear which sub-regions of target structures should be preferentially implanted to optimally detect the network involved in seizure onset and rapid propagation. Using normalized average group templates of structural connectivity from patients with hippocampal sclerosis (HS), we determine the greatest connectivity to critical sub-regions and based upon this propose optimal locations for SEEG targeting.

Design. Observational cross-sectional study.

Subjects. Twelve patients with HS (6 right) that had undergone SEEG and pre-operative diffusion imaging were identified from a prospectively maintained database.

Methods. Whole brain connectomes with 10 million tracts were generated using cortical seed regions derived from whole brain GIF parcellations. Normalized group templates were generated separately for right and left HS patients. Orbitofrontal cortex (OF), insula (INS), cingulum (Cing) and temporo-parietal-occipital junction (supramarginal gyrus, angular gyrus, precuneus, fusiform gyrus and lingual gyrus) were segmented into surgically targetable subregions. All subregions had similar volumes. Connectivity of the amygdalohippocampal complex (AHC) was defined based on the number of streamlines terminating in the subregions of interest.

Results. Left HS showed preferential connections to the ipsilateral: posterior part of lateral OF cortex, posterior short gyrus of anterior INS, posterior part of the posterior Cing, middle part of lingual gyrus, posterior part of precuneus and middle part of fusiform gyrus. Right HS showed preferential
connections to the ipsilateral: posterior part of the lateral OF cortex, anterior long gyrus of posterior INS, posterior part of posterior Cing, anterior part of lingual gyrus and posterior part of precuneus.

Conclusions. Using whole brain connectomes we determine surgically feasible targets in sub-regions based on greatest connectivity to the AHC. We propose that SEEG targeting utilizing computer-assisted planning may improve the understanding of the overall network connectivity in order to enhance the diagnostic utility of the SEEG implantation. SEEG electrode placement within structures associated with pTLE and TL+ may aid in delineating the SOZ if the correct sub-regions are targeted. This should be evaluated prospectively.
TP3-6

Preliminary evaluation of diagnostic Home Video Telemetry (HVT)

W. Stern, G. Leschziner, R. Howard, M. Koutroumanidis

GSTT, London, UK

Objectives. To assess the clinical usefulness of HVT over the first 2 years

Design. Cohort observational

Subjects. 60 patients (49 F) with epilepsies or non-epileptic paroxysmal clinical events

Methods. 48-72 hour continuous video EEG at patients’ own environment

Results. HVT answered the primary clinical question in 45/60 patients (75%), and provided additional clinical information in 5 patients [2 with unsuspected coexistent psychogenic non-epileptic seizures (PNES) and 3 with unsuspected sleep disorders (SD)]. Of the 12 patients with Idiopathic Generalized Epilepsy, absences had been overestimated in 6 and underestimated in 4, while absence status was recorded in 1 of the 2 patients in whom it had been suspected. Valproate was possible to drastically reduce or stop in 3/6 women. Focal seizures were recorded in 19 of 28 patients with focal epilepsies, PNES were the habitual seizures in further 2 patients, while syndrome classification changed in one. In all 4 patients referred for differentiation between SD and epilepsy, HVT confirmed parasomnias in 2, daytime naps in 1 and idiopathic hypersomnia in 1. The diagnosis of PNES was confirmed in 8 of 13 suspected patients. HVT was unhelpful in the 3 patients referred for not witnessed, poorly understood episodes of loss of consciousness. Three patients switched off the video and 2 failed to change battery on day 2.

Conclusions. HVT is a useful diagnostic test provided that diagnostic hypothesis and clinical question are appropriate.
Objectives. Vagal nerve stimulation (VNS) is a neuromodulatory therapy indicated in drug-resistant epilepsy (DRE). Its side effects are frequently minor, however, sleep-disordered breathing (SDB) has been previously reported [1]. Obstructive sleep apnoea (OSA) is highly prevalent in individuals with refractory epilepsy, and may be a cause of poor control of seizures [2].

Methods. Three DRE patients with active VNS underwent a video-polysomnography with 21-channel montage electroencephalography in our centre.

Results. First and second patients showed OSA at the time of VNS activation. In the first patient, the apnoea-induced arousals triggered VNS auto-firing and consequent respiratory events, perpetuating the SDB. The third patient had episodes of stridor, and an increased respiratory rate, coinciding with VNS activation. Our cases are representative of different forms of SDB that occurred as a consequence of the switch-on phase of the VNS device.

Conclusions. Sleep-related breathing disturbances should be considered before VNS implantation, and should be routinely assessed after having started the therapy. Changes in stimulation parameters, and positive airway pressure therapy, may be required to treat the SDB.
Awareness of neurosurgical staff with DVLA guidelines in common neurosurgical conditions

D. Dasic, P.K Kumi, A.K Kershberg

Royal London Hospital, London, UK

Objectives. 1. To determine whether neurosurgical staff are aware of which of the common conditions seen have driving restrictions. 2. To determine whether neurosurgical staff are aware of what they are able to do within current regulations if a patient refuses to comply with DVLA advice given. 3. To build a case for development of more ways for the DMG and medical professionals to engage

Design. Observational questionnaire-based study

Subjects. Neurosurgery staff at the Royal London Hospital - doctors and senior nurses

Methods. Responses collated and represented as percentages

Results. 37 health care professional took part. 10% uncertain of what to do if advice on driving was not complied with 20% responded no to if confidentiality could be breached in certain cases where it is warranted. 70% responded yes to if confidentiality could be breached in certain cases where it is warranted. 45% unaware of DVLA guidelines for intra-cranial tumours 15% full knowledge of DVLA requirements

Conclusions. Annually, over 1.25million people die because of a road traffic crash globally (WHO fact sheet). An estimated 20-50 million suffer non-fatal injuries, with many developing significant disabilities as a result. It is thus not surprising that one of the newly adopted 2030 Agenda for Sustainable Development is a target of halving the global number of deaths and injuries from road traffic crashes by 2020 – less than 2years away. It has adopted the safe systems approach to help achieve this target, some cornerstones of which are safe road user and adequate law traffic law enforcement which medical personnel have a key role in. Although clinicians are already involved with this, medical standards are continually reviewed/ updated when indicated considering recent developments in traffic medicine and seminal events. In October 2016 for instance, the Drivers’ Medical Group (DMG received negative press following a parliamentary and health service ombudsman report. One area identified for improvement was DMG’s processes for engaging with the medical profession. In the same year, the then 25year old guidance for medicals professional was updated. This study aims to assess the familiarity of neurosurgical clinicians (junior doctors and consultants) and senior neurosurgical nurses with the current DVLA requirements for neurosurgical patients. The goal is to show that the changes to the regulations that occur following seminal events are sometimes not apparent to clinicians involved in the field. We hope that this will help build a case for establishing a system where the DMG and medical professionals are more engaged (for example via clinical nurse specialists who can go on to update their specialty on changes relevant to their field when they occur). Our study has demonstrated suboptimal awareness and poor understanding of the current DVLA regulations. In our study, we have highlighted the importance of improving
communication between clinicians and the DMG and developing novel ways to keep medical professionals up to date and continuously engaged with the DMG.
Assessment of seizures in over 75-year olds: a clinical audit

Z.T. Ahmed, A. Rather

University College Hospital, London, UK

Objectives. This audit evaluates the assessment of first seizures in over 75-year-olds within our centre using NICE guidance (CG137) as our standard. This is in response to the National Audit of Seizure management in Hospitals which revealed significant deficits in current practice.

Design. A retrospective audit design was used.

Subjects. We reviewed patient records of 74 patients over the age of 75 who presented to A&E with their first seizure between 1st January and 30th April 2017.

Methods. Data entry took place between 14th November and 22nd January when follow-up information should have been available. A proforma based on current NICE guidance was used to evaluate initial assessment, investigations and specialist review.

Results. 38 females and 36 males were assessed with an average age of 83 years (range 76-95). NICE recommends that all patients are seen by a specialist within 2 weeks, however only 38% of our patients met this standard. Only 65% of patients indicated for an EEG had one and 34% waited longer than the recommended 4 weeks. Neuroimaging was optimal with 95% of patients receiving an MRI within 4 weeks. In contrast, blood glucose was only measured in 47% of patients and only 51% had a 12-lead ECG despite recommendations that these investigations should be performed routinely.

Conclusions. There is a lack of comprehensive A&E assessments and specialist referral for older people both within our centre and nationally. A more thorough and integrated approach is needed to improve outcomes and optimise care.
Objectives. To explore the role of social media in neurosurgical public engagement.

Design. Neurosurgery public engagement content from Brainbook, a multi-platform, social media-based resource will illustrate dissemination and engagement opportunities in neurosurgery.

Subjects. The audiences across social media were patients and the public, allied healthcare professionals, medical students and neurosurgeons.

Methods. In collaboration with the NIHR Global Health Research Group on Neurotrauma, the subject of acute subdural haematoma was used as a public engagement content source, using patient interviews, medical illustration, consultant-led discussion and operative footage. The content was presented over three days (23rd-25th February 2018). Social-media analytics were gathered through social media applications.

Results. 101,418 impressions (defined as penetrance onto individual media feeds and total views of the content) were gained across social media, over the course of three days. The most popular social media posts included medical illustration and film. Users were predominantly below the age of 34 years.

Conclusions. Social media is an effective method of creating global engagement opportunities with various groups including patients and the public, allied healthcare professionals and neurosurgeons. The potential for neurosurgery engagement with various audiences is encouraging but will need adequate development and sources of funding.
Sir Geoffrey Jefferson, a father of the SBNS, a remarkable life.

T. Hope

University Hospitals, Nottingham, UK

Objectives. The foundation of a Society of Neurological Surgeons was Jefferson’s idea. How did this come about? The objective is to research this period of our history and its development.

Design. A review of papers and articles held in the University of Manchester, The University of Oxford and abstracts from a biography of Jefferson by Peter Schurr, enables an historic presentation to the SBNS and the ABN.

Subjects. In 1926 Sir Geoffrey Jefferson was closely connected to the leading minds in British neurology and neurological surgery. His friendship and correspondence with Cushing was a major force in his drive for a specialist society. These players on the neurosurgical stage are the subjects of this presentation.

Methods. As in the design, the author will survey all available material including photography and handwritten manuscripts.

Results. On the very next day after being appointed a consultant neurological surgeon at the Manchester Royal Infirmary, Jefferson arranged a meeting at the Athenaeum Club to consider the formation of our society. This was held on December the 2nd 1926 and the first formal scientific meeting was held on the 3rd at Queen Square!

Conclusions. The formation of this small society was crucial in presenting British neurosurgery as a specialty in its own right to medicine in the United Kingdom. No other neurosurgical society existed in Europe at this stage. Jefferson is indeed the father figure of our society today.