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PROCEEDINGS

Proceedings of the 2025 Spring Meeting of the Society of British Neurological Surgeons

This meeting was hosted by Royal Victoria Hospital, Belfast, 12th–14th March 2025 at the International Convention and Exhibition Centre, Belfast. The full abstracts of the platform presentations are followed by the titles of those submissions accepted as e-posters. The order of abstracts is that of presentation. Any papers in the programme that were not presented to the society at the meeting have not been published.

WEDNESDAY 12TH MARCH
MAIN SESSION
WM1 HOT TOPICS

Quality Improvement in action – Neurosurgery Clinical Networks (NCN) in England from the perspective of the East of England Neurosurgery Network (E of E NN)

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Objectives: Summarise the 2023 NCN Specification, empower clinical colleagues in neurosurgery to actively participate in their local network.
Design: The 2023 NCN specification outlined requirements for establishment, development, and management of English NCN's in adult neurosurgery.[1,2] Their scope is improvement in care quality and equity; their ambition is to positively affect current and future population outcomes. NCN's are tasked with three aims: improving health and wellbeing for all, increasing quality of care, and making sustainable use of NHS resources.
Subjects: NCN's should include all providers who deliver neurosurgical care across the entire patient pathway, with clinical representation from the whole multi-disciplinary team.
Methods: All neurosurgery providers are required to be part of one of eight NCN's: North East and Yorkshire, North West, Midlands, East of England, London (North/South), South East, and South West, with 1–4 Neuroscience Centres within each. The NCN's are hosted by a named organisation but operate at arm's length; funding is ring-fenced for each annual programme of work. Network functions are grouped by service delivery, resources, workforce, quality, collaboration, transformation and population health.
Results: The EoE NN is the only NCN with a single neurosurgical provider (CUH). Since launch (October 2023, 18mnths ago) it has generated >190 members. The 3-year development strategy includes: launch (2023/4), establishment (2024/5), consolidation (2025/6). NCNs are a vehicle for specialty level collaboration between patients, providers and commissioners. They have clear lines of accountability with Integrated Care Boards (ICBs), including providers and provider collaboratives, and to NHS England (NHSE) Regional Teams. However, ownership is local, ensuring alignment to, and creation of, local mandates.
Conclusions: How NCNs and services interface with the work of neurosurgery services is determined locally, yet to date clinician engagement with NCN's is low. We hope to highlight an opportunity for clinicians across neurosurgical care to shape their local mandate.

References

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WM1-1

Middle meningeal artery embolisation for chronic subdural haematoma – where are we now? Meta-analysis of three randomised controlled trials and review of ongoing trials

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Objectives: Middle Meningeal Artery Embolisation (MMAE) has been proposed for CSDH as both an adjunct and standalone treatment. We aimed to pool three recently published randomised controlled trials, to reliably estimate the effect of MMAE. We also carried out a systematic review of ongoing trials and their key outcomes.
Design: PRISMA-compliant meta-analysis and systematic review (PROSPEROID CRD42024618816).
Subjects: All published RCTs/ongoing trials.
Methods: Three published RCTs (MAGIC-MT, EMBOLISE, and STEM) assessing MMAE in CSDH were included. Trial primary outcomes were pooled for analysis using random effects models. Primary and secondary outcomes (recurrence/surgical rescue, functional outcome) were obtained, stratified by

treatment group (undergoing surgery, and nonsurgical management). A descriptive review of trials in public registries was conducted (search date 30th November 2024).

Results: Overall, 1432 patients were included from three trials in pooled analysis. Overall, MMAE reduced symptom progression/recurrence, but was not statistically significant (OR 0.43, 95% CI 0.16–1.19, $p = 0.07$). MMAE was not associated with reduced recurrence in the group undergoing surgery only (OR 0.56, 95% CI 0.16–2.00, $p = 0.19$), reduced progression in groups undergoing nonsurgical management (OR 0.25, 95% CI 0.00–14.98, $p = 0.15$). MMAE did not influence functional outcome (Modified Rankin Scale 0–2) on pooled analysis (OR 0.99, 95% CI 0.13–7.43, $p = 0.97$). From the literature search, twenty-one ongoing/published trials were identified. Nineteen studies included arms assessing MMAE as an adjunct to surgery, eleven MMAE compared to observation, and four MMAE compared to surgery. The most common primary outcome was recurrence, either radiologically, or requiring a second operation/surgery (47.8%, N = 11). Inclusion criteria, embolisation agents, and primary and secondary outcomes differed significantly between studies.

Conclusions: In a pooled analysis of three randomised controlled trials, use of MMAE in patients undergoing surgery did not appear to reduce recurrence or improve functional outcomes. Further studies assessing these cohorts are ongoing.

WM1-2

A proposal for a national chronic subdural data hub (nCSDH) to explore potential inequalities in outcome and experience

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Objectives: Chronic subdural haematoma (cSDH) care is delivered across neurosurgical networks. Many patients require transfer to the neuroscience unit (NSU) meaning experience and outcome could vary by referral route. Understanding this requires the linkage of data across the network with outcomes examined across a range of geographic and socioeconomic settings.

Design: We propose a 'national chronic subdural data hub' (nCSDH). As well as understanding potential inequalities in cSDH care, the roll-out will serve as a feasibility test of such a cross-site system for future audit or platform trials.

Subjects: All adult patients referred to a participating NSU with a diagnosis of cSDH over an 18-month period will be included (projected start Q2 2026).

Methods: Supported by the SBNS and the Royal College of Anaesthetists Centre for Research and Improvement we will deploy the platform across a target of 8 participating networks. Data will be collected on a secure, NHS toolkit compliant REDCAP instance. Designated site leads will be recruited in each participating NSU with data from referring hospitals collected via resident doctor audit and research networks. At study conclusion, data will be integrated into the TBI-REPORTER platform. Feasibility will be assessed by comparison to referral logs and a nested qualitative stream.

Results: Funding has been secured from the National Institute for Health and Care Research (NIHR). A pilot of potential key performance indicators (KPIs) is occurring alongside local quality improvement initiatives in the East of England. Designs for database structure and an interactive data viewer are being developed. We have confirmed interest from multiple sites but are keen for expressions of interest from other centres. Regulatory applications will commence in 2025.

Conclusions: We provide an initial update on a vision for a cross-site outcome platform for cSDH. If successful this could support future QI, and research in cSDH and other specialist surgical conditions.

WM2 SPINE 1
WM2-1

Acute reoperation in tubular lumbar spinal surgery: a single institution case series of 4433 patients undergoing paracentral discectomy, interlaminar decompression and transforaminal lumbar interbody fusion

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Objectives: To identify risk factors for minimally invasive spinal surgery (MISS), we analysed our department's experience with acute reoperation (<30 days) for lumbar MISS tubular paracentral discectomies, interlaminar decompressions and transforaminal lumbar interbody fusions (TLIFs).

Design: All MISS patients from 2011 to February 2024 at our single centre of eight neurosurgeons were retrospectively reviewed.

Subjects: Two case-controls per reoperation were manually selected. Each control had undergone the same primary procedure within six months of the index case, the same levels and, if possible, by the same surgeon.

Methods: Parameters statistically assessed included age, sex, BMI, frailty (per the Modified Charlson Comorbidity and MFI-5 Frailty Indexes), comorbidities, private/public patient, workplace injury, preoperative anticoagulant use, preoperative blood results, symptomatic indications, prior spinal surgery, preoperative imaging findings, approach side, tube length, operative time, postoperative drains/antibiotics, length of stay, time to follow-up, and clinical outcome.

Results: Of 4433 patients who underwent lumbar MISS, there was a 2.4% acute reoperation rate for paracentral discectomy (n = 2444), 2.4% for decompression (n = 1233) and 1.3% for TLIFs (n = 756). Paracentral discectomy reoperation was predominantly for residual/recurrent disc fragments and was significantly associated with preoperative anticoagulants, hypertension, motor changes, past procedures at the index level, and left-sided approaches. Decompression reoperation was predominantly for haematoma and was significantly associated with preoperative urinary symptoms and past

procedures at the index level. TLIF reoperation was predominantly for cage migration and was significantly associated with diabetes and motor changes before the primary procedure.
Conclusions: This retrospective case-control series reports our institution's complication profile and outlines the risk factors for acute reoperation for tubular lumbar surgery. The classic predictors of older age, higher BMI, and frailty indexes did not correlate with acute reoperation using these MISS techniques. The identified risk factors may guide preoperative planning and help predict outcomes when counselling patients in the future.

WM2-2

The current concepts of the management of oligometastatic spinal disease at a quaternary centre

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Objectives: Radical treatment of oligometastatic disease (OMD) can be curative. Spinal OMD (SOMD) has been radically treated by tomita-en-bloc spondylectomy (TES) since the 1990s. SOMD in the era of Stereotactic Body Radiation Therapy (SBRT) has changed current concepts of management. We outline our pathway at a quaternary spinal centre to radically manage SOMD.
Design: Retrospective observational study
Subjects: A total of 5269 spinal metastases were referred to our unit; 177 (3.3%) were SOMD (0.9% in 2017; 2.7% in 2023).
Methods: Retrospective analysis of patients, between 2017 and 2024 identified with SOMD, at a quaternary centre with developed spinal oncology and specialised stereotactic MDTs. We analysed patients, imaging, treatments and mortality.
Results: Breakdown of neoplasia: Renal cell carcinoma (24%), Breast (17%), Prostate (10%), Lung (9%), Colorectal (5%), Sarcoma (5%), Melanoma (2%), Neuroendocrine (2%) and Uterine (2%). Synchronous OMD n = 38 (33%) vs metachronous n = 78 (67%). 113 patients were managed surgically and 64 non-surgically. Surgical management: TES (9.5%), separation surgery (25%), palliative decompression (46%), (17.1%) kyphoplasty, and 2.9% radiofrequency ablation (RFA) alone. Non-surgical patients were referred back to oncologists for SBRT, via Bilsky's NOMS algorithm. Overall Survival at 2 years: separation surgery 100% (n = 26), palliative decompression 84.6% (n = 39), TES 80% (n = 10), and kyphoplasty 90% (KP; n = 10). 30 received carbon fibre instrumentation and 24 titanium.
Conclusions: Treatment of SOMD has changed significantly from TES to less morbid procedures. Following NOMS, we identified 65 (n = 113/178) patients for: separation surgery + SBRT, prophylactic BK + SBRT, and RFA. We have shown excellent local control at 2 years with no recurrence at site, and excellent survivorship: 100% at 2 years. We conclude it is essential to have high level of suspicion of SOMD within a spinal oncology MDT to identify eligible patients for radical treatment as these results show curative oncological surgery can lead to a disease-free state.

WM2-3

Spinal nerve sheath tumours: a 10 year review of outcomes and complications in a National Neurosurgical Centre

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Objectives: Spinal nerve sheath tumours (SNST) are most commonly benign tumours that present with pain. The aim of the study was to assess the presentation and outcomes, in particular new neurological deficits in surgically treated SNSTs
Design: Retrospective Study
Subjects: All surgically treated SNSTs in a single institution from 2014–2023
Methods: Patients were identified by searching the institution's histopathological database and neuro-oncology MDT. Patient charts, electronic records and imaging were examined. Patient demographics, presenting symptoms, tumour characteristics, surgical procedures, use of intra-operative monitoring (IOM), neurological outcomes and complications were recorded.
Results: 169 tumours were operated on in 164 patients. 66% (109) of patients were male, and 34% (55) females, with an average age of 48 years (range 11–88). Pain was the most common presenting symptom in 71.6% (121). 26.0% (44) patients presented with a motor weakness. Tumours were most commonly found in the lumbar spine (38.3%). 63.3% of tumours were located intradural extramedullary. The mean maximal diameter of tumours was 3.2 cm (0.6–21 cm). Schwannoma was the most common diagnosis (80%), followed by neurofibroma (13%) and malignant peripheral nerve sheath tumours (4%). Gross total resection was achieved in 65.9% patients, and IOM was used in 21.9% cases. The overall complication rate was 24.9% (42). New motor and sensory deficits occurred in 6.1% (10) and 3.7% (6) cases respectively. Post-operative cerebrospinal fluid leak and infection rates requiring re-operation rates were 5.5% (9) and 1.2% (2) respectively. Complications were not associated with GTR (24% vs 25%, $p = 0.83$) or the use of IOM (27% vs 23%, $p = 0.73$). Complications were associated with larger tumours (maximal diameter of 3cm and greater) ($p = 0.04$)
Conclusions: Gross total resection of spinal nerve sheath tumours is a safe procedure with a low risk of new neurological deficits

WM2-4

Concurrence of calcium pyrophosphate deposition disease in patients undergoing surgery for spinal degenerative disease: a case series and systematic review

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Objectives: To report our institutional series of patients who underwent spinal surgery for degenerative disease and whose intraoperative samples confirmed the presence of Calcium Pyrophosphate Deposition Disease (CPPD). We performed a systematic review of the clinical, radiological features and outcomes of patients who underwent surgery for degenerative spine problems with a subsequent diagnosis of spine CPPD.
Design: Retrospective case series and systematic review of the literature
Subjects: Adults undergoing surgery for degenerative spine disease in whom intraoperative samples revealed the presence of calcium pyrophosphate deposition disease
Methods: The systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Our institutional case series was produced from a review of patient case notes and our electronic records.
Results: Two hundred and eleven articles from electronic databases met our search criteria. Thirty-seven clinical studies comprising 153 patients aged 23 to 83 years were included. Of these, 68 were male and 85 were female. A total of 33.7% involved the cervical region, 16.2% involved the thoracic region, and 50% involved the lumbar region. The common comorbidities included hypertension, dyslipidaemia, diabetes mellitus, cardiac and renal issues. The common radiological features included non-specific degenerative changes, an epidural mass, and calcified masses, among others. The most common intraoperative finding was chalky white deposits. The vast majority of patients had good postoperative outcomes
Conclusions: Spinal CPPD is likely much more common than we currently report, primarily because it is underdiagnosed or misdiagnosed for other pathologies. This review investigated the epidemiology, presenting features, imaging, histopathological and intraoperative findings of this disease. Future work needs to investigate these issues further. In patients with degenerative spine disease with coexisting spinal CPPD planned for medical management, targeted medical therapy aimed at pseudogout might improve the overall outcome

WM2-5

Radiological evaluation of expandable versus non-expandable cervical corpectomy cages: a single centre retrospective cohort observational study

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Objectives: To evaluate any radiological differences between expandable corpectomy cages (EC) and non-expandable cages (NEC) in cervical spinal surgery.
Design: Retrospective observational cohort study at a tertiary spinal centre.
Subjects: Cervical corpectomy cases from December 2016 till April 2023 were included and categorised in two cohorts – EC and NEC.
Methods: Demographic data was collected and pre-operative, immediate post-operative and final follow-up imaging studied to assess: 1. Sagittal alignment: C2-C7 lordosis angle, focal lordosis angle and C2-C7 sagittal vertebral alignment (SVA) 2. Anterior and posterior disc heights (ADH and PDH) 3. Cage subsidence at final follow-up
Results: Twenty-five patients treated with EC (n = 15, mean age 58.1 years [43–70], M:F = 11:5) or NEC (n = 10, mean age 59.6 years [38–84], M:F = 8:2) were included in the study with a mean follow-up duration of 13.8 months (5–36) for NEC vs 7 months (2–31) for EC. Indications varied from trauma (n = 1 each cohort), degenerative (n = 6 each cohort), tumour (n = 8 EC, n = 2 NEC) and infective pathologies (n = 1 NEC). NEC had statistically significant better restoration of PDH with an improvement of 27.4mm vs 21.7mm (p-value <0.05). There was a non-significant increased improvement of mean SVA with NEC 15.5mm v/s 7.6mm (p-value >0.05). EC provided a mean C2-C7 lordotic angle improvement (1.97o vs 0.03o, p value $>.05$) and a mean improvement of focal lordosis (5.8o vs 1.78o, p-value >0.05). NEC had increased subsidence of >3mm (relative risk of 2.25, 95% CI [0.522, 9.697], p-value $>.05$). At final follow-up all patients maintained their neurological status.
Conclusions: EC provides similar radiological results when compared to NEC with a reduced short term incidence of cage subsidence and a better restoration of cervical lordosis. With a maintained neurological status for all patients the excess costs involved in utilising EC are not justified.

WM3 SHORT ORAL 1

WM3-1

Flattening the learning curve in endoscopic spine surgery, a two-consultant learning model

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Objectives: This study aims to explore the learning curve associated with endoscopic spinal discectomy, emphasising the challenges of mastering a new minimally invasive technique. It highlights the role of peer-reviewed surgical training, structured feedback, and supervision in ensuring safe patient outcomes and enhancing surgeon performance.
Design: A two-consultant model was used to examine the learning curve in endoscopic spinal discectomy. The operative times for each consultant were recorded and compared individually and collectively, allowing the generation of learning curves. These curves assess the relationship between surgical experience and operative time, with the goal of identifying the impact of feedback and supervision on the learning process.
Subjects: Four spinal surgeons, in the early stages of learning endoscopic discectomy participated in the study. The process started by going to the simulation course and training on models. Two consultants were allocated per case. Each consultant performed a series of cases with the support of the other, with data collected.
Methods: Operative time was divided into two phases: time from the patient on the table (TT) to the cutting time (CT), which reflects the theatres team's familiarity with the new setup, equipment, and instrument placement, and the time from start (CT) to finishing (FT), representing the actual surgical time. The reduction in time for each phase was analysed across the cases, with learning curves plotted for each consultant and a collective experience curve.
Results: Preliminary analysis shows a decreasing trend in operative time as the number of cases increases. Both individual and collective learning curves indicate significant improvements in efficiency over time, supporting the effectiveness of peer-reviewed training and feedback in the early learning phases.

WM3-2

Spinal awake surgery for lumbar decompression reduces the costs of length of stay

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Objectives: Recent studies have demonstrated that awake spine surgery is associated with improved patient satisfaction and reduced length of stay. However, the economic impact and patient experience of awake spinal surgery are unclear.
Design: We present retrospective experience of the Oxford Spine Awake Surgery (SAS) protocol for lumbar decompression surgery between January 2021 and February 2022 at a single centre.
Subjects: All patients undergoing SAS lumbar decompression surgery between January 2022 and February 2023.
Methods: Retrospective case series conducted at a single centre.
Results: 32 patients underwent SAS surgery during the time period analysed (mean age: 63.4, IQR: 32, 79.5). 75% of patients underwent single-level decompression while the remainder underwent two level surgery. Patients were low to moderately comorbid (mean Charlson Comorbidity Index 2.5, IQR: 0, 4). The average length of stay was (1 day, IQR: 1,1). Only 4 (12.5%) of patients required conversion to a GA. 28 patients completed postoperative surveys. 95.8% of patients said they felt comfortable during the procedure and 85.7% of patients said that they felt comfortable postoperatively. 55 bed days were saved and based on average in-patient bed cost per day, a total of £27750.00 were saved.
Conclusions: Patients had high satisfaction with SAS for lumbar decompression, reducing length of stay and costs.

WM3-3

Is a wound-drain needed routinely after anterior cervical discectomy and fusion? A decade in review at a tertiary neurosurgical centre in the UK

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Objectives: Post-operative subfascial drains are commonly used in anterior cervical discectomy and fusion (ACDF) surgeries to help lower the risk of complications from post-operative haematomas (POHs) and surgical site infections (SSIs). However, controversy surrounding their efficacy remains, due to limited guidelines and a lack of conclusive evidence. The primary aim of this study is to determine whether placing a drain offers any therapeutic benefit for post-surgical outcomes in ACDF intervention, hence re-evaluating their routine use in clinical practice.
Design: Retrospective case series analysis from 2013 to 2023.
Subjects: 1938 adult patients who had undergone ACDF surgery at our institution were included in the analysis. 1022 patients were males, and the median age of the cohort was 49 years.
Methods: Patient information and operative details were gathered using the electronic patient record by direct review. Patients were categorised into drain and non-drain cohorts and stratified according to several predictor variables including baseline demographics, and clinico-social characteristics. Statistical testing was performed to look for differences in outcome measures between groups.
Results: Of these patients, 1614 (83.3%) had subfascial drains placed during surgery. Baseline demographics differed slightly between both cohorts, with patients in the drain group having a higher median age ($p = 0.02$), and a significantly higher proportion were male ($p = 0.02$), hypertensive ($p < 0.01$), drank alcohol ($p < 0.01$) and smoked ($p = 0.04$). Between the two groups, we observed no significant difference in rates of reoperation for haematomas ($p = 0.43$), SSIs ($p = 0.85$) or LOS ($p = 0.18$).
Conclusions: Our study found no significant differences in the incidence of haematomas or SSIs between patients with

drains and those without, nor was there any difference in postoperative length of stay between the groups. Therefore, our results do not support the routine use of subfascial drains in clinical practice.

WM3-4

Case series: exoscopic laminectomy for cervical spine surgery

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Objectives: This case series aims to assess the advantages of using an exoscope for cervical laminectomy, focusing on enhanced visualisation, surgical precision, and improved ergonomics compared to traditional methods. The goal is to highlight the benefits of exoscopic assistance in complex cervical spine surgeries.
Design: This retrospective case series includes ten patients who underwent cervical laminectomy with the use of an exoscope. The surgeries were performed at a single institution over one year. The review examines intraoperative factors such as visualisation quality, surgical precision, and postoperative recovery.
Subjects: The patients, aged 35 to 82 years, had a variety of conditions requiring cervical laminectomy, including cervical spondylotic myelopathy, spinal stenosis, trauma-related fractures, and degenerative spinal disorders. All patients had failed conservative treatment and were selected for decompressive laminectomy. Several patients presented with multilevel stenosis or complex cervical pathologies.
Methods: All surgeries were performed using an exoscope system, which provided high-definition, three-dimensional visualisation of the surgical site. The exoscope was mounted above the field, displaying magnified images on a monitor for the surgeon. A standard posterior cervical laminectomy approach was followed. Key intraoperative metrics such as surgical time, complication rates, and precision in bone and tissue removal were recorded. Postoperative recovery, including pain management, hospital stay, and neurological outcomes, was monitored.
Results: Exoscopic assistance offered superior visualisation, particularly in tight anatomical spaces, enabling more precise removal of bone and soft tissue. Surgeons reported improved ergonomics, reducing the need for prolonged awkward positioning. Surgical times were similar to traditional methods, but with fewer complications. There were no major issues such as nerve injury or dural tears.
Conclusions: Exoscopic-assisted cervical laminectomy provides enhanced visualisation, improved ergonomics, and precise surgical outcomes. This technique offers significant advantages over traditional methods, especially in complex cases. Further studies are needed to fully evaluate long-term benefits.

WM3-5

Review of the literature on subaxial cervical pedicle screws

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Objectives: This review aims to examine the current literature on subaxial cervical pedicle screws, focusing on their indications, surgical techniques, biomechanical advantages, complications, and technological advancements. The goal is to assess their clinical outcomes and compare them to alternative fixation methods in treating cervical spine disorders.
Design: This narrative review synthesises findings from biomechanical studies, clinical outcomes, case series, and technological advancements in the placement of subaxial cervical pedicle screws. The review focuses on indications, variations in surgical techniques, and associated complications.
Subjects: The literature discusses patients who have undergone cervical spine surgeries utilising cervical pedicle screws. These patients include those with traumatic injuries (fractures, dislocations), degenerative diseases (spondylotic myelopathy), spinal deformities (cervical kyphosis), and tumours. The review also includes studies on different surgical techniques and complex multi-level cervical pathologies.
Methods: A systematic search was performed across PubMed, Scopus, and other academic databases for studies published between 2010 and 2023. Keywords such as 'subaxial cervical pedicle screws', 'cervical spine fixation', 'biomechanics', 'surgical techniques', and 'complications' were used to identify relevant studies. The selected studies contributed to understanding the outcomes, biomechanical properties, and complication rates associated with cervical pedicle screws.
Results: Cervical pedicle screws provide significant biomechanical advantages, offering enhanced stability and resistance to rotational forces compared to lateral mass screws. These screws demonstrate higher pullout strength and better outcomes in multi-level fusion surgeries. However, complications such as screw malposition, neural injury, and vascular injury remain concerns due to the small and variable anatomy of cervical pedicles.
Conclusions: Subaxial cervical pedicle screws are a highly effective method for stabilising the cervical spine, offering superior mechanical advantages in complex surgeries. While complications are possible, they can be minimised with accurate preoperative planning, intraoperative navigation, and advanced surgical techniques. Further research is needed to optimise long-term outcomes and reduce complications.

WM3-6

Does the severity of stenosis increase the risk of CSF leak?

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Objectives: 1. Look at the incidence of dural tear/CSF leak in single level lumbar decompression surgeries 2. To assess if there is any correlation between dural tear/CSF leak with the degree of lumbar spinal stenosis using the Glasgow Lumbar Spinal Stenosis Scale (GLSSS)
Design: Retrospective cohort study
Subjects: Patients who underwent single level lumbar decompression for symptomatic lumbar spinal stenosis in the Institute of Neurological Sciences N = 100
Methods: A retrospective case series analysis was conducted in the Institute of Neurological Sciences in the neurosurgery department. The degree of lumbar spinal stenosis was quantified using the novel GLSSS. Then, the operation notes of these patients were reviewed looking for level of surgery and intra-operative dural tear.
Results: Out of the 100 patients who underwent lumbar decompression, just over half the patients were operated at the L4/5 level, with over a quarter at L5/S1 level. 10% had dural tear/CSF leak intra-operatively. 1 patient had a doubtful durotomy but no CSF leak was noticed. Only 3 patients had a dural tear/CSF leak during a redo operation. Only 20% of this cohort had an emergency decompression rather than elective or expedited surgery. The average relative degree of compression for the patients who had a dural tear was 53.3% whereas the average relative degree of compression for the total cohort was 52%. Half the patients who had a dural tear were operated at L4/5 level with 40% operated at L5/S1 level.
Conclusions: Although we could not conclude whether the severity of lumbar spinal stenosis increases the risk of dural tear, more data is needed, and we will continue to collect the data.

WM3-7

Advances in 3D Printing in spinal surgical planning

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Design: Complex spinal surgeons encounter daily anatomical challenges in managing various intraoperative factors to achieve optimal surgical outcomes. Over the past decade, 3D-printed surgical models and implants have gained increased attention among medical professionals. Recently, attention has shifted towards patient-specific 3D printing due to its potential to improve surgical outcomes. The utilisation of patient-specific 3D printing in complex revision surgeries allows for less invasive procedures, thereby reducing patient risk and enhancing results. Numerous documented instances illustrate the use of patient-specific 3D-printed implants in challenging spinal revision surgeries. In cases where cervical disc replacement is unsuccessful, traditional methods often require extensive reconstructive spine surgery. Alternatively, virtual surgical planning combined with a custom 3D-printed implant provides a feasible solution. This approach facilitates a smaller and safer surgical procedure, with the custom implant precisely conforming to the patient's bone defects. Three months post-operation, osseointegration begins, thereby contributing to structural stability. Patient-specific 3D-printed implants offer an advantage over standard implants by optimising surface area topography and endplate anatomy. Moreover, 3D-printed implants are a viable option for patients with atypical spinal structures such as kyphoscoliosis. Despite the uniqueness inherent to all spines, some exhibit more significant anatomical variation. The application of 3D printing in spinal deformity correction is demonstrated in a series of cases.

WM3-8

Spinal lesion: malignant rhabdoid tumour, SMARCB1 (INI1/BAF47)-deficient in an adult

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Objectives: To describe a rare case of an intradural extramedullary (IDEM) atypical teratoid/rhabdoid tumour (AT/RT) in a 29-year-old male, featuring unique genomic characteristics, including SMARCB1 (INI1/BAF47) deficiency, presented as a single case report with a literature review.
Design: Case report with literature review component.
Subjects: A single patient in an exceptionally different demographic from those typically associated with AT/RT of this nature.
Methods: Utilising a retrospective case review with review of literature.
Results: A 29-year-old male presented with progressive neck pain, left shoulder discomfort, and upper limb weakness. Initial imaging was unremarkable, but follow-up MRI revealed a rapidly growing left-sided intradural extramedullary lesion at C4/5, compressing the spinal cord. Surgical resection through posterior cervical laminectomy confirmed the diagnosis of a rare SMARCB1-deficient malignant rhabdoid tumour (MRT), an aggressive and exceptionally rare neoplasm in adults. Partial excision was achieved without compromising critical structures, though residual motor weakness persisted post-operatively.
Conclusions: To date, only ten other adult spinal AT/RT cases with this type of mutation have been described in the literature. The exceptionally rare and aggressive nature of this tumour presents complex diagnostic and therapeutic challenges. Post-operative histogenetic analysis can inform the decision to sooner undertake a course of radiotherapy followed by a combination of chemotherapy (including agents such as

vincristine, cyclophosphamide, cisplatin, and etoposide), additional radiotherapy and further resection. Our case is interesting in light recent literature. In spinal AR/TR cases, 33% occur in the cervical region with our patient's age being just under the mean of 33.9 years. Like most cases, he underwent surgical resection, though gross total resection is only achieved in 43% of cases. In this instance, maximal resection was unachievable due to vertebral artery involvement. Notably, our patient showed no signs of leptomeningeal involvement, unlike 80% of the patients described in the literature.

WM3-9

Rising trends in spinal cord injuries among trauma patients: a retrospective analysis to inform future service needs at a major trauma centre

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Objectives: In recent decades, a concerning rise in spinal cord injuries (SCI) has paralleled increased trauma-related admissions. This trend presents significant challenges to healthcare systems, requiring efficient management of acute medical needs and the associated economic impact. The objectives of this study were to (a) review SCI admissions at a national tertiary centre across all spinal pathologies, and (b) perform a cost projection analysis to support formal resource planning.
Design: Retrospective analysis of admission Data, with associated cost analysis.
Subjects: All patients who presented to a major trauma centre for management of an SCI between 2017 and 2019.
Methods: A retrospective analysis was conducted on trauma patients with SCI who were admitted to the National Spinal Injuries Unit at Mater Misericordiae University Hospital from 2017 to 2019. Patient demographics, clinical features, and length of stay (LOS) were recorded and analysed annually.
Results: The study included 148 patients, with 108 males (73%) and 40 females (27%). Notable trends included an annual increase in the proportion of ASIA grade A cases, a decrease in the average age of patients, and an increase in average LOS. Increases were also observed in ASIA Grade D patients, who showed rising average age and LOS. There was a general trend of increasing average LOS over the three years for all patients.
Conclusions: The findings indicate that trauma patients are requiring longer hospital stays, in a high cost setting. A higher proportion of cases now involves ASIA Grades A and D, with the most severe forms of SCI occurring in younger individuals. These trends suggest that enhanced resource planning is essential to manage the needs of trauma patients, particularly those with the most complex and severe injuries.

WM3-10

Symptomatic vertebral artery loop formations: a scoping review of epidemiology, pathogenesis and treatment

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Objectives: This review aims to collect all available literature describing symptomatic vertebral artery loops. In addition, we present the first documented case of a Filipino patient with symptomatic multilevel VALFs.
Design: Scoping Review
Subjects: 30 articles and 30 patients found to have symptomatic vertebral artery loops
Methods: We performed a scoping review of literature in PubMed, British Medical Journal and New England Journal of Medicine. Full text original, descriptive and analytical studies of symptomatic VALF patients were collated. Data from retrieved articles were collaboratively reviewed, systematically tabulated and synthesised through thematic analysis, paired T-test and Chi Square Test.
Results: A total of 30 articles and 30 patients found to have symptomatic vertebral artery loops were included. Mean age of patients was 53 years; of which, 17 (57%) were females. Tortuosity was more apparent on the left side with C5-C6 (31%) as the most common level of affectation. Neck pain (13%) and shoulder pain (26%) were the most common left and right-sided presenting symptoms. In terms of outcome, there was no statistically significant difference among the surgical techniques reported ($p = 1.00$), and between surgical and conservative management ($p = 0.99$).
Conclusions: Vertebral artery loops are increasingly recognised as significant causes of cervical radiculopathy. These anomalies are thought to arise from cervical trauma hemodynamic stresses, or mechanical and degenerative causes. Symptomatic VALFs are either managed conservatively or surgically (posterior, anterior or anterolateral approach). An evolving understanding and prompt clinical recognition of this entity are paramount for an effective, patient-tailored, and risk-free treatment strategy.

WM3-11

Risk factors for reoperation after minimally invasive tubular transforaminal lumbar interbody fusion: a cohort study of 756 patients

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Objectives: Despite increasing use, data on the complication profiles and reoperation risks in minimally invasive spinal surgery are limited. This study examines short-term (<30 days) and long-term (>30 days) reoperation rates and associated risk factors following tubular transforaminal lumbar interbody fusion (TLIF) in a high-volume setting.

Design: We retrospectively reviewed TLIF cases from 2011 to February 2024, with follow-up ending in March 2024, performed by eight neurosurgeons at a single centre.
Subjects: Reoperation rates were analysed for 756 patients, with each complication matched to two case-controls undergoing TLIF procedures within six months, at comparable levels, and ideally by the same surgeon.
Methods: Parameters statistically assessed included age, sex, BMI, frailty (mCCI and MFI-5), comorbidities, private/public patient, workplace injury, preoperative anticoagulant use, preoperative blood results, symptomatic indications, prior spinal surgery, preoperative imaging findings, approach side, operative time, length of stay, time to follow-up, and clinical outcome. Statistical analysis was applied using Fisher's exact tests or independent T-tests, with multivariate analysis conducted with logistic regressions.
Results: There was a 1.3% reoperation rate (n = 50) at a mean follow-up of 1.5 years (SD 1.7 years). Short-term reoperation was mainly due to cage migration, significantly linked to diabetes and preoperative motor deficits. Long-term reoperation, also frequently due to cage migration, was associated with private insurance status, osteoporosis/osteopenia, and prior lumbar surgery. Multivariate analysis revealed that osteoporosis/osteopenia, diabetes, private insurance, and prior lumbar surgery were independent risk factors for reoperation. Poorer MacNab outcomes were noted in reoperation patients and were further associated with diabetes, higher frailty scores, elevated preoperative haemoglobin, longer operative time, and static cages.
Conclusions: Our findings suggest osteoporosis/osteopenia, diabetes, private insurance, and prior lumbar surgery as key predictors for reoperation and poorer outcomes following tubular TLIF. This study contributes to understanding risk stratification and may inform decision-making in TLIF patient selection and postoperative care.

WM3-12

An observational study on time to burr hole evacuation of cSDH and its outcomes

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Objectives: There are no established standard guidelines for the clinical practice of burr hole evacuation of chronic subdural haemorrhage (cSDH) in neurosurgical patients. We aim to assess whether the time from hospital admission to surgical evacuation via burr hole, performed within 24 hours of cSDH diagnosis, has an impact on the perioperative recovery of patients.
Design: This is a retrospective observational study of patients who underwent cSDH evacuation over 3 months in a neurosurgical department.
Subjects: A total data set of 41 patients.
Methods: All patients who underwent burr hole evacuation for cSDH over 3 months were included. Patients on antiplatelet or anticoagulation therapy were excluded from the results. The analysis included the duration from admission to discharge, and post-operative complication rates, including DVT, infection, and rebleeding. Follow-up clinic letters were reviewed to assess residual or persistent neurological deficits, such as motor deficits or dysphasia.
Results: Over a 3-month period, 41 patients were reviewed. Of these 41 patients, 14 were on antiplatelets and anticoagulants. Of the remaining 27, 14 underwent a burr hole procedure within 24 hours. Post-operative complications, specifically rebleeding, were noted in 7.14% of patients who underwent the burr hole procedure within 24 hours, compared to 15.38% in those who did not. The infection rate was 23.07% in patients who had surgery within 24 hours, compared to 15.38% in those who did not. Neurological deficits observed during follow-up were similar in both groups. The duration of inpatient stay ranged from 4 to 71+ days for patients who did not undergo surgery within 24 hours, and from 2 to 27 days for those who did.
Conclusions: The audit highlights that fewer than half of patients received burr hole evacuations in under 24 hours of admission. Significant rates of infection and re-bleed were observed, necessitating a review of perioperative protocols.

WM3-13

Hyponatraemia in subarachnoid haemorrhage – does it really matter?

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Objectives: Identify incidence of hyponatremia after aSA and quantify its association with measurable outcomes.
Design: PRISMA-compliant systematic review and meta-analysis (PROSPERO ID CRD42022363472).
Subjects: All articles on SAH including sodium measurements, and association with outcomes from three databases (MEDLINE, EMBASE, Cochrane Library) between January 1990-January 2024.
Methods: Hyponatremia definitions, incidence during admission, and association between vasospasm, length of hospital stay, and poor outcome (Glasgow Outcome Scale three or less) were identified. Pooled incidence rates, binary and continuous outcomes were calculated using random effects meta-analysis models.
Results: In total, 52 studies (10512 patients) were included. Most studies included patients admitted to tertiary neuroscience centres (61.5%, N = 32), or critical care units (23.1%, N = 11). Sodium of less than 135 mmol/l was the most commonly utilised hyponatremia definition (84.6%, N = 44). The pooled incidence of hyponatremia was 37.0% (95% CI 31.7–42.4%). Hyponatremia increased the risk of vasospasm (15 studies, Odds Ratio [OR] 2.93, 95% CI 1.77–4.84), and length of hospital stay (3 studies, 16.4 days vs 8.0 days, Mean Difference [MD] 8.5 [95% CI 4.6–12.4]), but was not associated

with poor outcome (10 studies, OR 1.15, 95% CI 0.44–3.02). These findings remained when carrying out sensitivity analysis for different hyponatremia and outcome definitions, bias, and aSAH populations.

Conclusions: Hyponatremia is common in aSAH, increases the likelihood of vasospasm, but in isolation does not appear to affect overall outcomes. Managing hyponatremia effectively should be a priority for treating clinicians.

WM3-14

Use of Avastin (Bevacizumab) in the treatment of brain arteriovenous malformations: a systematic review

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Objectives: Brain arteriovenous malformations (bAVMs) are complex vascular lesions that pose a high risk of intracranial haemorrhage and stroke, especially in younger individuals. Traditional treatments, including microsurgical resection, stereotactic radiosurgery (SRS), and endovascular embolisation, are often unsuitable for high-grade AVMs due to high complication rates. We aimed to conduct a systematic review to evaluate outcomes of Bevacizumab (Avastin) as medical management for bAVMs.

Design: A systematic review conducted according to PRISMA guidelines and registered with PROSPERO (ID: CRD42024563735).

Subjects: Studies in English investigating the theoretical and clinical outcomes of Bevacizumab as a medical therapy for patients aged 18 years and older with intracranial AVMs.

Methods: Comprehensive searches of PubMed, Embase, and Medline were performed for studies published up to March 2024, using terms related to Avastin, Bevacizumab, and brain arteriovenous malformations. Screening and data extraction were performed independently by two reviewers, with disagreements resolved by a senior author ABM. Quality and risk of bias were assessed using NIH tools.

Results: Six studies met inclusion criteria. Preclinical evidence showed its ability to inhibit VEGF-driven angiogenesis and endothelial proliferation, potentially preventing lesion growth. Clinically, a pilot study in two patients with large, unresectable bAVMs treated with 12 weeks of Bevacizumab (5 mg/kg biweekly) and 40 weeks of observation showed reduced VEGF levels and improved symptom control without adverse effects, though no AVM size reduction was observed. Bevacizumab demonstrated promise in managing refractory complications post-SRS, with studies reporting symptom resolution and reduced perilesional oedema in majority of cases, while a subset achieved nidus obliteration within one year.

Conclusions: The evidence for Bevacizumab as a first-line bAVM treatment remains limited. Studies suggest symptom control and safety but no significant size reduction when used alone. Larger studies with varied dosing regimens and longer follow-ups are needed to assess its full therapeutic potential and long-term outcomes.

WM3-15

Out-of-hours surgery for chronic subdural haematoma – is it safe?

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Objectives: Identify if out-of-hours (OOH) surgery for Chronic Subdural Haematoma (CSDH) is associated with increased rate of recurrence, complications, mortality, and thromboembolic events.

Design: Retrospective, single centre case series at a tertiary neurosurgery centre.

Subjects: Consecutive patients with CSDH undergoing primary surgery (burr holes, craniotomy), from September 2021-September 2023.

Methods: Out of hours (OOH) was defined as an operation start time outside 8am-8pm. Primary outcome was recurrence requiring repeat surgery. Secondary outcomes included complications, thromboembolic events (DVT/PE), length of stay, and in hospital mortality. Differences were assessed using Chi-Squared tests and Student's t-tests. Subgroup analysis was performed for the group undergoing surgery between 12am-6am.

Results: A total of 263 patients were included (200 (76.0%) male, mean age 75.0 [SD] 11.3 yrs). Median time from admission to surgery was 37 hours (IQR 14–71.5 hours). In total, 49.8% (131/263) of operations took place OOH. There were no significant differences in baseline characteristics between the two groups. At a median follow-up of 9.2 months (IQR 4.8–13.2 months) there was no difference in recurrence rates between OOH and in hours groups (14.5% vs. 17.7%, $p = 0.483$). There was no difference in complication rates (13.7% vs 16.2%, $p = 0.585$), thromboembolic events (3.8% vs 3.1%, $p = 0.743$), length of stay (mean 15.9 vs 15.2 days, $p = 0.787$), or in-hospital mortality (2.3% vs 3.1%, $p = 0.483$).

Conclusions: OOH surgery for CSDH surgery is safe, does not appear to affect complications, recurrence, or mortality, and should be considered in appropriately selected cases.

WM3-16

The early admission characteristics and the need for early tracheostomy tube insertion in severe TBI patients: new insight with the help of AI algorithms

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Objectives: To predict tracheostomy requirements in traumatic brain injury (TBI) patients using initial clinical and demographic data available at arrival.
Design: Retrospective cohort study.
Subjects: TBI patients admitted to the neurointensive care unit (NICU) at Emtiaz Hospital, a large tertiary trauma centre.
Methods: Data from 546 patients, including 282 non-tracheostomy and 264 tracheostomy cases, were used to develop several machine learning (ML) models. Predictors included age, Glasgow Coma Scale (GCS), Rotterdam score, pupillary light reflexes, initial blood sugar, midline shift, and intracranial haematoma. ML models (logistic regression, random forest, gradient boosting machines, and multilayer perceptron) were trained using 70% of the dataset, with 30% used for validation.
Results: The logistic regression model predicted tracheostomy requirements with an AUC of 0.61, while random forest (AUC 0.64), multilayer perceptron (AUC 0.65), and gradient boosting machines (AUC 0.66) performed better.
Conclusions: While the best performing machine learning model achieved an AUC of 0.66, the results indicate that predicting tracheostomy requirements in severe TBI patients remains complex. These findings provide a foundation for developing predictive models to assist in clinical decision-making.

WM3-17

The incidence of seizures in patients treated with prophylactic antiepileptic drugs following traumatic brain injury

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Objectives: Post-traumatic seizure (PTS) is a well-documented complication of traumatic brain injury (TBI). PTS is often categorised into early (within 7 days post-TBI) and late occurrence (beyond 7 days post-TBI). Early PTS has been found to raise the overall metabolic rate, leading to secondary brain damage.
Methods: This audit study was conducted at a single institution in Dublin, Ireland and included patients admitted with a TBI from January 1, 2022 to December 31, 2023. Patients under the age of 18, pregnant women, and those with existing epilepsy were excluded from the study. We recorded patient demographics, admission date, mechanism of injury, their GCS score upon admission and referral, scan findings, any surgical interventions, and whether they experienced any seizures. Medical records were further reviewed to gather data on any AEDs prescribed during their hospital stay, including the type, dosage, frequency and duration of the medication.
Results: A total of 365 patients were admitted to Beaumont Hospital with a TBI during the study period of January 2022 to December 2023. This resulted in 325 patients meeting the inclusion criteria. The overall 325 patients were further categorised into 135 mild TBI, 70 moderate TBI, and 120 severe TBI included for analysis. Among these patients, 121 (37.2%) were on AEDs and 204 (62.8%) were not. Most of these patients were receiving levetiracetam as their prophylactic treatment. Early PTS were observed in 46 (14.4%) patients, and late PTSs were observed in 8 (2.5%) patients within the study group of 325 patients.
Conclusions: Seizures are a common complication of traumatic brain injury. A diagnosis of seizure disorder can have massive physical, mental and financial implications for a patient. Any healthcare professionals who may come in contact with patients following a TBI should be aware of the risk of seizures.

WM3-18

A retrospective audit of cranioplasty outcomes: infection rates and contributing factors

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Objectives: To evaluate infection rates post-cranioplasty in a single Scottish Neurosurgical Centre over a two-year period (September 2022–September 2024) and analyse the relationship between various clinical and demographic factors contributing to these infections.
Design: Retrospective study using patient records and operative data.
Subjects: Seventeen patients who underwent elective cranioplasty between September 2022 and September 2024.
Methods: Data was collected on demographics (age, sex, comorbidities including diabetes, hypertension, smoking status), surgical factors (indication for craniectomy, time interval between craniectomy and cranioplasty, duration of surgery, cranioplasty material used), and intraoperative details (skin preparation method, number of surgeons, suture materials). Infection outcomes were assessed based on time to onset, causative bacteria, and culture sensitivity. Additionally, antibiotics used (prophylactic and postoperative) and position on

the surgical list were recorded.
Results: Seventeen elective cranioplasties were performed during the study period. Three patients presented with infections at intervals of 16, 29, and 135 days post-cranioplasty, with a median presentation interval of 29 days. Gram-negative bacteria (Escherichia coli and Pseudomonas spp.) were isolated in two cases, while Staphylococcus aureus was identified in the third. One case was managed with surgical debridement and intravenous antibiotics, while the other two required removal of the cranioplasty. Chlorhexidine was used as a skin preparation method in all cases, including the infected ones. Prophylactic single-dose ceftriaxone and gentamicin were administered at induction for all patients.
Conclusions: This audit highlights an infection rate of 17.6% in elective cranioplasties, with both Gram-positive and Gram-negative pathogens identified as culprits. The uniform use of chlorhexidine prep and prophylactic antibiotics suggests other contributing factors may underlie infection risk. Future recommendations include a detailed review of intraoperative techniques and perioperative care protocols to mitigate risks and improve patient outcomes.

WM3-19

Retrospective analysis of histology and biochemical outcomes of Pituitary surgeries

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Objectives: To evaluate the histology, biochemical outcomes, postoperative complications, redo surgery and postoperative pituitary radiotherapy following pituitary surgeries that were done over 10 years.
Design: We collected biochemical, histological, postoperative complications of pituitary surgeries.
Subjects: 192 patients.
Methods: Data was collected from the hospital's electronic database, analysed using Microsoft Excel.
Results: Demographics: Age: 0.5% (1/192) < 20, 11.5% (22/192) 20–39, 44.3% (85/192) 40–59, 40.6% (78/192) 60–79, 3.1% (6/192) > 80. Gender: 45.8% (88/192) Male, 54.2% (104/192) Female. Ethnicity: 4.7% (9/192) Asian, 5.2% (10/192) Black, 1.3% (156/192) White, 8.9% (17/192) Not reported, Visual Fields: Preoperatively, 49.5% (95/192) experienced visual field defects. Surgical approach: 97.9% (190/192) Transsphenoidal, 0.5% (1/192) Transsphenoidal & Transcranial, 0.5%(1/192) Craniotomy. Hypopituitarism: 41% (78/192) Hypothyroidism, 32.3% (62/192) Adrenal insufficiency, 22.9% (44/192) Hypogonadism, 10.1% (19/192) Growth Hormone deficiency, 8.9% (17/192) AVP insufficiency. Postoperative complications: 10.4% (20/192) CSF leak 5.7% (11/192) Hyponatremia 3.1% (6/192) Cranial Nerve VI Palsy 2.1% (4/192) Meningitis 1.6% (3/192) Bleeding 1% (2/192) Sinusitis 0.5% (1/192) Septal Perforation 0.5% (1/192) Pneumocephalus 0.5% (1/192) Epistaxis 0.5% (1/192) Wound leak 0.5% (1/192) Stroke Histology Incidence: 44.3% (85/192) Gonadotropinoma, 14.1% (27/192) Growth Hormone Adenomas, 12.0% (23/192) Adenomas, 7.8% (15/192) Corticotropinoma, 6.3% (12/192) Mixed Adenomas, 1% (2/192) Prolactinoma, 3.1% (6/192) Silent Corticotrophinoma, 0.5% (1/192) Thyrotropinoma, 8.3%(16/192) Miscellaneous, 2.6% (5/192) Cyst. Further treatment: 12.5% (24/192) had radiotherapy, 19.3% (37/192) had a 2nd or 3rd surgery. Postoperative complications 26.5% (51/192) postoperative complications.
Conclusions: Histology analysis is consistent with the existing literature of incidence of Pituitary Adenoma. There were minimal postoperative complications noted.

PARALLEL SESSION
WP1 FUNCTIONAL

WP1-1

A single surgeon experience of gamma knife radiosurgery for trigeminal neuralgia

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Objectives: To evaluate the clinical outcomes of Gamma Knife Radiosurgery (GKR) in patients with refractory trigeminal neuralgia (TGN) who had failed medical management and undergone previous invasive therapies.
Design: A retrospective cohort review of clinical records for patients treated with GKR for TGN from 2011 to 2024.
Subjects: Twenty-seven patients (55.5% male, 44.5% female) were included. The most commonly affected trigeminal branches were V3 (48.1%), V2 (37.0%), and V1 (11.1%). The left side was more frequently involved (55.5%). All patients had failed prior invasive treatments, including radiofrequency rhizotomy (33.3%), microvascular decompression (29.6%), nerve blocks (7.4%), balloon rhizotomy (11.1%), and partial root section (3.7%).
Methods: Clinic letters from the electronic care record were analysed for demographics, prior therapies, medication use, pain relief duration, and subsequent interventions. Post-treatment follow-up data were available for 24 patients.
Results: Pain control was achieved in 79.2% of patients post-GKR, with 29.2% achieving control without medication. Of the 66.7% requiring medications for pain control, 31.3% experienced reduced medication use. Pain relief lasted a mean of 45.3 months at last follow up (range: 4–132). Morbidity was noted in 29.2%, with 25% experiencing paresthesia and 4.2% (1/24) reporting dysesthesia at last follow up. Four patients required further invasive treatments, with a mean interval of 33 months (range: 12–48). One patient underwent a second GKR without benefit.
Conclusions: GKR provides significant pain relief for refractory TGN, with a majority achieving sustained benefit. While morbidity was noted in a minority, GKR remains an effective option for patients failing prior invasive and pharmacological treatments. Further studies are needed to optimise patient selection and minimise adverse effects.

WP1-2

Endoscopic implantation of spinal cord stimulators: surgical technique and comparison with standard methods

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Objectives: Spinal Cord Stimulators (SCS) are effective for the management of a variety of chronic back pain conditions. Traditionally, either leads can be implanted percutaneously or paddles can be implanted using an open approach. We sought to develop an endoscopic technique to allow implantation of paddles in a minimally invasive way and to compare this technique to standard open and percutaneous techniques.
Design: Single centre retrospective review with description of surgical technique.
Subjects: Patients requiring SCS implantation using open (n = 13), percutaneous (n = 20), or endoscopic (n = 5) techniques.
Methods: The development of the technique initially in a cadaveric lab is described with supporting videos. All endoscopic cases were performed using neuromonitoring (SSEP/MEP). The medical records of all patients were reviewed to assess post-operative analgesic requirements, migration, and complications.
Results: The retrograde method of implantation was chosen due to reduced bony and soft tissue dissection required. Also, more secure implantation was possible with this approach. We describe the endoscopic technique in detail. Post-operative analgesia requirements for the endoscopic and percutaneous cases were similar and both were significantly lower than for open cases ($p < 0.001$). Operative time was expectantly longer for endoscopic cases. Same-day programming was possible with endoscopic cases and with modified anesthetic and programming protocols same day discharge was possible for our last endoscopic case. With a minimum 60-day follow-up, we did not have any wound related problems or hardware migration in the endoscopic cases.
Conclusions: Our findings indicate that endoscopic SCS implantation is a safe and feasible option that combines key advantages of both open and percutaneous standard approaches for SCS implantation.

WP1-3

Rapid-access pathway for trigeminal neuralgia: a single-centre experience of streamlined multimodal treatment delivery

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Objectives: Trigeminal neuralgia (TGN) can be severely debilitating, yet patients often face prolonged delays before accessing specialist care. We present our rapid-access pathway designed to expedite specialist assessment and treatment.
Methods: We implemented a dedicated TGN pathway with direct GP referral routes and specialist nurse triage. All referrals were reviewed within 48 hours, with urgent cases seen within two weeks. Our protocol mandated comprehensive initial assessment including high-resolution MRI with trigeminal sequences and neuroradiologist review.
Results: Over a three-year period, 489 patients were assessed through this pathway. Median time from referral to specialist review was 9 days (range 2–14). All patients underwent structured assessment including medication optimisation and imaging. For those requiring intervention, median time to treatment was 4 weeks. Treatment modalities offered included microvascular decompression (n = 154), percutaneous balloon compression (n = 170), and other procedures based on patient factors. Overall treatment success rate was 96.6%.
Conclusions: A dedicated rapid-access pathway for TGN significantly reduces time to specialist assessment and definitive treatment. Our multi-modal approach ensures patients receive personalised care plans promptly, potentially reducing the burden of chronic pain and improving outcomes.

WP1-4

Predictors of seizure outcome following epilepsy surgery: a long-term outcome study at the national hospital for neurology and neurosurgery, United Kingdom

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Objective: To identify the preoperative factors that significantly increased probability of achieving long-term seizure freedom and support surgical indication.
Design: Retrospective review of 1063 patients who underwent surgery for drug-resistant epilepsy in a single centre with a follow-up of more than 30 years.
Subjects: 1063 patients who underwent epilepsy surgery at the National Hospital for Neurology and Neurosurgery, United Kingdom from 1990 to 2022
Methods: Preoperative and follow-up data were collected prospectively through annual post-operative inquiries conducted by a neurologist and a clinical data manager. We assessed potential risk factors including demography, neuropsychological/psychiatric history, ASM use, seizures localisation and brain pathology on MRI. Cox univariate and multivariate regression models and Kaplan-Meier survival

analysis were performed to determine factors associated with seizure freedom.

Results: We analysed a total of 14187 patient years, spanning 32 years. History of focal to bilateral tonic-clonic seizures (FBTCS), absence of focal pathology on MRI and intellectual disability were significantly associated with seizure recurrence, with combination of the three factors being associated with the lowest seizure freedom rates. Duration of epilepsy prior to surgery, number of anti-seizure medication, history of status epilepticus, extratemporal surgery and use of intra-cranial EEGs indicated lower chances of seizure freedom but were associated with the 3 factors mentioned above. Having epilepsy for 5 or more years preceding surgery dramatically decreased the likelihood of achieving seizure freedom compared to durations of less than 5 years.

Conclusion: While in line with previous literature, our study shows that patients who are MRI-negative, have a history of FBTCS and/or suffer from intellectual disability have lower chances of seizure freedom. Intriguingly, our data also show that a history of seizure of more than 5 years significantly predicted seizure recurrent, stressing that early operation in patients with drug-resistant epilepsy should be advocated on the basis of both seizure freedom and cognitive outcome.

WP1-5

Functional hand representation in preoperative brain mapping: a navigated transcranial magnetic stimulation study

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Objectives: We sought to identify 'hotspot' locations for three hand muscles using navigated Transcranial Magnetic Stimulation (nTMS) in the primary motor cortex and assess lesion influence on hotspot location.

Design: Single-centre retrospective study

Subjects: Patients with intrinsic brain lesions undergoing preoperative nTMS motor mapping.

Methods: Hotspot coordinates for three hand muscles were defined relative to the centre of the hand-knob. The centroid between the three hotspots defined functional hand representation (FHR). Hotspot location was defined according to the largest Motor Evoked Potential (MEP) in a given muscle at the Resting Motor Threshold (RMT). RMT is the lowest magnetic pulse strength triggering an MEP in >50% of trials. The hand-knob was divided into zones to categorise hotspot locations.

Results: Complete mapping data was available from 153 patients (306 hemispheres). Hotspots were clustered within the lateral half of the hand-knob (44.6%) or lateral to the hand-knob but within the motor cortex (18.7%). Hotspots within the pathological hemisphere were more likely to be outside the hand-knob but within the motor cortex (chi-sq $p < 0.001$). Most hotspots for the three muscles were separate. Overlapping hotspots most often involved the First Dorsal Interosseous. Overlap patterns were not different between normal and pathological hemisphere ($p = 0.72$). The distance between hand-knob centre and the centroid trended longer in pathological hemispheres (9.6+/−4.6 mm vs 10.6+/−4.8 mm, $p = 0.054$) and was unaffected by proximity of the lesion to motor pathways. Distances between the three hotspots for each muscle were similar between the two hemispheres (6.9+/−4.3 mm vs 7.6+/−4.6 mm, $p = 0.155$).

Conclusions: FHR is most likely clustered laterally within the hand-knob. In pathological hemispheres, FHR is altered, with more hotspots lateral to the hand-knob and there is a trend towards a longer distance between the centre of the FHR and the centre of the hand-knob, likely indicating remodelling or altered cortical excitability.

WP1-6

Peri electrode tract oedema following implantation for stereo electroencephalography (SEEG)

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Objectives: The objective of this study is to describe our experience of peri-electrode tract oedema in stereo electroencephalography by reporting on its incidence and its clinical and biochemical correlations.

Design: This is a retrospective descriptive study.

Subjects: All adult patients over the age of 18 who underwent a stereo electroencephalography procedure in our institution between October 2020 and October 2024 were included. Patients who proceeded directly from removal of electrodes to resection surgery without interval imaging were excluded.

Methods: All patients had CT imaging within 72 hours after removal of electrodes and the presence of oedema along the electrode tract on these images was studied. MRI was used for interpretation when available, and the types of oedema described. All patients were monitored and recorded for clinical signs and symptoms of infection, and daily C-reactive protein (CRP) levels were recorded from day 1 to day 7 of their implantation. The trend of CRPs of patients with and without oedema were compared with non-linear regression using a 3rd order polynomial model and the extra sum-of-squares F test.

Results: 24 patients fit the inclusion and exclusion criteria. 79.2% of patients had radiographic oedema. Two radiographic distributions of oedema are described. Most patients display a trend of CRP increasing to a peak by day 2 and 3, and which tapers back down close to baseline by day 7. No statistical difference was found in the CRP trends between patients with and without oedema. 8.6% of patients had isolated fevers of non-infectious origin. 11.4% of patients had radiological evidence of haematoma, none of which were clinically significant. No patients had infective complications.

Conclusions: Radiographic peri-electrode tract oedema is common in SEEG and runs a benign course in our series.

WP2 SHORT ORAL 2
WP2-1

Post-operative outcomes following robotic-assisted stereo electroencephalography at a National Neurosurgical Centre

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Objectives: To assess the incidence of post-operative infection and haemorrhage following SEEG. To examine clinical and biochemical markers of inflammation that may be used to predict radiological cerebral oedema following SEEG.
Design: A single-centre, retrospective audit.
Subjects: 33 patients with drug-resistant epilepsy who underwent robotic-assisted SEEG between 2021–2024. Mean age 32; 51.5% Male.
Methods: Clinical charts and imaging data following implantation were analysed. Data were collected on duration of electrode implantation, temperatures, septic screen results, and serum CRP trends. Radiologic images were observed for evidence of cerebral oedema and/or haemorrhage.
Results: The mean duration of electrode implantation was 13.5 days. There were no neurological deficits reported after implantation. Post-implantation imaging showed a minimal subclinical haemorrhage in 10% of patients. 60% of patients had radiologic evidence of cerebral oedema relating to the implantation of electrodes with no associated clinical symptoms. No symptomatic infections were recorded. Higher CRP values were associated with radiographic oedema when compared to control group (OR 1.50, 95% CI 0.36–6.35). This association did not reach statistical significance in the one-way ANOVA test, which may be attributable to the small sample size.
Conclusions: We report a low rate of post-operative complications from SEEG. Literature suggests asymptomatic haemorrhagic complications occur in 19% of cases1, which is almost double our rate (10%). Systematic imaging after implantation and explantation helps to identify clinically silent complications of SEEG. In our cohort, elevated CRP values were not a reliable indicator of radiologic oedema, we will continue to recruit patients to further investigate whether a relationship exists. Overall, SEEG is a safe and well-tolerated procedure. This data further adds to the safety profile of SEEG.

WP2-2

The utility of robot assisted electrode placement with intraoperative image-guided confirmation of lead locality in deep brain stimulation (DBS) for movement disorders

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Objectives: DBS surgery in our country has only been performed since 2021 and is conducted at only a single centre. This study describes our experience with the provision of this service with emphasis on the safety, efficacy, and efficiency of robot assisted surgery with intraoperative image-guided confirmation of lead locality.
Design: This is a retrospective descriptive study of a prospectively maintained database.
Subjects: All patients who underwent insertion of intracranial electrodes for DBS for movement disorders from November 2021 until November 2024 were included.
Methods: The perioperative and intraoperative workflow will be described. Patient demographics, pathology, DBS targets, and implantable pulse generator (IPG) and lead types will be reported. Outcome measures including robotic registration accuracy, frequency of lead placement error requiring lead adjustment, complications, and degree of symptom improvement following programming sessions will also be reported.
Results: 50 consecutive patients were included in this study. 62% had a diagnosis of Parkinson's disease, 28% dystonia, and 10% essential tremor. The mean registration accuracy with the robot was 0.46mm. 30% of patients required intraoperative adjustments to their lead placement. 10% of patients required adjustment to the trajectory. 24% of patients experienced post-operative delirium and the mean length of stay post op was 4 days. There were no haemorrhagic complications, 1 patient required a reoperation for infection, and 1 patient required a reoperation due to late lead migration.
Conclusions: Robot assisted electrode placement with intraoperative image-guided confirmation of lead locality in deep brain stimulation (DBS) for movement disorders is safe, effective and efficient in our experience.

WP2-3

'Asleep' deep brain stimulation targeting ventral intermediate thalamus in essential tremor: systematic review and short case series

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Objectives: Deep brain stimulation (DBS) of the ventral intermediate thalamus (VIM) is a safe and effective treatment of essential tremor (ET). More recently, lead placement using direct anatomical targeting with the patient under general anesthesia has been described and implemented and is referred to as 'asleep DBS'. We wanted to examine outcomes in awake versus asleep methods for VIM targeted DBS in ET
Design: We performed a systematic review of asleep DBS procedures for ET to assess the outcomes of this technique and present a short case series.
Subjects: Patients who underwent asleep DBS insertion for ET with a VIM target were included as part of the National DBS service that performed the first DBS surgery in Ireland in November 2021.

Methods: A systematic review was performed looking at all studies utilising asleep DBS for ET according to PRISMA guidelines. Only studies in ET with VIM target were included.
Results: 206 patients with 360 leads inserted across 10 studies were included (including 3 patients in the current study), with robotic and non-robotic guided insertion. 3 studies had an internal comparison with traditional awake methods with microelectrode recordings. Functional improvement ranged from 48–71%. Radial errors across the studies ranged between 0.5 to 1.02mm. The mean lead passes ranged from 1.0 – 1.11 per lead. Complication rates ranged from 0–41.7%, with haemorrhage rates ranging from 0 – 8.3%, infections 0–16.2% and altered mental status from 0–24.2%. Operative times ranged from 205 to 333 minutes for bilateral lead insertion. Mean length of stay ranged from 1.5–3 days.
Conclusions: Asleep DBS, targeting VIM, is a safe and effective procedure in the treatment of essential tremor. High levels of precision allow submillimetre target accuracy in many cases. Functional outcomes and complications are comparable to awake procedures performed with microelectrode recordings.

WP2-4

Case report: Assessing the therapeutic effect of Bevacizumab in Labrune syndrome

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Objectives: Labrune's syndrome, or leukoencephalopathy with brain calcifications and cysts (LCC), is a rare genetic syndrome with limited treatment. In this study, our aim was to demonstrate how Bevacizumab- a new trial drug in LCC, can be an effective clinical adjunct in reducing cyst volume, alongside neurosurgical intervention. We quantified the clinical effect on cyst reduction in one patient, via MRI imaging at certain intervals post-Bevacizumab administration, over several years.
Design: Baseline CT and MRIs were performed to measure the initial cystic volume in this patient. Subsequently, Bevacizumab, a monoclonal antibody, was the trial drug administered, to ascertain its effect in halting or reducing pre-existing cyst formation. Bevacizumab was chosen based on international trials and case reports in Japan and the U.S, citing it as a potential treatment adjunct in LCC.
Subjects: We followed the progression of a 12-year-old male, who had initially presented to hospital with headaches and vomiting. The initial imaging on admission demonstrated that this patient had LCC, which involved an enlarging left cerebellar cyst.
Methods: Bevacizumab was administered in monitored intervals, with regular follow ups in clinic to monitor for symptomatic or neuroradiological evidence of improvement.
Results: On admission in 2017, the left cerebellar cyst was measured at 53.6 cm3. Bevacizumab was administered in 2019 and over two years, the MRI scans demonstrated a significant volume reduction of the cyst to 1.8 cm3 in 2022. This represents a 95% cyst reduction following the administration of Bevacizumab.
Conclusions: Bevacizumab has demonstrated an efficacious clinical outcome in reducing the left cerebellar cyst volume over a period of time. However, Bevacizumab is not without its side effects. Therefore, further research and clinical trials must be sought, to validate its potential as a prospective treatment adjunct, alongside neurosurgical interventions to maximise a positive health outcome in LCC.

WP2-5

Sub-temporal decompression: the forgotten treatment

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Objectives: Slit Ventricle Syndrome is a complication of ventricular shunts that can present in five different ways. The International Society of Paediatric Neurosurgery has evidence-based guidelines for treatment of Slit Ventricle Syndrome. Sub-Temporal Decompression may be a helpful treatment option
Background: Slit Ventricle Syndrome (SVS) is a well-established complication of intraventricular shunts that has been broadly defined as a symptomatic shunt malfunction without ventricular enlargement. There are five purported types of Slit Ventricle Syndrome, based on the intracranial pressure, size of the ventricles and working status of the shunt. The International Society of Paediatric Neurosurgery (ISPN) has guidelines published on their website for treatment options in each type of SVS. This audit investigates the number of Slit Ventricle Syndrome cases in the Irish population between 1993 and 2018, the adherence to ISPN guidelines for treatment as a standard and the outcomes for patients who underwent Sub-Temporal Decompression (STD).
Methods: A search was carried out on computer archives consisting of outpatient and discharge letters for patients of Temple Street Children's University Hospital, Our Lady Children's Hospital Crumlin and Cork University Hospital dating back from 1993 to 2018. Search words 'slit-ventricle syndrome', 'shunt over drainage', 'sub-temporal decompression' and 'bitemporal decompression' were used. The different treatment methods utilised were quantified. For patients who underwent STD, the number of invasive procedures subsequently required served as a marker for efficacy of this operation.
Results: In this time period there were 33 patients who had been diagnosed with SVS, though diagnostic imaging sought for confirmation of diagnosis could only be recovered for 32 ($n = 32$). In all, there were only 3 patients who underwent treatment outside of the ISPN guidelines. Based on this data, there was 89% adherence to the standard. Of the 8 patients who underwent STD there were only 2 who required further surgical intervention of any kind.
Conclusions: Based on this audit the paediatric neurosurgery service of Ireland has largely adhered to ISCP guidelines. With respect to patients who underwent STD, there were only 2 who required further surgery. This suggests that STD can be a potentially employable option in a certain variety of clinical scenarios.

WP2-6

Are we sending more G&S than needed?

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Objectives: This audit is designed to evaluate process usage patterns of 'Group and Save' (G&S) in Neurosurgery. The rationale behind this assessment stems from evidence showing that unnecessary blood transfusions can increase healthcare costs and inefficiency and may harm patients.
Design: Retrospective cohort study
Subjects: Elective Neurosurgical patients
Methods: This is a retrospective audit looking at elective neurosurgical admission from August to October 2024. We evaluated a total of 163 patients, both cranial and spinal admissions.
Results: Out of 80 cranial admissions, 95% had at least one G&S sent pre-op, and only 2.5% required crossmatching and blood transfusion. Compared to spinal admission, 90% had at least one G&S sent, and none required any transfusions. We found that craniotomies for tumours or vascular lesions were more likely to result in a haemoglobin drop of 10–20 g/L compared to posterior cervical and lumbar spine surgeries. This highlights a significant difference in perioperative blood loss between cranial and spinal surgical procedures.
Conclusions: The lack of surgical risk stratification tools to identify preoperative bleeding risk poses significant challenges. While transfusion requirements have progressively reduced in neurosurgical operations, Group and Save—costing £10–18 each—should primarily be used for patients with high bleeding risk factors. However, we observed that a large number of these tests were conducted despite transfusions being rare. Current hospital policy lacks clear guidelines in this area. Addressing these gaps by developing clear protocols and effective risk assessment tools is critical to improving surgical safety and enhancing overall patient care.

WP2-7

Assessing submission throughput at the British Journal of Neurosurgery and identifying causes of delays

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Objectives: To evaluate the throughput of submissions to the British Journal of Neurosurgery (BJNS) over a three-year period and identify key sources of delay.
Design: Retrospective review of submission data.
Subjects: All submissions to the British Journal of Neurosurgery from between June 2021 and September 2024.
Methods: Data pertaining to submission type and time of each stage of the editorial process was extracted and analysed.
Results: There were 3072 submissions in this time period of which 482 were revisions. The average time from submission to final decision across all submissions was 86+/−183 days. The time for processing revisions was significantly longer than processing original submissions (73+/−175 vs 156+/−208 days). The manuscript types associated with the longest processing times included technical reports, research articles, and reviews (129, 117, and 114 days respectively). Manuscript types with the shortest turnover times were book reviews, educational reports, and case reports (17, 23, and 39 days respectively) although a large range of times existed particularly for case reports and themed articles. Across all manuscript types, the main source of delays was from steps involving selection and assigning of reviewers. Once assigned, obtaining reviewers scores took on average 14+/−15 days.
Conclusions: Main delays to processing submitted articles arise from the step of selecting and assigning reviewers. Once a reviewer accepts, the process of completing a review is not a major source of delay. This reflects a key challenge faced by many journals.

WP2-8

Improving neurosurgical consenting audit: a comparative study of paper-based and digital methods

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Objectives: To evaluate the consenting process for neurosurgical procedures, comparing paper-based methods with a digital consenting platform, focusing on compliance with General Medical Council (GMC) guidelines.1 Cycle 2 included an online survey of surgeons and a random sample of 50 patients using the digital platform.
Design: A two-cycle audit assessing documentation quality, timing, risk inclusion, and adherence to GMC guidelines. Cycle 1 reviewed paper forms; Cycle 2 assessed digital consenting with additional survey feedback.
Subjects: A total of 114 patients (83 spinal and 31 cranial cases) were included in Cycle 1. All patients were adults with capacity to consent. Online surveys were conducted with surgeons and 50 patients in Cycle 2.
Methods: Data from two-week periods in August (2022 and January 2023) included procedure name clarity, risk documentation, abbreviations, timing, and confirmation of consent. Surveys gathered feedback on the digital platform's usability.
Results: Cycle 1: Clear procedure names (86.5%), same-day consent (34.6%), and material risks documented in only 36.5%. Abbreviations were minimal (61.5%), but handwriting

issues and incomplete blood transfusion or X-ray consents were noted in 25% and 38%, respectively. Cycle 2 (Survey Feedback): The digital platform eliminated handwriting issues and improved clarity and standardisation. Both patients and surgeons favoured its usability

Conclusions: Digital consenting significantly reduces documentation errors and enhances patient safety by eliminating handwriting issues and ensuring standardisation. It demonstrates clear superiority in reducing same-day consenting, a key factor in improving preoperative processes. Its potential to support informed decision-making underscores the need for broader adoption and targeted training to optimise implementation.

Reference

1. General Medical Council (GMC). Decision Making and Consent. NICE Guidelines. Consent and Communication Standards in Surgery; 2024.

WP2-9

The effects of frailty in neurosurgery

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Objectives: With increasing life expectancy and growing patient expectations, more elderly and potentially frail patients are being referred for acute and elective neurosurgical care. Frailty is known to adversely affect outcomes. This study aims to evaluate the effect of premorbid frailty on those referred and admitted through the acute neurosurgical unit at North Bristol Trust (NBT).

Design: In this single centre observational study, data was retrospectively collected capturing referrals from January-December 2022, of patients aged >65. Data was extracted from our online referral portal (Referapatient) and from hospital electronic records. Baseline frailty was measured using the clinical frailty score as part of the referral process. Indication for admission and level of frailty were used to assess inpatient and 12-month mortality rates. For an indicator of post intervention frailty, length of stay and discharge destination were recorded.

Results: From January to December 2022, 4112 referrals were received, with 28% (1151) leading to admission. Of those admitted, 37% had clinical frailty scores of 4 or higher (vulnerable to severely frail). Frailty was more prevalent among non-admitted patients (47.1%). The inpatient mortality rate was 10.6%, compared to 29.7% for non-admitted patients. By 12 months, the overall mortality rate for admitted patients rose to 36.7%. Higher frailty correlated with increased mortality, with the 'severely frail' group experiencing a 69.2% mortality rate. Frail patients also had longer hospital stays, averaging 24 days, versus 5 days for those with lower frailty scores.

Conclusions: Despite selection bias against frailty, a high proportion of neurosurgical patients at NBT exhibit frailty, impacting their clinical course. With significantly increased length of stays and 12-month mortality rates, a holistic clinical approach is essential. The growing call for a multidisciplinary approach to neurosurgical care, particularly in chronic subdural haematomas, Highlights the need for shared decision making from the start of the referral process.

WP2-10

Day-of-surgery skin decolonisation is associated with a lower rate of surgical site infection among elective neurosurgical patients

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Objectives: To establish the rate of surgical site infection (SSI) among elective neurosurgical patients and assess the efficacy of day-of-surgery skin decolonisation therapy on SSI rate.

Design: Closed-loop audit comparing baseline SSI rate with the rate following intervention.

Subjects: Consecutive adult elective neurosurgical patients (cranial and spinal) over two 6-month periods (May-October 2023 (baseline); November 2023 to April 2024 (intervention)).

Methods: All elective adult cranial and spinal neurosurgical patients were studied. Data were collected regarding baseline demographics, procedural details including duration, acute complications including SSI, causative organism(s), need for further procedures/readmission and total length of hospital stay.

Results: 300 patients in the baseline group had an infection rate of 4.7%. In the intervention group there were 325 patients with an infection rate of 1.8% ($p = 0.045$). Among cranial cases the infection rate was 4.8% at baseline and 2.1% after the introduction of Hibiscrub wash ($p = 0.11$). In spinal cases the baseline rate was 4.3% compared to 1.1% after intervention ($p = 0.21$). The mean procedure duration was not significantly different between the infection and non-infection groups ($p = 0.10$). Causative organisms included Staphylococcus aureus, coagulase-negative Staphylococci, Cutibacterium acnes, Pseudomonas and Klebsiella. There were no cases of methicillin-resistant Staphylococcus aureus (MRSA)-related infections. Patients who suffered surgical site infections had a significantly longer total hospital stay (including any readmission(s), mean 29.0 vs 9.6 days, $p < 0.0001$). 12 patients required a formal wound washout +/− removal of implants. There were no SSI-related deaths.

Conclusions: The rate of SSI among adult elective neurosurgical patients in our unit is within agreed standards at baseline. Giving all patients Hibiscrub wash on the morning of their surgery was associated with a reduction in the rate of SSI of over 60%. Reducing surgical site infection rate has a significant impact on emergency theatre usage as well as inpatient stay duration.

WP2-11

Sinonasal teratocarcinosarcoma: a case report of craniospinal metastasis

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Objectives: Sinonasal teratocarcinosarcoma SNTCS is a very rare and highly invasive tumour that is mostly found in the nasal cavity and paranasal sinuses. It is known to be a heterogeneous in nature. They are often misdiagnosed. It usually progress rapidly and has a very aggressive clinical course and poor prognosis. The aim of this article is to report a case of SNTCS, its clinical course, aetiology, diagnosis and to discuss the management options with a review of the literature.
Design: Case report
Subjects: 35 years old female patient presented March 2020 with nasal mass in left nostril.
Methods: Retrospective review of a case of SNTCS with metastasis into brain and spine.
Results: Patient presented with nasal obstruction with polypoidal mass in left nostril treated with endoscopic resection and radiotherapy. 9 months later presented with visual symptoms and hyponatremia and scan finding of dural based lesion with extension into bone and orbit which was resected and confirming recurrence of SNTCS. Patient subsequently complained of neck pain and imaging confirmed metastatic disease of cervical spine.
Conclusions: SNTCS is a rare and aggressive carcinoma with poor prognosis and limited survival. They rarely metastasise into the spinal axis. The optimal treatment modality is still unclear most commonly surgery followed by radiation therapy. Despite treatment reoccurrence rate is estimated to be 26% and metastasis rate is 10.9% and both metastasis and reoccurrence is 8.7%.

WP2-12
Withdrawn

WP2-13

The efficacy of novel drug therapy combined with conventional chemoradiation in glioblastoma multiforme management: a systematic review

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Objectives: Glioblastoma multiforme (GBM) is a fast-growing aggressive brain tumour with a 5-year survival rate of approximately 5–10%. Despite recent advances in treatment modalities it is generally considered to be incurable. Conventional therapy for patients with newly diagnosed GBM comprises total 60 Gy of radiotherapy (RT) delivered over 6 consecutive weeks, and concomitant and up to six cycles of maintenance temozolomide (TMZ) chemotherapy. In spite of aggressive therapy, the prognosis remains poor; hence, there is an urgent need for development of new therapeutic options.
Design: This systematic review aims to compare progression-free and overall survival outcomes, as well as safety and tolerability of novel drugs used in the management of GBM in adults.
Subjects: 37 full-text articles were included.
Methods: A literature search of the Embase, MEDLINE and CENTRAL databases was performed. Further inclusion criteria required a minimum of TMZ, RT and one novel drug
Results: Although dozens of novel therapies for GBM have been reported in the literature, the progression-free and overall survival outcomes have not reached statistical significance to date. Nevertheless, there are some promising drugs that have shown some improved efficacy compared to standard TMZ/RT in patients with newly diagnosed GBM. Median overall survival in GBM patients has increased from 31.4 months with TMZ/RT to 37.9 months with combined lomustine/TMZ/RT (CCNU/TMZ/RT); hence demonstrating superior efficacy of CCNU/TMZ/RT over conventional radiotherapy. The addition of pexidartinib (PEX) to the standard treatment improved progression-free survival from 9.7 months to 7.5 months observed in the control group.
Conclusions: There is no evidence to suggest that novel drugs reviewed in this article significantly improved survival probability in patients with GBM. Despite recent drug developments and advancements in cancer research, there is still a desperate need for novel approaches to GBM treatment to improve patient prognosis and survival outcomes.

WP2-14

A systematic review and meta-analysis of tubular retractors in neuro-oncological surgery

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Objectives: Neuro-oncological surgery necessitates a careful balance between maximising tumour resection whilst minimising damage to healthy brain parenchyma. Tubular retractors represent an emerging tool proposed to minimise surgically-induced brain injury, and thus facilitate in the optimisation of this onco-functional balance. The objective was to evaluate and synthesise the evidence regarding surgical outcomes of tubular retractors in neuro-oncological surgery.
Design: Systematic review and meta-analysis.
Methods: Studies reporting on surgical outcomes of tubular retractors in adult neuro-oncological cases were eligible. PRISMA guidelines were followed. Medline, Embase, the Cochrane Library, ClinicalTrials.gov, and ICTRP were searched to July 2024. Duplicate title/abstract screening, data extraction, and risk of bias assessments were conducted. Pooled prevalence of gross total resection (GTR) and complications were calculated using random effects models.

Results: Of the 2646 studies screened, 49 were included in the final analysis with a total of 684 patients. Combined pooled prevalence for GTR was 76% (95% CI: 67–85%), whilst for complications this was 14% (95% CI: 8–20%). GTR rate by tumour histology was: 52% for gliomas (95% CI: 41–62%), 80% for metastases (95% CI: 65–92%), and 100% for colloid cysts (95% CI: 99–100%). Complication rate by tumour histology was: 16% for gliomas (95% CI: 5–30%), 12% for metastases (95% CI: 1–28%), and 16% for colloid cysts (95% CI: 8–24%). There was no significant difference between tubular retractor systems with regards to combined pooled GTR or complication rate ($p > 0.05$).
Conclusions: There is mounting interest regarding the utility of tubular retractors in neuro-oncological surgery. However, this evidence remains largely in the form of case series, providing proof-of-concept, but limited in its ability to draw more robust comparisons to conventional retraction. Future prospective studies with greater sample sizes, longer follow-up, and direct comparison to conventional retraction are now needed to consolidate the position of tubular retractors in neuro-oncological surgery.

WP2-15

Intracranial biopsy for suspected tumours; a comparison of surgical approaches

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Objectives: There are currently no standardised methods for brain tumour biopsy in neurosurgery. We designed this study to review our case series and determine the most accurate method for biopsy of suspected brain tumours. Our objective was to determine diagnostic accuracy per approach in order to minimise the need for repeat procedures.
Design: Retrospective case series of patients undergoing biopsy of a brain tumour at the Walton Centre, between 01.01.2016 and 30.09.2024.
Subjects: Over 300 patients underwent biopsy for a suspected brain tumour. Other procedures such as: drainage of abscess or tumour debulking were excluded. The age range was 20–80 years with an average age of 60 years. Male: female ratio was 56:44.
Methods: Data was obtained from the Trust electronic system pertinent to the study and included: demographics, length of stay, method of biopsy, histological diagnosis and outcome.
Results: Currently, 62 cases have been reviewed, of which 55 had a diagnosis after one procedure. Seven cases required a repeat biopsy, with an open procedure as the most common cause. The number of patients with a post-operative surgical complication were 14 (22.6%) with the majority transient, and post-operative medical complications were 6 (9.7%). Overall, there were 6 burr hole biopsies, 25 CRW/Stereotactic Frame biopsies, 16 open/mini-craniotomy biopsies, 2 'other' biopsies, 8 Stealth (Medtronic) biopsies, and 4 Vertek (Medtronic) biopsies. There was no significant trend at the first stage of data collection.
Conclusions: In conclusion, permanent neurological complication rates were low and the average length of stay for a biopsy was 12-days. Our case series indicates that open biopsies can result in repeated procedures. Overall, we aim to establish the diagnostic accuracy of each procedure, the diagnostic yield of an intra-operative sample and complication rate per biopsy approach using the total dataset.

WP2-16

Transcranial magnetic stimulation – electroencephalography in neurosurgery: unexplored path towards personalised brain surgery

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Objectives: To perform a scoping review on use of Transcranial Magnetic Stimulation – Electroencephalography (TMS-EEG) in neurosurgical practice
Design: This scoping review, conducted following PRISMA guidelines, focused on TMS-EEG 21 in epilepsy, neuro-oncology, and general neurosurgery.
Methods: A literature search in Embase and Ovid 22 MEDLINE returned 3596 records, which were screened based on predefined inclusion and exclusion 23 criteria. After full-text review, three studies met the inclusion criteria. Two independent investiga-24 tors conducted study selection and data extraction, with mediators resolving disagreements. The 25 NHLBI tool was used to assess risk of bias in the included studies.
Results: 3596 articles were 26 screened following the above-mentioned criteria: 2 articles and 1 abstract met the inclusion criteria. 27 TMS-EEG is mentioned as a promising tool to evaluate tumour-brain interaction, improve preoper-28 active speech mapping and for lateralisation epileptic focus in patients undergoing epilepsy surgery. 29 Lack of detailed patient and outcome information preclude further considerations about TMS-EEG 30 use beyond the potential applications of this technique.
Conclusions: TMS-EEG research in neuro-31 surgery is required to establish the role of this non-invasive brain stimulation-recording technique. 32 Tumour-brain interaction, preoperative mapping and seizure lateralisation are in the front row for 33 its future applications.

WP2-17

Utility of Artificial intelligence (AI) and Machine Learning (ML) in Intraoperative Raman Spectroscopy (iRS) and Stimulated Raman Histology (SRH) for near real-time diagnosis in Central nervous system (CNS) tumour surgery-a scoping review

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Objectives: Central nervous system (CNS) tumours pose significant surgical challenges given their highly infiltrative nature. Intraoperative Raman spectroscopy (iRS) enables molecular analysis of unprocessed tissue samples, distinguishing tumour from normal brain tissue based on vibrational spectral signatures. Stimulated Raman histology (SRH) provides cellular-level imaging of unprocessed tissue for histopathological assessment. However, both techniques require expert interpretation and are time-consuming.
Design: This review evaluates the application of Artificial intelligence (AI) and Machine Learning (ML) models in iRS and SRH, highlighting their potential in achieving near real-time intraoperative diagnosis and streamlining neurosurgical decision-making and workflows.
Subjects: Six studies of 513 patients surgery were included in the review
Methods: Database searches identified studies on the utility of AI-ML models in iRS and SRH for CNS tumour surgery. Metrics including tumour margin detection, accuracy, sensitivity, specificity, and impact on intraoperative decision-making and workflows were analysed.
Results: SRH combined with Convolutional Neural Networks enabled near real-time histopathological diagnosis from fresh, unprocessed CNS tumour biopsies within operating theatres, reducing diagnosis time by 91.7% (2.5 minutes vs. 30 minutes), with an accuracy non-inferior to neuropathologists. Other ML models have achieved 93.9% accuracy in molecular subtyping of Isocitrate Dehydrogenase (IDH) and 1p/19q statuses in diffuse gliomas. In meningiomas, iRS augmented with supervised ML models distinguished infiltrated dura from healthy tissue with 95.44% specificity, maximising extent of tumour resection. Some models outperformed 5-ALA fluorescence in glioblastoma diagnosis, increasing accuracy by 76% ($p = 0.0009$). In Primary CNS Lymphoma versus glioblastoma, iRS with ML models achieved 89% sensitivity, guiding decisions on whether to proceed with surgical intervention. AI algorithms also improved iRS accuracy by filtering ambient light artefacts in operating theatres.
Conclusions: The integration of AI-ML with iRS and SRH is a significant advancement in CNS tumour surgery, enhancing surgical workflows. Future research should refine AI algorithms and further validate clinical outcomes in neurosurgical practice.

WP2-18

Compare Medtronic vertex versus Navigus needle biopsy system in surgical time and biopsy result

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Objectives: Compare the Medtronic Vertex versus Navigus in terms of diagnostic samples and surgical time
Design: Retrospective, prospective consecutive stealth guided biopsy cases performed by two participating neurosurgeons in a single unit.
Subjects: All patients underwent biopsy for brain tumours performed by two participating neurosurgeons using stealth guided needle biopsy either by Medtronic Vertex or Medtronic Navigus systems between 1st June 2019 and 31st May 2024. The patient with other biopsy techniques were excluded.
Methods: The patients list was collected using the trust Insight system. The patient's demographic data, surgical date, time for surgery start and end, stealth system used, and biopsy result collected. The surgical time calculated based on the recorded time which is usually the time from the end of WHO checklist (time out) until the dressing is applied and sign-out completed. This typically includes the time for stealth setup and registration.
Results: 51 patients identified with median age 64 year and M:F were 1.04:1. The biopsy was performed using vertex in 28 cases and navigus in 23 cases. Histopathology was inconclusive in 2 cases, one case for Vertex (3.5%) and 1 case for Navigus. (4.3%). The 2 cases had repeated biopsy with diagnostic results. There was one case with insufficient material for the markers, but the result was sufficient for the oncologist to treat. The average time for the Navigus was 1:21, and for the Vertex was 1:19.
Conclusions: Both, Navigus and Vertex Medteronic needle biopsy systems are comparable in accuracy and surgical time.

THURSDAY 13TH MARCH
MAIN SESSION
TM1 TRAUMA

TM1-1
CAMPBELL CONNELLY PRIZE WINNER

The diagnostic utility of salivary microRNAs in non-athlete concussion

Emma Toman
Royal Stoke University Hospital, Stoke, UK

TM1-2

Audit of routine imaging following burrhole evacuation of chronic subdural Haematoma

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Objectives: The aim of this study was to review current departmental practice and outcomes for patients with chronic subdural haematoma (CSDH) who had undergone burrhole evacuation. New consensus guidelines on management of patients with CSDH recommend against routine post-operative imaging and recommend starting chemoprophylaxis for venous thromboembolism (VTEp) 24–48 hours post-operatively.[1]
Design: Single-centre retrospective analysis.
Subjects: Adult patients with CSDH who underwent burrhole evacuation from January to October 2024.
Methods: Records were identified from clinical coding (n = 58) with ineligible patients excluded (n = 15). Data collection from case records (n = 43) included demographics, laterality, length of stay, post-operative imaging and VTEp, readmission and mortality rates.
Results: Forty-three patients were included, 32 males and 11 females. Site of CSDH was left n = 20, right n = 10 and bilateral n = 13. The aetiology of CSDH was head injury in 65% of patients. Median age was 77 years (IQR 75–81) and median length of stay was 5 days (IQR 4–9). 100% of patients underwent routine post-operative CT head. For 39/43 patients CT head demonstrated residual but improved haematoma appearance and one patient returned to theatre. Twenty-three patients were prescribed antiplatelet or anticoagulant agents pre-admission. Post-operatively 13 patients received chemical VTEp, on average after four days. Twenty-nine did not receive chemical VTEp during admission. Mortality was 9% and readmission rate was 14%.
Conclusions: This audit provides evidence that it is safe to discontinue use routine CT head following burrhole evacuation of CSDH and that post-operative imaging should be guided by clinical condition, in line with ICENI guidelines, reducing unnecessary radiation exposure for patients and costs for departments.[1]

Reference

1. Stubbs DJ, Davies BM, Edlmann E, Improving Care In Elderly Neurosurgery Initiative (ICENI) Working Group. 2024, *et al.* Clinical practice guidelines for the care of patients with a chronic subdural haematoma: Multidisciplinary recommendations from presentation to recovery. *Br J Neurosurg* 2024; 11:1–10.

TM1-3

Guidance on conservative management of acute subdural haematoma in the elderly

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Objectives: Outcomes of craniotomy for acute subdural haematoma (ASDH) in elderly patients are often poor, leading to initial conservative management with a potential burr hole drainage after clot liquefaction. However, the lack of specific guidelines for conservative management in non-neurosurgical settings can result in misinterpretation of neurosurgical advice and subsequent mismanagement. Stemming from an index case, this audit aimed to evaluate the extent of these issues and propose solutions.
Design: A retrospective audit.
Subjects: Elderly patients (>70years) diagnosed with ASDH.
Methods: The audit comprised two parts: 1. District Hospital Cohort: Review of neurology, comorbidities, mass effect, advice, and outcomes for patients admitted under General Medicine over one year. 2. Regional Neurosurgical Centre Referrals: Analysis of referrals via the Orion system over one month where conservative management was advised. Presentations were clinically graded as: • Category A: Small ASDH with no mass effect, requiring routine head injury management and no follow-up. • Category B: Sizeable ASDH (with/without mass effect) where close monitoring +/− delayed intervention may be appropriate. • Category C: Large ASDH where surgery is futile, warranting best supportive care. The alignment between advice and its implementation at district hospitals was assessed.
Results: 1. District Hospital Cohort: Of total 18 patients, three cases of misinterpretation of advice led to two avoidable deaths and one delayed intervention. 2. Neurosurgical Referrals: 34 referrals involved ASDH. Among these, 15 were insignificant, 13 required monitoring, and 6 were deemed futile. Eleven patients received non-specific 'conservative management' advice, prone to misinterpretation.
Conclusions: While NICE guidelines exist for head injuries, they lack specificity for managing non-GCS 15 patients in non-neurosurgical settings. Explicit neurosurgical advice is essential to mitigate risks and improve patient outcomes.1,2

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TM1-4

Factors associated with extended ICU stay in traumatic brain injury patients admitted to neurosurgical ICU

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Objectives: To identify factors associated with extended ICU stays (>7 days) in traumatic brain injury (TBI) patients.
Design: Retrospective cohort study.
Subjects: TBI patients admitted to a neurosurgical ICU, comparing those with ICU stays ≤7 days (n = 1990) to those with ICU stays >7 days (n = 1958).
Methods: Demographics, medical history, injury mechanism, admission characteristics, imaging findings, and interventions were analysed to identify factors associated with ICU length of stay. Statistical comparisons between the two groups were performed.
Results: Patients with ICU stays >7 days had a higher prevalence of diabetes (7% vs. 5%, $p = 0.006$) and vehicle-related injuries (28% vs. 19%, $p < 0.001$). They presented with lower Glasgow Coma Scale scores (median 7 vs. 13, $p < 0.001$), higher initial blood sugar levels (median 161 vs. 120 mg/dL, $p < 0.001$), and increased coagulopathy (43% vs. 34%, $p < 0.001$). Imaging showed greater incidence of subarachnoid haemorrhage (33% vs. 27%, $p < 0.001$), intracerebral haemorrhage (37% vs. 28%, $p < 0.001$), and skull base fractures (38% vs. 30%, $p < 0.001$). The extended ICU stay group required more decompressive craniectomies (19% vs. 6%, $p < 0.001$) and tracheostomies (52% vs. 3%, $p < 0.001$).
Conclusions: Extended ICU stays in TBI patients are associated with severe injury, complex imaging findings, and increased need for surgical interventions. Identifying high-risk patients early can help guide targeted interventions to optimise outcomes and resource utilisation in TBI care.

TM1-5

Abdominal and pelvic surgery in traumatic brain injury patients; a registry-based retrospective analysis

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Objectives: To investigate the impact of concurrent abdominal and pelvic injuries on the prognosis of traumatic brain injury (TBI) patients, with a focus on the need for surgical intervention and long-term outcomes.
Design: Cross-sectional study.
Subjects: 1492 TBI patients aged 14 years and older, admitted to a major trauma centre between 2016 and 2018.
Methods: We collected routinely recorded data from the emergency department for the independent variables. The outcome measures included the occurrence of abdominal or pelvic surgeries and the 6-month Glasgow Outcome Scale (GOS) score, categorised as favourable or unfavourable, in TBI patients who underwent such surgeries (n = 101).
Results: Key findings indicated that TBI patients with skull base fractures (OR =1.977, 95%CI 1.106–3.534), those who underwent decompressive craniectomy (OR =3.586, 95%CI 1.399–9.194), younger age (OR =0.982, 95%CI 0.966–0.998), and lower admission blood pressures (OR =0.973, 95%CI 0.962–0.984) were more likely to require abdominal or pelvic surgeries. A favourable outcome was less likely among those who underwent surgery (OR =0.526, 95%CI 0.285–0.970). Furthermore, in patients who had abdominal or pelvic surgeries, younger age (OR =0.902, 95%CI 0.836–0.973) and pelvic surgeries (OR =6.016, 95%CI 1.972–18.351) were associated with unfavourable long-term outcomes.
Conclusions: Abdominal and pelvic surgeries in TBI patients are strongly linked to unfavourable long-term outcomes. These findings should be considered in clinical decision-making and prognosis for TBI patients with concurrent injuries.

TM1-6

Taking on the impossible – outcomes of a new secondary/complex cranioplasty service

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Objectives: To audit outcomes of a secondary/complex cranioplasty team in a tertiary unit.
Design: Retrospective audit.
Subjects: All adult cases referred for secondary cranioplasty, or requiring complex reconstruction.
Methods: Audit of outcomes, looking primarily at treatment failure, and potential predictors of failure.
Results: A total of 29 patients have completed treatment under the care of the team. The team consists of a neurosurgeon, adult craniofacial surgeon and free tissue surgeons. 23 cases had previous infections. Cases had been operated between 0 and 7 times (mean 3.2), for a variety of primary pathologies. Titanium was used for secondary reconstruction in 19 cases, hydroxyapatite in 5, autologous/split graft in 3 and two elected for no further reconstruction. Complex was defined as multiple failed surgeries or large, complex defects. Cases were operated either by craniofacial surgeon alone, craniofacial and neurosurgical or the whole team, depending on the skill mix required for the bone and soft tissue defect to

be reconstructed. 7 patients have had free tissue transfer and 2 patients rotational scalp flaps. A total of 6 cases have had complications (20%). 2 plate infections, one neck wound infection, one plate fracture, one haematoma requiring plate removal and one flap skin breakdown. This compares favourably with primary cranioplasty published case series despite our complex case load. Only 2 cases currently have not managed to be reconstructed due to complications. Free flap cases have a higher rate of complication (2 out of 6). Complication rate for non free tissue transfer cases was 14%.

Conclusions: Use of a multi-disciplinary team produces consistently safe treatment with very acceptable morbidity. We believe that meticulous planning of the hard tissue reconstruction combined with considered incision placement and soft tissue handling is key to providing consistent high quality outcomes in this group.

TM1-7

Benign paroxysmal positional vertigo in acute traumatic brain injury patients – data from a multi-centre prospective randomised feasibility study

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Objectives: Benign paroxysmal positional vertigo (BPPV) affects approximately 34% of acute TBI patients. However, there is a paucity of acute prospective data regarding the most effective treatment, optimal time to treat and recurrence. Given such uncertainties we aimed to investigate the feasibility of assessing and treating BPPV in acute TBI.

Design: Multi-centre randomised controlled feasibility study

Subjects: Participants were recruited from three major trauma centres in London, UK. Inclusion criteria included those >18 years, with a closed head injury (as noted by CT scan) and were an inpatient on a major trauma or outlying ward. Importantly, subjective dizziness was not a prerequisite for inclusion.

Methods: Patients were assessed for BPPV by trained ward therapists. Those with BPPV were randomly allocated to one of three interventions (repositioning manoeuvres, Brandt Daroff exercises or advice) and were followed up at 4 and 12 weeks.

Results: 192 patients consented to participate. Of those, BPPV was diagnosed in 58. Skull fracture was significantly associated with the presence of BPPV. Adverse events of vomiting were noted in 6 patients, whilst 11/58 patients sustained a fall during the trial. Repositioning manoeuvres appeared to be more effective at treating BPPV (75% of patients had a negative Dix Hallpike at 12 week follow up compared to 42% and 52% in Brandt Daroff and advice groups respectively). Despite a short follow up period of 12 weeks, recurrences were noted in just under a fifth of patients.

Conclusions: This is the first data from a prospective study investigating the feasibility of assessing and treating BPPV in acute TBI. A large proportion of patients with BPPV had experienced a skull fracture. Bilateral BPPV appears to be more common than previously recognised. Although repositioning manoeuvres appeared to be effective, a significant proportion of patients experienced a recurrence in our short follow up period.

TM1-8

The utility of the pupillometer in the ED population and its neurological implications: a service evaluation

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Objectives: To evaluate the relationship between age and pupillary metrics, particularly the Neurological Pupil Index (NPi), in a diverse emergency department (ED) population, aiming to improve neurological assessments and patient outcomes.

Design: A single-centre observational study using automated pupillometry to assess pupillary function in ED patients.

Subjects: The study included 439 alert (GCS 15) adult ED patients, ages 18–95.

Methods: Automated pupillometry was employed to measure pupillary metrics, including minimum pupillary size, NPi, and secondary parameters such as constriction and dilation velocities. Multiple regression models were used to identify predictors of NPi in both eyes. The relationships between age, pupillary size, and NPi were examined, with statistical significance set at $p < 0.05$.

Results: Minimum pupillary size and resting pupillary size showed a significant negative association with age, with older patients having smaller pupils ($p < 2.2e\text{-}16$). NPi values, conversely, increased with age ($p < 0.05$). Minimum pupillary size emerged as the most significant predictor of NPi ($p < 2.2e\text{-}16$). Secondary metrics, such as constriction and dilation velocities, did not significantly affect NPi, suggesting limited clinical relevance in the context of neurologically intact GCS 15 patients.

Conclusions: Age strongly influences pupillary size and NPi, with smaller pupils and higher NPi values observed in older individuals. Minimum pupillary size was the strongest predictor of NPi, while constriction and dilation velocities offered minimal additional value. Incorporating age-adjusted reference values for NPi into clinical practice could enhance

neurological assessments. Larger, multi-centre studies are needed to confirm these findings and explore automated pupillometry's role in evaluating neurological conditions, particularly in patients with impaired consciousness and GCS.

TM1-9

Neuronal death and inflammation can be ameliorated via modulation of High Mobility Group Box 1 (HMGB1) signalling in a human tissue model of traumatic brain injury

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Objectives: We previously presented data[1] outlining increases in brain cell death and neuroinflammatory gene expression, mediated via the substance HMGB1, in a novel human tissue explant model of Traumatic Brain Injury (TBI). Our next research questions were: whether these gene expression alterations translate to significant changes at the protein and cellular level, and whether modulation of these pathways might ameliorate neurotraumatic cell death, and modulate cell phenotype behaviours, in this TBI model.
Design: Three-dimensional cultures were generated from human brain cortex. After ten days in vitro, half of cultures underwent weight-drop injury to simulate TBI, whilst half remained as uninjured controls.
Subjects: Human cortical tissue was collected from appropriately consented patients, ($n = 50$) undergoing resections of non-traumatic lesions, (e.g. sclerosis, neoplasia).
Methods: Neuronal and inflammatory protein levels were assessed in control and injured cultures, with and without HMGB1-modulation, using proteomic mass spectrometry, immunocytochemistry, and immunosorbent assays. Cell death and cell phenotype quantification, via immunofluorescence, was also performed after control and injured cultures were treated with a variety HMGB1-signalling antagonists.
Results: Proinflammatory protein levels within the cultures were markedly increased after injury, with concomitant reductions in proteins associated with neuronal integrity. Neuron death, with concordant upregulation of deleterious microglia and immature oligodendroglial cells, was also observed following neurotrauma. These patterns were all reversed after treatment with HMGB1-antagonism targeting the Receptor for Advanced Glycation End products, but not with Toll-Like Receptor blockers.
Conclusions: The reduction in post-traumatic human neuron death, and concordant down-regulation of deleterious proinflammatory protein levels, following treatment with selected HMGB1-antagonists in this model, highlights that this signalling sub-pathway is a promising candidate for further drug development. This could represent a novel avenue to improve clinical outcomes for future TBI patients.

Reference

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TM2 VASCULAR

TM2-1

Risk factors for anterior communicating artery aneurysm rupture: a case-control study

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Objectives: Unruptured intracranial aneurysms have a point prevalence of 2–3% and the vast majority never rupture. The ISUIA study suggests that IA located within the anterior circulation <7mm in size have a 0% rupture rate. More recent data suggest this may not apply to anterior communicating artery aneurysms (ACoA). The aim of this study was to determine factors associated with ACoA rupture.
Design: Case Control Study.
Subjects: 100 patients with ruptured AcoA, 100 patients with unruptured AcoA.
Methods: A cohort of consecutive unruptured ACoA (controls) were then compared to a matched population of ruptured ACoA (cases). Aneurysm morphology and A1 diameter was assessed using thin slice (0.5–1mm) CT/MR angiography. Lasso logistic regression analyses were performed using Python and ROC analysis was performed to asses model performance.
Results: 360 ruptured ACoA were treated during the study period. The median size at rupture was 5mm and 267/360 (74%) were ≤ 7mm in maximal diameter. During the same period, 100 consecutive patients with unruptured ACoA were followed up for a median duration of 38 months (IQR 40). None ruptured during follow-up. These were matched to 100 ruptured ACoA. The mean 5-year rupture rate predicted by ISUIA and the annual rupture rate predicted by UCAS were both lower in the ruptured cohort. On multivariate analysis, irregular morphology (OR 2.63, $p = <0.001$), hypertension (OR 1.66, $p = 0.005$) and the presence of A1 aplasia/hypoplasia (OR 1.47, $p = 0.046$) were significantly associated with ACoA rupture. The AUC of the model was 0.84, indicating good model performance.
Conclusions: Irregular aneurysm morphology, hypoplasia/aplasia of the A1 segment and hypertension were found to be associated with ACoA rupture. Aneurysm size was not identified as a significant predictor of rupture. These findings may assist in selecting patients with ACoA at high risk of future rupture who stand to benefit the most from treatment.

TM2-2

Outcomes of microsurgical clipping of unruptured saccular middle cerebral artery aneurysms

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Objectives: To assess the outcomes of microsurgical clipping of unruptured saccular middle cerebral artery (MCA) aneurysms.
Design: This is a single surgeon series.
Subjects: A prospective database of all aneurysms which underwent microsurgical clipping between 1st January 2013 and 31st December 2022 was examined. All patients undergoing clipping of unruptured MCA aneurysms were examined.
Methods: Fusiform aneurysms, recurrent aneurysms, and aneurysms requiring bypass surgery and AVM-associated aneurysms were excluded. Patient demographics and operative details were obtained from a prospective single surgeon aneurysm database. Clinical and radiological records were assessed for any postoperative complications.
Results: 112 unruptured saccular MCA aneurysms in 99 patients were treated by microsurgical clipping. 72 were female. Median (interquartile range: 50–59 years) age was 56 years. 67 patients' aneurysms were identified incidentally. 32 patients had family history of intracranial aneurysms. 52 patients had multiple aneurysms. 53 patients' clipped MCA aneurysms were right sided and 3 patients had bilateral MCA aneurysms clipped separately. There was no postoperative mortality. 15 patients suffered temporary postoperative focal neurological deficit (10 dysphasia, 1 hemiparesis and dysphasia, 2 hemiparesis and facial weakness, 1 hemiparesis only and 1 facial weakness only), all of which subsequently resolved. There were no cases of permanent focal neurological deficit. 1 patient required CSF diversion for hydrocephalus. There were 3 superficial wound infections. There were no deep seated bone or intracranial infections. There have been no cases of aneurysm rupture or retreatment during the follow up period.
Conclusions: Microsurgical clipping is a safe and effective method for treating unruptured MCAs in appropriately selected cases. The results of endovascular techniques including long term follow up should be compared with those of microsurgical clipping.

TM2-3

A retrospective observational study of argipressin use in patients with aneurysmal Subarachnoid Haemorrhage (aSAH) admitted to the intensive care unit (ICU)

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Objectives: Aneurysmal Subarachnoid Haemorrhage (aSAH) complicated by cerebral vasospasm can result in Delayed Cerebral Ischaemia (DCI) and other adverse outcomes. Mean Arterial Pressure (MAP) augmentation is used to prevent cerebral hypoperfusion in DCI using various vasoactive agents. One such agent is Argipressin, and is associated with hyponatremia.
Design: This study explores the use of Argipressin for MAP augmentation in aSAH patients with a focus on hyponatremia.
Subjects: Sixty-six patients with 69 admissions were included under three groups of Argipressin ($n = 26$), other vasopressor ($n = 33$) and no vasopressor ($n = 10$).
Methods: A retrospective review of patients with aSAH admitted to the ICU of a national neurosciences hospital was performed (Institutional approval: CA2023/264). Changes in serum sodium levels, requirement for treatment of hyponatremia (glucocorticoids, hypertonic saline), and MAP targets were compared across the groups.
Results: Patients on Argipressin had significantly higher Sequential Organ Failure Assessment (SOFA) scores (7.5 vs 6 vs 2.5, $p < 0.0001$) and World Federation of Neurological Surgeons (WFNS) grades (4 vs 2 vs 2, $p = 0.0017$) compared to other vasopressor and no vasopressor groups. Argipressin use resulted in higher cumulative hydrocortisone doses (1000 mg vs. 250 mg, $p = 0.04$) and longer treatment duration (4 vs. 2 days, $p = 0.04$) compared to other vasopressor group. The decrease in serum sodium was greater in the Argipressin group (4.5 mmol/l vs 3.0mmol/l, $p = 0.20$) but surprisingly not statistically significant. MAP targets were significantly lower for the Argipressin group (80mmHg vs 95 mmHg). Time to vasopressor cessation was significantly longer in Argipressin group (10.5 vs. 6.0 days), with a 56% lower probability of cessation (hazard ratio:0.4384, 95% CI: 0.2560–0.7507).
Conclusions: Our study suggests that Argipressin, while being a potent vasopressor to maintain MAP in poor-grade aSAH patients, may worsen their hyponatremic burden. Larger studies are required to corroborate these findings on its effect on serum sodium levels in aSAH.

TM2-4

CT beyond six hours in suspected subarachnoid haemorrhage: is lumbar puncture still relevant?

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Objectives: To assess the investigation of suspected subarachnoid haemorrhage (SAH), evaluating adherence to NICE guidelines, detection rates of SAH on CTs performed beyond 6 hours from symptom onset, and the relevance of lumbar puncture (LP) in diagnosis.
Design: Single-centre retrospective cohort audit.
Subjects: Adult patients presenting with symptoms suggestive of SAH from October 2023 to October 2024 to a district general hospital.
Methods: Patients were identified through CT requests containing keywords suggestive of SAH, coded diagnoses of SAH or unspecified cerebral haemorrhage at discharge, and recorded LPs. Inclusion criteria: age >18, symptoms suggestive of SAH, no trauma history, and documented symptom onset. Data collected included time from symptom onset to imaging, CT findings, LP performance, and xanthochromia results.
Results: 97 patients (mean age 51 ± 18 years, 66% female) were included. CT identified SAH in 16 patients (mean age 57 ± 17 years, 97% female, with aneurysmal SAH in eight cases). Of the positive CTs, seven occurred <6 hours, two within 6–12 hours, two within 12–24 hours, and five beyond 48 hours. 14 patients had alternative radiological findings, while 67 had no identified cause. Of 53 patients scanned >6 hours, 8 underwent LP; none showed xanthochromia (2 samples were insufficient/lost). Two patients underwent LP despite CT <6 hours: one had a CT suggestive of SAH with a degraded cerebrospinal fluid (CSF) sample; the other had a negative CT and CSF.
Conclusions: LPs were not routinely performed for patients with negative CT scans and were often hindered by sample issues or patient refusal. Modern CT imaging effectively identified SAH beyond 6 hours. No missed SAH cases were identified in discharged patients, though limited follow-up prevents definitive conclusions. These results suggest that larger multi-centre studies could provide further evidence to refine guidelines and extend the CT window for ruling out SAH.

TM2-5

Impact of personalising antiplatelet drug therapy based on platelet function testing of patients undergoing insertion of intracranial stent or flow divertor

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Objectives: To evaluate the impact of adjusting dual antiplatelet therapy (DAPT) for patients undergoing intracranial stenting or flow diversion (IS/FD) for the treatment of intracranial aneurysms based on platelet function testing (PFT).
Design: Single centre retrospective series. End-points include the risk of post-procedure diffusion weighted imaging (DWI) changes, new neurological deficit and groyne haematomas or pseudo-aneurysms.
Subjects: The inclusion criteria includes (1) all patients undergoing IS/FD between January 2017 to December 2021; (2) patients ≥16 years old; (3) no concomitant use of contour or web devices; (4) availability of PFT.
Methods: Patients were divided into those who had DAPT changed vs those who had not. Presence of DWI hits was based on post-procedure MRI imaging reported by a consultant neuroradiologist. Presence of complications was based on clinical notes.
Results: Of the 216 patients who underwent IS/FD, 171 patients met the inclusion criteria. 66 (38.60%) of included patients had DAPT changed. The basic demographics of both cohorts were similar (mean age 55.79 (±2.58) vs 56.12 (±1.85), *p*-value 0.831; Male:Female ratio 1:2 vs 1:3.2, *p*-value 0.174). There were similar rates of new DWI changes between the two cohorts (42.42% vs 40.00%, (*p*-value 0.754)). However, there were more patients had new neurological deficits amongst patients who had their DAPT changed (21.43% vs 4.76%, (*p*-value 0.0318)). There were no differences between rates of groyne haematomas or pseudo-aneurysms (7.58% vs 3.81%, (*p*-value 0.283)).
Conclusions: Based on our current practice, patients who had their DAPT changed are at higher risk of having new neurological deficit after IS/FD insertion. It is unclear if this is due to a lack of standardisation when DAPT is changed based on PFT or if patients who have abnormal PFT tend to be more prone for thrombotic events. A local protocol for PFT and DAPT is being discussed.

TM2-6

Decompressive craniectomy for MCA infarction: a two-cycle audit on regional practices and adherence to NICE guidelines

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Objectives: To evaluate the surgical role of decompressive craniectomy (DC) in managing middle cerebral artery (MCA) infarctions. This audit compares current regional practices against NICE guidelines published in 2019, aiming to improve referral quality, Assess neurosurgical on call decision and patient outcomes.
Design: A retrospective two-cycle audit of referrals for DC, analysing adherence to guidelines, neurosurgical decisions, and patient outcomes. two audit cycles: 1st cycle (July 2020–June 2021) and 2nd cycle (July 2022–June 2023).
Subjects: Adult patients (≥18 years) referred for neurosurgical intervention following MCA infarction to The Walton Centre. Exclusions included infarctions outside the MCA territory and other small territorial strokes.
Methods: Referrals and outcomes were assessed using Orion and emergency theatre data. Parameters included patient demographics, percentage MCA infarction, Glasgow Coma Scale (GCS), eligibility under NICE guidelines, Oncall decision and outcomes. Statistical comparisons of referral quality and patient outcomes were performed across both cycles.

Results: -Referral rates increased slightly: 43 (1st cycle) to 47 (2nd cycle). -Adherence to NICE guidelines from referring hospitals improved from 16% in the 1st cycle to 31% in the 2nd cycle. -Thrombectomy access increased from 10% (1st cycle) to 19% (2nd cycle). -Neurosurgeons accepted 6 patients (1st cycle) and 5 patients (2nd cycle) for DC, with outcomes split between rehabilitation discharge (50%) and mortality (50%). -Several referrals meeting NICE criteria were declined due to high surgical risk or poor prognosis.
Conclusions: Thrombectomy services showed measurable improvement, but referral quality remains a challenge. Structured regional pathways involving early stroke team input, joint care by neurology and neurosurgery, and local education are essential to align practices with NICE guidelines and improve patient outcomes.[1]

Reference

1. NICE Guidelines: Decompressive Craniectomy for Malignant MCA Infarction, May 2019. Vahedi K, *et al.* (2007). *Early decompressive surgery in malignant MCA infarction: pooled analysis of DECIMAL, DESTINY, and HAMLET trials.* Lancet Neurology 2007; 6(3) 215–22.

TM2-7

A single centre experience of intracranial AVM treatment

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Objectives: To evaluate outcomes in patients whose intracranial AVMs were treated in our centre over a 7 year period.
Design: Retrospective case series.
Subjects: 59 patients who first underwent treatment of their intracranial AVMs in our unit between 2015 and 2022.
Methods: We searched our neurovascular database for patients who first underwent treatment of their intracranial AVMs between 2015 and 2022. We then collected relevant data from our EPR systems.
Results: Mean age was 45.7 years at the time of initial treatment. 84.7% of AVMs had bled prior to treatment. Mean follow-up was almost 3 years. 52.5% of patients were managed on a scheduled basis while the rest were treated emergently. Endovascular treatment was the initial treatment modality in all cases. 79.4% of procedures were completed successfully. 38.0% of successful initial procedures resulted in radiographic AVM obliteration. There was a trend towards higher obliteration rates in those treated on a scheduled basis (48.0%) versus unscheduled basis (28.0%), though this did not reach statistical significance. There was a trend towards higher obliteration rates in patients whose AVMs had not bled (55.6%) compared with those that had (34.1%), but this did not reach statistical significance. 92.5% of patients whose initial treatment was unsuccessful or did not achieve obliteration underwent further procedures. In these patients, repeat endovascular treatment was the modality most frequently chosen, followed by SRS, and finally surgery. Radiographic obliteration was achieved in 81.3% of patients who underwent further treatment. Recurrence rate was 0%. Complication rate was 13.6%.
Conclusions: Endovascular techniques are the first line modality for treating AVMs in our centre. We do not offer SRS for the treatment of AVMs in our centre. Radiographic obliteration was achieved in over a third of patients after successful initial treatment. Incompletely treated AVMs had excellent obliteration rates following re-treatment. Recurrence rate was 0%. The complication rate was low.

TM2-8

Cerebrovascular bypass surgery – over 20 year experience in a quaternary neurosurgical centre

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Objective: Cerebral revascularization is performed in patients with neurovascular disorders for various reasons when conventional treatments are not feasible or have been exhausted. It is used to augment or replenish blood flow for ischaemia from steno-occlusive disease, moyamoya, etc.; to reinstitute or replace blood flow in the treatment of complex aneurysms, tumours, etc.; and to divert or reverse blood flow to facilitate thrombosis and occlusion of unstable aneurysms. Re-establishing adequate cerebral perfusion through bypass surgery is vital to prevent long-term neurological sequelae associated with these pathological conditions and if left untreated are a significant cause of morbidity and mortality. Though cerebrovascular bypass surgery is a well-established treatment in highly specialised dedicated quaternary neurovascular centres practised around the world, it is offered in limited centres across the United Kingdom and Republic of Ireland. This study aimed to highlight our experience of cerebrovascular bypass surgery in management of neurovascular diseases in a quaternary neurosurgical centre in the United Kingdom
Methods: A Retrospective case series of 68 adult and paediatric cases managed with cerebrovascular bypass surgery from January 2003 to December 2024, in a high-volume quaternary referral neurosurgical centre in the United Kingdom.
Results: 68 patients were included in the study period. 43 patients had direct bypass surgery for low flow vascular abnormalities, whilst 20 patients had high flow vascular abnormalities. 5 cases were indirect cerebrovascular bypass for moyamoya, these were managed with EDAMS ($n = 4$) and EDAS ($n = 1$). Within the low flow group, 36 patients underwent superficial temporal artery harvest, and 7 patients underwent occipital artery graft harvest. Within the high-flow cohort, 19 patients had radial artery graft harvest, and 1 patient had saphenous venous graft used. Overall, 28 patients underwent cerebrovascular bypass surgery for moyamoya disease phenomena or syndrome, 23 bypass cases were for giant aneurysm, 3 cases were for dissecting, thrombosed or

blister aneurysms, 5 were for complex PICA aneurysms. In the high-flow cohort, 7 patients had vascular complications including spontaneous intra-operative aneurysmal rupture and death, thrombosed grafts and stroke, 3 recovered fully with revision of their grafts. 6 patients had complications within the low-flow cohort including graft thrombosis, skin necrosis and poor graft uptake. 1 patient in the indirect bypass cohort developed a stroke with dysphasia.
Conclusions: This study underscores the importance of cerebral vascular bypass surgery as a transformative intervention for patients with high-risk neurovascular pathology, highlighting improved patient outcomes and clinical recovery following intervention. Multidisciplinary care approach, dedication, discipline and documentation of data in cerebrovascular bypass surgery is mainstay in ensuring appropriate decision making and improving patient outcomes for these onerous and formidable cases who otherwise have no alternatives.

TM3 BASIC SCIENCE

TM3-1

Go small – win big: microRNAs, Nobel Prize, future neurosurgery

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World Federation of Neurosurgeons;

Objectives: Progress in neurosurgery to date has involved improved precision for incision and excision. Many neurosurgical conditions are not 'cured' by traditional surgery, e.g. most brain tumours, stroke, trauma, degenerative spine. The disappointingly modest success of stem cells for conditions like spinal cord injury has led to additional techniques to augment neural repair/regeneration.
Methods: Extracellular vesicles (exosomes, EVs) allow cell to cell communication and can aid the diagnosis and treatment of many nervous system conditions. A major 'cargo' of EVs are small non-coding RNAs – microRNAs (miRNAs) and related 'long' non-coding RNAs (lncRNAs) and circular RNAs (circRNAs). Awarding the 2024 Nobel Prize in Physiology or Medicine to Victor Ambros and Gary Ruvkun for describing miRNAs suggests their importance for nervous system disorders (among other disorders). PubMed searches in November 2024 updated earlier searches on EVs and miRNAs.
Results: Searches for < microRNA and brain > plus < microRNA and spine > alone yielded over 5000 articles, with 300+ published in 2024. Examples of neurosurgical conditions where miRNAs can enhance diagnosis and/or treatment: – Malignant primary and metastatic brain tumours: miRNAs can aid diagnosis (biomarkers), enhance native immunotherapy, improve chemotherapy response (e.g. temozolomide) – Meningiomas: circulating miRNAs can monitor tumour growth or regression, reducing need for CT/MRI scans – Stroke/vasospasm: miRNAs can be an ultra-early biomarker for ischaemic stroke and can ameliorate both secondary brain damage and vasospasm – Trauma: miRNAs can be biomarkers and ameliorate neuroinflammation – Degenerative spine and disc disease: miRNAs can ameliorate disc degeneration, ligmentum flavum hypertrophy (lumbar stenosis), osteoporosis – Neurodegenerative disorders: miRNAs can be both predictive and therapeutic for Alzheimer's, Parkinson's, etc. – Mood disorders: miRNAs contribute to the pathogenesis of depression, bipolar disorder, PTSD.
Conclusions: Neurosurgeons should collaborate with research colleagues, given the impact miRNAs will have on the diagnosis and treatment of many neurosurgical conditions.

TM3-2

Nanomedicine at the service of drug delivery for primary and secondary brain tumours

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Objectives: Primary and secondary brain tumours often hold devastating prognosis and low survival rates despite the application of maximal neurosurgical resection, and state of the art radiotherapy and chemotherapy. One limiting factor in their management is that several antineoplastic agents are unable to cross the blood brain barrier (BBB) to reach the tumour microenvironment. Nanomedicine could hold the potential to become an effective means of drug delivery to overcome previous hurdles towards effective neuro-oncological treatments
Methods: A scoping review, following the SANRA guidelines was conducted using key terms input into PubMed to find articles that that reflected emerging trends in the utilisation of nanomedicine in drug delivery for primary and secondary brain tumours.
Results: Various strategies were found in this scoping review that have been exploited by different nanoparticles to bypass the BBB and contribute to therapeutic protocols based on: chemotherapy, immunotherapy, focused ultrasound, radiotherapy/radiosurgery and radio-immunotherapy.
Conclusions: The emerging trends summarised in this scoping review indicate encouraging advantageous properties of nanoparticles as potential effective drug delivery mechanisms. However there are still nanotoxicity issues that largely remain to be addressed before translation of those innovations from laboratory to clinical practice.

TM3-3

Mismatch repair protein expression in glioblastoma and its implications in newly diagnosed glioblastoma

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Objectives: We proposed to evaluate mismatch repair protein expression, namely mutL homologue 1 (MLH1), mutS homologue 2 (MSH2), mutS homologue 6 (MSH6), and post-meiotic segregation increased 2 (PMS2), in GBM, and correlate them with PDL-1 expression and evaluate their influence in survival.
Design: A retrospective observational study.
Subjects: Patients with confirmed IDH wild type GBM, operated between 2018–2021 in our Institute and received adjuvant therapy were included in the study.
Methods: Clinical and survival data were collected from the records and regular follow up. IHC for PDL-1 and various MMR proteins were performed on the FFPE tissue sections. Relevant statistical tests were employed for analysis.
Results: This study included 69 patients of GBM treated, (43 men and 26 women). The mean age of the cohort was 51.54 ± 11.57 years. MSH2, MSH6, MLH1, PMS2 were studied in 69 cases. MSH6 was found to be lost in 8.6% of the cases with MSH2 and MLH1 in 7.2% and 1.44% of the cases respectively. The cumulative MMR protein loss of expression in the study was found to be 13.04% and PDL-1 immunopositivity in 29% of the cases. Inter marker analysis revealed no significant association between the markers studied. PDL-1 positive group had lesser median overall survival, although it was not statistically significant to arrive at a conclusion. Loss of MMR expression was found to be a significant factor affecting survival. The median OS in patients with retained expression was 12 months, while in those with loss of expression, the median OS was 19 months.($p = 0.055$).
Conclusions: Our study demonstrated that MMR proteins are expressed in a small percentage of primary GBM patients, the expression of which potentially influence survival. Their expression did not correlate with PDL-1 expression. A thorough experimental validation is necessary to fully comprehend the underlying mechanism of spontaneous hypermutagenesis in gliomas.

TM3-4

Radiogenomic AI model predicts cancer immune signature in IDH-wildtype glioblastoma: PRECISE-GBM study

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Objectives: The aim of the study is to identify machine learning based radiological biomarkers that can predict immune status within the tumour microenvironment of IDH-wildtype glioblastoma.
Design: This is a retrospective multicentre machine learning based study
Subjects: This study utilises open access anonymised matched radiogenomic data of TCGA-GBM, CPTAC, Ivy GAP, REMBRANDT and CGGA datasets.
Methods: Imaging data consisted of MRI based radiomic features extracted from deep learning based segmented tumours. Immune scores and cell-specific scores (T cells, tumour associated macrophages (TAMS), dendritic cells (DCs) and natural killer cells (NK cells)) were extracted from the transcriptome. Eleven AI models were trained with overall immune scores and immune cell-specific scores. Validation of the trained model was performed with the held-out REMBRANDT and CGGA dataset.
Results: One-hundred-and-ten patients were included in the study. Trained AI models predicted the labels for immune score and cell-specific scores (CD4, CD8 T cells; M0, M1, M2 TAMS; DCs, NK cells) with balanced accuracy of 1.00, 0.90, 0.92, 0.92, 1.00, 0.87, 0.92, 0.87 respectively. In the REMBRANDT validation dataset, the low score predictions were correct in 66.7%, 88.9%, 91.7%, 83.3%, 83.3%, 71.4% cases, respectively. Similarly, in the CGGA validation dataset, low score predictions were correct in 60%, 75%, 75%, 100% and 100% cases, respectively.
Conclusions: The radiomic signature and the radiogenomic PRECISE-GBM model non-invasively predicted immune status in IDH-wildtype glioblastoma. The model has the potential to stratify patients for immunotherapy within prospective glioblastoma clinical trials.

TM3-5

Elucidating the efficacy of the brain-penetrant PI3Kα-WNT pathway inhibitor DYR895 against primary glioma cells

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Objectives: The aims of this project were to identify which key signalling pathways are perturbed by the pleiotropic small-molecule kinase inhibitor DYR895 and elucidate the potential cytotoxic, pro-apoptotic, anti-proliferative, and anti-invasive effects of DYR895.
Design: All statistical analysis was carried out as a 2-way ANOVA with Tukey's multiple comparisons using the GraphPad Prism statistical package. Quantification of western blots and 3D invasion assay was done using ImageJ.
Subjects: Not applicable.
Methods: This research utilised three primary patient-derived Glioma cell cultures (GBM6, GBM22, and GBM143) in the cell viability assay and western blots. In the apoptosis, proliferation, and 3D invasion assays only GBM6 was used.
Results: DYR895 inhibits the WNT pathway with 5 nM IC50 in a TopFlash assay (previous data). DYR895 treatment led to a

decrease in relative cell viability {EC50 = 2.79 μM (GBM6), 5.93 μM (GBM22), 2.14 μM (GBM143)}. Western blot analysis and band quantification showed that mean p-AKT/AKT {0.47 a.u. to 0.079 a.u ($p < 0.0001$)} and p-S6K/S6K ratios {0.43 a.u. to 0.22 a.u. ($p < 0.05$)} of all three cell cultures were significantly decreased upon DYR895 treatment. DYR895 treatment induced a significant increase in the percentage of apoptotic cells from 22.08% to 71.42% ($p < 0.001$). Additionally, DYR895 induced anti-proliferative effects, with the fold proliferation of DYR895-treated cells being significantly diminished compared to control-treated cells on days 2 {1.66 vs 3.13 ($p < 0.0001$)}, 3 {2.21 vs 3.67 ($p < 0.0001$)}, and 4 {2.54 vs 5.24 ($p < 0.0001$)}. A low concentration of DYR895 also reduced 3D invasion of glioma neurospheres in geltrex, with a significant decrease in the fold area of DYR895-treated spheroids at 5 days versus control-treated spheroids {0.754 vs 2.14 ($p < 0.0001$)}.

Conclusions: Collectively, these data demonstrate that DYR895 perturbs PI3K/AKT/mTOR signalling and induces cytotoxic, pro-apoptotic, anti-proliferative and anti-invasive effects on Glioma cells in vitro.

TM3-6

Intraparenchymal administration of naïve B lymphocytes protects cognitive function and modulates local neuroinflammation in experimental haemorrhagic stroke

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Objectives: Intracerebral haemorrhage (ICH) is a devastating type of stroke, with up to 70% mortality by 5 years. Currently, no specific treatment exists to improve neurological outcome in ICH survivors, making this a critical unmet need. Long-term neuroinflammation drives ongoing secondary brain injury and morbidity in ICH. Our objective is to develop novel strategies for immunomodulation and neuroprotection after ICH, using cell-based therapies that can adapt to the complex injury microenvironment.

Methods: We investigated the effects of a single intraparenchymal application of B lymphocytes in a murine model of collagenase-induced ICH, assessing in situ survival dynamics and B cell-mediated neuroprotection. Luciferase-expressing B cells were delivered 24 hours post-ICH and tracked using in vivo imaging (IVIS). The functional and neuromodulatory effects of B cell therapy were assessed using neurobehavioral tests and highly-multiplexed spectral flow cytometry respectively.

Results: We report the first in vivo use of B cell therapy for ICH, demonstrating functional improvement when B cells were applied 24 hours post-injury in a murine model of ICH. We demonstrate that B cells can be delivered to the ICH-injured brain intraparenchymally and intracerebroventricularly, peaking in activity 3–7 days after administration and being undetectable within two weeks. B cells administered intraparenchymally post-ICH were associated with acute neuroprotection of motor function in wire grip and rotarod assays ($p < 0.05$, two-way repeated-measures ANOVA), and highly significant cognitive neuroprotection at 30 days post-injury in a Y maze paradigm ($p < 0.0001$, two-way ANOVA). The exogenous therapeutic B cells were capable of both central and systemic immunomodulation, significantly altering the proportion of anti-inflammatory cytokines expressed by immune populations in both the brain and spleen.

Conclusions: We report for the first time that the intraparenchymal delivery of B lymphocytes presents a promising immunomodulatory cell-based therapy for ICH, capable of facilitating functional neuroprotection and dynamic immunomodulation of adjacent immune populations.

TM4 GLOBAL

TM4-1

SBNS Caribbean training Fellowship – First cohort experience and reflections

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Objectives: The SBNS Caribbean Training Fellowship was established to allow 2 UK based neurosurgical trainees to work in Kingston, Jamaica for 3 months each, to gain exposure to neurosurgical work in another world region, with the aim to broaden their knowledge and learn from the surgeons based and working there. Sebastian and I are the first trainees from the UK to undertake this fellowship, and the aim of this presentation is to update the SBNS regarding the experience, lessons learned and aims for the future of this program.

Design: Two 2 month placements working in Kingston for myself and Sebastian, full time as part of the senior resident tier at UHWI.

Subjects: Sebastian and myself, along with the Kingston Public Hospital and University hospital West Indies consultant and resident neurosurgeons.

Results: The aim would be to give a talk in a Global Neurosurgery area of the conference to update all interested members on the outcomes of the fellowship, on our reflections and lessons learned, and what we hope to achieve moving forward with this exciting Global Neurosurgical partnership

Conclusions: The fellowship has provided and is providing a very robust, immersive and educational experience for British Neurosurgical Trainees in the 3 month period we are based there. it also opens opportunities for Jamaican Trainees to come work in the UK as an essential part of their training includes working outside of Jamaica. We intend to present to provide an update on the inaugural year of what we hope is a long term partnership that will be beneficial to all involved.

TM4-2

Jamaican national trauma database update and results

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Objectives: Establish a trauma database recording all TBI admissions under neurosurgical management in Jamaica (across multiple neurosurgical units), charting their presentation, pathology, interventions and outcomes over a 3 month period and assess trends and patterns in the cohort.
Design: Using GEO-TBI, all patients with head injuries requiring referral to and admission under a managing neurosurgical team has their mechanism of injury, clinical status, intervention if any and outcomes recorded in GEO TBI Software over a trail 3 month period.
Subjects: All TBI admissions under neurosurgical care across the island of Jamaica between November 2024 and January 2024.
Methods: Logging of all patients and admissions as above using the GEO TBI database to record and generate results to give insight into the severity of injuries, their management and long term outcomes.
Results: Collection of data is ongoing and will be finished and analysed prior to SBNS meeting in March in line with the aims of the Global Neurosurgical SBNS group.
Conclusions: Awaited.

TM4-3

Neurosurgical training programme in Nepal

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TM4-4

Challenges of establishing neurosurgery unit in a rural setting of Nepal

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Objectives: To describe the challenges of establishing a neurosurgery unit in a rural setting of Nepal To describe the current scenario of health, financial and logistics resources in neurosurgery unit at the setting
Design: Descriptive cross-sectional study
Subjects: The study has been performed at Province Hospital
Methods: Data was collected from primary and secondary sources at the Province Hospital, Surkhet. The situation of the neurosurgery services including outpatient clinic, emergency services, in patient, intensive care unit were analysed and the development was compared to a standard unit in a tertiary centre.
Results: Karnali is one of the most remote regions in Nepal with a high volume of neurosurgical cases. Most of the cases had to be referred elsewhere but due to poor road connectivity, referral was problematic. So establishing a neurosurgery unit was paramount in the region. A total of 130 neurosurgical cases were performed under the neurosurgery unit in a period of one year. Most of the cases were of traumatic brain and spinal injuries. To start with one neurosurgeon was involved in establishing care. Now the hospital has a well-functioning neurosurgery outpatient clinic, emergency care, imaging services including computed tomography, x ray, intensive care unit. Financial incentives have been provided by the government of Nepal.
Conclusions: Establishing neurosurgical care in a rural setting is a daunting task with lots of challenges but is possible.

TM4-5

Progress in robotic neurosurgery in middle-income countries: close to or far from high-income nations' standards? – a global surgical perspective

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Objectives: Robotic neurosurgery has the potential to revolutionise healthcare by offering unparalleled precision, minimally invasive techniques and improved surgical outcomes. Although this novel technology has made progress in HICs, several MICs, particularly those with stronger economies, have made strides in adopting it.
Methods: A review of published studies on robotic neurosurgery in MICs was conducted. MICs were identified using the latest World Bank Income Group data, covering upper and lower middle-income nations. The focus on MICs reflects the absence of robotic surgical systems in low-income countries. Included studies spanned descriptive, case-control, cohort, observational, and randomised controlled trials, published in full text and in English.
Results: The application of robotic systems in neurosurgery in MICs has led to improvements in pre-operative planning, intra-operative accuracy and post-operative outcomes. In particular, robotic neurosurgery in MICs has achieved a success rate of 83% in neuroendovascular procedures, while in spine surgery a remarkable accuracy rate of 99.34% has been reported in certain MICs, surpassing traditional techniques. Other MICs, such as Brazil, have shown a significant reduction in operating time, from 140 minutes to just 60 minutes. Despite these successes, MICs continue to face numerous challenges, including higher rates of post-operative complications and adverse outcomes. In China, for example, complications such as hemiplegia and even death have been reported

following robotic surgery, with 2% of patients experiencing post-operative bleeding. Haemorrhagic complications are also a serious concern in which India reports a high rate of 29.8% haemorrhaging during stereotactic biopsy procedures. While significant progress has been made in some economically strong MICs, the majority of lower/impoverished MICs face persistent challenges related to financial constraints, inadequate infrastructure and a lack of trained personnel.
Conclusions: This review calls for global health initiatives to ensure that the benefits of robotic neurosurgery extend beyond HICs and reach underprivileged populations around the world.

TM4-6

Burden of paediatric mild to moderate head injury in a lower-middle-income country adult-only neurosurgical unit

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Objectives: Head injury disproportionately affects Lower-Middle-Income Countries (LMICs) where trauma systems are overburdened and underdeveloped. This study aimed to highlight the volume of mild to moderate head injuries amongst preschoolers (age <6 yrs) admitted in an adult-only public-sector neurosurgical unit.
Design: Retrospective case series.
Subjects: Of 913 children <6 years of age with mild to moderate TBI presenting to Jinnah Hospital Lahore between 2017–2022, 293 required admission and could not be diverted to a paediatric neurosurgery centre and were included.
Methods: Patient demographics, mechanism of injury, clinical and radiological findings, management, and outcomes were reviewed. Patient data were analysed with ethical approval via SPSS-28.
Results: Patients had a median age of 30 months, and 55% were male. The most common mechanism of injury was falls (83%), followed by road traffic accidents (16%). The median GCS at presentation was 14. Key clinical features included vomiting (70%) and loss of consciousness (57%). Fracture patterns revealed open fractures in 3.4% and closed fractures in 17% of cases. Radiological findings were positive in 71% of cases, with linear fractures (29%), depressed fractures (9.5%), and extradural haematomas (8.8%). The median haemoglobin level was 8.70 g/dL (IQR: 7.98–9.83 g/dL). Most patients were moderately anaemic (72%), according to the WHO classification. Management was predominantly conservative (96%), with surgical intervention required in 4.1%, including evacuation, elevation, and shunt procedures. At discharge, Glasgow Outcome Scale scores were favourable, with 98% of patients achieving a score of 5, 2% with a score of 4, and 0.3% with a score of 3.
Conclusions: Mild to moderate TBI in Pakistan poses a significant challenge, such that adult centres without a fully comprehensive paediatric service have to admit patients. Improving healthcare infrastructure and investing in prevention strategies, such as road safety, are essential to reduce the incidence and severity of TBI in LMICs.

WM4-7

A tale of two countries: comparing head injury burden in a low-middle-income versus high income country neurosurgical centre

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Objectives: Infrastructure of trauma systems/services is poorly developed in LMICs. We aimed to compare the burden of head injury in a prototypical high-volume LMIC-neurosurgical unit to an equivalent HIC-neurosurgical unit.
Design: Cohort study comparing retrospective head injury patient data admitted under neurosurgery to prospectively collected equivalent data in Pakistan
Subjects: 74 patients admitted from the West-of-Scotland (WoS) region to the Institute of Neurological Sciences (INS) Glasgow (January-December 2022), and 546 consecutive head injury patients from Lahore admitted to the Punjab Institute of Neurosciences over 6 months.
Methods: Data collected included demographics, injury-mechanisms, clinical outcomes, and management pathways. T-test and chi-squared/Fisher's test were used for comparisons ($p < .005$ considered significant).
Results: Referral acceptance was significantly higher in Lahore (65% vs 25%; $p < 0.05$). Though head-injury predominately affects males in both countries (79% vs 81%; Pakistan vs UK), the Pakistani population is significantly younger (34yrs vs 47yrs mean age; $p < 0.001$). Mild-TBI was a significantly more common admission (71%) in Lahore than in the UK (47%) [$p < 0.001$) however, severe-TBI was more common an admission in West-of-Scotland (32%) versus Lahore (11.4%) [$p < 0.001$]. Road-traffic-accidents (RTA) were predominant in Pakistan (79%), while falls were most common in the UK (64%) [$p < 0.001$]. In Pakistan, 68% of patients were motorbike drivers. Management was either surgical or conservative in the WoS (47% vs 53%), whereas most cases (76%) were managed conservatively in Lahore. Mortality was approximately 9% in both centres, but discharge destinations differed: WoS saw 17% repatriated to local hospitals and 9.7% to rehabilitation, while 88% of Lahore patients were discharged home.
Conclusions: This study highlights significant differences in head-injury mechanisms, severity, management, and

discharge care. Patients admitted to a neurosurgical centre in the UK were more likely to be requiring surgical intervention. Pakistan's younger demographic and RTA predominance reflect the distinct public health challenges faced by an LMIC, such as preventative road safety measures.

WM4-8

Global Epidemiology and Outcomes following Traumatic Brain Injury (GEO-TBI) registry – current status and ongoing research

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Objectives: Global disparity exists in the demographics, management, and outcomes of traumatic brain injury (TBI), but the factors underlying these differences remain unclear. Establishing a more accurate global picture of the burden of TBI requires systematic and ongoing data collection across management modalities. The objective of research has been to establish an international TBI registry that enables service benchmarking, identification of unmet need in TBI management, and its evidence-based prioritisation in policymaking.
Design: We have designed and implemented a prospective international TBI registry, the dataset of which was constructed in a consensus-based manner to ensure applicability across variable healthcare settings. The Global Epidemiology and Outcomes following Traumatic Brain Injury (GEO-TBI) registry is currently functional. The first study on the registry, the three-month snapshot study GEO-TBI: Incidence, will finish in the beginning of 2025.
Subjects: Patients with TBI.
Methods: Prospective data collection.
Results: The registry currently includes 1098 patients with TBI from Asia, Africa, America and Europe, and the interim results show notable variability in the aetiologies, mechanisms and outcomes of TBI between healthcare settings, whilst underlining the varying availability of routine TBI care. We will present descriptive interim data from the registry.
Conclusions: The differences in TBI epidemiology, mechanisms and outcomes shown by the GEO-TBI registry data highlight opportunities for injury prevention, identification of best practices and outcome comparison.

TM4-9

Developing a global framework for digital health in traumatic brain injury (TBI): clinician perspectives of the use of digital technologies in the TBI care pathway

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Objectives: To explore neurosurgical clinicians' perspectives on the integration of digital technologies in the TBI care pathway. To develop a guiding framework for digital technology integration through determining its current use in TBI care and exploring potential optimisation points in the care pathway.
Design: A cross-sectional, pragmatic, qualitative study using critical realist-informed thematic analysis. The study design incorporated systems thinking through semi-structured interviews based on the Engineering Better Care principles of people, systems, design, and risk.
Subjects: International recruitment of practising neurosurgical clinicians through purposive sampling. Recruitment occurred through NIHR ABSI collaborating centres, social media and society newsletters.
Methods: Data collection through MS Teams interviews March-July 2024. The semi-structured interview guide explored technology availability, healthcare infrastructure, clinical pathways, and contextual challenges of technology use. Analysis followed Wiltshire and Ronkainen's five-step critical realist thematic analysis using NVIVO™: (1) data familiarisation, (2) systematic coding, (3) theme generation, (4) theme review and development, and (5) theme definition. The University of Cambridge Engineering Department Research Ethics Committee reviewed this study and provided ethical approval (ID: #431).
Results: Six inductive themes emerged from the analysis: Availability, Acceptability, Applicability, Capability, Feasibility, and Possibility. Themes formed the foundation of a novel conceptual framework for digital health technology design and implementation, visualised as a hexagonal radar chart. The framework demonstrates the interplay between themes and their relationship to broader concepts of 'Intervention & Adoption' and 'Context & Infrastructure', allowing for nuanced representation of different technologies in various contexts.
Conclusions: Significant disparities were revealed in technology availability and utilisation between urban and rural areas and across income settings. While digital technologies show promise for enhancing TBI care, implementation success depends on considering factors including digital literacy, infrastructure, and cultural attitudes. The developed framework serves as a practical tool for guiding research, policy, and practice in digital technology integration across diverse global healthcare contexts.

PARALLEL SESSION

TP1 ONCOLOGY 1

TP1-1

Retrospective analysis on the use of Dexamethasone in the initial management of brain tumours: are we pharmacovigilant?

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Objectives: To assess compliance with the pharmacovigilance of steroid prescriptions and its clinical use in brain tumour patients.
Design: Retrospective study.
Subjects: All cases referred to on-call Neurosurgery at King's College Hospital with a diagnosis of 'brain tumour' over 3 months (1st December 2023–29th February 2024).
Methods: 316 brain tumour referrals were analysed with the following variables to define a complete steroid plan: the initial advice provided by the on-call team, the appropriateness of initiation, the dose, duration, neuro-oncology multidisciplinary team (MDT) referral.
Results: 63.6% (201/316) were commenced on steroids following their initial referral based on history and radiology. Of these cases, 10.9% (22/201) had a complete documented plan on the reply; the remaining (89%, [179/201]) either didn't have complete plans (22.8%, [46/201]) or were referred to the MDT for definitive plans (66%, [133/201]). 89.5% (180/201) of patients on steroids were reviewed in the MDT. The cases not discussed (10.4% [21/201]), included those not advised to in our reply (19% [4/21]), not referred to (19% [4/21]) or deemed palliative (33.3% [7/21]) by the local team, or patients who died before the MDT(28.5% [6/21]). 39% (79/201) of patients underwent resections. Post-operative steroids were administered to 93.6% (74/79). 3.7% (3/79) of these lacked a clear postoperative plan, and 38% (30/79) were kept on steroids for >2 weeks. 10.4% (21/201) developed steroid-related complications – surgical site infections (57% [12/21]), cushingoid habitus (9.5% [2/21]), osteoporosis (9.5% [2/21]), diabetes (0.9% [2/21]) and psychiatric complications (1.4% [3/21]). Of these cases, 33.33% (7/21) had incomplete initial steroid advice, and 23.8% (5/21) of conservatively managed patients lacked documented MDT steroid advice.
Conclusions: Most of the patients referred via the on-call were started on steroids depending on the presentation and diagnosis. However, many lacked a complete documented plan both initially and at MDT. Hence, vigilant steroid advice and monitoring are needed to prevent complications.

TP1-2

The patterns of referral for patients with brain metastases to the neuro-oncology MDT

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Objectives: 20.0–40.0% of patients with cancer will develop brain metastases (BM). This retrospective study aims to demonstrate the numbers, demographics and outcomes of patients referred for BM to a university hospital Neuro-oncology MDT in 2013 vs 2021.
Design: Retrospective cohort analysis.
Subjects: All adult patients referred to the Neuro-oncology MDT in 2013 and 2021, with histopathological or radiologically-suspected diagnosis of intrinsic BM were included.
Methods: Data collection from Welsh Clinical Portal and Synapse.
Results: The number of patients referred to the MDT nearly doubled between 2013 and 2021 (94 vs 179 respectively). Lung cancer was the most common primary throughout. The majority of patients had a solitary BM in 2021 (43.0%) and 2013 (56.4%). Fewer patients had a brain metastasis as their cancer-presenting problem in 2021 ($p < 0.01$). Incidental diagnosis of BM in 2021 was (21.2%) compared to 2013 (5.3%). The proportion of patients undergoing surgery was not significantly different but there was a significant increase in SRS treatment ($p < 0.0001$, 49.7% in 2021 vs 14.9% in 2013). In 2021, 2 patients had had SRS for a fourth time whereas in 2013, the maximum was three rounds by 1 patient. There is a significant difference in survival between the different primary cancers in both 2013 and 2021. Median overall survival for breast, melanoma, lung and GI cancers improved but only lung cancer survival was significantly better (median 4.6 vs 11.7 months respectively, $p < 0.0001$). Overall, the median OS for all patients has statistically improved between 2013 and 2021 from 5.3 months to 11.4 months ($p < 0.0001$).
Conclusions: With advances in primary cancer treatment, more patients are developing BM. More BM are found asymptomatic, possibly due to better imaging and screening. SRS is the most common treatment plan, including recurrent SRS treatments, putting an increasing demand on this service. BM survival has improved.

TP1-3

External validation of the Royal Marsden Hospital stereotactic radiosurgery survival score in patients with metastatic brain disease

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Objectives: Stereotactic radiosurgery (SRS) is a cornerstone of management in intracranial metastatic disease, yet there exists considerable challenges in selecting patients for treatment and predicting their survival. The Royal Marsden Hospital SRS Survival Score (RMH-SSS) is a novel prognostic tool that compares favourably with existing scoring systems. We sought to externally validate the RMH-SSS in a representative cohort treated at a large regional centre. A secondary aim was to ascertain its utility in predicting local control.
Design: Single-centre retrospective cohort study.
Subjects: 242 patients (130 females, median age 64 years, range 20–84 years) with 421 brain metastases who underwent SRS between 2017 and 2023.
Methods: Stratified RMH-SSS scores (0–2, 3, 4–5, 6–11) were derived from patient electronic care records. Overall survival (OS) and local control (LC) were defined as the interval between date of SRS treatment and that of the incident event (death and local relapse respectively). Predictors of OS and LC were identified by Cox regression. Prognostication via recursive partitioning analysis (RPA) was used as a comparator of RMH-SSS performance.
Results: Median OS and median LC following SRS were 15.1 months [11.6–17.9] and 15.9 months [11.9–19.5] respectively. Gross tumour volumes (GTV) < 1.5cm3 and higher performance status (KPS $\geq$90) were associated with increased OS (GTV: HR $=0.53$ [0.36-0.76], $p < 0.001$; KPS: HR $=0.63$ [0.46–0.86], $p < 0.01$) and LC (GTV: HR $=0.55$ [0.40–0.76], $p < 0.001$; KPS: HR $=0.52$ [0.38–0.71], $p < 0.001$). Patients with higher RMH-SSS scores (6–11) had significantly better OS (HR $=0.23$ [0.14–0.37], $p < 0.001$) and LC (HR $=0.30$ [0.18–0.48], $p < 0.001$) compared to patients in the lowest scoring stratum (0–2). Relative to RPA, RMH-SSS conferred modest improvements in discriminatory power (Harrell concordance gains: OS $=0.08$, LC $=0.11$) and marginal benefits in prediction accuracy (Brier decrements: OS $=0.02$, LC $=0.01$).
Conclusions: In this real-world, external validation study, we demonstrate that RMH-SSS compares favourably to RPA in predicting OS and LC in patients with brain metastases.

TP1-4

Tumour control rates following Gamma Knife radiosurgery – the Belfast-Leeds experience

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Objectives: Since 2010, the first author has treated 311 NI tumour patients (including 64 metastases, 74 meningioma, 143 vestibular schwannoma) at Leeds GK centre. In recent years, Belfast has acquired its own Linac-radiosurgery unit to treat metastases (from 2017) and meningiomas (from 2021).
Design: The aim of this retrospective review, was to establish GK-control rates for the above common tumours serving a benchmark for local treatments.
Subjects: 43 patients had GK for a solitary metastasis while 21 had multiple metastases treated during the same (23) or over multiple sessions (10). Treatment dose, based on tumour volume, ranged from 15–24 Gy. Five atypical meningioma patients were treated with 16 Gy with the remainder treated with 12–14 Gy as benign tumours. 143 vestibular schwannoma patients were treated with a marginal dose of 12 Gy.
Methods: Patient and imaging details were obtained from the NIECR database. Leeds treatment details were accessed using Elekta Mosaiq Record & verify systems.
Results: Imaging was available in 61 metastases patients – 34 demonstrated local control at median interval of 10 months while 27 demonstrated progression at median interval of 13 months following GK. Median survival was 15 months post-GK with death due to extracranial disease progression (n = 26), brain/CNS disease progression (n= 14), both brain and extracranial disease progression (n = 13), and other causes (n = 3) while seven patients were tumour-free at last clinical follow-up. Five elderly meningioma patients evidenced progression at a median interval of 5 years. None of the remaining (93%) patients have evidence of progression with at least 3 years of imaging follow-up. 87% tumour control rates were seen in vestibular schwannoma patients with at least 5-years imaging follow-up. Of the 18 patients who progressed (at median interval of 3 years post-GK), 11 have had surgery to date.
Conclusions: The novel collaboration with Leeds has yielded tumour control rates comparable with other published series.

TP1-5

Awake craniotomy for insular glioma: a single-centre results

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Objectives: Insular gliomas (IG) represent a significant challenge in neurosurgical oncology due to their deep-seated location within the brain and proximity to critical neurovascular structures. Awake craniotomy (AC) a crucial technique for minimising neurological deficits whilst maximising extent of resection (EOR). This study aims to report the outcomes of AC for IG in our centre.
Design: Retrospective review
Subjects: Insular glioma patients
Methods: A retrospective review of all patients who underwent AC for IG from 2015–2023 were performed. Data on patient characteristics including but not limited to demographics, pre- and postoperative Karnofsky performance status (KPS), surgical approach, EOR, intra- and postoperative complications, morbidity, mortality, disease recurrence, progression-free survival (PFS) and overall survival (OS) at 1 year from the time of surgery were collected.
Results: Twenty-five patients (16 males; 9 females) underwent AC for IG (median age =37 year). Median pre- and post-operative KPS was 90 (range: 40–100) and 80 (range: 30–100), respectively. Tumours were resected using a transopercular approach in 23 patients and a transsylvian approach in 2 patients. The EOR ranges from 37.2 to 95.9% with a minimum of 80% achieved in 42.9% of cases. Post-operative complications included transient speech disturbance (16%), permanent (12%) or transient (8%) motor deficit, seizures (4%) and pseudomeningocoele (4%). Reduction in seizures frequency was noted in 95.5% of cases. There were no surgery-related mortality or postoperative infection. The OS and PFS at 1 year were 100% and 80%, respectively.
Conclusions: This is the first study in the UK to solely report outcomes of AC for IG. Our data demonstrates that AC for IG is safe, feasible and provides comparable outcomes to those reported in the literature.

TP1-6

Glioblastoma patients and more than 2 years survival: a series of 83 patients

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Objectives: Median survival for glioblastoma remains within the range of 12 months. Very few patients survive more than 2 years. Our objective is to identify the disease features of patients with confirmed diagnosis of glioblastoma who survived more than 2 years from diagnosis.
Design: We retrospectively reviewed our institute oncology database between September 2004 and December 2023.
Subjects: All patients with confirmed histological diagnosis of glioblastoma who survived for 2 years or more were included in this study
Methods: The patient electronic record were reviewed. The patients' clinical characteristics, imaging findings, tumour molecular and trends of treatments were examined.
Results: 902 patients identified as high grade glioma on the oncology data base. 83 patients with confirmed diagnosis of glioblastoma who survived ≥2years were identified (range of survival between 24 and 205 months). 50 patients were males and 33 were females. Median age was 54.5 years (range between 22 and 73 years). 53 patients presented with headache, and 64 patients were neurologically intact preoperatively with Karnofsky's Score ≥90. Frontal location was the commonest. Most were in non-eloquent locations. 78 patients received Trimodal Treatment of Surgery, Fractionated Radiotherapy, and Chemotherapy and 66 patients received Extended treatment with Temozolomide (>6 cycles). Most of the patients showed MGMTp methylation
Conclusions: Young age, good Karnofsky's score, Trimodal Treatment of Surgery, Fractionated Radiotherapy, Chemotherapy and MGMTp Methylation were good predictive of long survival with glioblastoma. Extended treatment with Temozolomide may play a role. Further studies of patients' characteristics, tumour molecular and trends in treatment may provide insight about long survival with glioblastoma

TP1-7

Low grade glioma outcomes from a single neurosurgical centre over 15 years

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Objectives: This study was aimed to review long term outcomes of patients operated on between 2010 and 2024 with histological and molecular confirmation of a low grade glioma (WHO 2021 Classification).
Design: This study was retrospective cohort analysis
Subjects: 77 patients who had operations performed by a single neuro-oncology subspecialist with pathology results confirming a Grade 1 or Grade 2 glioma as per WHO classification.
Methods: Data was collected prospectively in a locally maintained Microsoft Excel spreadsheet. All patients who preoperatively had MRI imaging suggestive of a low grade glioma where included on the database. A comprehensive review of patient notes and electronic care record data was performed to obtain detailed follow up. Any patients who subsequently had a pathology report not in keeping with a low grade glioma were excluded. Data was analysed using Microsoft Excel and SPSS statistical software. The factors influencing potential outcomes were drawing from the Pignatti scoring system.
Results: 77 patients were included – 29 females and 49 males (F:M 1:1.7). The mean age of the patients at operation was 38.9 +/− 12.8 (range 18–84). 32 patients were diagnosed with a WHO Grade 2 oligodendroglioma and 45 diagnosed with a WHO Grade 2 astrocytoma. The majority of patients presented with seizures irrespective of tumour location, size or patient demographics. The most common anti-epileptic prescribed was levetiracetam and almost all patients with seizures improved following tumour resection. 14/77 (18%) of

patients are deceased – average time from initial surgery to death 7 years. Mean age of deceased patients at time of surgery was 49.5 vs 38.9 overall.
Conclusions: Patient mortality in the deceased group is in keeping with published data. Patient age at diagnosis seems to be a significant contributing factor to mortality. Tumour resection has a significant role in seizure management in this cohort.

TP1-8

In situ light-source delivery during 5-aminulevulinic acid-guided high-grade glioma resection: the INSIGHT Study

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Objectives: In this paper, we share our initial experience using a new technology that delivers the blue-light source responsible for 5-ALA-related fluorescence in situ – the Nico Myriad Spectra System© and the potential applications of this technique within the existing field of high-grade glioma surgery.
Design: retrospective single-centre study.
Subjects: The inclusion criteria consisted of patients aged >18 years, presumed or possible differential diagnosis of high-grade glioma on the preoperative MRI, both elective and emergency surgery, preoperative administration of 5-ALA and a valid consent form for the procedure.
Methods: This is a retrospective single-centre study of patients who underwent surgery with the in situ light-source delivery of both white and blue light (405 nm) from March to September 2024 with a presumptive diagnosis of high-grade glioma. In all cases, 5-ALA administration was performed using an oral route with a dose of 20 mg/kg up to a maximum dose of 1500 mg per patient, as previously published by our group.
Results: A total of 35 patients were operated upon with this new technology. Fluorescence was identified in 30 cases (85.71%), with residual fluorescence in 11 (36.66%). The main applications were better white–blue light alternation and visualisation during tr-MIPS, increase in the extent of resection at the border of the cavity, identification of satellite lesions in multifocal pathology, the differentiation between radionecrosis and tumour recurrence in redo surgery and the demarcation between normal ependyma versus pathological ependyma in tumours infiltrating the subventricular zone.
Conclusions: This proof-of-concept study confirms that the novel in situ light-source delivery technology integrated with the usual intraoperative armamentarium provides a spatially, functionally and oncologically informed framework for glioblastoma surgery.

TP1-9

Low grade glioma patients and vorasidenib: a chance for new treatment

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Objectives: WHO low-grade gliomas (LGG) are known for their complex pathology, diverse clinical behaviour and challenging surgical and oncological management. For patients >40 years old, NICE currently recommends surgery, radiotherapy and adjuvant PCV chemotherapy for residual LGG disease. The INDIGO trial investigated the role of Vorasidenib in LGG and showed significant improvement in progression-free survival (PFS) and time to intervention. Our aim was to review our cohort of LGG patients and determine the number of patients potentially eligible for Vorasidenib.
Design: A retrospective review of all LGG patients at The Walton Centre using the Neuro-oncology database, clinical records and pathology datasets were performed.
Subjects: Only patients 16-years or older diagnosed with WHO Grade II LGG: astrocytoma or oligodendroglioma as per the WHO Classification 2021, were included in the study. Data was collected from 2018 onwards to ensure treatment within the last 5-years.
Methods: The inclusion and exclusion criteria were followed as per the INDIGO trial: Karnofsky Performance Score >70, at least one previous surgery, no anti-cancer treatment and measurable non-enhancing disease >1cm.
Results: In total, 111 LGG patients were treated within the last 5-years. Of these, 24 patients were excluded due to relocation or progression of disease, leaving 87 patients. Male to female ratio was 55:45 with a median age of 39. The most common location was frontal (63%). Overall, 16% (14/87) of patients were included in accordance with INDIGO, with prior anti-cancer treatment as the main excluding cause.
Conclusions: At present, Vorasidenib is not available in the UK and awaiting approval by the MHRA and subsequent cost-effectiveness review by NICE. However, we aim to start treating eligible patients once the IDH dual inhibitor is available in the NHS, in order to optimise care for our patients.

TP2 PAEDIATRICS

TP2-1

The relationship between neuroimaging and neurocognitive outcomes in paediatric moya disease

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Objectives: The ability to predict prognosis for individuals with moya moya disease (MM) is lacking. This study explores

the relationship between neuroimaging and neurocognitive outcomes in paediatric patients with MM.
Design: Retrospective single-centre study.
Subjects: 34 patients treated at Great Ormond Street Hospital since January 2004.
Methods: Intellectual function was assessed using the Wechsler Scales. Neuroimaging was used to determine cerebral perfusion. Variables included the Suzuki Grade, Ivy Sign score, MRI score, and a new Angiogram score. This was out of 12 with each main vessel of both hemispheres graded (0 = normal, 1 = abnormal, 2 = absent).
Results: The Ivy Sign and MRI score were significantly negatively associated with all indices of intellectual function. The angiogram score was moderately negatively correlated with non-verbal reasoning, and weakly with full-scale intelligence quotient (FSIQ) and working memory. Subanalysis revealed that the relationship between the Angiogram score and Ivy Sign score with intellectual function was primarily due to the involvement of the posterior circulation. The mean IQ scores for those with posterior circulation involvement fell in the mild-moderate impairment range, and those without fell in the conventional average range. PCA Ivy Sign score and MRI score together significantly explain 35% of the variance in FSIQ. An MRI score cut-off of 3.5, and PCA Ivy Sign score of 0.5 were found to have an optimal balance for sensitivity and specificity (sensitivity 73%, specificity 79% and 93% and 58% respectively) in predicting FSIQ <85.
Conclusions: This is the first paper to reliably identify relationships between routine neuroradiology and neuropsychological outcomes, and the risk associated with PCA involvement. Either MRI or PCA Ivy Sign score could be used to predict which children are most at risk of cognitive impairment. Future prospective, large, multicentre studies are required to assess generalisability, and the role in outcome monitoring, particularly in reversibility post-revascularisation.

TP2-2

Is postoperative high dependency care really needed for children undergoing supratentorial brain tumour surgery?

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Objectives: We present our analysis of the existing Paediatric High Dependency Unit (HDU) admission policy following craniotomy for brain tumours at our institution and discuss our thoughts for its revision in the context of paediatric supratentorial tumour surgery.
Design: A retrospective review of a prospectively maintained database of all children, (up to sixteen years old) undergoing supratentorial craniotomies for resection of paediatric brain tumours over a fifteen-year period at a single paediatric neurosurgical unit.
Subjects: Forty-three children underwent fifty-nine craniotomies for supratentorial hemispheric tumours between December 2008 and November 2023. The cohort comprised of twenty-four females and nineteen males. The median age of the children was 8 years.
Methods: When screening the database, the postoperative course of each patient was reviewed, assessing the number of patients who had HDU needs post-operatively, and the relative depth of input from paediatric HDU specialists that each patient received.
Results: Ninety-seven percent of children in the study cohort (n = 42) did not require any HDU-level monitoring or treatment post-operatively; these patients were all rapidly discharged from HDU to a standard ward bed post-operatively. Only one patient from the study cohort had tangible HDU needs in the post-operative period, comprising of invasive cardiovascular monitoring and repeated blood transfusions. This child's tumour was known to be large, highly vascular, and invasive pre-operatively.
Conclusions: We advocate a rational and nuanced approach with regards to predicting which children will most likely need paediatric HDU care following supratentorial craniotomy for resection of a brain tumour. This rationalisation could improve resource availability and reduce financial burdens upon paediatric neurosurgical units.

TP2-3

Fetoscopic repair of open neural tube defects: the UK's first case series

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Objectives: Spina bifida represents a significant cause of world-wide morbidity and mortality, affecting 2.1 per 100,000 new live births. Antenatal repair, driven by the MOMS trial, gained in popularity, with a more recent increased drive towards fetoscopic procedures. We had previously reported our initial experience in the UK's first fetoscopic case series. We now provide a follow up with our first 30 patients and compare results with published literature.
Design: Single centre, retrospective case series.
Subjects: All patients underwent fetoscopic repairs from September 2018 to January 2024.
Methods: Data was collected from patient records, operative notes, imaging and intra-operative footage on obstetric, maternal, foetal and neonatal characteristics.
Results: 30 foetuses underwent repair of an open neural tube defect (NTD) under fetomaternal anaesthesia. The average maternal age at surgery was 30.61 years. The average gestational age at surgery was 26 + 5 weeks, and at birth was 33 + 4 weeks. Premature rupture of membranes (PROM) was experienced by 17 mothers (63%). 10 babies were born by spontaneous vaginal delivery (37%). 64% of patients achieved an S1 motor level function and full reversal of Chiari II malformation occurred in 52%. In 20% of patients, hydrocephalus resolved, while 28% required CSF diversion. CSF leak was seen in 7%. At the latest follow-up, all patients required intermittent catheterisation. 1 patient required emergency C-section due to bradycardia presumed related to fetomaternal

haemorrhage and did not survive. 1 patient succumbed to aspiration pneumonia at 3 months of age.
Conclusions: Fetoscopic spina bifida repair is a valuable addition to the armamentarium for the repair of open NTDs. Current evidence suggests this reduces the risk to mothers and subsequent pregnancies. Much work has taken place to reduce the rates of premature delivery and improve foetal outcomes.

TP2-4

Timing of neuroendoscopic lavage for the management of neonatal intraventricular haemorrhage

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Objectives: Neonatal intraventricular haemorrhage (IVH) is a common complication of preterm birth and optimal treatment strategy remains uncertain. Neuroendoscopic lavage (NEL) has gained interest as a method for removal of intraventricular haematoma and debris, with outcomes suggesting it to be safe and potentially efficacious for reducing requirement for ventriculoperitoneal shunting. To the best of our knowledge, we present the largest global series to assess the outcomes from NEL for neonatal IVH.
Design: A single centre retrospective review.
Subjects: Neonates who underwent NEL as the primary surgical management of hydrocephalus secondary to germinal matrix haemorrhage.
Methods: A retrospective review was carried out, between January 2011 and November 2023, identifying infants who underwent NEL for hydrocephalus following germinal matrix haemorrhage at our institution. Data was extracted on patient baseline demographics, co-morbidities, complications, re-operation rate and shunt requirement.
Results: We identified 45 patients (29M:16F), who underwent NEL at a median corrected age of 36 weeks and 0 days (range, 29 weeks and 5 days to 61 weeks and 4 days). 28 patients underwent a simultaneous endoscopic third ventriculostomy (ETV). 7/45 (15.6%) had post-procedure complications: 5 CSF leaks (11.1%), 3 infections (6.7%) and 1 rebleed within 72hrs of NEL (2.2%). 27/45 patients (60.0%) went on to require a ventriculoperitoneal shunt (VPS). The relative risk of requiring VPS insertion if a patient underwent NEL + ETV compared with NEL alone was 0.88 (95%CI: 0.548 – 1.42; $p = 0.609$). The 12-month shunt survival rate was 19/27 (70.4%). On multivariate analysis, a significant baseline predictor of shunt independence was undergoing NEL at an earlier corrected age ($p = 0.007$).
Conclusions: NEL is safe and potentially efficacious treatment for neonatal IVH. The procedure may reduce shunt dependence, particularly if performed earlier in the disease process. For those who require CSF diversion NEL is associated with improved shunt survival.

TP2-5

Follow up of infants with skull fractures by neurosurgeons due to the risk of growing fractures; is it needed?

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Objectives: This study aims to identify the factors associated with growing skull fracture development to determine which children require follow-up.
Design: This is a single-centre retrospective study based on referral data from the University Hospital of Wales (UHW) neurosurgical unit.
Subjects: Patients under one year old who sustained a traumatic skull fracture between 2013–2023 and were referred to the neurosurgical team at UHW were assessed. Referral data for all head injuries between 2008–2013 was unavailable but surgical records were accessed for the only case of a child who developed a growing skull fracture in this time period.
Methods: A total of 190 patients sustained skull fractures, with three requiring surgery for a growing skull fracture. Each fracture was analysed using the commuted tomography (CT) head for its characteristics, including fracture splay distance and fracture elevation/depression.
Results: A total of 190 cases were reviewed, which showed a male to female ratio of 1.6:1. The majority of patients presented prior to 1 month of age and the most common mechanism of injury was a fall (80%). The most common fracture sustained was a linear fracture (87.4%). Of all fractures, the most common bone affected was the parietal bone (88.4%). Of those who developed a growing skull fracture, there was a significant difference in both the fracture splay distance ($p < 0.05$) and fracture elevation/depression distance ($p < 0.05$). All 3 patients who had growing skull fractures had a fracture splay distance above 5 mm at presentation and an elevation/depression of over 4 mm. 32% of children ($n = 61$) who had fractures had follow-up, with only nine having a fracture diastasis over 4mm.
Conclusions: Resources and investigations should focus on children with fracture displacement over 4mm and/or elevation/depression distance of over 3mm, as they are at significantly greater risk of growing skull fracture development.

TP2-6

Obstructive hydrocephalus in under 1's. Should ETV always be offered?

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Objectives: (1) To establish the ETV success scores of children who were shunted under 1 year old for obstructive hydrocephalus in our institution, (2) Evaluate the shunt failure

rate in this cohort, (3) To whether ETV should be offered to this cohort
Design: Retrospective analysis of children shunted under the age of 1 year for obstructive hydrocephalus in our centre in the last 10 years.
Subjects: Children under 1 year old with obstructive hydrocephalus who had a shunt inserted as the primary CSF diversion procedure
Methods: For each of these patients we assessed what their ETV success score would have been at the time the shunt was inserted using the Kulkarni ETV Success Score. We calculated the shunt failure rate for this cohort of patients.
Results: 69 children under the age of one underwent a shunt in the last 10 years. Fifteen were excluded due to incomplete data sets, shunts being inserted in other units or overseas or because the cause of the hydrocephalus was not obstructive or unclear. 20 children have not had a shunt revision to date. 8 children required 3 or more revisions. 38 revisions were carried out in 27 children and in all but 8 children, the first revision was required within the first 2 years of the shunt 's life. The median predicated ETV success score was 40% and in 6 children the ETV success was 50% or higher. Yet ETV is documented as being discussed in only 4 cases.
Conclusions: Informed consent requires that all possible treatment options are discussed with patients, parents, carers or guardians. In order for consent to be fully informed ETV should be discussed with parents and fully documented, even where the success rate is predicted to be low.

TP2-7
Withdrawn

TP2-8

Use of rapid-sequence MRI in paediatric brain and ventricular assessment in the UK & Republic of Ireland

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Objectives: Risks of ionising radiation are well established in children. Children with CSF shunts experience higher rates of cranial CT imaging due to difficulty of excluding shunt dysfunction from other illness. We aimed to identify use of rapid MRI in paediatric neurosurgical units in the UK and ROI. We also present our experience of using rapid sequence MRI in the assessment of paediatric shunt dysfunction.
Design: An 8-question survey was emailed to paediatric neurosurgeons via the British Paediatric Neurosurgery Group at every one of 19 units in the UK and ROI. Responses were collected using Google Forms.
Subjects: Paediatric neurosurgeons across the UK and Ireland.
Methods: Results were analysed using descriptive statistics.
Results: 18 institutions completed the survey and responses were mostly from consultants (14/18). The preferred methods for evaluating ventricle size in paediatric patients with an existing CSF shunt was CT (12/18), quick brain/ventricle check MRI (5/18), and standard MRI (1/18). A quick brain MRI protocol exists in 44.4% (8/18) of units. Of these, 5 units had access only on weekday daytimes while the other 3 units had full 24/7 access. Quick MRI has existed for >10 years in 2 units, 5–10 years in 1 unit, and <5 years in 5/8. Reported MR sequence was T2 axials in 5/7, T2 axials and sagittal CISS in 1/7, and sagittal ciss only in 1/7. Need for sedation use was rare in all units (8/8). Obstacles to implementing rapd MRI were lack of emergency access to MRI facilities (8/13) and lack of staffing (6/13).
Conclusions: There is disparity in access to rapid-sequence MRI in UK & Republic of Ireland with only 3 of 18 paediatric neurosurgery.

TP3 SPINE 2

TP3-1

Day-case open lumbar spine surgery: a Newcastle upon Tyne Hospitals experience

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Objectives: Our aim was to report our experience in open day-case lumbar surgery performed over 2 years.
Methods: A retrospective review of case notes, imaging, and patient demographics was conducted. Included patients were screened and operated at a day-case surgical facility between Nov 2022 till date. Only lumbar decompressions were performed. Statistical analyses were conducted on Exce.
Results: In total, 68 patients (51.5% males) were included. Median age was 53. Median ASA grade was 2. Most patients were not using antiplatelets (98.5%) or anticoagulants (97.1%). Median BMI was 28.6. Nearly all underwent single-level surgery (97.1%) only and most underwent unilateral decompression (70.6%). Complications were low: 1 patient had a CSF leak and required readmission for low-pressure symptoms. Another required evacuation of a haematoma. Six (8.8%) were transferred to the tertiary hospital for pain management. Overall median length of stay was 1 day. The majority (82.4%) reported full or partial improvement in their symptomatology at follow-up.
Conclusions: Day-case open lumbar surgery is feasible and safe, with low observed complications and good outcomes at follow-up. However, case selection is critical to reduce complications and avoid unnecessary hospitalisation.

TP3-2
Withdrawn

TP3-3

The effect of Intraoperative Neurophysiological Monitoring (IONM) on the extent of tumor resection in adults with Intramedullary Spinal Cord Tumours (IMSCT)-a systematic review and meta-analysis

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Objectives: Intramedullary Spinal Cord Tumours (IMSCTs) are associated progressive neurological deficits and significant iatrogenic complications with surgical intervention, given their proximity to essential spinal fibre tracts. Various Intraoperative Neurophysiological Monitoring (IONM) modalities including Somatosensory Evoked Potential, Motor Evoked Potential, and D-waves are used in practice to help preserve neurological function. However, their impact on Extent of Resection (EOR) of tumours remains unclear.
Design: This systematic review aims to evaluate the effect of IONM on EOR and to inform best practice guidelines for adults with IMSCTs undergoing surgical intervention.
Subjects: Of the 2,699 studies screened for title and abstract, 112 full texts were reviewed, and 12 studies (8 case series and 4 retrospective cohort studies) met the inclusion criteria. The cumulative sample size was 775 patients: 658 underwent surgery with IONM (case group) and 117 underwent surgery without IONM (control group).
Methods: This systematic review has been registered on International Prospective Register of Systematic Reviews (CRD42024572336). Searches were performed on MEDLINE, Embase, and CINAHL from inception to July 2023. Studies assessing the utility of IONM in IMSCT surgery in context of tumour EOR were included. Risk of Bias (RoB) analyses were conducted using Joanna Briggs Institute RoB checklists.
Results: Gross total resection (GTR) was achieved in 80% (n = 526) of patients in the case group, compared to 76% (n = 90) in the control group. Postoperative neurological outcomes were reported in 8 studies, with 65% of patients in the case group demonstrating improved functional neurological scores compared to 46% in the control group. The pooled relative risk for GTR with IONM in the cohort studies was 0.98 (95% CI: 0.93–10.3).
Conclusions: Our analysis suggests that IONM does not negatively impact tumour EOR in IMSCT surgery. Larger prospective studies and randomised controlled trials are needed to further evaluate its role in optimising resection outcomes and functional preservation.

WP3-4

Shared decision-making in the treatment of lumbar spinal stenosis

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Objectives: This study aimed to assess how often shared decision-making (SDM) was utilised, whether SDM affects surgical decision-making, and if patient outcomes differ when patients are involved in surgical treatment decisions for LSS.
Design: SDM involves incorporating patient preferences and values into treatment planning and has been associated with greater patient satisfaction, compliance, and outcomes. Lumbar spinal stenosis (LSS) can be surgically treated with decompression with or without fusion, and patient preferences may influence the choice of surgery. We investigate the use of SDM in the treatment of LSS as part of the Stenosis Outcomes in Lumbar Instrumentation and Decompression (SOLID) Trial.
Subjects: We established the Lumbar Spinal Stenosis Learning Program (LSS-LP), a registry for 540 patients undergoing treatment of spinal stenosis in Veterans Affairs hospitals (43 centres).
Methods: Neurosurgeons and orthopaedic surgeons were surveyed regarding factors involved in surgical decision-making for the treatment of LSS, including patient preference. Patient-reported outcomes were collected at 3, 6, 12, and 24 months post-operatively. Outcome measures included the Zurich Claudication Questionnaire (ZCQ), Oswestry Disability Index (ODI), and pain scores.
Results: Overall, in 58/540 (10.7%) of cases, patient preference was reported by surgeons as an 'important element that factored into the decision to fuse or not'. Patient preference was considered in a larger, but still minor, proportion (18.7%) in cases of clinical equipoise. Fusion rates were lower (21.1% vs 36.7%) when patient preference was considered. The improvement in symptom severity in cases of decompression with fusion was 84% higher (ZCQ score decreased by 29.1 vs 16.1) when patient preference was considered compared to when it was not.
Conclusions: SDM was associated with patients more frequently choosing decompression alone vs decompression with fusion and with improved clinical outcomes in the treatment of lumbar spinal stenosis. Despite these benefits, SDM use was infrequently reported, suggesting underutilisation.

WP3-5

BASSGPT: a grounded retrieval augmented generation large language model for spine surgery patients

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Objectives: The cornerstones for disseminating information to patients includes physical patient leaflets and direct recommendations from healthcare professionals. The pre-, peri and post operative period for patients undergoing any type of spine surgery is often characterised by increased levels of health anxiety, and as such sources of reliable information and reassurance are necessary. Thus, the aim of this study was to create a reliable chatbot that patients undergoing spine surgery could utilise at any point in their journey to gain further information from.
Design: Retrieval augmented generation large language model (LLM).
Subjects: All patient information leaflets from the British Association of Spine Surgeons.
Methods: All patient leaflets were first concatenated into a single PDF file. A local server was created where a large language model was able to read the PDF file and generate answers to the questions asked by the users. GPT 3.5 turbo was used as the LLM of choice, and its performance was evaluated against the state of the art GPT 4. This pipeline was then deployed as a website accessible via private access for the local trust.
Results: BASSGPT was developed as a custom retrieval augmented generation (RAG) LLM for spine surgery patients. A custom website was created where patients could interact with the chatbot. The performance of the LLM was evaluated on RAG specific metrics: context_recall: 0.9444, context_precision: 1.0000, context_entity_recall: 0.5771, faithfulness: 0.9444, answer_relevancy: 0.9371, context_relevancy: 0.1554, context_utilisation: 1.0000.
Conclusions: The impact of such large language models on enhancing patient care is continually growing. Models like ours that demonstrate low rates of hallucinations and high rates of context specific answers have the potential to improve patient health anxieties and allow faster dissemination of information. Further work on patient perspectives regarding these technologies is required before implementation in clinical practice.

WP3-6

Utility of MR tractography in traumatic cervical spinal cord injuries: a pilot study

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Objectives: The aim of this study was to develop and implement an optimised Diffusion Tensor Imaging (DTI) protocol with tractography for evaluating cervical spinal cord injuries. This approach was designed to enhance the diagnostic and prognostic capabilities of MRI in spinal trauma, offering additional insights that could correlate with clinical findings and aid in prognosis.
Design: A clinical study was conducted to assess the application of DTI and tractography in cervical spinal cord injury patients, with a focus on improving diagnostic accuracy and providing better insights into spinal cord integrity.
Subjects: The study involved five adult patients who had sustained cervical spinal cord injuries. These patients underwent MRI scans using a 3 Tesla MRI scanner to capture the necessary data for analysis.
Methods: Each patient was scanned using a DTI sequence based on a spin-echo echo planar imaging technique. The sequence parameters included an axial plane with a repetition time (TR) of 9,200 milliseconds, echo time (TE) of 82 milliseconds, 37 slices of 3 millimetres in thickness, and a matrix size of 128×128. The b-values were set to 0 and 1000 s/mm^2 across six directions, and the total scan time was approximately 2 minutes. DSI-Studio software was used to generate tractography images, which were colour-coded to represent diffusion directions: blue for inferior-superior, green for posterior-anterior, and red for left-right orientations.
Results: The tractography images provided essential diagnostic information, revealing regions of spinal cord compression and nerve orientations not visible on conventional MRI. This visualisation enhanced diagnostic accuracy and allowed for more precise identification of neural compromise, aiding in clinical decision-making.
Conclusions: DTI and tractography provide valuable supplementary information about spinal cord trauma without significantly increasing scan time. The results depend on scan quality and specialised interpretation. Further research is needed to explore the full potential of these techniques in acute cervical spinal cord injuries.

TP4 TEACHING AND TRAINING

TP4-1

Effects of cognitive distraction on performance during a simulated spinal procedure

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Objectives: To evaluate the effect of cognitive distraction on operative performance during a simulated neurosurgical procedure, mimicking the challenges of on-call scenarios requiring simultaneous task management.
Design: Prospective study using a simulated cervical spine model with controlled distraction.

Subjects: Eight neurosurgical trainees from one London neurosurgical centre. Four 'early' trainees (ST3/4) and four 'Late' trainees (ST6–SCF).
Methods: Trainees completed a questionnaire on their experiences with distractions before performing a cervical decompression on a simulated spine model. Distractions, replicating on-call scenarios, included questions and situational interruptions. Operative performance and distraction indicators (e.g. looking away) were recorded. The model tracked temperature and pressure changes, while a consultant assessed decompression quality blindly.
Results: All participants reported greater distractions during emergency surgeries than electives. Mistakes while distracted were reported by most, except two. Junior trainees emphasised stopping, concentrating and prioritising tasks, while seniors favoured delegating and using coping strategies like music. Questionnaire scores were lower during distraction (median 4.5 vs. 6 for juniors, 5 vs 6.5 for seniors). Performance was better under control conditions. Distraction increased task duration in both groups ($p = 0.038$) and led to longer total time ($p = 0.001$) and frequency ($p = 0.010$) of looking away, with juniors looking away more frequently ($p = 0.029$). Pressure variance increased under distraction, with seniors demonstrating better drill control, exerting less pressure but generating higher temperatures. No significant differences in decompression quality were observed.
Conclusions: Cognitive distraction adversely affects neurosurgical performance, with juniors more affected than seniors. Seniors employed better coping strategies, suggesting experience mitigates distraction impacts. Despite performance decrements, decompression quality remained consistent, emphasising the importance of developing distraction management skills during training.

TP4-2
Withdrawn

TP4-3

Digital pathways to medical school electives: enhancing access and inclusion

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Objectives: Medical school electives enable students to explore specialities, make contacts, and develop portfolios. However, the application process can be time-consuming, administratively burdensome, and lack transparency. Application for postgraduate training programs such as neurosurgery is competitive. The methods by which students access these opportunities must evolve alongside other aspects of medical education. We propose that a free-to-use matching platform can address the key concerns raised in our survey, by improving transparency, broadening access, and reducing administrative load. Surgical societies, such as the SBNS, are poised to transform the current process through the establishment of an online matching tool. We discuss the feasibility of implementation, key functional aspects of any proposed tool, and potential future benefits.
Design: Cross-sectional survey.
Subjects: The survey was distributed to medical students and doctors who were currently studying or had trained internationally, as well as those who were studying or had trained in the UK.
Methods: The authors constructed a cross-sectional semi-structured questionnaire distributed to medical students and doctors. Our survey captured the greatest perceived barriers to application, key factors considered in selecting an elective, overall perceived benefit, and previous elective experiences.
Results: 200 responses were collected (28% medical students, 52% international medical graduates, 20% UK medical doctors). 55% of our cohort had yet to complete an elective. The greatest barriers to electives were financial implications, teaching quality, achieving acceptance, and administrative tasks. Electives were considered crucial for experiencing other healthcare systems, networking, personal growth, exploring specific specialities, and professional development.
Conclusions: Adopting a neurosurgery elective portal is an innovative way to position the SBNS as a speciality training and recruitment leader. This proposed enhancement represents a forward-thinking approach to addressing current neurosurgical education and workforce challenges.

TP4-4

The value of a stroke medicine placement to the neurosurgical trainee

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Objectives: To describe the case mix and the training opportunities available to Phase 1 neurosurgical trainees during a Stroke medicine attachment.
Design: Two ST1 trainees collected clinical and radiological data on consecutive patients admitted to the stroke unit over two three-month periods (Feb–May 2023 and Feb–May 2024).
Subjects: Patients with a provisional diagnosis of 'stroke' admitted to a University Hospital acute stroke unit during the study period and examined/reviewed by the neurosurgical trainees.
Methods: Data were recorded on the clinical presentation, radiological appearances and management of the included patients. The learning opportunities were mapped to the Neurosurgery 2021 Phase 1 curriculum.
Results: We undertook consultant-supervised neurological examinations of 195 separate patients. 136 had had ischaemic events, 21 intracranial haemorrhages and 38 non-stroke diagnoses. Of the Capabilities in Practice, we participated in outpatient clinics at level III; inpatient ward rounds at level IIb; and MDT working at level III. 33 of the 39 topics in the Phase 1 syllabus were covered, including 112 knowledge and 41 skills objectives. Five of ten critical conditions listed in the neurosurgical training curriculum were encountered. We recruited two patients to a multi-centre clinical trial. Four patients underwent mechanical thrombectomy while one underwent decompressive craniectomy for malignant MCA syndrome.

Conclusions: We show the experience of neurosurgical trainees, the number of patients, and the variety of neurological presentations on the stroke unit. The volume and turnover of patients provides excellent learning opportunities to the neurosurgical trainee, particularly with respect to neuroanatomical localisation of symptoms and signs. Clinical placements in Phase 1 do not specify stroke medicine as a related discipline, however in a motivated neurology-led stroke medicine unit there are fantastic opportunities for neurosurgery phase 1 trainees to get experience, consultant-led teaching and learning opportunities. We recommend that stroke medicine should be named in the 'related disciplines' for Phase 1 placements.

TP4-5
Withdrawn

TP4-6

Developing the next generation of holistic neurosurgeons: a scoping review of role of humanities and arts in neurosurgical medical education

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Objectives: To assess the extent, range, and impact of incorporating humanities and arts into neurosurgical education for medical students, with the goal of fostering empathetic, ethically reflective, and well-rounded future neurosurgeons.
Design: Scoping review conducted using the PRISMA-Scoping review protocol to identify relevant studies integrating humanities and arts in neurosurgical education.
Subjects: Medical students engaged in neurosurgical education programs incorporating humanities or arts, including literature, visual arts, music, history, or philosophy.
Methods: A comprehensive search of multiple databases and grey literature was performed, focusing on English-language studies addressing the integration of humanities and arts into neurosurgical education. All study designs were considered. Of the 2,411 records identified, 15 studies met inclusion criteria and were analysed. Key themes were extracted, and the impact of humanities and arts integration was synthesised.
Results: Four themes emerged: 1. Ethical frameworks and moral reasoning (n = 4): Improved decision-making and ethical sensitivity. 2. Reflective practices and emotional intelligence (n = 9): Enhanced professional identity formation and emotional awareness. 3. Humanising medical practice through arts and narrative medicine (n = 7): Strengthened empathy and patient-centered care. 4. Visual arts for spatial reasoning (n = 3): Improved three-dimensional thinking and surgical training. The studies highlighted benefits such as enhanced empathy, ethical decision-making, critical thinking, and spatial skills, although implementation remains inconsistent, and robust validation of impact is limited.
Conclusions: Integrating humanities and arts into neurosurgical education offers a holistic approach, enriching cognitive and ethical competencies essential for practice. Methods like operative rehearsal sketches exemplify cost-effective tools to enhance learning outcomes. A balanced curriculum combining biomedical sciences with humanities can cultivate neurosurgeons who are not only technically adept but also empathetic, reflective, and emotionally intelligent. Further rigorous research is needed to standardise and validate these approaches.

TP4-7

D.A.N.S.E: improving the availability and affordability of neurosurgical skills workshops for medical students

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Objectives: We delivered a neurosurgical skills simulation teaching event with the purpose to offer high-quality, accessible and low-cost teaching of multiple neurosurgical skills. The main approach to reduce our event cost was to use 'domestic' objects to mimic the skull and scalp – including eggshells, coconuts and neoprene. A secondary aim was to assess the efficacy of these in simulation.
Design: The full-day event consisted of six neurosurgical skills stations, and a series of lectures discussing neurosurgical career, and trainee application. Delegate tickets were priced at £35. The event was organised by foundation doctors and medical students and overseen by a consultant neurosurgeon. Neurosurgical registrars were recruited to help facilitate the stations.
Subjects: Eighteen delegates from three different medical schools attended the event (66.7% female), with all students between their second and final years of medical school.
Methods: A two-part questionnaire was offered to all delegates to determine the success and quality of the event. Both surveys contained identical five-scale ratings and free text questions, allowing for direct comparisons before and after the event. Independent t -tests were used to compare pre- and post-event mean scores.
Results: Post-event, students felt significantly more confident in their understanding of the principles behind all six neurosurgical stations. Students also felt significantly more confident in their understanding of neurosurgery as a career and the application process. 100% of respondents enjoyed the workshop and would recommend to their peers.
Conclusions: For medical students interested in a career in neurosurgery, opportunities to learn relevant techniques and skills are often expensive and difficult to access. This even highlights affordable methods of simulation with almost 1:1 level tutoring to result in significant student satisfaction. We encourage other groups to develop their own affordable simulation events to attract students to a specialty often

considered daunting and inaccessible, and address gaps in the medical school curriculum.

TP4-8

The impact of a webinar series on student perspectives to neuroscience research barriers

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Objectives: To identify barriers to medical students engaging with neuroscience research and assess the impact of a webinar series on influencing these barriers.
Design: A prospective, mixed-methods study using pre- and post-event surveys to evaluate the impact of a neuroscience-focused webinar series on students' research perceptions and readiness.
Subjects: Medical students from 20 universities worldwide who attended the webinar series from September to December 2023. A total of 101 participants completed pre-event surveys, and 95 completed post-event surveys.
Methods: A four-part online webinar series was conducted, featuring academic clinicians presenting neuroscience-related research projects and discussing research practices, methodologies, and strategies for involvement. Surveys distributed via Google Forms collected quantitative and qualitative data before and after the series. Self-reported confidence in research, perceived barriers, and interest levels were assessed. Statistical analysis was conducted to compare pre- and post-event outcomes, while thematic analysis identified common themes.
Results: Students' self-reported confidence in conducting research improved from 2.8/5 pre-webinar to 3.9/5 post-webinar ($p < 0.05$). Among students with dissertation experience, 95% reported an increased interest in research. While 66% initially expressed uncertainty about how to explore research opportunities, 52% indicated that the webinar alleviated these barriers. Additionally, 95% of participants reported improved understanding of neuroscience research, and 64% felt more likely to pursue future research opportunities.
Conclusions: The webinar series significantly enhanced medical students' confidence and interest in neuroscience research. Students with dissertation experience were particularly motivated to conduct their own research. These findings suggest that structured, accessible research education led by academic clinicians can address perceived barriers and equip students to engage with scientific research, aligning with the GMC outcomes for new doctors. Incorporating similar initiatives into medical education may foster early interest and competence in research, ultimately benefiting patient care.

TP4-9

Effective self-directed learning and performance perception: insights from the United Kingdom national undergraduate neuroanatomy competition

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Objectives: To understand what resources medical students choose for self-led neuroanatomy learning compared to resources routinely provided to them and assess their ability to gauge their own abilities/competency in the context of their performance at The National Undergraduate Neuroanatomy Competition. Neuroanatomy is a key component of a neurosurgical education and begins at medical school, though students' experience and engagement at this stage is highly variable.
Design: a post competition survey was distributed to participants to ascertain their attitudes to different learning materials and their insights into their own performance using five and ten point Likert Scales and free text questions. The competition itself consisted of a single best answer assessment of applied neuroanatomy and a spotter examination based on specially dissected specimens, neurohistology and neuroradiology. There was also an afternoon of interest talks for participants to attend while marking of the exams was completed.
Subjects: 58 medical students completed the post-competition survey out of 68 attendees.
Methods: statistical analysis was performed using RStudio and thematic analysis by the 2023 NUNC committee.
Results: the majority of students felt the quality of neuroanatomy teaching at their respective institutions was insufficient and lacking detail; 81% of respondents would like to see more dedicated neuroanatomy teaching in their curriculums. Most students were taught neuroanatomy with lectures, prosected specimens and dedicated digital learning resources; however when learning neuroanatomy primarily chose to use textbooks and other, non-university affiliated resources. Regarding their competition performance, participants accurately assessed their own performance compared to their actual results ($R = 0.51$, $p < 0.05$).
Conclusions: There is an apparent disconnect between the resources students are taught neuroanatomy with and those used for learning/understanding it; this may be due to the increasingly generalist approach to medical school curriculums providing less depth-focused learning. Attendees' abilities to reflect accurately on their own performance suggests reflective insight and self-awareness.

TP4-10

Clinical exposure to neurosurgery at medical school: the current medical student experience

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Objectives: To compare the clinical exposure and educational opportunities in neurosurgery for medical students placed at neurosurgical centres and non-neurosurgical centres during their undergraduate clinical neurosciences placements and assess its impact on their preparedness for practice.
Design: A mixed-methods study using a questionnaire to gather quantitative and qualitative data from medical students.
Subjects: Forty medical students from Cardiff University, United Kingdom, who had completed a clinical neurosciences placement.
Methods: A questionnaire was electronically distributed via email, social media, and in person.
Results: Of the 40 respondents, eighteen (45%) students received no neurosurgical experience during their placements, meaning they will complete their entire undergraduate career without any exposure to neurosurgery. Students at neurosurgical centres were significantly more likely to attend neurosurgical theatre ($p = 0.022$). Educational opportunities such as tutorials, small group teaching, case-based discussions, and simulations were more frequently reported at neurosurgical centres. Thematic analysis of qualitative responses corroborated these findings, emphasising disparities in exposure and perceived preparedness between neurosurgical and non-neurosurgical centres.
Conclusions: Students placed at neurosurgical centres have greater exposure to neurosurgical opportunities compared to those at non-neurosurgical centres. This disparity may affect learning, examination outcomes, and readiness for clinical practice. As medical student numbers rise, ensuring adequate exposure to neurosurgery is vital for fostering clinical competence and interest in the field. Strategies to provide equitable and comprehensive neurosurgical exposure across medical schools are urgently needed.

TP4-11

Neurophobia amongst medical students: Hype or Reality

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Objectives: Neurophobia' is a well reported phenomenon in the literature where in medical students and junior doctors have an inherent nervousness or 'fear' of neurology and neurosurgery. We wanted to establish if less medical students choose neurology and neurosurgery as a career and identify is neurophobia is an ingrained belief or learned behaviour?
Design: Questionnaire.
Subjects: Medical students, over the age of 18.
Methods: We developed a questionnaire to assess medical student views and beliefs in connection with a career in neurosurgery. Specifically we examined their views and beliefs in the following domains: considering a career in neurology and neurosurgery, confidence with neuro anatomy and pathology, traits associated with neurosurgeons and neurologists and finally, their perceived barriers to a neuro career.
Results: 264 medical students completed the survey. Students from fourteen different medical schools across the world responded, with the highest number of students being from Irish medical schools. Over half of participants (58%) felt that neurology is an intimidating module and/or career choice while a huge 80% felt neurosurgery was an intimidating choice. We believe our research appears to be the first to open the survey to students across the world, with no limitations placed on region.
Conclusions: Neurophobia is not limited to any one geographical region, age group or gender. It appears to be mainly be driven by an intimidation of the complex nature of neuroanatomy and neuropathology. This negative perspective can be further enhanced when students go on to have a negative experience on clinical attachments.

TP4-12

Perceptions of gender representation in neurosurgery among undergraduate medical students: an international survey

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Objectives: Understanding factors that shape medical students' perceptions of gender representation in neurosurgery is crucial for addressing gender disparities in the field. In this large-scale, cross-sectional international survey, we aimed to identify the key drivers influencing medical students' views on gender disparity in the neurosurgical workforce. In doing so, we sought to highlight potential targets for educational initiatives that may improve gender equity and inclusivity within the specialty.

Design: Cross-sectional survey.
Subjects: 239 undergraduate medical students (113 females) comprising 62 preclinical and 177 clinical students.
Methods: An online survey was disseminated via the Brainbook international ambassador programme. Multivariate ordinal regression was performed to assess the effects of student sex, stage of study, continent of study, income group, and several indices of neurosurgical exposure (hours of neurosurgical teaching, number of operations observed, involvement with external neurosurgical societies) on perceptions of neurosurgery. A 5-item Likert scale was used to assess students' perceptions of the specialty.
Results: Male students (20%) were more likely than female students (14%) to agree that there was appropriate representation of male and female surgeons in neurosurgery (OR = 1.92, $p = 0.008$), although both groups largely (52.7%) disagreed with this view. This was likewise the case with preclinical students (23% agreement) compared to those in their clinical years (15% agreement) (OR = 2.04, $p = 0.019$). Compared to those from lower income countries, students resident in higher income countries were more likely to disagree that gender representation among neurosurgeons was appropriate (57% vs. 28% disagreement, OR = 2.50, $p = 0.023$). Monotonically, students who received more hours of neurosurgical teaching were less likely to agree that gender representation was appropriate. This effect attained significance in students who received in excess of 20 (OR = 0.29, $p = 0.010$) and 30 hours (OR = 0.33, $p = 0.033$) of teaching.
Conclusions: Greater exposure to neurosurgery – through increased teaching provision and operative experience, may deepen awareness of gender disparities within the neurosurgical workforce.

TP4-13

Developing formal teaching for interns rotating through neurosurgery

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Objectives: Determine if the department of neurosurgery fulfils the national intern training program and Medical Practitioners Act in providing structured educational opportunities to interns to develop their clinical knowledge.
Design: Cross Sectional Study
Subjects: Interns rotating through Neurosurgery.
Methods: Cross sectional questionnaire for interns at the end of their neurosurgical rotation.
Results: The results were: 83.3% of interns feel that they have developed competency, safe practices and clinical knowledge.100% felt that their clinical duties were not balanced with an education and training program. 50% did not receive formal teachings of clinical skills and information training. 50% achieved self-directed learning through medical reading, and 33% achieved through attending grand rounds, journal clubs and attended structured teaching. No intern achieved learning through lectures and tutorials. 66% requested for structured teaching and 30% requested teaching rounds.
Conclusions: Majority of interns feel that have achieved competency, safe practices and clinical knowledge during their time in neurosurgery. However, all interns felt that their clinical duties were not balanced with an education and training program. There was a call for structured teaching and rounds. This highlights an interesting discrepancy. Despite the facts that candidates felt they fulfilled key objectives defined by the National Training Program and Medical Practitioners Act, there was still a call for formal teaching on a backdrop of feelings on unbalanced clinical duties and teaching. This begs the question to which extent is the program designed for its candidates.

FRIDAY 14TH MARCH

MAIN SESSION
FM1 ONCOLOGY 2

FM1-1

Endoscopic transchoroid approach to third ventricular lesions

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Objectives: Purely endoscopic approaches to intraventricular lesions are gaining popularity with advancements in neuroendoscopic equipment. However, third ventricular lesions, particularly those in the middle and posterior third ventricle, continue to pose a significant challenge due to the complex anatomy leading to limited accessibility. We present our 10-year single centre experience using the endoscopic transchoroid approach to third ventricular lesions.
Design: Retrospective observational study (case series).
Subjects: Paediatric and adult patients with 3rd ventricular pathology.
Methods: Our endoscopic transchoroid approach was performed in 81 patients presenting with symptoms of hydrocephalus and a third ventricular lesion between 2015 and 2024. A monoportal technique with a rigid endoscope was employed, with trajectory and entry points planned using neuronavigation. The choroid plexus was coagulated, the anterior septal vein coagulated and cut, and the choroid fissure split to widen the foramen of Monro, improving access to the third ventricle. For posterior third ventricular lesion, we modified our technique to a purely posterior fissure split without sacrificing the anterior septal vein.
Results: The series included 81 patients who underwent either biopsy, debulking, subtotal or gross-total resections. Aqueductoplasty with stent insertion was performed in one patient. All patients also underwent endoscopic third ventriculostomy (ETV) and Rickham reservoir placement. The pathology of the lesions included pilocytic astrocytoma, craniopharyngioma, colloid cysts, glioblastoma, immature teratoma, germinoma and pineal parenchymal tumours. One patient had obstructive hydrocephalus from intraventricular haemorrhage requiring delayed fissure split to re-establish CSF pathways.

Conclusions: In centres with the appropriate expertise, the endoscopic transchoroid approach offers improved access to the third ventricle and in select cases obviates the need for more invasive approaches.

FM1-2

A simple modification of the endoscopic ultrasonic aspirator to allow increased versatility and use down multiple endoscopes in the largest reported case series

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Objectives: Despite growing interest in neuro-endoscopy, endoscopic resection of intra- and paraventricular brain tumours is still hindered by a lack of appropriate instrumentation. The Söring ultrasonic aspirator holds significant promise but is limited due to its original design allowing sole use with the GAAB® endoscope.
Design: A simple modification of the ultrasonic aspirator which allows use down multiple endoscopes is described along with surgical outcomes in the context of the largest reported case series of 58 procedures in 52 patients, thus further expanding its applications and versatility.
Methods: Retrospective review of single institution case series.
Results: Our modification enabled the use of the Söring ultrasonic aspirator with the MINOP® InVent neuroendoscope, facilitating tumour resection in 58 procedures out of 52 patients between July 2015 and June 2022. Near-total to gross-total resection was achieved in 30.8% of cases, with no permanent neurological deficits observed. The modified aspirator proved effective and safe, with no adverse events related to its use.
Conclusions: The Söring ultrasonic aspirator represents a significant landmark in neuroendoscopic surgery. Our modification allowed greater versatility and compatibility with multiple endoscopes. This safe and effective modification will broaden its use and with time will have a considerable impact in the field of minimally invasive neurosurgery.

FM1-3

Cranioplasty in neuro-oncology patients: a single centre experience

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Objectives: Cranioplasty in neuro-oncology patients using synthetic implants is performed to restore the function and the configuration of the skull. In this population, cranioplasty is performed either primarily in tumours with bone infiltration, or secondary to post-operative complications such as oedema and infection. This study aims to examine the long-term outcome of surgical techniques and timing in this cohort.
Design: Single centre retrospective cohort study.
Methods: Electronic medical record review of all patients included in the study. Preoperative notes, intra-operative data and clinical outcomes data was collected and analysed.
Results: We identified 624 patients who underwent cranioplasty procedures at our centre between the years 2011 and 2024, of which 205 (33%) were identified as neuro-oncology related cranioplasty. 39% underwent primary cranioplasty and 61% had secondary procedures requiring delayed cranioplasty. Both groups had 10% rate of post cranioplasty complications requiring return to theatres. Titanium cranioplasty was used in 66% of the primary group and 91% in the secondary group. 80 of our 205 patients had a PEEK cranioplasty of which 8 were in the secondary group. 3.5% of the titanium implant group required permanent CSF (cerebrospinal fluid) diversion following cranioplasty while none of the PEEK group required this.
Conclusions: The type of surgical procedure – primary versus secondary, the material used for the cranioplasty – titanium versus polyether ether ketone – and the length between the first and second surgery (in the secondary subgroup only) were not related with the post-operative complications after the cranioplasty procedure ($p > 0.05$). However, the titanium implants group were noted to have a higher rate of infection as compared to the PEEK group (10.3% versus 0%, $p = 0.059$).

FM1-4

Defining the relationship between extent of resection and neurological deficit in eloquent tumour resections utilising IONM

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Objectives: To assess the relationship between degree of resection and clinical outcome in tumour resection cases utilising intraoperative neuromonitoring (IONM).
Design: Single centre retrospective review of patients undergoing resection of supratentorial tumours with IONM from January 2019 to December 2023.
Subjects: Adults undergoing resection of eloquently located tumours using IONM. Tumours of all histopathological types; awake and asleep cases; and primary and redo surgeries were included. The minimum follow-up period was 1 year.
Methods: Data was collected retrospectively through case file review. Pre and postoperative tumour volumes were obtained using Brainlab. Data was analysed using Prism GraphPad software. Statistical significance was defined as a p-value <0.05.
Results: 53 patients were identified, of which most were male (69.8%). Mean age was 40 years with a range of 18–72. Redo surgeries presented 32.1%. Frontal lobe involvement was the most frequent. 20.8% involved multiple lobes. Diffuse astrocytoma comprised 26.4%, followed by anaplastic

astrocytoma (18.9%), oligodendroglioma (17%) and glioblastoma (17%). 30.2% of cases were performed awake. Median length of stay (LOS) following surgery was 4 days. 54.7% of patients developed a neurological deficit post-operatively. Frontal lobe tumour infiltration was the only factor significantly associated with the likelihood of deficit. At discharge 92.5% patients were graded as having a good mRS (0–2), this rose to 98.1% at 1 year follow-up. 69.8% underwent a near total resection (>90% of tumour). Subtotal resection (STR) was significantly associated with female sex, left sided tumour laterality and if the case was performed awake. There was no significant difference in mRS outcomes or mortality between the NTR and STR groups.

Conclusions: A high proportion of patients experienced deficits immediately post-operatively despite reassuring IONM feedback. It appeared that these deficits resolved quickly and without significant impact upon LOS or activities of daily living.

FM1-5

Re-evaluating the role of surgical resection in primary CNS lymphoma: insights into minimal invasive neurosurgical techniques

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Objectives: To evaluate the potential role of minimally invasive neurosurgical techniques, specifically the minimally invasive parafascicular surgery (MIPS) approach, in the management of primary central nervous system lymphoma (PCNSL) for diagnostic and therapeutic purposes.

Design: A single-centre retrospective study.

Subjects: Consented patients with suspected primary CNS lymphoma who underwent either stereotactic biopsy or surgical resection using the MIPS approach.

Methods: Patient data were collected retrospectively, including surgical approach, extent of resection, perioperative outcomes, time-to-diagnosis, and complications. Functional outcomes and oncological treatment initiation timelines were analysed. Two illustrative cases were presented to demonstrate the balance between surgical goals and functional preservation.

Results: The MIPS approach provided larger tissue specimens for diagnostic accuracy, reducing the likelihood of inconclusive diagnoses and multiple procedures. It also facilitated timely diagnosis and oncological treatment initiation, particularly in patients on steroid therapy. Subtotal and partial resections were performed with careful consideration of functional outcomes, demonstrating that minimally invasive techniques can achieve diagnostic and decompressive goals while preserving neurological function.

Conclusions: The MIPS approach shows promise in addressing diagnostic and decompressive needs in selected PCNSL cases, particularly for large or deep-seated lesions. Its role warrants further evaluation in a prospective, multicentre setting to define its impact on outcomes and overall survival in this patient population.

FM1-6

Awake craniotomy in speech eloquent glioblastomas: understanding post-operative speech recovery a temporal analysis

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Objectives: Maximising extent of resection (EOR) with speech eloquent Glioblastoma must be balanced against risk of neurological deficit. It is observed that patients undergoing resection of speech eloquent tumours often experience post-operative dysphasia and recovery of this speech function remains poorly characterised.

Design: Retrospective single centre series.

Subjects: Patients undergoing awake craniotomy, utilising tractography, 5-ALA and intraoperative neurophysiology, for primary resection of speech-eloquent IDH-Wildtype Glioblastoma.

Methods: Cases were reviewed over a 10-year period, between January 2014 and January 2023. All patients had verbal and visual-language testing throughout resection. Resection was halted within 3–4 mA subcortical stimulation for positively identified language tracts. Outcomes assessed included neurological complications, EOR and overall survival (OS).

Results: 94 patients (54M:40F, median age 56.8 years) were included. There were 24 dominant frontal tumours in proximity to the pars triangularis/opercularis and the superior longitudinal fasciculus, 18 dominant parietal and 52 dominant temporal tumours in proximity to either the inferior parietal lobule, inferior longitudinal fasciculus, inferior fronto-occipital fasciculus or arcuate fasciculus. New or progressive dysphasia was observed post-operatively in 51/94 patients (54.3%) but only 2 patients (1.1%) experienced permanent speech disturbance persisting beyond 3-month follow-up.

Conclusions: Patients should be counselled about the significant risk of transient dysphasia following speech-eloquent tumour resection. When resecting to within 4mm (or 4mA subcortical positive stimulation threshold) of eloquent speech fibres, there is good chance of speech normalisation to pre-operative baseline within 3 months.

FM1-7

Does the addition of intra-operative ultrasound to multimodal (awake, tractography and 5-ALA guided) eloquent glioblastoma resection improve extent of resection: a retrospective matched cohort study

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Objectives: Maximising extent of resection (EOR) with eloquently located glioblastoma must be balanced against risk of neurological deficit. The optimal surgical adjuncts to enable maximal safe resection remains undefined. We present the first series to assess the safety and efficacy of awake craniotomy (AC) using 5-aminolevulinic acid (5-ALA) and tractography, with and without the additional use of intraoperative ultrasound (USS) guidance to resect Isocitrate Dehydrogenase (IDH) Wildtype GB.
Design: Single-centre retrospective matched cohort study.
Subjects: Patients undergoing AC for primary resection of eloquently located IDH-Wildtype GB.
Methods: We conducted a single-centre retrospective matched cohort study (1:1) of patients undergoing AC for primary resection of eloquently located IDH-Wildtype GB, over a 10-year period, between January 2014 and January 2023. Outcomes assessed included neurological complications, EOR and overall survival (OS).
Results: 156 patients (92M:64F, mean age 57.2 years) were included, with 78 patients having the use of intraoperative USS and 78 patients without. All cases used neuronavigation, 5-ALA and DTI. The cohorts were well-matched in age, gender, WHO performance status, tumour volumes, lobar and functional locations. Gross total resection (>98%) was achieved in 101/156 patients (64.7%), whilst 51/156 patients (32.6%) had a near total resection (95–98%). The median percentage EOR with USS was 100%, whilst without USS was 97.8% (Wilcox, $p = 0.0004$). There was no increased risk of permanent neurological deficit with this more complete resection achieved with USS (Fisher's Exact test $p = 0.65$), suggesting it was not of inferior safety. Median OS was 19.0 months (95% CI: 16.7 – 21.3 months).
Conclusions: Intraoperative USS is a widely available, cost-effective option for the real-time visualisation of tumour residual to facilitate maximal resection, in conjunction with other operative adjuncts. It is reported that USS and 5-ALA provide different information about tumour extent, and when combined intraoperatively, enhance EOR synergistically.

FM1-8

Service Evaluation of Intergrated Palliative Care Outcome Scale (iPOS)scores in patients with Neuro-oncology diagnoses

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Objectives: To investigate if people with neuro-oncology diagnoses present to a hospice inpatient service with different symptoms when compared to people with other oncological diagnoses.
Design: Retrospective case series notes review across three inpatient hospice units.
Subjects: Neuro-oncology patients & Oncology patients (Control)
Methods: Between October 2022 and June 2023, a random selection of 75 patients' admissions were reviewed. Patients were included if they had a a) primary brain tumour, b) secondary brain tumour, or c) other primary oncology diagnosis with no evidence of brain tumour. Primary outcome was iPOS (Integrated Palliative Care Outcome Scale) scores on admission. Secondary outcome was overlap between symptoms on iPOS and those reported during admission clerking.
Results: Demographic differences between the groups included a younger median age at death for primary brain tumours. Median length of stay was higher for those with primary brain tumours (13 days vs. 10 days for other groups). In the primary brain tumour group the most frequent reason for admission was because the patient was dying (53% vs 36% for other groups) and death was a more likely outcome of admission (94% vs. b) 73% and c) 55%). Across all three groups the high scoring iPOS symptoms were poor mobility & fatigue. The main symptoms on admission for those with primary brain tumours was due to cognitive related symptoms (35% vs. b) 23% and c) 0%). Whereas the main symptom on admission for those with secondary brain tumours was due to raised ICP symptoms (41% vs. a) 25% and c) 5%).
Conclusions: iPOS-Neuro was developed for use in long term neurological conditions and includes more physical symptoms related to cognitive, communication and continence issues. Our data suggests iPOS-Neuro could be used instead of iPOS to more accurately assess symptoms in those with a primary brain tumour, thus improving management and patient outcomes.

FM2 SKULLBASE AND CSF
FM2-1

Dural reconstruction following retrosigmoid craniotomy: results of an endonasal style repair

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Objectives: Cerebrospinal fluid (CSF) leak following retrosigmoid craniotomy is a common complication, with an incidence ranging from 0–30%, and an average of 10%.[1] Various techniques have been employed to minimise the incidence of post-operative CSF leak. The aim of this study is to evaluate the effectiveness of a specific retrosigmoid dural reconstruction technique to prevent CSF leaks and associated complications.
Design: Retrospective analysis of a prospectively maintained database.
Subjects: Patients undergoing a retrosigmoid craniotomy.
Methods: The dural reconstruction technique employed endoscopic endonasal repair principles, incorporating the use of a DuraGen® inlay layer, secured to the dural margins with monofilament sutures and a dural sealant. We examined the incidence of CSF leaks, the requirement for re-operation, infection rates, and the development of pseudomeningoceles in the cohort.
Results: 56 patients underwent a retrosigmoid craniotomy between May 2019–October 2024. The pathology was: schwannoma in 30/56 cases (53.6%), meningioma in 15/56 cases (26.8%), aneurysm 3/56 (5.4%), epidermoid and cavernoma in 3/56 (5.4%) cases, AVM and haemangioblastoma in 1/56 (1.7%) cases. The cohort included primary operations (48/56, 85.7%) and re-do cases (8/56, 4.3%). 1/56 (1.8%) of patients developed a post-operative CSF leak. This patient presented with CSF rhinorrhoea which was attributed to failure to completely obliterate the mastoid air cells with bone wax. There were no instances of CSF leak through the wound. There were no pseudmoeningoceles. None of the patients required any post operative CSF diversion.
Conclusions: The utilisation of endoscopic endonasal dural reconstruction techniques in the retrosigmoid approach appears to significantly reduce the rate of CSF leaks below that reported in the literature. Further multi-institutional study of this technique is warranted.

Reference

1. Fishman AJ, Marrinan MS, Golfinos JG, Cohen NL, Roland JT, Jr., Prevention and management of cerebrospinal fluid leak following vestibular schwannoma surgery. *Laryngoscope* 2004;114: 501–5.

FM2-2

Effectiveness of microvascular decompression for typical and atypical trigeminal neuralgia patients and predictors of successful outcome

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Objectives: The outcome of microvascular decompression (MVD) is well documented for typical trigeminal neuralgia (TGN) patients, but many authors regard atypical features such as absence of classical triggers to be a poor prognostic indicator for the success of MVD.1 Here, we present our outcome data for typical and atypical TGN patients undergoing MVD and determine the predictors of successful outcome.
Design: Retrospective review of case notes and imaging findings for consecutive patients undergoing MVD in the period March 2019 to February 2024. Outcome was assessed according to the Trigeminal Neuralgia Gamma Knife Outcome Scale (TNGKOS), a validated outcome scale.
Subjects: Patients undergoing MVD for TGN in the period March 2019 to February 2024 at a single institution
Methods: Kaplan-Meier survival analysis was used to plot outcome in typical and atypical TGN patients and Cox proportional hazards model was used to determine predictors of a non-1A outcome (pain-free and able to stop all antineuropathic medications).
Results: Of the 123 patients in the study, mean age was 51 and 70% were female. 57% of patients had right-sided symptoms, and the most common distribution was V2 and V3 combined pain. Patients with typical TGN were pain-free and able to stop all antineuropathic medications (1A outcome on TNGKOS) in 65% of cases at 1 year post-operatively, and 53% at 2 years post-operatively. For those with atypical TGN, 30% remained 1A outcome at 1 year, with effect sustained at 2 years. The predictors of failure of 1A outcome are also evaluated.
Conclusions: In atypical TGN MVD can procure a 1a response but should be counselled carefully pre-operatively due to possibility of incomplete remission. Negative predictors of outcome include features of facial migraine, absence of lancinating pain, multiple sclerosis or ear/retromastoid pain.

FM2-3

Petroclival meningiomas: trials and tribulations

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Objectives: Given the demanding nature of petroclival meningiomas and their association with the critical neurovascular structures, these lesions are technically challenging.
Design: Objective Emphasis was placed on evaluating modes of presentation, surgical approaches, postoperative

neurological outcome, complications, and recurrence rates. Methods Eighty patients underwent surgical treatment. The majority of them were women (65%). Authors retrospectively reviewed the patients' medical records, imaging studies, and pathology reports between 1993 and 2021.

Methods: Results Headache was the most common presentation (62.5%). The frequently used approach was transpetrous (33.75%), followed by orbitozygomatic (26.25%). Gross-total resection was performed in 34 patients (42.5%), and the remaining had a residual tumour (57.5%). Twenty- eight patients with remnants were treated with Gamma Knife surgery. Thirty patients had post- operative cranial neuropathies. The most common cranial nerve (CN) deficit was CN III dysfunction (22.5%), and facial weakness (17.5%). CN dysfunction was transient and permanent in 14 (46.7%), and 9 (30%) patients, respectively. Twelve patients developed hydrocephalus requiring ventriculoperitoneal shunt. CSF leak was noted in 4 patients. Adequate radiographic follow-up (minimum 6 months) was available for 54 patients (67.5%). The mean follow-up was 38 months. In eleven patients, tumour progression or recurrences were noted. The median time to recurrence was 87 months. At discharge, 91.5% had good outcomes (GOS Scores 4 and 5). Four patients died of causes unrelated to surgery.

Conclusions: The authors' primary surgical goal was to attain maximal tumour resection while preserving or improving neurological function and favoured the treatment of residual or recurrent tumours with stereotactic radiosurgery.

FM2-4

Prediction of growth in vestibular schwannomas: Nano-omics enabled discovery of circulating prognostic biomarkers

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Objectives: Vestibular schwannomas (VS) are characterised by their highly variable and unpredictable natural history; only ~1/3 demonstrate significant growth requiring treatment following diagnosis. Active intervention via surgical resection or stereotactic radiosurgery is associated with greater success rates and fewer complications when tumours are treated at a smaller size. The ability to predict growth at the time of diagnosis would therefore represent a significant advance in the care of patients with VS. This study aimed to utilise a nanoparticle-based pipeline for the identification of novel circulating biomarkers to distinguish growing from non-growing VS.

Design: Biomarker Development.

Subjects: 44 patients with growing VS. 33 patients with static VS.

Methods: Plasma samples were collected from sporadic VS patients with growing (n = 44) and non-growing (n = 33) tumours. The Nano-Omics approach was applied to capture and enrich disease-specific proteins that cannot be directly detected by conventional proteomics analysis of the blood. Progenesis QI for Proteomics software was used for the identification of differentially abundant proteins.

Results: A total of 145 differentially abundant proteins were identified in VS patients with growing tumours relative to those with static tumours. Application of the biomarker selection criteria (FDR adjusted p-value (q-value) < 0.05, unique peptides >1 and fold-change >1.3), revealed a panel of 15 biomarker candidates of tumour growth implicated in activation of the complement cascade and acute phase response signalling. Furthermore, we identified THBS1 as one of the top candidate biomarkers ($p < 0.0001$) with an excellent diagnostic performance of 80.2%.

Conclusions: The Nano-Omics pipeline has enabled the discovery of prognostic biomarkers with the potential to predict future growth in VS patients. Prediction of growth at the time of diagnosis would facilitate a disruptive paradigm shift in the clinical management of VS patients and may permit identification of growing tumours at the time of diagnosis, allowing us to intervene earlier with lower morbidity.

FM2-5

MEK promotes neuronal cell death and inhibits central axonal sprouting following peripheral facial motor nerve injury

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Objectives: The extracellular signal-regulated kinase (ERK) cascade plays an important role in neuronal survival and in mediating synaptic plasticity.

Methods: To investigate the function of neuronal ERK activity, transgenic mice were generated wherein dominant-negative (dn) MEK1 was expressed using the pan-neuronal T-alpha1-tubulin promoter. We explored the effects of MEKdn on neuronal cell death, peripheral regeneration, target reinnervation and central sprouting following transection of the facial motor nerve.

Results: Compared with wild-type controls, MEKdn animals showed a 50% reduction in neuronal cell death following injury. MEKdn mutants caused a reduction in late microglial activation and T-cell recruitment, secondary to reduced neuronal cell death. Mutant animals revealed a striking dichotomy in the central and peripheral pattern of axonal outgrowth. Peripheral nerve regeneration and target reinnervation of whisker hair movement were normal. However, there was a large increase in the central sprouting of motor nerve fibres in mutant animals, compared with wild-type controls. Both galanin- and CGRP-immunoreactive fibres were affected.

Conclusions: Overall, these data point to an important role of MEK in promoting post-traumatic neuronal cell death, neuroimmune surveillance, and inhibition of central axonal sprouting, but argue against its involvement in peripheral nerve regeneration or target reinnervation.

FM2-6

Pragmatic UK NPH Trial (PUNT)

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Objectives: To design a UK wide multicentre trial to look at the potential benefit of performing surgery for Normal Pressure Hydrocephalus (NPH) without performing provocative tests, e.g. infusion tests or extended lumbar drainage.
Design: The Association of British Neurologists created a Normal Pressure Hydrocephalus Significant Interest Group, with a subcommittee to look at trial design. The subcommittee considered the most important questions to be answered in NPH.
Subjects: NPH is undertreated in the UK and provocative testing further delays access to definitive treatment. The subcommittee decided to explore whether shunting based on clinical and imaging diagnosis alone would be safe, and at least as effective as surgery after provocative testing.
Methods: Review of the evidence for provocative testing Review of existing guidance Iterative process of trial design in group setting and consideration of acceptability and feasibility.
Results: Most studies show an 80% response to shunting. Lumbar tap tests, lumbar infusion tests and Extended Lumbar Drainage are all strong positive predictors of shunt responsiveness, 80–100%, but can all also produce false positive results 13–32%, meaning a significant proportion of NPH patients who may have improved with surgery could be denied treatment. International guidelines allow proceeding directly to shunting on the basis of clinical and imaging features alone.
Conclusions: A study comparing the pragmatic treatment of NPH on clinical and radiological features alone, compared with the addition of provocative testing as an aid to diagnosis, is feasible on the grounds that such treatment is recognised in international guidance, and desirable as a positive outcome could significantly reduce the duration of the patient journey and increase the availability of treatment. The trial subcommittee proposes a UK wide single blinded trial recruiting patients with clinical features of NPH and large ventricles randomised to either direct shunting, or provocative testing to determine whether or not a shunt should be placed.

FM2-7

Ventriculo-pleural shunt – a good second line option in the management of complex hydrocephalus

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Objectives: To record the cases of ventriculo-pleural (V-Pleural) shunt placement including the indications and complications To identify the main indications for switching from first-line management of hydrocephalus into V-Pleural shunt To evaluate the effectiveness of V-Pleural shunt as a second line management for hydrocephalus.
Design: Retrospective review cohort.
Subjects: Adult and paediatric patients with shunted hydrocephalus.
Methods: 13 patients underwent V-Pleural shunt or V-Pleural shunt related surgeries from August 2022 to 2024 are recorded retrospectively, including both paediatric and adult patients. The data collections are done via healthcare records, computer held information, patients' medical charts and NIMIS. The data is compared from different approaches.
Results: The indications for using V-Pleural shunt instead of ventriculoperitoneal (VP) shunt or endoscopic third ventriculostomy (ETV) are shunt malfunctions, persistent shunt-related symptoms, body habitus and abdominal ascites. The common complications of V-Pleural shunt include general shunt failures and V-Pleural shunt specific complications, including pleural effusion, pleuritic chest pain and pneumothorax.
Conclusions: Even though there are V-Pleural shunt related complications, multiple methods have been tried to reduce the risk of developing pleural effusion, pleuritic chest and pneumothorax, including the use of anti-siphoning devices, and carbonic anhydrase inhibitors. Therefore, V-Pleural shunt can be considered as a viable second line option for management of hydrocephalus when VP shunt and ETV are not applicable.

FM2-8

Use of neuronavigation and shunt survival: a single centre series

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Objectives: Ventricular shunting is one of the most common neurosurgical procedures although is associated with a high revision rate, often due to ventricular catheter blockage. The aim of the study was to appraise whether the use if neuronavigation is associated with better catheter positioning and shunt survival.
Design: Retrospective single-centre series.
Subjects: All adult patients (over 16) undergoing any new or revision CSF shunt operation including a ventricular cannulation over a 2 year period.

Methods: Pertinent factors such as patient demographics, ventricular size, underlying pathology, grade of surgeon, time of surgery were extracted. Proximal catheter positioning was assessed using post operative computed tomography scans and then graded using a three-point scale. A revision was defined as any further procedure on that shunt system for any indication during the follow up period.
Results: 124 patients undergoing 131 shunt procedures fulfilled inclusion criteria; and were followed up for a median of 652 days. 29% and 31% of shunts had been revised at 1 and 2 years, respectively. Neuronavigation use was associated with worse catheter position and shunt survival, although tended to be used for more difficult cases. There was a strong correlation between catheter position and shunt survival for patients with small ventricles, but not for those with medium or large ventricles. Most navigated cases required additional imaging and took longer.
Conclusions: Neuronavigation is a vital tool for difficult shunt cases, such as those where ventricular size is small, but we argue that it is not required for straightforward cases, as the increased precision does not result in improved revision rate and does increase burden on theatre time and hospital resources.

FM2-9

Normal pressure hydrocephalus: frequent comorbidities, incidence of post operative seizures, abdominal pain, and quality of life

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Objectives: The objective of this study was to determine the frequency of post operative seizures and abdominal pain in idiopathic normal pressure hydrocephalus (iNPH) patients who underwent shunt insertion as well as their comorbidities and overall quality of life.
Design: This is a single centre retrospective case series study.
Subjects: The subjects included patients treated with a lumboperitoneal (LPS) or ventriculoperitoneal shunt (VPS) for iNPH from 2009 to 2021. Exclusion criteria were patients lost to follow up, refused participation or deceases. Demographic, clinical and radiological data were derived from the records.
Methods: Postoperative seizures, abdominal pain and overall quality of life were assessed via telephone questionnaires.
Results: Data from 135 patients (133 males, 32 females) with a mean age of 74 (SD+/− 7.55) years was analysed. 134 patients received a VPS, with all proximal catheters placed parietally. Out of the 3 patients with an initial LPS, two underwent VPS insertion at a later point. None had experienced new onset of epileptic seizures. Post operative abdominal pain was reported in 29 cases (21.6%) and estimated at a mean of VAS 6/10 (SD+/−2). Cardiovascular diseases were commonly encountered in the past medical history. Patients reported an overall health of 60/100 (SD+/−24).
Conclusions: Epilepsy is not a common post operative complication following shunt insertion. This could be a relevant finding in particular to patients living in countries where temporary legal driving restrictions have a negative impact on their already impaired mobility.

PARALLEL SESSION

FP1 GENERAL NEUROSURGERY

FP1-1

Meningioma surgery and VTE – managing the risk

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Objectives: We aimed to determine the incidence and risk factors for VTE following meningioma surgery as well as our current standard of VTE prophylaxis post operatively.
Design: Retrospective single centre study of 93 patients undergoing meningioma surgery between 01/04/2023 and 31/03/2024.
Subjects: Adult patients undergoing surgery for meningioma.
Methods: Retrospective review of pre-assessment, operative and inpatient notes to identify pre- and post-operative risk factors. Discharge letters, subsequent clinic records and GP notes were used to identify records of any post-op VTE events within a up 3month follow up period.
Results: 26% of patients had at least one risk factor present pre-operatively, increasing to 42% post-operatively. The vast majority of patients had mechanical thromboprophylaxis prescribed (80%) and were also prescribed pharmacological prophylaxis on day 1 post-op (75%). Our institution advises continuation of mechanical thromboprophylaxis for 6 weeks post-op and this was documented on the discharge letter. The majority of patients were prescribed LMWH on discharge for a mode number of 14 days. During follow up, one patient developed a fatal PE whilst in hospital and aside from this there were no other incidences of VTE identified. 10% of patients had post-operative haematoma/collections, with 50% of these requiring further intervention.
Conclusions: Historically meningiomas have been thought to be associated with increased VTE risk however more recent literature suggests the risk may be no higher than with other tumours. We have demonstrated a low incidence of post-operative VTE in our patients undergoing meningioma surgery meningioma. Based on previous literature and experience our centre adopts a fairly aggressive approach to post-operative pharmacoprophylaxis which is likely to contribute to this. This risk needs to be carefully balanced, however against the increased bleeding risk with LMWH, noting the post-operative haematoma rate of 10% in our cohort.

FP1-2

The significance of body mass index on post-operative outcomes of patients undergoing surgery for Chiari Type 1 malformation

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Objectives: To explore the differences in presentation, clinical outcomes, and surgical complications in Chiari Type 1 malformation (C1M) surgery between obese and non-obese patients.
Design: A retrospective cohort analysis.
Subjects: Sixty-nine patients who underwent a foramen magnum decompression (FMD) for C1M in a single neurosurgical unit over a five-year period (2015–2020).
Methods: Peri-operative demographics, clinical features, imaging, and follow-up data were collected from electronic case notes for all patients undergoing surgery for C1M at a single neurosurgical unit. Outcome data was collected from six to twenty-four months post-operatively. Fisher's Exact Test was used to assess for statistical significance between relevant variables.
Results: Roughly half of patients in the cohort were obese (BMI >30; n = 34; 49%). Equal proportions of patients underwent bone-only surgery (obese n = 12; non-obese n = 10) and bony decompression with duraplasty (obese n = 11; non-obese n = 10). Significantly fewer obese patients had a syrinx at the time of surgery compared to non-obese patients, (obese n = 10; non-obese n = 17; $p = 0.0007$). Significantly more obese patients presented with Valsalva-related headache ($p = 0.0251$). There were no other significant differences in pre-operative symptomatology, symptom severity, or symptom duration between obese and non-obese patients in this cohort. There were no significant differences in post-operative complications, ($p = 0.335$) readmission rate, ($p = 0.151$) nor for improvement of symptoms, ($p = 0.504$) between obese and non-obese patients in this study. Recurrence of symptoms, ($p = 0.303$) and the need for further surgery, ($p = 0.243$) were also not significantly different between the two groups.
Conclusions: There were no significant differences in post-operative complications, nor in clinical outcomes, between obese and non-obese patients undergoing surgery for C1M in this study. Obesity may therefore not be as substantial a predictor of surgical outcomes in C1M as other factors may be. High BMI in isolation should thus not preclude patients from consideration for FMD if they have symptomatic C1M.

FP1-3

Do AI chatbots assist in obtaining informed consent for spinal surgery

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Objectives: To assess the ability of open-access AI chatbots to produce consent forms that are readable, legible, and contain adequate information.
Design: An online search was conducted to identify available open-access AI chatbots. Selected chatbots were tasked with producing consent forms for six procedures listed on the British Association of Spine Surgeons (BASS) website. The readability of the output was evaluated using online readability tools and compared to BASS consent forms for content accuracy.
Subjects: Consent forms generated by ChatGPT, Gemini, Meta AI, and Perplexity AI were selected for their ease of access and use by individuals, in addition to BASS consent forms.
Methods: The AI chatbots were asked to produce a 'comprehensive consent form for' the named procedure. The readability of the output was assessed using an online readability score calculator for Flesch-Kincaid, Gunning Fog Index, SMOG Index, Automated Readability Index, and Dale-Chall. The content was compared against BASS consent forms and leaflets.
Results: All AI chatbots used in this study produced consent forms containing brief surgical descriptions, aims of the surgery, alternatives, surgical complications, and postoperative expectations. The readability of the produced consent forms was comparable to BASS forms, averaging at a college level (age 18–21). The content information was also comparable to BASS forms and leaflets, with minimal missing information varying between the AI chatbots. Additionally, the chatbots were able to produce personalised consent forms when patient symptoms and specific procedure details were provided.
Conclusions: AI chatbots can produce reliable, legible, and readable consent forms. These tools are easily accessible and usable by patients. Personalised consent forms can be generated using these tools.

FP1-4

ChatGPT vs the neurosurgical registrar on-call

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Objectives: This scoping study attempts to compare outcomes in management of unselected emergency referrals by the ChatGPT 4o LLM and the management plans given by the on-call middle grade doctor (ST3+ equivalent).
Design: This is a retrospective cohort study.
Subjects: Patient referrals taken via the on-call neurosurgical registrar phone over a 2 month period at a single neurosurgical centre.

Methods: 69 referrals were selected from the handover document from August to September 2024. Referrals were selected from a range of subspecialties. Referral text and imaging report submitted to ChatGPT 4o. ChatGPT 4o was asked pre-specified questions regarding the management of the referral to include need for admission or outpatient management, the location of the admission, need for operative intervention and management of anticoagulation. These outcomes were compared with the management plan provided by the middle grade doctor using a chi square test.
Results: Chat PT 4o advised admission for 63 patients compared to 64 by the on-call doctor. Across all domains assessed ChatGPT 4o gave reasonably comparable advice to the on-call doctor. The main difference we found was in the location of admission. ChatGPT 4o was significantly more likely to suggest admission to the neurosurgical unit rather than to remain in the local district general hospital −18 patients (28%) admitted by the on-call doctor vs 37 (57%) by ChatGPT 4o. This was particularly apparent with the oncology patient subset ($p = 0.015$).
Conclusions: Firstly, ChatGPT 4o provided safe advice for all cases and all questions asked. ChatGPT 4o had a significantly higher rate of admission to the neurosurgical unit than the on-call doctor perhaps reflecting advice from a setting without resource limitations. This study was limited by small sample size and a single centre but shows that there is scope for AI in neurosurgical care but with careful clinician oversight.

FP1-5

Towards net zero operating in neurosurgery

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Objectives: The climate crisis is one of the greatest threats to public health and surgery is a significant contributor to carbon emissions generated by the NHS.[1] Here we describe our experience of sustainable operating by using evidence-based methods to reduce our carbon footprint across three neurosurgical theatres during our Green operating day.
Design: The Green operating day was run at a single site over a 12-hour operative day and included 10 neurosurgical cases. Following discussions with the theatre, anaesthetic and sustainability team, each operative case was reviewed and changes in the consumables, surgical instruments and utilities recorded.
Subjects: All patients included for the green operating day were informed and consented to take part.
Methods: Carbon footprint was calculated using an environmentally extended input-output model for baseline and Green operating day. Qualitative data was collected on the participants of the Green operating day to assess attitudes and behaviours towards sustainability in neurosurgery. Cost benefit analysis of the green surgery day along with potential future savings is also explored.
Results: There was a total reduction of carbon emissions by 31%, equivalent to 1.04 tonnes CO2e. A secondary benefit was seen in a 22% reduction in cost across the three neurosurgical theatres. Reductions were seen across different aspects of surgery including anaesthetics, surgical instruments, waste and utilities.
Conclusions: This study demonstrates the feasibility of carbon footprint reduction within neurosurgical theatres which was not associated with increases in operative duration or adverse patient outcomes. This study advocates for environmentally conscious decision making in neurosurgical procedures.

Reference

1. Brighton & Sussex Medical School, Centre for Sustainable Healthcare, and UK Health Alliance on. Green surgery: Reducing the environmental impact of surgical care. 2023 [cited 2024 Apr 2];(v1.1).

FP1-6

Optimising management of brain abscesses: a 10 year-long cohort study of surgical and medical management in a tertiary care centre

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Objectives: To evaluate the clinical characteristics, management, and outcomes of brain abscesses treated at a tertiary care centre.
Design: A retrospective cohort study analysing clinical and management data from treated brain abscesses at a tertiary care centre over 10 years.
Subjects: 175 patients diagnosed with brain abscesses, subdural or epidural empyemas, or postoperative infections between January 2013 and September 2023. The cohort comprised 143 adults and 32 paediatric patients.
Methods: Clinical data, imaging results, treatment, and patient outcomes were analysed. Presentation severity and outcomes were evaluated using the Glasgow Coma Scale (GCS) and the Glasgow Outcome Scale (GOS), respectively. Management strategies were classified as either surgical (burr hole drainage or craniotomy) or conservative (antibiotic therapy alone).
Results: The majority of patients (74.9%) presented with favourable GCS scores, while 11.4% exhibited moderate to poor scores. Parenchymal abscesses were the most common diagnosis, followed by subdural empyemas. Surgical intervention was required in 65.3% of cases (burr hole drainage 36.6%, craniotomy 29.7%), with 14.9% undergoing multiple procedures. Conservative treatment was used in 34.7%. Favourable outcomes (GOS 4–5) were observed in 71% of cases. The overall mortality rate was 5.8%, and 10.5% of patients experienced poor outcomes.
Conclusions: The observed bimodal age distribution, heavy reliance on surgical interventions, and complexities of postoperative care underscore the need for standardised management protocols. Developing these protocols and exploring targeted therapies for specific populations, such as paediatric or immunocompromised patients, are key areas for future research.

FP1-7

Intracerebral abscess: to excise or not?

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Objectives:

- To provide an overview of the pathogens isolated from intracerebral abscesses
- To determine the link between antibiotics duration and size of abscess
- To determine the link between antibiotics duration and management approach

Design: Cross-sectional retrospective descriptive study

Subjects: Patients with Bacterial Brain Abscess presenting to Neurosurgery and Clinical Microbiology Departments, Beaumont Hospital, Dublin

Methods: A cross-sectional retrospective study was conducted based on six years of retrospective data (January 2016 to December 2021). All cases of brain abscesses presenting to Beaumont hospital were included in the study while patients unable to complete the antibiotic therapy or brain abscesses due to mycobacterial species, fungi, or parasites were excluded. Data was collected in from departmental database and charts and was stored in an excel database. It was analysed for descriptive statistics.

Results: A total of 74 patients were identified for inclusion. The mean age being 49.4 ± 15.8 years with male predominance (66.2%). Most of the abscesses (82.4%) were single lesions. Frontal lobe (37.8%) was the most common location, and the most commonly isolated pathogen was Streptococcus intermedius (37.8%). 52 (70.3%) and 14 (18.9%) number of patients underwent drainage or excision of the abscess(es) respectively. 64 (86.5%) patients' antibiotics duration could be determined, and no relationship was found with antibiotic duration and initial surgical management type ($p = 0.128$). Most patients received between 4–6 weeks (60.9%) of antibiotics. No statistical significance was appreciated when comparing initial drainage ($p = 0.177$) or only antibiotics use only ($p = 0.992$) however, initial excision of abscess wall ($p = 0.017$) with duration of antibiotics was significant.

Conclusion: From the preliminary data, no clinical significance is found between antibiotics duration with size of abscess or initial management. Further data once analysed will provide more insight into its significance.

FP1-8

Intracranial bacterial abscess in the Republic of Ireland: a 12-Year epidemiological review (2010–2021)

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Objectives: Intracranial abscess is an uncommon diagnosis associated with significant morbidity. This multi-centre study, encompassing the Republic of Ireland's two adult neurosurgical referral centres, describes the national epidemiology, microbiology and outcomes of patients presenting with bacterial intracranial abscess.

Methods: A twelve-year retrospective review of radiological, laboratory, and medical records for adult patients (>16 years) admitted with bacterial intracranial abscess between January 1st 2010, and December 31st 2021 across both sites. Fungal, parasitic, and mycobacterial cases were excluded.

Results: Of 192 patients, 127 were male (66.2%); mean age at diagnosis was 54 years (SD =10.5). Community-acquisition occurred in 183 (95.3%) cases. The highest number of presentations were observed in 2020 (n = 32). A preceding or concurrent sinusitis, mastoiditis, or dental infection was identified in 39.1% (n = 75), a prior neurosurgical procedure in 14.6% (n = 28), and infective endocarditis in 14.5% (n = 28). No attributable risk factor was identified in 22.9% (n = 44). A solitary intracranial lesion was present in 82.3% (n = 158). The frontal lobe was the most common site for solitary lesions (38.6% [61/158]). Solitary lesions were more common in those with dental or ear, nose and throat (ENT) infections (41.1% [65/158]. Immunosuppressed patients were significantly more likely to have multiple lesions (26.4% [9/34] versus solitary lesions 6.9% [11/158]; (OR 4.4, 95% CI 1.67–11.5), $p = 0.004$). Neurosurgical drainage was performed in 90.6% (n = 174). A single isolate was cultured in 84 patients (43.7%); Streptococcus intermedius was most common (n = 35). In-hospital mortality was 3.1%.

Conclusions: This first cross-site national study has provided an epidemiological and microbiological update on intracranial abscess in the Republic of Ireland. Common features include solitary frontal lobe abscess, growth of S. intermedius, male preponderance and association with ENT or dental infection, consistent with recent epidemiological studies. Mortality is lower than reported internationally.

FP1-9

A single centre review of Cutibacterium species neurosurgical infections: the silent pathogen

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Objectives: Cutibacterium sp. are slow-growing skin commensals increasingly recognised as pathogens in post-neurosurgical infections, though data remains limited. This study aimed to identify patients with Cutibacterium sp. neurosurgical infections and assess their clinical characteristics and treatment outcomes.
Design: Retrospective single-centre cohort study.
Subjects: Patients with Cutibacterium sp. neurosurgical infections.
Methods: Patients in whom any Cutibacterium sp. was isolated from neurosurgical specimens between November 2018–May 2024 were identified. Cases were reviewed to determine infection type and timing, clinical features, co-pathogens, antimicrobial susceptibility, treatments, and outcomes.
Results: Overall, Cutibacterium sp. were isolated from 250 specimens from 140 patients, with an average time to culture positivity of 5 days (range 3–19). Cutibacterium infection was identified in 51 patients, 30 (58%) were male. C. acnes was the most common species isolated (50/51 cases). 22 (43%) patients had monomicrobial infection. Infected surgical sites included craniotomy (30 cases), cranioplasty (10), other CNS prostheses (4), craniectomy (4), VP shunts (2), and lumbar decompression (1). Median time from surgery to infection diagnosis was 56 days (range 9 days-25 years). Symptoms varied with some patients exhibiting little to no signs of inflammation at the site of infection, and some having systemic signs or elevated inflammatory markers. Definitive therapy included linezolid (23), ceftriaxone (20), and amoxicillin (9), with a median duration of antibiotic therapy of 42 days (range 9–84). Six (12%) patients experienced relapse (n = 2) or recurrence (n = 4) of infection due to inadequate source control, with recurrence in one occurring years later.
Conclusions: This study represents the largest cohort of post-neurosurgical Cutibacterium sp. infections reported to our knowledge. Cutibacterium sp. caused diverse infections, often with minimal local or systemic inflammatory signs making diagnosis challenging. Their detection requires prolonged anaerobic culture and this study emphasises the importance of this essential aspect when processing neurosurgical specimens.

POSTERS
BASIC SCIENCE

BS-1

The genomic revolution in neurosurgery: unravelling the new frontiers with chromosomal microarray analysis

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FUNCTIONAL

FS -1

Neurosurgery in transhumanism: bridging human cognition and machine augmentation

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FS-2

Can machine learning algorithms improve epileptogenic zone detection?

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FS-3

Pilot study to assess awareness of spinal cord stimulation and persistent spinal pain syndrome in clinicians in multiple specialties at a large NHS trust

B. Benzahia, A. Elyas, G. Mattocks, A. Alamgir, A. Ahmed, S. Nikolic, A. Ghosh and M. Khan

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FS-4

Trigeminal neuralgia in young patients: treatment dilemmas and long-term outcomes

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GENERAL NEUROSURGERY

GN-1

Neurosurgical theatre time utilisation: a single-centre audit study

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GN-2

To dex or debulk: a central nervous system presentation of Rosai-Dorfman disease

S. Gnanakumar, J. Lau, B. Herron, J. McNamee, L. Venkatraman, M. Moore, F. Conlon and M. Shanmuganathan

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GN-3

A systematic review and patient interview: exploring the psychological impact of trigeminal neuralgia

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GN-4

Developing sustainable solutions for global wellness in neurosurgery

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GN-5

Efficacy of middle meningeal artery embolisation as an adjunct to surgical evacuation in reducing the recurrence of chronic subdural haematoma: systematic review

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GN-6

Evaluating the history of the Scottish contributions to the field of neurosurgery

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GN-7

Predicting survival in patients with malignant glioma using artificial intelligence

M. H. Shah[a,b], W. Awuah[c], A. Ben-Jaafar[d], S. Roy[e], P. Nkrumah-Boateng[f], J. Tan[g], T. Abdul-Rahman[c] and O. Atallah[h]

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GN-8

Local surgical prophylaxis for elective patients undergoing neurosurgical procedures

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GN-9

A five-year review of external ventricular device infections in Ireland's national neurosurgical centre

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GN-10

Incidental idiopathic left uncal herniation: a case study & literature review

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GN-11

Which students aspire to neurosurgery? Insights from the FAST Study

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NEUROVASCULAR

N-1

The impact of nicorette replacement therapy on the risk of vasospasm following subarachnoid haemorrhage

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N-2

Preliminary experience with the use of a 3D exoscope for excision of unruptured brain arteriovenous malformations: case series and comparative analysis

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ONCOLOGY

O-1

A rare presentation of a primary melanocytic tumour of the central nervous system: a case report

L. Dablouk, S. Altaib, D. Murray and M. Iqbal
Cork University Hospital, Cork, Ireland

O-2

Implementation of a surgical neuro-oncology EPIC (electronic record) bundle: impact on documentation, clinical outcomes and patient safety

P. Dey, J. M. Aliaga-Arias, A. Elhag, V. Hurwitz, J. P. Lavrador, R. Bhangoo, K. Ashkan and R. Gullan
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PAEDIATRICS

P-1

Contributing factors to infection rates in the management of neonatal hydrocephalus: a review of the literature

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P-2

The current state of paediatric-to-adult transitional neuro-oncology: a systematic review of healthcare needs, current practices, and barriers

A. B. Bilal[a], I. T. Taouba[a], T. H. Honeywell[b], A. V. Vasudevan[a], R. D. Duff[a], L. B. Burn[c] and C. K. Kaliaperumal[d]
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P-3

Assessing neurocognitive outcomes in paediatric patients with craniosynostosis: a systematic review

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P-4

Treatment outcomes for high-grade paediatric cranial arteriovenous malformations: a systematic review

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P-5

The role of artificial intelligence in predicting outcomes in paediatric traumatic brain injury: a systematic review

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SKULLBASE

SB-1

Optimal surgical approaches for giant pituitary adenomas

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SPINE

S-1

Kissing cervical spine schwannomas in a young female from a low resource setting

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S-2

A single centre experience of lumbar transverse process fractures and associated ureteric injuries

K. O. Carey, M. V. Mathew, A. Basnet and K. Chandrasekaran

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S-3

Intraoperative monitoring for spine surgery in LMICs: Applications, outcomes and access disparities

K. M. Mannan[a], W. A. Awuah[b], S. Roy[c], P. A. Nkrumah-Boateng[d], A. Ben-Jaafar[e], J. K. Tan[f], T. Abdul-Rahman[b] and O. Atallah[g]

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S-4

Evaluating the accuracy of automated and semi-automated anonymisation tools for unstructured health records

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S-5

Coexisting arteriovenous fistula and spinal lipoma: a systematic review and illustrative case report

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S-6

Robotic-assisted single-position anterolateral approach to lumbar spinal surgery: a PRISMA review and meta-analysis

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TEACHING AND TRAINING

TT-1

A qualitative UK study of the use and experiences of intraoperative neuromonitoring

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TT-2

Near misses: who saves the day? Exploring mechanisms behind near misses in healthcare

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TRAUMA

T-1

Lingual epilepsy following traumatic brain injury: a case report and literature review

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T-2

Thoracic laminectomy for spinal cord injury secondary to calcified ligamentum flavum and bilateral facet hypertrophy: a case report of remarkable functional recovery

L. H. Pearson, J. Weeks, E. Supsupin, D. Tavanaiepour, K. Tavanaiepour, U. Cikla, A. Amer and V. Sekar

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T-3

The confounding factors to the assessment of concussion: a narrative review

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T-4

Clinical characteristics associated with mortality in traumatic brain injury patients admitted to neurosurgical ICU

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T-5

The long-term functional outcomes of patients following a traumatic brain injury

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T-6

Comparing predictive performance of GCS-P, GCS, and motor score variants in traumatic brain injury outcomes: a retrospective analysis

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T-7

Factors influencing delayed recovery and disability levels in severe traumatic brain injury survivors with a favourable outcome at six-month follow-up

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