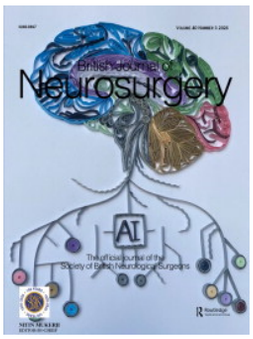

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Proceedings of the 2026 Spring Meeting of the Society of British Neurological Surgeons

Carole Turner

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PROCEEDINGS

Proceedings of the 2026 Spring Meeting of the Society of British Neurological Surgeons

This meeting was hosted by the Society of British Neurological Surgeons and the British Neurosurgical Research Group, 15th–17th April 2026 at the Doubletree by Hilton Majestic Hotel, Harrogate. 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.

MAIN LECTURE THEATRE
WEDS 15TH APRIL
WM1 HOT TOPICS

WM1-1

Safe neurosurgery 30+ years on

Barrie D. White
Queen's Medical Centre, Nottingham, UK

Objective: The last two decades of the last Century saw considerable changes in the NHS, with increasing scrutiny of services and individual clinicians.
SBNS tapped into this and in 1993 produced Safe Neurosurgery, then Safe Neurosurgery 2000, and the British Neurosurgical Workforce Plan 2000–2015.
Some of the requirements in these documents fitted the national agenda – hours reduction from >100hrs per week towards 40hrs. Others – 30beds/million population were unfunded and slower to achieve because they were seen as a self-serving wish list.
Design: 'Standards for Patients Requiring Neurosurgical Care' was published in 2002, with a new approach involving Regional Specialised Services Commissioners. This document, based on National Cancer Standards, comprised ~450 standards allowing a comprehensive overview of every component of the core service and supporting elements.
Method: All Neurosurgical Centres were asked to assess themselves. Twenty-six did. The responses were scored and a colour coded matrix created, allowing instant appreciation of local and national strengths and weaknesses.
Results: Some Centres fared better than others, but overall Neurosurgery met 65% of the Standards. We were adequately managed but had difficulties with access to the service (bed numbers), and discharge from it (rehabilitation).
The plan was to celebrate successes and support the struggling; to concentrate on national deficiencies while bringing everyone up to average at least, thus gradually improving the national picture.
Conclusion: There was a flurry of success, with other specialties adopting the model, but sadly, NHS reorganisations, successive NHS Plans, emphasis on efficiencies, and other factors led to loss of impetus. Little has changed, but recently with resurgence of standards, publication of rankings and several 'scandals', the time is again ripe.
SBNS was modest in its ambitions, setting out what it saw to be minimum requirements. These are still pertinent and could be resurrected but need concerted effort and Central support to be successful.

WM2 TRAUMA

WM2-1

Objective biomarkers of sports-related concussion and recovery: protocol for the Podium Multimodal Concussion Study

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Objective: Sport-related concussion remains a clinical diagnosis with limited objective biomarkers of early neurobiological injury. This study aims to define multimodal signatures of concussion – integrating neuroimaging, biofluid analyses, vestibulo-ocular and neurophysiological measures, and impact biomechanics from instrumented mouthguards (IMGs) and computer vision – to improve objective diagnosis, prognostic modelling and recovery monitoring.
Design: Prospective, longitudinal, multimodal observational cohort study conducted across the 2025/6 Premiership Rugby season with a single professional club (Gloucester Rugby). All elite players undergo preseason baseline assessments with repeated in-season follow-up testing. A comparison cohort of non-contact athletes provides baseline control data. Analyses will include within- and between-subject comparisons in the study cohort, supported by harmonised multimodal processing and personalised computational modelling.
Subjects: As of December 2025, 63 elite rugby players (33 female, 30 male) have been enrolled. Based on observed incidence, ~15 concussions are anticipated this season. Up to 100 non-contact athlete controls will undergo identical baseline assessments. Ethical approval has been obtained (CUREC ID 772420).

Method: A mobile 3-Tesla MRI scanner positioned pitchside enables neuroimaging within hours of a suspected concussion. Sequences include structural (T1/T2), diffusion MRI, resting-state fMRI, susceptibility-weighted imaging and divided subtracted inversion recovery. Concussed players undergo assessments at baseline, HIA1–3, return to play and at an optional chronic timepoint; non-concussed players undergo baseline and post-match testing. Complementary multimodal assessments include: Biofluids: venous plasma, fingerprick blood and acellular saliva for point-of-care GFAP/UCH-L1 and extended proteomics; Neurophysiology and vestibulo-ocular testing: EEG, balance board, pupillometry, and baseline neck strength/EMG; Impact biomechanics: IMGs and multi-angle video reconstruction.
Multimodal integration and personalised modelling will characterise early pathophysiological trajectories.
Results: Pilot testing ($n = 10$) has confirmed feasibility and supported optimisation of the multimodal protocol.
Conclusion: This study provides a novel platform for characterising the immediate neurobiological response to concussion, with the aim of generating field-deployable biomarkers to support clinical decision-making and return-to-play management.

WM2-2

Randomised Evaluation of Surgical teChniques for patients Undergoing Emergency Cranial Decompression (RESCUE CD–TBI)

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Objective: An important early consequence of TBI is the development of significant brain swelling, which if untreated can lead to herniation and death. This is frequently treated by a decompressive craniectomy (DC). Another option, that is often performed in low and middle-income countries, is a decompressive craniotomy (DCO), in which the bone flap is replaced but not rigidly secured. This allows a degree of outward expansion of the brain and does not need a cranioplasty. RESCUE-ICP showed an increased rate of survival in the surgical group while RESCUE-ASDH showed a similar outcome rate between DC and craniotomy. However, surgery was performed in a higher proportion of the craniotomy group, but more wound complications occurred in the craniectomy group.
This trial aims to compare the clinical effectiveness of DCO vs DC is required to support a greater uptake of DCO, if appropriate.
Design: We aim to undertake two multi-centre, pragmatic, parallel group, superiority randomised trials to compare the clinical and cost-effectiveness of DCO VS DC for adult TBI candidates for decompression due to an intracranial haematoma and/or brain swelling.
Method: The study is now open in 4 Countries (India, Pakistan and Argentina). 14 patients have been enrolled so far. Centres from Indonesia, Malaysia, Bosnia Herzegovina and Sweden will be open within the next few weeks. The process of opening in the UK has been initiated in Cambridge.
Conclusion: The study is in its early stages and 16 patients have been randomised so far. If you are interested in taking part, please contact us at ev349@medschl.cam.ac.uk or at edoardo.viaroli@nhs.net.

WM2-3

MAST Trials – Optimizing the management of antiepileptic drugs in TBI patients

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Objective: Post-traumatic seizures (PTS) are classified as early (within 7 days post-TBI) or late (after 7 days). The incidence of early PTS following severe TBI is as high as 14% and their prevention is crucial to prevent impairments in brain autoregulation and further late PTS. There is no high-quality evidence regarding the optimal seizure prophylaxis and duration of treatment following PTS. This international NIHR-HTA funded project aims to define best practice in the use of AEDs for TBI patients by conducting two randomised clinical trials (RCTs) run in parallel but independent of each other.
Method: MAST Duration: A multi-centre, pragmatic, randomised trial (316 patients, power 83%) to compare the clinical effectiveness (absolute difference in rate of late PTS 24 months post-TBI) of a longer course of AED (>6 months) versus a shorter course (up to 3 months) for TBI patients with early PTS.
MAST Prophylaxis: A multi-centre, pragmatic, three arm, randomised trial (1221patients, power 90%) to compare the clinical effectiveness (absolute difference in the rate of PTS within the first 2 weeks post-TBI) of a 7-day course of prophylactic phenytoin or levetiracetam versus no AED.
Results: Both studies are now in their fourth year of recruitment. 1025patients have been enrolled in MAST Prophylaxis, while 260 patients were recruited in MAST Duration.
Conclusion: We are not far from completing both studies, but we need a joint final effort to reach our targets. Both studies have recently become international, so if you would like to collaborate, please emailev349@cam.ac.uk.

WM2-4

Timing of Venous Thromboembolism Prophylaxis for adult patients with Traumatic Brain Injury (TOP-TBI): a pragmatic, randomised trial

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Objective: Following a TBI, patients are at considerable risk of morbidity and mortality for a number of reasons, including the development of venous thromboembolism (VTE). In hospitalised patients, national guidelines recommend early initiation of pharmacological VTE prophylaxis (PTP) for appropriate patient populations. However, in patients with TBI the optimal timing for initiation of PTP remains unclear. This trial aims to evaluate the clinical and cost-effectiveness of early PTP administration (<72 hours) versus late administration (>120 hours or not administered at clinical discretion) for adult patients with TBI.
Design: This will be a multi-centre, parallel-group, pragmatic, randomised superiority trial. The inclusion criteria is as follows: adult patients (≥ 16 years of age), acute TBI, (defined as acute traumatic changes on CT brain, either in isolation or in the context of polytrauma), patients admitted to hospital within 72 hours of injury. The primary outcome will be clinically relevant VTE within 30 days from randomisation, to include any confirmed diagnosis of symptomatic DVT, pulmonary embolism or death related to VTE. All centres who manage patients with TBI are eligible to participate.
Method: We will recruit 1512 patients in total (150 in the internal pilot, 1362 in substantive study). The study will be 60 months with closure planned for the third quarter of 2028.
Results: We have already recruited 65 patients in 3 months across 5 Sites.
Conclusion: The study is ongoing and we are looking forward to opening more National and International Sites. For further information, please contact Midhun Mohan (mm2446@cam.ac.uk).

WM2-5

Pre-operative platelet transfusion for chronic subdural haematoma – a retrospective cohort study

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Objective: Assess the impact of pre-operative platelet transfusion (including number of pools administered), on clinical outcomes in CSDH.
Design: Single-centre retrospective cohort study.
Subjects: Consecutive patients undergoing primary surgery for CSDH between 2015 and 2023 at a tertiary neurosurgery centre.
Method: Patients were included if they were administered antiplatelet medication (aspirin, clopidogrel, or dual antiplatelet therapy (DAPT)) < 7 days of surgery. Primary outcomes included complications, bleeding, and thrombotic events, stratified by antiplatelet type/number of platelet pools transfused. Multivariable regression analysis was used to identify factors associated with complications.
Results: 152 patients were included (aspirin 68.5%, $n = 104$; clopidogrel 21.1%, $n = 32$; DAPT 10.5%, $n = 16$). Thirty-eight (25.0%) patients received no platelets, 37 (24.3%) received one pool, 76 (50.0%) received two pools, and one (0.6%) received three pools. In total, seven patients (4.6%) had postoperative thrombotic events. There was no significant difference in thrombotic events among groups receiving zero, one, or two pools for those on aspirin (0% vs 0% vs 5.7%, $p = 0.214$), clopidogrel (0.0% vs 11.1% vs 7.7%, $p = 0.748$), or DAPT (33.3% vs 0% vs 12.5%, $p = 0.646$). In the overall cohort, 26 patients (17.1%) had bleeding events, including recurrence of CSDH ($n = 20$, 14.5%). Bleeding event rates did not differ significantly between the zero, one, and two pool groups among patients on aspirin (13.8% vs 12.5% vs 23.1%, $p = 0.419$), clopidogrel (16.7% vs 10.0% vs 6.7%, $p = 0.782$), and DAPT (66.7% vs 0.0% vs 25.0%, $p = 0.270$). On multivariable analysis of complications associated with pools of platelets transfused for the overall cohort and aspirin-only cohort, there were no significant differences. The number of platelet pools transfused was not associated with overall survival ($p = 0.34$).
Conclusion: Number of pools of platelets transfused does not appear to correlate with adverse outcomes in CSDH. Clinical outcomes appear comparable between patients receiving zero, one and two pools. Further studies should compare outcomes stratified by transfusion group.

WM2-6

Depression as a factor of gut-brain dysfunction and worse psychological outcomes in Traumatic Brain Injury at a Major Trauma Centre: Preliminary Results of the CAROLINA-MTC Study

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Objective: There is increasing evidence that traumatic brain injury (TBI) induces dysregulation of the gut-brain-axis (GBA) long term and depression could be a

predictor, bidirectionally linked to gut-brain dysfunction. We investigate the prevalence of depression after TBI/concussion, and whether depression is a predicting factor of GBA dysfunction or specific symptoms thereof after injury.
Design: We are performing a cross-sectional, observational study of ≥100 participants, capturing data via clinical notes and questionnaires at 3 weeks from admission OR regaining capacity and 12 weeks post-incident. This preliminary analysis includes 35 participants.
Subjects: Inclusion criteria were: admitted/transferred to King's College Hospital Emergency Department, confirmed new TBI/concussion, age ≥16, able to provide informed consent. Participants were excluded if no TBI/concussion, unsurvivable injury, or prisoner/in custody.
Method: Using unadjusted logistic regression models, and tested whether depression (PHQ-9 ≥ 10) was predicted by gastrointestinal symptoms (PAGI-SYM); food avoidance (ARFID), post-concussion symptoms (RPCSQ, CSI), other factors. New symptoms were measured at ≥60% reported positive.
Results: 12/35 patients (36.4%) had depression. There was no difference in age, gender, alcohol abuse/gastrointestinal disorders, lesions, other injuries, admission/incident time, hospital days, trauma call, ITU admission/duration, pre-hospital GCS, loss of consciousness, recollection, procedure(s), post-traumatic seizure and anti-epileptic medication. History of anxiety/depression($p = 0.003$), current antidepressant use($p = <0.001$) and mode of injury ($p = 0.003$) were associated with depression, the depressed group scored higher in: CSI, moderate/severe-extreme($p = <0.001$), ARFID-NIAS2-low interest ($p = 0.007$), NIAS3-fear of eating ($p = 0.009$), RPCSQ3-headaches/dizziness/nausea ($p = 0.015$), RPCSQ13-later/cognitive/emotional/somatic symptoms ($p = <0.001$), PAGISYM ($p = <0.001$), SCC1-nausea ($p = 0.007$), SCC2-vomitting ($p = <0.001$), SCC3-early fullness ($p = 0.017$), SCC7-reflux ($p = 0.018$).
Most new symptoms occurred in concussion (PhQ9 = 4/9, RPCSQ =9/16), Subdural Hematoma (RPCSQ =10/16, CSI =8/25) and contusions (CSI =6/25).
Conclusion: These preliminary findings suggest that TBI and concussion could induce general GBA dysfunction, and depression could be an associating factor. They now require replication with our full cohort, imaging analysis (FSL) and potential microbiome analysis.

WM2-7

Time to restarting anticoagulation in chronic subdural haematoma – a single centre retrospective study

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Objective: Chronic subdural haematoma (CSDH) incidence is increasing, with anticoagulant medication increasingly common. Optimal timing for resumption of surgically managed CSDH remains uncertain.
Method: Single-centre retrospective cohort study of adults taking regular anticoagulation prior to surgery from 2015 to 2023. Primary outcomes included resumption status, bleeding events (including recurrence), thrombotic events and mortality. Comparisons were assessed by Fisher's exact test and Kaplan-Meier Analysis. Cox proportional hazard models were used to estimate hazard ratios (HR).
Results: A total of 221 patients were included (52 female, mean age 78.6 ± 9.0). In total, 161 patients (72.9%) were taking warfarin, and 57 (25.8%) taking a direct oral anticoagulant. Anticoagulation was restarted in 63% ($N = 140/221$) post-operatively (agent changed in 15%). Bleeding events occurred in 13.1% ($N = 29/221$) and thrombotic events in 6.3% ($N = 14/221$). There was no difference in bleeding events between restarting anticoagulation at <2 weeks (13.3%, $N = 4/30$), 2 weeks (2.6%, $N = 1/38$), 3–4 weeks (7.4%, $N = 2/27$) and >4 weeks (17.8%, $N = 8/45$) ($P = 0.14$). There was no difference in thrombotic events in groups restarting at <2 weeks (0%, $N = 0/30$), 2 weeks (5.3%, $N = 2/38$), 3–4 weeks (11.1%, $N = 3/27$), or >4 weeks (8.9%, $N = 4/45$) ($P = 0.37$). Resumption of anticoagulation at <2 weeks (HR 0.46, $p < 0.05$), 2 weeks (HR 0.51, $p < 0.05$) or 3–4 weeks (HR 0.30, $p < 0.01$) was associated with lower mortality.
Conclusion: Restarting anticoagulation is not associated with higher bleeding or thrombotic risk, and leads to increased overall survival in CSDH. This study supports re-commencement of anticoagulants between 2 and 4 weeks.

WM3 SHORT ORALS

WM3-2

Use of oxygen therapies in the management of postoperative pneumocephalus: a systematic review

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Objective: Pneumocephalus is a common postoperative complication of intracranial surgery. Currently, management strategies are varied, with the effect of supplemental oxygen reported to improve outcomes. We aimed to identify studies that assess supplemental

oxygen therapies in postoperative pneumocephalus, to define the evidence base for optimal practice.
Method: A PRISMA-compliant systematic review was conducted (PROSPERO ID CRD420251058879). Articles published in MEDLINE, EMBASE, and Cochrane Library from journal inception to April 2025 were included. Pneumocephalus definitions, postoperative incidence, and association between selected implemented oxygen therapies and improvements in patient outcomes were identified.
Results: In total, six studies were included ($n = 213$). Treatment with 100% Fi02 demonstrated improvement in air volume (two studies, mean decrease in pneumocephalus volume 87.83ml vs 71.29ml, median pneumocephalus volume 7.06 cm^3 vs 9.65 cm^3). Normobaric oxygen increased absorption (one study, percentage pneumocephalus absorption in 24 hours 65% vs 31%). Clinical outcomes were rarely reported, with one study reporting an increase in alertness following supplemental oxygen delivery (One study, 44 patients, Stanford sleepiness scale).
Conclusion: Use of supplemental oxygen therapies improved radiological appearances of pneumocephalus. Clinical improvement rates and method of oxygen supplementation should be compared in future prospective studies.

WM3-3

Improving continuity of care and communication through a clinical team–led digital handover system in neurosurgery

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Objective: To identify deficiencies in existing handover practices and introduce a structured, clinical team–maintained digital handover system to improve communication, reliability, and patient safety.
Design: A quality improvement project using a baseline cross-sectional survey followed by the design and pilot implementation of a digital handover system.
Subjects: Members of the neurosurgical clinical team, including registrars/fellows, senior house officers (SHOs), and advanced nurse practitioners (ANPs).
Method: A baseline questionnaire was distributed to assess current handover practices, barriers, and perceived safety concerns. Quantitative data were analysed descriptively, and qualitative free-text responses underwent thematic analysis. Findings informed the creation of a shared digital handover sheet integrated into the institutional electronic system (ePMA/NerveCentre) for the Neurosurgery HDU ward. This platform supports patient confidentiality, real-time updates, and collective ownership. Early pilot feedback was gathered informally to evaluate feasibility and user satisfaction.
Results: 11 respondents completed the baseline survey: 45.5% registrars/fellows, 36.4% SHOs, and 18.2% ANPs. All participants relied on verbal communication, while only 54.5% used a team-maintained handover list. Barriers included time constraints (50%), lack of formal structure (50%), reliance on nursing handovers (37.5%), and IT limitations (25%).
Safety concerns were prominent: 72.7% reported missed or delayed tasks due to inadequate handover, including unacknowledged investigations, delayed discharges, and missed intrathecal antibiotics. Most respondents felt a team-maintained digital handover would improve safety (63.6%), and 81.8% were willing to pilot the new system.
Early pilot feedback demonstrated improved visibility of outstanding tasks, reduced duplication, and smoother cross-cover and weekend transitions.
Conclusion: A clinical team-led digital handover system is feasible, acceptable, and addresses key communication and workflow deficiencies in neurosurgery. Early outcomes show improved continuity, shared accountability, and reduced missed tasks. Further evaluation with ongoing audit cycles will measure its impact on safety and explore extension to other specialties.

WM3-4

Approaching families in neuro-critical care: a literature review on best practices for research recruitment and communication

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Objective: To identify and synthesise evidence on best-practice communication strategies for approaching families in neuro-critical care research settings.
Design: A structured literature review was conducted to assess communication strategies in neuro-critical care research. The review included studies published between 2010 and 2025 that focused on family communication and research recruitment.
Subjects: 17 studies were included in the review, focusing on families of patients in neuro-critical care units, particularly those involved in research recruitment and surrogate decision-making.
Method: A comprehensive search was performed in PubMed and MEDLINE using terms related to neuro-critical care, family communication, and research recruitment. Data from 17 studies were thematically analyzed to identify common communication strategies and reported outcomes. 8 studies specifically discussed how families were approached and their preferences for receiving information.
Results: The studies consistently emphasized the importance of early, transparent, and empathetic communication. Effective strategies, such as relationship-centred care where nurses and healthcare providers offer clarity and reassurance, were widely endorsed. Families preferred warm, personal communication conducted face-to-face at a manageable pace, while telephone communication was often perceived as lacking empathy. Written materials, though sometimes described as 'cold' or 'informal', were considered helpful when their purpose was clearly explained. PPI was highlighted as beneficial in designing trials that better support families during decision-making. Multi-

disciplinary approaches and repeated discussions were found to improve understanding and willingness to participate. Families valued knowing the researcher's identity, the reason for the approach, and having discussions in private settings. A clear verbal summary at the end of the discussion, with minimal closed-ended questions, was also preferred.
Conclusion: Compassionate, clear communication improves ethical recruitment, reduces family distress, and supports equitable participation in neuro-critical care research. Further research is needed to optimize the design of written recruitment materials and explore how best to support informed decision-making during the recruitment process.

WM3-5

Perceptions of neurosurgery as a career choice among final year medical students in Malaysia: a cross-sectional study

Kavin Raj Purushottaman[a], Edmund Liang Chai Ong[b,c], Asma' Mohamad Afifi[d], Cecilia Koh Zhi Wei[e], Nabilah Huda Ahmad Syamsury[f], Muthuthangtrige Rishira Milan Marinus Fernando[b], Elwin Raj Paul Raj Vethamuthu[g], and Al Hassan Sajahan[h]

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Objective: To explore perceptions, attracting and deterring factors, prior exposure, and educational needs related to neurosurgery among final-year medical students in Malaysia, aiming to understand influences on neurosurgical career interest.
Design: Cross-sectional questionnaire-based study.
Subjects: Final-year medical students from 12 Malaysian medical schools ($n = 60$). They were chosen as they are closest to career decision-making and are exposed to undergraduate / postgraduate surgical practice.
Method: Participants completed a structured questionnaire containing demographic items and 5-point Likert-scale questions assessing perceptions of neurosurgery. For clarity, responses were grouped into Agree (Agree + Strongly agree), Neutral, and Disagree (Disagree + Strongly disagree). Descriptive statistics are reported here. Inferential analysis is ongoing and will be included in the final manuscript.
Results: Of the 60 respondents, 45% were male and 55% female, with 93.3% aged 18–25. Only 20% reported interest in pursuing neurosurgery, while 36.7% were 'maybe' and 43.3% were not interested. Key attracting factors included the technical skill requirement (80%), variety of cases (76.7%), technological innovation (73.3%), and rewarding patient impact (70%). Deterrents were prominent: long training duration (90%), stress (85%), lengthy surgeries (83.3%), competitiveness (78.4%), medico-legal concerns (76.7%), and limited training centres (71.7%). Notably, although 60% had some clinical exposure to neurosurgery, many still perceived the specialty as intimidating or highly demanding, suggesting that current exposure may be insufficiently structured or limited in depth. Social media shaped perceptions for 63.3%, further highlighting external influences on career choices.
Conclusion: Students appreciate the intellectual and technical appeal of neurosurgery but are likely discouraged by structural challenges and lifestyle concerns. Strengthening undergraduate exposure and mentorship, as well as addressing systemic training barriers, may improve recruitment. This study is limited by its small sample size and uneven representation across institutions, which may restrict generalisability. Larger multi-centre studies are recommended. Further statistical analysis will refine these findings and identify predictors of neurosurgical career interest.

WM3-6

Gender and geographic inequities in the global neurosurgical workforce: a scoping review

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Objective: To synthesise published global evidence on gender representation and geographic distribution within the neurosurgical workforce over the past 20 years.
Design: Scoping review.
Subjects: Published studies, registry data, and international society and global health reports describing neurosurgeon demographics worldwide.
Method: An initial scoping review of the literature was undertaken following PRISMA-ScR. Peer-reviewed publications and workforce reports published between 2005 and 2025 were reviewed, including data from the World Federation of Neurosurgical Societies and WHO–affiliated sources. Descriptive data on neurosurgeon density, gender distribution, and temporal trends were extracted.
Results: Published estimates indicate substantial global inequity in neurosurgical workforce distribution. High-income regions commonly report neurosurgeon densities exceeding 1 per 100,000 population, whereas many low- and middle-income countries report densities below 0.1 per 100,000, with some regions having fewer than 1 neurosurgeon per million population. Approximately 70–75% of the global neurosurgical workforce is estimated to be concentrated in high-income countries. As for gender, women comprise a minority of the neurosurgical workforce worldwide, most frequently reported in the range of 5–15% overall. Higher proportions were reported in Europe and North America (commonly 10–20%) and markedly lower representation across much of Africa, South Asia, and parts of Latin America (often $<5\%$). Longitudinal data from several regions suggest a gradual increase in female representation over the past two decades, with

relative increases of approximately 2–5 percentage points since 2010 in some high-income settings. However, gender-disaggregated data remain inconsistently reported, particularly in low-resource regions.
Conclusion: Preliminary synthesis of published data demonstrates persistent gender and geographic disparities in the global neurosurgical workforce. Despite an increase in female participation, women remain significantly underrepresented worldwide, and critically low in many regions. Completion of this scoping review will consolidate existing evidence, identify gaps in reporting, and inform policy initiatives aimed at improving equity and access to neurosurgical care globally.

WM3-7

Multispectral imaging in neurosurgery: a review and implementation guide

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Objective: Multispectral Imaging (MSI) is a non-invasive optical imaging technique which can provide pixel-level information about tissue composition and characteristics. This can have significant clinical implications e.g. delineating tumour margins and identifying functional tissue. The purpose of this review is to create a clear, concise implementation guide for the understanding Multispectral Imaging (MSI) and implementing this into clinical practice.
Design: Technical review and translational implementation framework mapping the key optical principles, hardware requirements and set-up, data processing and data analysis of MSI.
Subjects: Published papers presenting data on the use of MSI in neurosurgery.
Method: Review of current evidence on the applications and potential uses of MSI in neurosurgery. Practical guide mapping technical decisions with clinical requirements and objectives e.g. mapping tumour margins, identifying and preserving eloquent brain regions.
Results: MSI supports widefield, non-invasive mapping of the surgical scene by building on basic principles of light-tissue interactions. Multiple hardware setups are available and may be customised to match the clinical objectives and to optimise the integration into standard surgical set ups e.g. the operating microscope. Machine learning methods are required for translating spectral data into clinically meaningful maps. One of the main challenges in MSI applications is obtaining reliable ground truth, therefore requiring a multimodal approach to validation e.g. with preoperative MRI and intraoperative video-data.
Conclusion: MSI is a valuable, non-invasive adjunct to the neurosurgical intraoperative visualisation workflow. It is possible to customise set-ups and data processing pipelines in direct response to the clinical objectives. With a high re-usability factor and minimal impact on additional operating time, MSI is a modality that closely aligns with the principles of sustainable surgery.

WM3-8

Cognitive task analysis and artificial intelligence in neurosurgery for surgical scene understanding and decision-making support

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Objective: The latest developments in Artificial Intelligence (AI), Machine Learning (ML), and Deep Learning (DL) technology promise to transform and revolutionise the practice of modern neurosurgery. Cognitive Task Analysis (CTA) is a formal technique used to model expert cognition and to support critical decision making in high-stakes fields. This study aims to review the existing AI, ML and CTA techniques available for modelling expert cognition and surgical scene understanding in neurosurgery. Based on this, an implementation guide for training and AI-assisted surgical scene understanding will be proposed.
Design: Scoping, narrative review of current CTA techniques in the context of neurosurgery, evaluation of study quality, benefits and drawbacks of each methodology and a visual, structured implementation guide.
Subjects: Primary research articles published between 2000 and 2024 on surgical cognition, surgical scene understanding and predictive modelling across neurosurgery.
Method: Thematic, narrative synthesis of data from the following domains: neurosurgical, educational and computer science journals. Integration of findings into a stepwise implementation guide.
Results: Conventional CTA techniques offer a robust pedagogic framework for expert-level surgical scene understanding. However, the process can be labour intensive, therefore affecting the scalability of these techniques. In addition, adherence to robust methodological frameworks can be variable. Automating the CTA process using machine learning and AI techniques, such as video-language models (VLMs) and natural-language processing (NLP) may support integration into surgical training curricula and AI-assisted surgical decision-making platforms. The following key steps are essential for effective implementation for each index case: 1) Define key decision-making points, 2) Video-verbal cue mapping using VLMs, 3) Create case-specific libraries of CTA data 4) Validate CTA models, 5) Integrate into multimodal platform for supporting surgical decision-making tools.
Conclusion: A 'human-in-the-loop' AI approach to surgical scene understanding, anchored in robust methodology mapping expert cognition/action patterns can provide valuable, reliable tools for intraoperative surgical decision-making support.

WM3-9

Towards green neurosurgery: a cost-consequence analysis of innovations supporting sustainable surgical practice

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Objective: Evaluating the role of 'green technology' and artificial intelligence (AI) in improving environmental surgical sustainability and overall cost efficiency.
Design: Narrative review of 'green' technology in Neurosurgery and comparison with traditional tools. Evaluation using cost consequence analysis (CCA). The outcomes and impact of each technology are mapped under three domains 1) Operational, 2) Financial, 3) Environmental outcomes.
Subjects: Studies reporting on environmental consequences, carbon emissions, economic analyses and operational implications of AI and non-invasive optical imaging tools in Neurosurgery compared with traditional imaging techniques and workflows.
Method: Analysis of papers reporting on costs, changes in additional operating time/theatre use/ impact on workflow, and sustainability principles in neurosurgery. Data synthesis using cost-consequence analysis frameworks.
Results: Non-invasive optical imaging technologies and AI demonstrate multiple principles of sustainable innovation, with a high re-usability factor, lower energy demands, reduced waste and use of consumables. Furthermore, by supporting intraoperative decision-making, AI and non-invasive optical imaging can improve efficiency, streamline the workflow and reducing additional operating time/ theatre delays.
Conclusion: Non-invasive optical imaging and AI can support and enhance cost efficiency and environmental sustainability by reducing operational costs, reducing waste and supporting efficient energy use. These technologies demonstrate principles of sustainable innovation in neurosurgery.

WM3-10

A systematic review of prehabilitation strategies in degenerative cervical myelopathy

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Objective: To systematically review evidence for prehabilitation strategies in patients undergoing surgery for degenerative cervical myelopathy (DCM).
Design: PRISMA-guided systematic review of clinical trials and observational studies.
Subjects: Adults with DCM undergoing surgical decompression, representing 381,134 patients across eleven studies.
Method: A systematic search of MEDLINE and Embase (1975–2025) identified studies evaluating physical, pharmacological, or educational prehabilitation strategies. Outcomes included dysphagia, operative duration, infection, neuromuscular function, pain, quality of life, and patient satisfaction. Risk of bias was assessed using Joanna Briggs Institute (JBI) tools, and levels of evidence were assigned per Oxford Centre for Evidence-Based Medicine (OCEBM) guidelines.
Results: Eleven studies ($n = 381,134$) evaluated mechanical, pharmacological, and educational strategies. Modified Tracheal Traction Exercises (MTTE) reduced dysphagia compared to traditional Tracheal Traction Exercises (TTTE) (25.3% vs. 44.1%, $p = 0.018$) and shortened operative time, while traditional TTTE reduced hospital stay duration (1.9 vs. 2.4 days, $p = 0.041$). Epidural steroid injections demonstrated no significant benefit for infection or functional outcomes, and repeated injections were associated with increased reoperation risk in posterior cervical decompression and fusion (OR $= 1.40$, $p = 0.02$). Prophylactic dexamethasone reduced C5 palsy rates (3.6% vs. 9.5%, $p = 0.01$), though evidence remains limited. Riluzole showed no significant improvement in neuromuscular outcomes (Nurick grade score change -1.28 vs. -1.15, $p = 0.41$) or quality of life (Short Form-36 physical component summary: 6.26 vs. 5.22, $p = 0.36$). Opioid use reduced operative duration and hospital stay duration, but increased long-term disability (Neck Disability Index $+22.7$ vs. $+18.7$, $p = 0.047$). Educational interventions increased patient satisfaction (7.8 vs. 7.1, $p = 0.024$). Evidence was heterogeneous and long-term data limited.
Conclusion: Prehabilitation may reduce complications such as dysphagia and improve perioperative outcomes in DCM. Mechanical and pharmacological strategies show promise, but standardised protocols and high-quality trials are needed to define their role in surgical optimisation.

WM3-11

A systematic review of pain in degenerative thoracic myelopathy

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Objective: Degenerative thoracic myelopathy (DTM) defines symptomatic compression of the thoracic spinal cord with aetiologies such as thoracic spondylotic myelopathy, ossification of the posterior longitudinal ligament, and ossification of the ligamentum flavum. Motor impairment and sphincter dysfunction is often seen alongside pain, but quantitative characterisation of pain and the implication for its optimal surgical or conservative management is limited. This review

therefore aims to synthesise quantitative data on pain outcomes following treatment of DTM.
Method: A systematic search of MEDLINE and Embase was conducted following PRISMA protocols. Studies published between 2010 and 2025 reporting pre- and post-treatment pain outcomes for patients with DTM using the Visual Analogue Scale (VAS)/Numeric Rating Scale (NRS) and/or Oswestry Disability Index (ODI) were included. Relevant data were extracted and compared across intervention types.
Results: Twenty-eight studies met inclusion criteria, comprising 1,225 patients. Surgical interventions demonstrated consistent and statistically significant reductions in pain, with mean VAS improvements ranging from 0.6 to 6.1 cm (average 3.0 cm) and ODI reductions ranging from 9.2% to 52.5% (average 29.7%). In thoracic disc herniation, discectomy produced a mean VAS reduction of 4.16 (95% CI [3.48, 4.83], $p < 0.0001$), while ossification of the ligamentum flavum was associated with a mean reduction of 3.04 (95% CI [2.39, 3.70], $p < 0.0001$). Comparisons between discectomy with versus without fusion, and laminectomy versus laminotomy, revealed no significant differences in pain outcomes.
Conclusion: Surgical management of DTM appears effective in reducing pain and disability, particularly in cases involving thoracic disc herniation or ossification of the ligamentum flavum. However, substantial heterogeneity in study design and pain-outcome reporting limits the ability to recommend specific surgical techniques. Standardisation of quantitative pain measures in future research is essential to strengthen the evidence base and guide optimal management strategies.

WM3-12

Left T8-9 transthoracic rib-sparing retropleural direct lateral excision of a calcified intradural thoracic disc

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Objective: To present a novel rib-sparing approach for resection of a complex intradural thoracic disc in a symptomatic patient.
Design: Technical Note.
Subjects: A 56-year old female with thoracic myelopathy. CT and MRI demonstrated spinal cord compression from a calcified intradural thoracic disc.
Method: In view of clinical deterioration, the patient consented to thoracic disc resection via a minimally invasive left T8-9 rib-sparing transthoracic retropleural direct lateral approach under neuromonitoring. This novel approach is described and supplemented with high quality video.
Results: Following the procedure, the patient recovered well, mobilising on Day 1 and discharged home on Day 5 post-operatively.
Post-operative CT and MRI demonstrated good spinal cord decompression and disc resection.
Conclusion: We present a novel minimally-invasive approach for resection of a complex intradural thoracic disc in a symptomatic patient.
There are no reports of such a combination pathology and this minimally invasive management in the literature. Other techniques are either posterior, anterior, involve rib resection or large thoracotomy with chest drain placement or, are thoracoscopic which is not an available technique in all centres.

WM3-13

An illustrative case report of endoscopically treated rare compressive cervical spine pseudogout presented with myelopathy

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Objective: Calcium pyrophosphate deposition (CPPD), commonly known as pseudogout, is an inflammatory arthropathy characterized by the deposition of calcium pyrophosphate dihydrate crystals in joint cartilage and surrounding tissues. The occurrence of pseudogout affecting the ligamentum flavum of the cervical spine remains rare in the literature. This report presents a case of cervical myeloradiculopathy resulting from a compressive calcified ligamentum flavum due to CPPD deposition, treated through a full endoscopic minimally invasive approach.
Subject: A 73-year-old female presented with bilateral hand paraesthesia, numbness, balance issues, and frequent falls. Neurological assessment revealed a positive Romberg's test, hypertonicity and exaggerated deep tendon reflexes bilaterally, alongside positive Babinski and Hoffman signs. Other examination findings and blood markers were normal. Magnetic resonance imaging (MRI) of the cervical spine revealed a significant canal stenosis at C4/5 level with a T1 and T2 -weighted hypointense posterior epidural mass compressing the cord predominantly on the left side. Computed tomography (CT) scan showed a high-density area, indicating a calcified posterior ligamentum flavum. She underwent a minimally invasive endoscopic posterior C4/5 left hemi-laminotomy with over-the-top decompression and complete excision of the cervical calcified lesion under continuous intraoperative neuromonitoring (IONM). Post operatively she recovered well. Histopathological analysis confirmed CPPD deposition.
Conclusion: The endoscopic approach not only highlights the potential of uniportal endoscopic techniques in managing cervical CPPD but also suggests a paradigm shift towards less invasive surgical interventions. By minimizing tissue disruption and avoiding fusion surgery, we can significantly reduce procedure-related morbidity, thereby improving patient outcomes. The case report emphasises the importance of considering CPPD in differential diagnoses for patients presenting with compressive neurological symptoms and neck pain, particularly in older adults. Furthermore, obtaining a histopathological diagnosis post-operatively is crucial in suspected patients, as it informs the use of anti-inflammatory medications, thereby reducing recurrence risk and optimising patient management strategies in the long term.

WM3-14

Measuring RE-AIM in spine surgery: metrics and variability across intervention types and settings

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Objective: The RE-AIM framework (Reach, Effectiveness, Adoption, Implementation, Maintenance) provides a structured approach to evaluating health interventions, yet its application in inpatient surgical contexts, particularly spine surgery, remains underexplored. Given the complexity of perioperative workflows and the need for scalable knowledge translation (KT), understanding how RE-AIM metrics are selected and reported is critical for advancing field-wide implementation in spine care.
Method: We systematically reviewed publications identified through the curated RE-AIM list on re-aim.org. Titles, abstracts, and full texts were screened in Rayyan using predefined criteria. Eligible studies explicitly applied RE-AIM in inpatient medical or surgical settings. Data were extracted into a structured proforma and coded using COMET outcome domains, ERIC implementation strategies, and Proctor's taxonomy to characterise metric choice and reporting depth.
Results: Fifty-five studies met inclusion criteria. Most were conducted in high-income countries (92.7%), with emergency medicine (20.0%) and internal medicine (18.2%) most common. Interventions spanned digital tools, decision support systems, education/training, and psychosocial support. Metrics most frequently relied on EMR/EHR logs (50.9%), fidelity checklists, and training records. RE-AIM domains were variably reported: Reach (100%), Effectiveness (94.5%), Adoption (98.2%), Implementation (100%), and Maintenance (80.0%). Implementation and adoption metrics dominated, while patient-centred and psychosocial outcomes which are highly relevant to spine surgery such as pain scores, quality of life, and functional recovery were rarely primary endpoints. Only 58.2% of studies achieved comprehensive coverage across all five domains.
Conclusion: RE-AIM has been applied across diverse inpatient contexts, but reporting depth is uneven. For spine surgery, transferable metric families include service delivery/utilisation, fidelity and workflow integration, and sustainability mechanisms. Future KT initiatives should deliberately incorporate patient-reported and equity-sensitive outcomes to ensure interventions are not only effective but also feasible, scalable, and equitable across surgical centres.

WM3-15

A single centre retrospective review of consent conformity to professional standard for lumbar surgery (microdiscectomy and decompression); what can we learn?

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Objective: Adequate information remains the backbone of surgical consent. This study evaluated the extent to which cauda equina syndrome (CES), nerve root damage (NRD) and major haemorrhage (MH) were documented during the consent process for patients undergoing surgery for degenerative lumbar spine conditions.
Design: Retrospective study.
Method: A retrospective review of patients who underwent simple lumbar decompression ± discectomy for degenerative conditions over a 12-month period. Preoperative electronic medical records and completed consent forms were examined for documented mention of CES, NRD, MH. Extracted data were analyzed using SPSS version 25, with statistical significance defined as a p-value <0.05 for associations.
Results: A total of 165 consents for operations performed were reviewed. 130 (78.8%) were elective and 35 (21.2%) were emergency/urgent operations. Emergency operations were overwhelmingly consented by Registrars/Fellows 34 (97.1%), the figure is less for elective operations 73 (56.2%). There is a significant association between rank of surgeon and type of surgery with consultants less likely to consent emergency operations (X^2 20.32, $p < .00001$). MH was listed in 20 (12.1%) with no significant difference between cadre of consenting surgeon (X^2 1.0289, p .3104). NRD was mentioned in 153 (92.7%) cases, and all Consultant-administered consents were compliant. 11.2% of registrars did not document that. CES as a complication was documented in 52 (31.5%) of consent and registrars were more likely to document this (X^2 9.0824, p .0026). When bladder/bowel dysfunction/incontinence was factored in, recorded mention of the risks of CES rises to 83.63%. Registrars were more likely than consultants to record this risk ($X^2 = 3.9$, $p < .047$).
Conclusion: There is poor documentation of MH and CES in the consent of patients undergoing above-mentioned surgery. In addition, resident doctors are more likely to consent patients for emergency operations. There is a need to improve the documentation of the afore-mentioned risks on consent forms.

WM3-16

Surgical management of post traumatic syringomyelia: a systematic review

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Objective: Posttraumatic spinal cord injury (SCI) and Syringomyelia can lead to progressive neurological decline. Unfortunately, no preferred surgical treatment for Post-traumatic Syringomyelia (PTS) has been established so far. The literature was reviewed to systematically analyse the options for surgical management of PTS and to support the development of recommendations for surgical management.
Method: International databases (Pubmed, Google Scholar, and Cochrane Central Register of Controlled Trials (CENTRAL)) were searched systematically using relevant search terms. Literature published in the English language between 2013 and 2025 was gathered. Case reports of below 3 cases, age below 18 years and literature discussing syrinx developed due to other causes except trauma were excluded.
Results: A total of 45 retrospective studies were analysed in the last thirteen years (2013–2025), filtered using a PRISMA flow chart. Overall 205 patients fulfilled the eligibility criteria and were included in the study. Data from 131 decompression and arachnolysis ± duraplasty (63.9%), 23 subarachnoid-subarachnoid shunt (11.2%), 32 syringosubarachnoid shunt (15.6%), 14 syringoperitoneal shunt (6.8%), 3 syringopleural shunt (1.4%) and 2 subarachnoid peritoneal shunt (0.9%) patients were analysed. The mean follow-up after surgical intervention was 36.8 months. Postoperatively, 66 patients improved symptomatically (32%), 105 remained stable (51.2%), and 34 deteriorated (16.6%). Decompression and arachnolysis ± duraplasty is still regarded as the preferred method of surgically treating PTS.
Conclusion: A definitive result regarding the best surgical approach to treat PTS is still not recommended in the literature. Decompression and arachnolysis ± duraplasty is regarded as the primary surgical option to re-establish the cerebral-spinal fluid (CSF) flow to treat PTS. If it fails or there is radiological evidence of extensive scarring, a syringopleural shunt may be considered as an alternative approach as negative intrapleural pressure is regarded as helping adequate syrinx fluid drainage compared to the positive pressure of the peritoneal cavity and hydraulic pressure of subarachnoid space.

PARALLEL LECTURE THEATRE
WEDS 15TH APRIL
WP1 ONCOLOGY MENINGIOMA AND SKULLBASE

WP1-1

IMPACT-2: a risk-stratified trial of watchful waiting versus active intervention in incidental meningioma

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Objective: The IMPACT tool was developed in 2019 and validated in 2025 for stratifying the management of incidental meningioma patients. The tool combines routinely available imaging and clinical characteristics, and groups patients into low-, medium- and high-risk. Current recommendations are discharge or low frequency imaging surveillance for low-risk patients (5 and 10 years), imaging surveillance for medium-risk patients (1,3,5 and 10 years), and early intervention or more frequent surveillance for high-risk patients. We aim to assess routes to integrate the IMPACT tool into routine clinical practice.
Design: A multi-centre prospective study, which may take the form of a registry and a stratified randomised controlled trial (e.g. observation vs surgery/SRS for medium and high-risk meningioma, and registry follow-up for low-risk meningioma or tailored follow-up based on IMPACT vs. surveillance based on NICE guidance).
Subjects: Adult patients with a newly-diagnosed incidental meningioma.
Method: We aim to (1) assess feasibility, acceptability and barriers to implementation via questionnaire survey to UK neurosurgeons, (2) assess patients' views on stratified management, via semi-structured interviews, (3) design the study in partnership with patients and other key stakeholders and (4) seek funding from NIHR Health and Social Care Delivery Research (HSDR) to conduct a pragmatic trial of the IMPACT risk stratification tool. Further design details, including number of patients and outcome measures are yet to be agreed on.
Results: The results of this study will provide level 3 evidence on how to manage patients with incidental meningiomas.
Conclusion: Incidental discovery is becoming the most common way to diagnose meningioma. We aim to provide level 3 evidence for their management that will determine UK and international guidelines.

WP1-2

The cytokine response to meningioma surgery in seizure and seizure-naive patients

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Objective: The role of neuroinflammation is increasingly being recognised in a range of seizure syndromes, including meningioma-associated seizures. We sought to characterise the inflammatory response to meningioma surgery in a combination of patients with pre-operative, new postoperative, and no seizures.
Design: Single centre translational pilot study.
Subjects: Eight patients undergoing meningioma surgery. Three patients had pre-operative seizures and five patients were seizure naive at the time of surgery. One seizure-naive patient developed new postoperative seizures.

Method: Whole blood was collected in EDTA tubes at knife-to-skin, 1 hour after knife-to-skin, 4 hours, 24 hours, and 48 hours, centrifuged, and plasma was aliquoted and frozen. A Luminex plate designed to detect 46 inflammatory mediators was loaded with samples. The plate was read using a Luminex 200 analyser running STarStation software. Cytokine concentrations were calculated by reference to an eight-point five-parameter logistic standard curve for each cytokine.
Results: All 46 cytokines were recovered at one or more postoperative timepoints. Inflammatory mediators demonstrated stereotyped time courses following surgery. Most inflammatory mediators showed an early reduction in concentration at 1 and 4 hours before returning to or above baseline at 24 to 48 hours. There were no clear differences between patients with and without pre-operative seizures except at the 48 hour time point where concentration of interleukin-6 was higher in patients without pre-operative seizures.
Conclusion: This pilot data demonstrates stereotyped patterns of inflammation following meningioma surgery and suggests differences between patients with and without seizures. Further samples from more patients with new postoperative seizures are required to confirm these differences and be able to use this data for seizure risk prediction.

WP1-3

International consensus to define outcomes and outcome measurement instruments for clinical effectiveness trials and clinical studies of untreated intracranial meningioma (COSMIC-2): a protocol

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Objective: To operationalise the Core Outcome Set for Intracranial Meningioma Studies (COSMIC).
Design: An international, multi-stakeholder consensus development study using structured surveys and an online consensus meeting.
Subjects: Participants will include neurosurgeons, oncologists, neurologists, patients with meningioma, and carers. A minimum of 60 participants will be recruited.
Method: Outcome definitions (ODs) and outcome measurement instruments (OMIs) will be selected using distinct but parallel methodologies. ODs will follow a two-phase process, while OMIs will follow a three-phase process. Both will begin with the generation of longlists derived from the original COSMIC systematic review and unpublished patient-reported outcome measure data from the COSMIC PhD programme. Expert review will be sought to ensure completeness. OMIs will undergo quality assessment against the COSMIN framework. Consensus will be sought through two-round Delphi surveys conducted via REDCap. Participants will score items using a 9-point Likert scale, with score of 7–9 indicating critical importance. Consensus will be assessed after each round. If consensus is not achieved, an online consensus meeting will be convened.
Results: Consensus will be achieved on a minimum, standardised list of ODs and OMIs. Consensus-In is defined as $\geq$80% of participants rating an OD/OMI as critical, while consensus-out is defined as $\leq$50%. ODs/OMIs will be categorised as follows: (i) if a single OD/OMI reaches consensus-in, it will be recommended; (ii) if more than one OD/OMI reaches consensus-in, these will be discussed and voted on in a consensus meeting; (iii) if no OD/OMI reaches consensus-in, those without consensus will be discussed; (iv) if all OD/OMIs reach consensus-out, the outcome will be labelled as 'no appropriate OD/OMI ratified'.
Conclusion: COSMIC-2 proposes a novel methodology to operationalise a Core Outcome Set. This work will improve consistency in outcome reporting and enhance the quality of evidence synthesis in future research.

WP1-4

Balance symptom trajectories and predictors following Gamma Knife radiosurgery for vestibular schwannoma: a retrospective case series

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Objective: Vestibular schwannomas (VS) commonly cause imbalance, yet balance outcomes following Gamma Knife stereotactic radiosurgery (GKRS) are underreported. This stdy describes longitudinal imbalance trajectories in VS patients following GKRS.
Design: Retrospective case series.
Subjects: All individuals undergoing GKRS for VS at a single neurosurgical unit between October 2012 and April 2023.
Method: Demographic, clinical, radiological, and dosimetric data were extracted from electronic records. Imbalance was documented pre- and post-GKRS, with symptom trajectories recorded for those symptomatic at baseline. Logistic regression models were used to evaluate associations between imbalance and clinical, tumour, and dosimetric factors. Tumour size was assessed volumetrically and graded using the Koos classification.
Results: Of 387 eligible patients, 40% (154/387) reported imbalance pre-GKRS, rising to 59% at follow-up. Among 233 initially asymptomatic patients, 28% (64/233) developed new-onset imbalance. Pre-GKRS imbalance strongly predicted post-GKRS imbalance (OR 4.07, 95% CI 2.46–6.82, $p < 0.0001$). Mixed-effects modelling showed an increased likelihood of imbalance after GKRS (OR 2.15, 95% CI 1.30–3.57, $p = 0.003$). Pre-GK headache and increasing age were additional

independent predictors. No associations were identified with tumour characteristics or dosimetric parameters. Among patients with documented symptom resolution, median time to symptom resolution was shorter in patients with new-onset imbalance (19 months) than in those with pre-existing imbalance (32 months), though this difference was not statistically significant (log-rank $p = 0.10$).

Conclusion: Imbalance is common in patients undergoing GKRS for VS and is strongly influenced by baseline symptom burden, in particular pre-existing imbalance and headache, rather than tumour size or dosimetry. These findings emphasise the importance of systematic, long-term follow-up to inform patient counselling and expectations regarding balance outcomes.

WP1-5

Surgical site infections in tubular retractor-assisted minimal invasive parafascicular approach versus conventional craniotomy in neuro-oncology: a multicentre cohort study

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Objective: To compare the incidence and management of surgical site infections (SSIs) following Minimally Invasive Parafascicular Surgery (MIPS) using tubular retractors versus conventional open craniotomy in patients undergoing brain tumour resection.

Design: Retrospective multicentre cohort study.

Subjects: A total of 189 adult patients who underwent craniotomy for brain tumours at two UK neurosurgical centres between January 2020 and February 2024. Ninety patients underwent MIPS and 99 underwent conventional craniotomy.

Method: Patient data were extracted from electronic records. SSIs were defined according to the 2021 CDC criteria. Variables analysed included demographics, comorbidities, steroid use, tumour location (intraparenchymal vs intraventricular), histology, and intra/postoperative factors. The primary outcome was the 90-day SSI rate. Subgroup analyses explored differences in infection rates by tumour compartment and histological subtype.

Results: Overall, SSIs occurred in 6.4% of cases (12/189). SSI incidence was significantly lower in the MIPS group (4.4%) compared to the open group (8.1%). Among intraparenchymal tumours, MIPS was associated with a significantly lower SSI rate (3.8% vs 13.7%, $p = 0.046$). No significant differences in SSI were observed when stratified by histology. Reoperation for infection was required in 10.1% of open cases versus 1.1% of MIPS cases ($p = 0.011$), with bone flap removal only performed in the open group. All MIPS-associated infections were successfully treated non-operatively.

Conclusion: MIPS is associated with a reduced rate and severity of SSIs compared to conventional craniotomy, particularly in intraparenchymal tumours. These findings suggest a potential benefit of minimally invasive approaches in neuro-oncology, both in reducing infection risk and enabling conservative management when SSIs occur. A formal cost-effectiveness analysis is warranted to further assess the clinical and economic impact of MIPS.

WP1-6

Incidental fourth ventricular subependymoma – surgical resection is not required

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Objective: To determine the role of non-surgical management of incidental fourth ventricle subependymoma.

Design: Single centre retrospective cohort study.

Subjects: Patients met the following criteria: diagnosis between 2014 and 2021, age $\geq$18 years old, MRI finding of a 4th ventricle tumour, indication for imaging not related to the tumour, and MRI appearance consistent with a subependymoma as determined by a consultant neuro-radiologist.

Method: Baseline characteristics, MRI scan frequency, and tumour growth were recorded, along with details of any surgical interventions, outcomes and complications. Tumour growth was defined as any increase in size reported by a consultant neuro-radiologist on serial CT or MRI.

Results: Thirty-three patients (20 male, 13 female, median age at diagnosis 58 (range: 22–80)) with incidental fourth ventricle subependymoma were identified. Subependymoma was identified on MRI in 76% of cases, and visible retrospectively in 18%. No patients with subependymoma visible on retrospective scans showed any sign of growth when comparing the prior MRI with the 'discovery' MRI.

Twenty-eight patients were managed with active surveillance (85%), two patients underwent surgical intervention (6%), two patients did not receive neurosurgical follow up post-referral (6%), and one patient was deemed unsuitable for follow up due to comorbidity (3%). In the surveillance cohort, median follow-up was five years (range 2–11), with a median imaging frequency of one scan per year (range 0.5–2.1). No patients under active surveillance developed tumour-related symptoms. Four patients showed radiology growth. Both surgically treated patients experienced postoperative complications (pseudomeningocele $n = 2$; hydrocephalus requiring VP shunt $n = 2$), and persistent

symptoms including headaches, nausea and horizontal diplopia.

WP2 – SHORT ORALS

WP2-2

Bilateral cavernous sinus aneurysms causing pituitary dysfunction: illustrative case and systematic review

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Objective: To describe a rare case of bilateral cavernous sinus aneurysms presenting with pituitary dysfunction and review relevant literature on carotid aneurysms associated with pituitary dysfunction, with a focus on clinical presentation, mechanisms, management, and outcomes.
Design: Single illustrative case report and systematic literature review.
Subjects: An 80-year-old woman with bilateral cavernous aneurysms and pituitary dysfunction, and 28 additional cases of pituitary dysfunction secondary to carotid artery aneurysms.
Method: The index case was reviewed using patient records, imaging, and electronic data. The systematic review was conducted in accordance with PRISMA guidelines, identifying 28 relevant studies comprising 28 cases. Data on patient demographics, clinical presentation, aneurysm features (location, laterality, size, rupture status), endocrine findings, imaging modality, management and outcomes were analysed.
Results: The index patient presented with falls, diplopia. Endocrine evaluation revealed low morning cortisol level and a high prolactin. Initial CT head imaging suggested a pituitary macroadenoma, however MR angiography revealed bilateral cavernous internal carotid artery (ICA) aneurysms with intrasellar extension, compressing the pituitary gland. Given her age, comorbidities and aneurysm morphology, she was managed conservatively with hormone replacement and antiplatelet therapy, with stable neurological status on follow-up.
The review highlighted that most patients are middle-aged women (72.41%) presenting with chronic headache, pituitary dysfunction and visual disturbance. The majority were due to large ICA aneurysms causing compressive stalk or gland dysfunction (96.55%), and rarely due to pituitary apoplexy or haemorrhage (3.44%). Endovascular treatment was the most frequent aneurysm management strategy, while endocrine replacement was required in almost all cases and often lifelong.
Conclusion: Bilateral cavernous ICA aneurysms represent a rare but important cause of pituitary dysfunction and may closely mimic pituitary adenomas. Clinicians should consider intrasellar aneurysms in the differential diagnosis of sellar masses. Advanced vascular imaging is strongly suggested in order to prevent misdiagnosis and avoid potentially life-threatening complications.

WP2-3

Giant pituitary adenomas: lessons from a single centre cohort study

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Objective: Giant pituitary adenomas (diameter >40mm) are a surgical challenge. Our aim was to review tumour characteristics, management and outcomes for a series of patients presenting with giant adenomas.
Design: Retrospective single centre, single neurosurgeon study.
Subjects: 15 patients with giant pituitary adenomas.
Method: Records of all patients presenting in Southeast Scotland with pituitary adenomas who underwent surgery between 2020 and 2025 were reviewed. 15 patients with giant pituitary adenomas were identified. Clinical presentation, tumour characteristics, surgical outcomes and follow up data was collected.
Results: 11 (73%) patients had non-functional adenomas, and 4 (27%) had functioning adenomas. The chief presenting complaint was visual disturbances in 9 patients (60%). Knosp score was 4 in 8 patients (53%), 3A in 4 patients (27%), and grade 1 and 2 in the remainder. Patients were followed up for an average of 16.8 months. 14 patients were operated via a transsphenoidal approach. 1 required a combined approach with craniotomy. Following surgery, vision improved in 74% of patients and remained unchanged in 13%. 2 patients did not have a visual assessment due to lack of capacity. There were no cases of post-operative cerebrospinal fluid leak, vascular injury, stroke, infection or mortality. The most common complication was new anterior pituitary insufficiency (7 patients, 47%), followed by diabetes insipidus (5 patients, 33%). 5 patients (33%) have required adjuvant radiotherapy since surgery.
Conclusion: Surgery is a safe treatment for giant pituitary adenomas, but their large size demands a nuanced approached. Importantly, the optic apparatus was adequately decompressed in all patients with visual disturbance. Complication rates in this dataset were acceptable, with no cases of post-operative CSF leaks. These cases are more likely to require postoperative radiotherapy than their macroadenoma counterparts.

WP2-4

Adherence to hydrocortisone protocol following endoscopic transsphenoidal surgery

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Objective: Patients undergoing endoscopic transsphenoidal pituitary surgery are at risk of hypothalamic-pituitary-adrenal (HPA) axis suppression and subsequent adrenal insufficiency, making perioperative glucocorticoid replacement with hydrocortisone essential. This audit assessed adherence to the local perioperative hydrocortisone protocol in patients undergoing endoscopic transsphenoidal surgery at a single neurosurgical centre.
Design: A retrospective single centre clinical audit conducted in the neurosurgical ward in Ninewells Hospital, Dundee.
Subjects: Fourteen consecutive patients who underwent endoscopic transsphenoidal pituitary surgery between March 2022 and January 2025.
Method: Data were extracted from hospital electronic and paper-based prescribing systems. These data were compared to the local perioperative hydrocortisone protocol for patients undergoing endoscopic transsphenoidal surgery.
Results: Two out of fourteen patients were diagnosed with Cushing's disease. Correct pre-operative dosing occurred in eight (67%) cases; two missed the dose and one emergency case received an incorrect dose. Postoperatively, nine (64%) received both correct doses, while the remainder had delayed or incomplete dosing. Cortisol testing was omitted in 4/14 (29%) patients.
Conclusion: Adherence to the hydrocortisone protocol was inconsistent, with dosing errors, delayed weaning and incomplete documentation. Additionally, the emergency case demonstrated a complete deviation from the protocol, underscoring the lack of clear guidance and awareness in unplanned settings. A clear, standardised and widely disseminated guidelines, supported with staff training, is essential. Furthermore, improving documentation and clarifying cortisol testing criteria for Cushing's patients are key to enhancing compliance and ensuring safe perioperative glucocorticoid management following transsphenoidal surgery.

WP2-5

Novel BRAF:ZBTB20 fusion in an infratentorial pilocytic astrocytoma

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Objective: Case presentation of first described BRAF:ZBTB20 fusion in an infratentorial pilocytic astrocytoma in an adult patient.
Design: Case report.
Subject; A 46-year-old male.
Method: FusionPlex next generation sequencing.
Results: The Magnetic Resonance Imaging (MRI) seen below as Figure 1 of both T1 weighted (T1) and T2 weighted (T2) MRI, demonstrated an irregular shaped non-enhancing lesion with a cystic and solid component, measuring 23 mm diameter. The mass involved the right medulla, with extension to the right inferior cerebellar peduncle.
Histologically: specimen shows a lightly cellular glial tumour composed of cells with elongated and slightly irregular nuclei in a fibrillary background, with fine processes visible on smear preparation. Cytologic atypia was minimal and mitotic figures were not seen.
FusionPlex next generation sequencing for variant analysis was performed and did not detect a BRAF mutation. A fusion analysis, nonetheless, detected a fusion involving Gene 2 BRAF (Ref Seq ID NM_004333.6, RNA Co-ordinate Chr7:140482821, Exon 10) and Gene 5′ ZBTB20 (Ref Seq ID NM_015642.6, RNA Co-ordinate Chr3:114069441, Exon 9). This fusion was predicted to retain the BRAF protein-kinase domain. DNA methylation profiling using the Deutsches Krebsforschungszentrum / German Cancer Research Centre (DKFZ) Heidelberg classifier version 12.8 was unable to classify this tumour, with the closest match being to the methylation class of 'Low-grade glial/glioneuronal/neuroepithelial tumours' with a calibration score of 0.65.
Conclusion: Our literature search confirmed this study to be additional to three other novel BRAF fusion. This list is likely to grow as molecular testing becomes more routine and accessible. As a result, this may shed light onto tumorigenesis, and aid in classification, diagnosis and prognosis. Additionally, with a number of MAPK inhibitors targeting BRAF now available, molecular testing in pilocytic astrocytoma, as well as other gliomas, is becoming more valuable than ever.

WP2-6

Gamma knife radiosurgery as treatment for rare pulmonary artery sarcoma-derived brain metastases

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Objective: We present the first reported case of pulmonary artery sarcoma (PAS) brain metastases managed with Gamma Knife Radiosurgery (GKS) and review existing literature regarding outcomes.
Design: Retrospective case report and literature review.
Subjects: A 68-year-old male with histologically confirmed PAS who presented with visual disturbances and 15 synchronous brain metastases two years after initial diagnosis.
Method: Following multidisciplinary tumor board review, the patient underwent single-session GKS for all 15 intracranial lesions. The dominant parieto-occipital lesion (8.3cc) was treated with 22 Gy, while smaller lesions received 25 Gy.
Results: Follow-up MRI at one month demonstrated effective local control, with the majority of lesions showing regression or resolution. Despite stable

neurological status, the patient experienced rapid systemic deterioration and succumbed to the disease three months after the diagnosis of brain metastases. A literature review identified only six prior papers reporting PAS brain metastases, with no patients surviving beyond six months of intracranial involvement.
Conclusion: This case illustrates the first use of GKS for PAS brain metastases, demonstrating its utility for achieving local control and palliation. However, overall prognosis remains poor, dictated primarily by aggressive systemic disease progression.

WP2-7

Diffuse pachy meningeal convexity dural recurrence of olfactory neuroblastoma: a case report and literature review

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Objective: To present a rare case of diffuse pachymeningeal convexity dural recurrence of olfactory neuroblastoma occurring more than a decade after initial treatment, highlighting the clinical presentation, diagnostic challenges, imaging features, histopathological confirmation, and multidisciplinary management, and to review the relevant literature to improve awareness and guide management of such atypical recurrences.
Design: Single-patient case report with retrospective review of clinical, radiological, and histopathological findings, supplemented by a review of the relevant literature on meningeal recurrence of olfactory neuroblastoma.
Subjects: A 67-year-old retired female with a history of Hyams Grade II olfactory neuroblastoma treated surgically with adjuvant radiotherapy 13 years prior, who presented with neurological symptoms suggestive of meningeal recurrence.
Method: The patient underwent clinical evaluation, neurological examination, and serial brain MRI, which demonstrated diffuse pachymeningeal dural thickening with cystic changes. Following multidisciplinary team discussion, a left frontal craniotomy and dural biopsy were performed for histopathological confirmation. Immunohistochemistry was used to confirm recurrent olfactory neuroblastoma. Postoperative management included clinical monitoring, short-term corticosteroids, and referral for further oncologic assessment. A literature review was conducted to contextualize this rare pattern of recurrence.
Results: Brain MRI revealed diffuse left convexity dural thickening with multiple small cystic lesions, without a discrete mass. Intraoperatively, abnormal purplish, highly vascular dural tissue with focal cortical adherence was observed. Histopathology confirmed recurrent Hyams Grade II olfactory neuroblastoma, with immunohistochemistry positive for synaptophysin, chromogranin, and neuron-specific enolase. The patient recovered without new neurological deficits and was referred for further oncologic management.
Conclusion: Diffuse pachymeningeal convexity dural recurrence of olfactory neuroblastoma is extremely rare and may occur many years after initial treatment. Awareness of this atypical recurrence pattern, combined with thorough imaging evaluation and histopathological confirmation, is essential for accurate diagnosis. Lifelong surveillance and multidisciplinary management are critical to optimize patient outcomes in such cases.

WP2-8

Exploring the role of AI and machine learning in ultrasound imaging: a scoping review and implications for intraoperative neuro-oncology

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Objective: To map and synthesise the peer-reviewed evidence on the applications of artificial intelligence (AI) and machine learning (ML) in ultrasound imaging, describe dominant technical approaches and validation practices, and identify underrepresented areas relevant to intraoperative translation in neuro-oncology.
Design: Scoping review.
Subjects: Peer-reviewed journal articles ($n = 669$) applying AI/ML to ultrasound imaging in adults.
Method: The review was conducted in accordance with PRISMA-ScR guidance. Records were deduplicated in Rayyan QCRI, and titles/abstracts were prioritised using ASReview. Included studies were charted for clinical domain, AI/ML task (e.g., diagnosis/classification, segmentation, prediction), algorithm type, dataset characteristics, validation strategy, and key outcomes.
Results: A total of 669 records were identified applying AI/ML to ultrasound, meeting the inclusion criteria. Most work addressed diagnostic tasks (436/669, 65.2%), with 109 studies (16.3%) extending classification beyond diagnosis. Convolutional neural networks were commonly used. Segmentation was the primary AI/ML function in 157 studies (23.4%), while prediction tasks accounted for 84 (12.5%). Functional assessment was uncommon (27/669, 4.0%), and imaging-guided intervention was rare (16/669, 2.4%).
Applications clustered within established imaging areas, including breast (17.9%) and thyroid (10.3%). Only 17 studies focused on the brain, of which seven involved the adult brain. A single study addressed glioma, demonstrating positive results in intraoperative molecular diagnosis to aid prognostic planning. Overall, intraoperative ultrasound applications were scarce, with the majority of studies targeting preoperative tasks such as diagnosis and segmentation.

WP2-9

Predicting and prognosing early intracranial haemorrhage in acute promyelocytic leukaemia: a review of clinical, biochemical and radiological markers

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Objective: Intracranial Haemorrhage (ICH) remains one of the main causes of early mortality in Acute Promyelocytic Leukaemia (APL), an otherwise highly curable malignancy. About 8–13% of patients with APL suffer from ICH resulting in early mortality. This systematic review aims to highlight and evaluate the clinical features, laboratory markers and radiological findings which predict and prognose early ICH in patients with APL. These markers can guide the diagnostic/prognostic workup for patients with APL and facilitate appropriate neurosurgical involvement as part of multidisciplinary management.
Design: This is a systematic review of peer-reviewed articles regarding predictors of early ICH in APL.
Subjects: The articles incorporated in this review are retrospective studies about patient outcomes in APL. This review does not directly involve patient contact or first-hand use of patient data but involves a synthesis of clinical information across various studies.
Method: Literature search was conducted across EMBASE, PubMed and Google Scholar using the PRISMA guidelines. The search was not constrained by year of publication and only articles published in English were considered.
Results: High white blood cell count, given its direct connection with disease burden, was described as a reliable marker of the risk of early ICH across various studies. Literature differs on the reliability of coagulopathy markers in predicting early ICH. Among these, elevated prothrombin time is a useful and feasible laboratory marker mentioned across studies. The role of D-dimer, fibrinogen as well as biochemical markers such as lactate dehydrogenase is less clear. Finally, the swirl sign seen on CT brain can be a key radiological marker predicting fatality due to ICH.
Conclusion: Evidence supports the incorporation of full blood count (for WBC), coagulation screen (for PT) and CT brain in the diagnostic/prognostic bundle in APL to predict/prognose early ICH and facilitate appropriate and prompt multidisciplinary management, including neurosurgical input.

WP2-10

Hidden complications of anterior skull base surgery: a case of occult CSF leak

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Objective: Esthesioneuroblastoma, also known as olfactory neuroblastoma, is a rare malignant neoplasm arising from the olfactory neuroepithelium, presenting with sinonasal symptoms, diagnosed at an advanced stage. Over 1,000 cases have been described in the literature since the tumour was first reported in 1924. Management requires a multidisciplinary skull-base approach combining surgery and radiotherapy. We report a 58-year-old woman, previously fit and well, who presented with several months of nasal obstruction, increased mucous production and persistent difficulty in throat clearing. Imaging revealed a left-sided Sinonasal Cavity and the anterior Cranial Fossa lesion expanding into the olfactory recess (cT3N0M0). Endoscopic biopsy confirmed esthesioneuroblastoma Kadish stage C. The patient underwent a combined endoscopic endonasal and transcranial resection via a bicoronal frontal craniotomy with intraoperative lumbar drain insertion. The procedure was uncomplicated. However, her postoperative course showed symptomatic pneumocephalus, fluctuating levels of consciousness and low-pressure headaches. Due to the absence of an external CSF leak, CSF rhinorrhea and the lumbar drain being clamped, the underlying cause could not be identified. She was managed with high-flow oxygen therapy and epidural blood patch, which resulted in clinical improvement, retrospectively indicating an occult CSF leak. No further leakage occurred. The patient progressed well and was discharged on postoperative day 16. She completed adjuvant proton beam radiotherapy. At early follow-up, she demonstrated good postoperative recovery with no residual neurological deficits.
Results: Early detection and treatment of occult CSF leaks are uncommon but clinically significant in anterior skull base surgery. Unlike overt CSF leaks with clear clinical signs such as rhinorrhea or wound drainage, occult CSF leaks may manifest only through indirect features, including low-pressure headaches, altered consciousness, or postoperative pneumocephalus. Therefore, heightened clinical vigilance and a low threshold for treatment are essential in the postoperative care of anterior skull base surgeries, even in the absence of overt CSF leakage.

WP2-11

Invasive neuromodulation of the central nervous system in painful trigeminal neuropathy: a systematic review

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WP2-12

Perioperative liposomal bupivacaine for postoperative pain control in cranial neurosurgery: a systematic review

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Objective: Post-craniotomy pain is common and contributes to increased opioid use and delayed recovery. Liposomal bupivacaine (LB) is a long-acting local anaesthetic that provides sustained analgesia for up to 96 hours. Its role in cranial neurosurgery remains uncertain.
Design: A systematic review was conducted in accordance with PRISMA guidelines and registered prospectively on PROSPERO.
Method: MEDLINE, EMBASE, CINAHL, Web of Science, and CENTRAL were searched. Eligible studies assessed perioperative LB in elective cranial neurosurgical procedures and compared it with conventional local anaesthetic or no local infiltration. Primary outcomes were postoperative pain scores and opioid consumption expressed as morphine milligram equivalents. Secondary outcomes included length of stay, complications, and cost.
Results: Four retrospective single-centre studies involving 184 patients were included. One study examined adult aneurysm craniotomy, and three examined paediatric cranial vault remodelling or Chiari decompression. In adults, LB bupivacaine did not significantly reduce pain scores, opioid use, or length of stay but significantly increased analgesic cost. In paediatric cohorts, LB was associated with significantly reduced opioid use in the first 24 hours in one Chiari study and across the first three postoperative days in cranial vault remodelling. Effects on pain scores and length of stay were variable.
Conclusion: This is the first systematic review evaluating perioperative liposomal bupivacaine in cranial neurosurgery. Current evidence shows limited benefit in adults and variable short term opioid sparing effects in selected paediatric populations, with higher cost. Routine use cannot be recommended. High-quality randomised trials are required to define its clinical and cost-effectiveness.

WP2-13

Does middle meningeal artery embolisation reduce recurrence of chronic subdural haematoma? a systematic review and meta-analysis of randomised trials

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Objective: Chronic subdural haematoma (CSDH) is a common neurosurgical condition with a substantial risk of recurrence following surgical evacuation. Middle meningeal artery embolisation (MMAE) has emerged as a neurointerventional adjunct that targets the pathophysiological neovascular membrane responsible for recurrence. This study synthesises the highest-level randomised evidence evaluating the clinical effectiveness and safety of MMAE in reducing CSDH recurrence.
Design: Systematic review and meta-analysis of randomised controlled trials conducted in accordance with PRISMA guidelines.
Method: Four large randomised controlled trials comparing MMAE with standard care in adult patients with CSDH were included. The primary outcome was recurrence requiring repeat surgical intervention. Secondary outcomes included functional outcome (modified Rankin Scale), mortality, serious adverse events, and length of hospital stay. Pooled risk ratios (RRs) were calculated using random-effects modelling. Risk of bias was assessed using the Cochrane RoB-2 tool.
Results: 1,781 patients were analysed across the four trials. MMAE significantly reduced the risk of recurrence requiring surgery compared with standard care (overall pooled RR 0.40, 95% CI 0.28–0.58; $p < 0.00001$). There were no significant differences in mortality (RR 0.94, $p = 0.85$), serious adverse events (RR: 0.92, $p = 0.47$), or favourable functional outcome at follow-up (OR 0.97, $p = 0.88$). Length of hospital stay did not differ significantly where reported. Overall risk of bias was low, with some concerns related to reporting heterogeneity.
Conclusion: MMA embolisation significantly reduces recurrence of chronic subdural haematoma requiring repeat surgery while demonstrating a favourable safety profile and no adverse impact on mortality or functional recovery. These findings support MMAE as an effective adjunct in CSDH management, with further research required to refine patient selection and optimise clinical pathways.

WP2-14

Drain practices following surgical evacuation of chronic subdural hematoma

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Objective: There is variation in post-operative drain management following surgical evacuation of chronic subdural haematoma (CSDH). The objectives of the audit are:
1. Evaluate current drain management practices in CSDH.
2. Assess timing and policy regarding post-op mobilization, clamping of the drain, post-op CT scan, and restartingantiplatelet/anticoagulation.
3. Compare local practice with evidence and guidance.
4. Formulate recommendations for a standardised post-operative care protocol.
Design: Clinical audit.
Subjects: Patients underwent surgical evacuation of chronic subdural haematoma. National and international guidance used to compare against: 1) GET-UP trial at one month and one year (early mobilisation after surgical evacuation of chronic subdural haematoma reduces the infection rate at one month and improves the functional outcome at one year). 2) Follow-up Computed Tomography after Evacuation of Chronic Subdural Haematoma (RCT published in the NEW ENGLAND JOURNAL OF MEDICINE / DOI: 10.1056/NEJMc1812507) which showed no added benefits from routine CT scans after surgery.
Method: •Retrospective auditing of 50 patients who underwent CSDH evacuation. •Variables: Age, Gender, drain type, mobilization timing, duration of bed rest, clamping of the drain before mobilisation, post-op CT scan and its timing, timing for restarting antiplatelets/anticoagulants.
Results: •Mean age: 71.1 years •Early mobilization (<12h): 33 / 50 (66%) •Drain type: Subdural 100% •Clamping before mobilisation: 6 / 50 (12%), 5 were routine clamping and one due to CSF leak. •Post-op CT performed: 38 / 50 (76%) [42% the scan group had it before drain removal]. •Restart antiplatelets ≈14 days in 10 cases. Variable between patients with different co-morbidities.
Conclusion: •Adopt early mobilisation as a standard and document the rationale for bed rest.
•Adopt no drain clamping. •Stop routine post-op CT; use a symptom-driven approach. If the surgeon feels it is needed as a baseline post-op scan, no need to do it before drain removal. •Regarding restarting antiplatelets and anticoagulants, it is variable depending on the patient's co-morbidities.

WP2-15

The Monro-Kellie doctrine in infancy: dual case evidence of developmental exception

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Objective: To describe two complementary infant cases that illustrate how open cranial sutures permit compensation for increased intracranial volume, producing atypical presentations that challenge the classical interpretations of the Monro-Kellie doctrine.
Method: We report two infants with rapidly enlarging head circumferences and minimal neurological symptoms. Both underwent detailed neuroimaging, laboratory investigation, and neurosurgical management with longitudinal follow-up. Case 1 presented primarily with bilateral subdural hematohygromas, whereas Case 2 initially developed communicating hydrocephalus treated by endoscopic third ventriculostomy (ETV). Both subsequently required definitive cerebrospinal fluid (CSF) diversion via bilateral subdural-peritoneal shunt.
Results: In case 1, imaging demonstrated chronic subdural collections with neomembrane formation, consistent with impaired CSF absorption and vascular fragility. In case 2, ETV effectively reduced intraventricular pressure but was followed by development of bilateral subdural collections, attributed to the post-operative transdural pressure gradients. Despite large intracranial fluid volumes, neither infant exhibited clinical features of raised intracranial pressure due to preserved cranial compliance. Both achieved full neurological recovery following shunt placement, with stable occipitofrontal circumference and normal development at follow-up.
Conclusion: These cases demonstrate that in early infancy, the skull behaves as a compliant system capable of masking elevated intracranial volume. Consequently, rapidly increasing head circumference may represent compensated hydrocephalus without classical signs of raised intracranial pressure. Recognition of this developmental exception to the Monro-Kellie doctrine is crucial for timely diagnosis and tailored CSF diversion strategies. Hematohygroma in infancy under the same context needs early recognition and appropriate management in a multidisciplinary fashion. Long term follow-up is recommended.

WP2-16

Evaluation of the incidence of sinus pericranii in children with brain tumours

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Objective: Sinus pericranii are abnormal venous connections between the intracranial venous sinuses and extracranial venous system. They can be primary (congenital) or secondary to other pathology such as venous hypertension. There is paucity of data on incidence and pathophysiology of this entity. The objectives of this study were to evaluate incidence of sinus pericranii in the paediatric population presenting with brain tumour and to assess associated risk factors.
Design: Retrospective review of MRI Brain imaging of all paediatric cases with brain tumour presenting over a 5-year period (2020–2025).
Subjects: Paediatric patients with age <17 presenting with brain tumours.
Method: Pre-operative MRI brain post contrast images were reviewed in axial and sagittal views for all new paediatric patients with brain tumour retrospectively. Further information including age, sex, tumour location, obvious venous obstruction, histology of tumour and location of sinus pericranni and presence of hydrocephalus were analysed. Exclusion criteria were redo/revision cases or non-tumour histology.
Results: Overall, 101 cases of new paediatric brain tumours were identified and included. Sinus pericranii was identified in 14% with mean age of 8.4 years with male to female ratio of 11M:3F. All sinus pericranii were in peri-torcular location. Infratentorial location was the most common tumour location in this cohort (42.9%) and 100% of sinus pericranii cases were associated with hydrocephalus. Pilocytic astrocytoma was the most common type of tumour histology in this cohort (64.3%). Comparing cohorts with and without sinus pericranii, identified tectal location of tumour (21% vs 0 %), pilocytic astrocytoma (64.3% vs 25.3%) and hydrocephalus (100% vs 48.3%) as significant factors associated with sinus pericranii. No significant association was identified with other histological types or tumour location.
Conclusion: Sinus pericranii although rare can be seen in 14% of paediatric tumour patients. Our findings suggest that slow growing tumours and resulting hydrocephalus may play role in pathophysiology of this condition.

WP2-17

Utility of routine preoperative blood tests in elective paediatric neurosurgery: a retrospective audit at the Royal Infirmary of Edinburgh (2022–2025)

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Objective: To evaluate the clinical utility and cost of preoperative blood testing in elective paediatric neurosurgery.
Design: Routine preoperative blood testing in healthy children is common, but evidence suggests it has minimal impact on perioperative management. This audit evaluated testing practices, testing duplications, costs, and clinical utility in elective pediatric neurosurgery procedures at the Royal Infirmary of Edinburgh.
Subjects: 227 procedures for a total of 209 patients were analysed.
Method: All elective neurosurgical procedures in children less than 16 years old from January 2022 to June 2025 were reviewed. Data collected included demographics, procedure type, prior and pre-operative blood testing (within 30 days of the operation), test results, sample quality, clinical impact, and direct costs. Descriptive statistics were performed.
Results: 227 procedures for a total of 209 patients were analysed. The mean age was 10.7 and the majority of patients were male (61%). There was a total of 203 (89%) preoperative blood tests. Abnormal results occurred in 121 cases (60%), but none altered surgical or anaesthetic management. Prior testing within six months was available for 77 children; 67 underwent repeat testing despite previously normal results. Additionally, 24 children had no preoperative blood tests. The estimated cost saving for this audit was £608.8 for 3 years, and adopting a selective testing strategy could save over £1,000.
Conclusion: Routine preoperative blood testing in healthy children has minimal impact on perioperative management, often duplicates prior tests, and may cause patient discomfort. A selective, risk- and procedure-based testing strategy, particularly for high-risk groups such as intracranial tumours, can enhance patient experience and reduce costs without compromising safety.

THURSDAY 16TH APRIL
MAIN LECTURE THEATRE
TM1 – GENERAL NEUROSURGERY

TM1-1

250 years of Neurosurgery in Leeds – from trepanation in the industrial revolution to modern innovation

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Objective: To review the 250-year evolution of neurosurgery in Leeds and the wider West Yorkshire region, tracing its origins in meeting the demands of industrial trauma to its development as a modern, subspecialised academic and clinical centre.
Design: Historical analysis based on archival records, published literature, and documented contributions of pivotal individuals and institutions.
Subjects: Analysis focuses on key innovators who advanced neurosurgery, including founding surgeon William Hey; Thomas Teale; Clifford Allbutt; Arthur Mayo-Robson; Berkeley Moynihan; George Armitage; and William Henderson. Institutions include Leeds General Infirmary (1767), Leeds Public Dispensary (1824), Leeds School of Medicine (1831), West Riding Asylum, and regional neurosurgery at Pinderfields.
Method: Chronological review, tracing developments in surgical techniques, diagnostic and technological innovation, medical education, and service organisation. Primary/secondary historical sources were analysed and contextualised within broader medical, scientific, and social history.
Results: Neurosurgical development occurred in distinct phases.
Foundational (1767–19th century): Hey's management of industrial head injuries established Leeds as a regional centre for surgery, responding directly to the morbidity of rapid industrialisation.
Specialisation (19th–early 20th century): Classification of spinal and neuralgic disorders, and diagnosis of raised intracranial pressure with the ophthalmoscope. Ferrier's experiments in 1873 provided definitive evidence for cerebral localisation.
Formalisation (1930s–1950s): Armitage, influenced by Cushing, advocated for a dedicated neurosurgical service, culminating in appointment of Henderson as the first neurosurgeon in Leeds (1938).
Modern Expansion (1960s–present): Led by Myles Gibson and consecutive consultants, neurosurgical provision expanded with subspecialisation, structured trauma pathways, stereotactic surgery, and designation of Leeds General Infirmary as a Major Trauma Centre.
Conclusion: Neurosurgery in Leeds reflects a continuous legacy of innovation driven by clinical need and successive pioneers. Its progression from pragmatic industrial trauma surgery to a comprehensive academic specialty exemplifies enduring commitment to technical excellence, education, and adaptive patient care, positioning Leeds at the forefront of contemporary neurosurgical practice.

TM1-2

Optimal timing of cranioplasty post-decompressive craniectomy in traumatic brain injury: a systematic review, meta-analysis, and overview of ongoing trials

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Objective: The optimal timing of cranioplasty (CP) following decompressive craniectomy (DC) for traumatic brain injury (TBI) remains uncertain. This study compared outcomes of early CP (EC;$\leq$90 days) and late CP (LC;$>$90 days), examining the influence of ultra-early CP ($<$35 days) and implant material.
Design: Systematic review and meta-analysis conducted in accordance with PRISMA and AMSTAR-2 guidelines (PROSPERO ID:CRD420251032162).
Subjects: Adult TBI patients undergoing EC or LC following DC.
Method: MEDLINE, Embase, and CENTRAL were searched to April 2025, with grey-literature screening. Outcomes included overall complications, reoperation, and functional status; secondary endpoints comprised hydrocephalus, shunt dependence, infection, haematoma, bone resorption, seizures, mortality, and operative time. Risk of bias was assessed with ROBINS-I and RoB 2 tools, and certainty of evidence with GRADE. Pooled risk ratios (RRs) and mean differences (MDs) were calculated using random-effects meta-analysis.
Results: Eighteen studies ($n = 2226$) were included. Overall complications were similar between EC and LC (RR $=1.14$; $p = 0.43$). However, autologous/allogenic EC showed higher complication risk (RR $=1.92$; $p = 0.02$), and mixed-material EC increased reoperations (RR $=2.98$; $p = 0.02$). Functional outcomes did not differ. Ultra-EC reduced postoperative hydrocephalus (RR $=0.31$; $p = 0.005$), while shunt dependence showed no significant difference. No significant differences were observed in extra-axial collections, infection, haematoma, bone resorption, seizures, or mortality. Operative time was shorter for EC (MD$= -23.9$min; $p = 0.0008$), especially in ultra-EC (MD$= -42.4$min; $p < 0.00001$).
Conclusion: CP timing alone does not determine safety or efficacy. Outcomes are critically modified by implant material and perioperative context. Ultra-EC may confer operative and physiological advantages without excess infection or mortality, particularly with synthetic implants, whereas early autologous or allogenic reimplantation carries higher risk of complications and reoperations. These findings argue for moving beyond a simplistic early-versus-late dichotomy and instead shifting towards material- and patient-specific strategies. Harmonised definitions and material-stratified

prospective trials incorporating long-term functional outcomes are essential to establish evidence-based guidelines.

TM1-3

Predictors of cranioplasty infection following decompressive craniectomy: a single-centre retrospective study

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Objective: Cranioplasty is performed following a decompressive craniectomy to provide protection for the brain, improve neuro-rehabilitation outcomes, and restore cosmesis. Post-operative infection can significantly impact rehabilitation and morbidity. We aim to identify factors predictive of infection, following cranioplasty, to improve patient outcomes.
Design: Single-centre, retrospective cohort study.
Subjects: Adult patients who received a cranioplasty at our centre were included. Cranioplasties done after a bone flap removal were excluded.
Method: Patients were identified from the theatre database. data was obtained from the electronic patient record. Kaplan-Meier, univariate and multivariate statistical analyses were conducted in SPSS v30.
Results: 98 patients were included, 71.4% were male with a mean average at craniectomy of 39.1 years (95% CI 22.2–41.8). The most common aetiologies for craniectomy were trauma (42/98, 42.4%), infarction (17/98, 17.2%) and intracerebral haemorrhage (17/98, 17.2%). The mean average time between craniectomy and cranioplasty was 508.6 days (95% CI: 404.5–612.7). The most common implant material was titanium (78/98, 78.8%), followed by bone and hydroxyapatite (both 4/98, 4.04%). There was a 19.2% cranioplasty infection rate observed after an average of 110.1 days (95% CI: 78.6–141.6). Following univariate analysis, a non-significant trend was observed with time between craniectomy and cranioplasty and cranioplasty infection ($p = 0.093$), as well as age at cranioplasty and cranioplasty infection ($p = 0.060$). Multivariate analysis did not reveal any independent predictors of cranioplasty infection. Kaplan-Meier analysis showed that an operation duration >139 minutes ($p = 0.048$) and a registrar as the primary surgeon ($p = 0.005$) were associated with earlier cranioplasty infection. Cox proportional hazards regression did not reveal any factors independently associated with earlier cranioplasty infection.
Conclusion: No independent factors were associated with cranioplasty infection in this cohort over a long period of follow-up. Larger, prospective, and multicentre patient cohorts are needed to identify factors significantly associated with cranioplasty infection.

TM1-4

Adult cranioplasty outcomes and potential predictors of reoperation: a retrospective study

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Objective: Postoperative infection is a common complication following cranioplasty, contributing to a national readmission rate of 12% at 30 days, associated with increased morbidity, mortality, and healthcare costs. This may result in; return to theatre for cranioplasty removal, antibiotic therapy, prolonged hospital stays, and revisional surgery. We evaluated infection and readmission rate at 30-days (primary outcome) and 12-months (secondary outcome) in adult patients undergoing cranioplasty to identify clinical and procedural variables associated with an increased risk of morbidity.
Design: Single centre retrospective cohort study.
Subjects: Adult patients undergoing primary or revisional cranioplasty from April 2018 to August 2024.
Method: Patients were identified from clinical coding and data were collected from medical records including demographic, operative, and outcome data. Outcomes were 30-day and 12-month postoperative complications including reoperation. Univariate and multivariate regression analysis was performed.
Results: 117 patients, 69 males and 48 females with a median age of 48 years were included. 89% were primary cranioplasties and 11% were revisional. All patients had antibiotics on induction, vancomycin powder was used intraoperatively in 62% of cases. Postoperative antibiotic regimes were variable with an average duration of 5 days, and 27% had no postoperative antibiotics. Thirty-day reoperation rate was 6%, with 2 cases of infection and 4 extradural haematoma, and 1 wound revision. Re-admission rate was 2.6%. There were no deaths at 30 days. 12-month reoperation rate was 5%. Patients who did not receive post-operative antibiotics had an increased risk of post operative infection at 30 days ($P = 0.017$). There were no independent predictors identified on logistic regression.
Conclusion: Our local cranioplasty readmission rate is lower than the national average (2.6% vs 12%). Patients who did not receive post-operative antibiotics had a significant increase in risk of reoperation due to infection at 30 days. Identifying modifiable factors may help reduce complication and reoperation rates, improving outcomes for patients undergoing cranioplasty.

TM1-5

Time to surgery in acute subdural haematoma – a systematic review and meta-analysis

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Objective: Assess the impact of time to surgery on mortality and morbidity in acute subdural haematoma (ASDH).
Design: PRISMA compliant systematic review and meta-analysis (PROSPERO ID (CRD420250652338).
Method: Articles published in MEDLINE, Embase, and Cochrane Library between inception and 24 March 2025 were included. Surgical timing (cut-off and definition), mortality, patient demographics, surgical approach and complications were identified. Mortality rates in relation to surgical timing were calculated using random effect models.
Results: Of 3318 articles identified, 39 studies (9844 patients) were included. Pooled mean age was 46.8 years. The most common time to surgery definition was <4h or >4h ($N = 20$), 24h ($N = 7$), 6h ($N = 2$) and 10h ($N = 2$). The most common time definition used was from injury ($N = 27$), and from admission ($N = 7$). Using a <4h definition, there was no statistically significant difference in mortality between early and delayed surgery (RR 0.99 [95% CI 0.72–1.33; $p = 0.96$, $I^2 = 83\%$]). Using a <24h definition, there was no difference in mortality between early and delayed groups (RR 1.53 [95% CI 0.51–4.56; $p = 0.30$, $I^2 = 71\%$]). Sensitivity analysis of recently published studies showed no difference in mortality between <4h and >4h groups (RR 0.89 [95% CI 0.51–1.53; $p = 0.81$, $I^2 = 84\%$]). Morbidity data and functional outcomes were not routinely recorded, with three studies reporting no significant association with surgical timing and morbidity. Most papers ($N = 30$) were found to be at moderate to severe risk of bias.
Conclusion: There is no clear evidence that early surgical intervention improves mortality outcomes in patients with ASDH. Further studies evaluating surgical timing and morbidity are required.

TM1-6

Bolt-connected versus tunnelled external ventricular drains: a systematic review and meta-analysis comparing accuracy and complications

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Objective: To compare accuracy and complications between bolt-connected and tunnelled external ventricular drains (EVDs).
Design: Systematic review and meta-analysis.
Method: PRISMA compliant systematic review and meta-analysis was conducted (PROSPERO ID CRD420251045971). Articles published in MEDLINE, Embase, and Cochrane Library between inception and 1 May 2025 were included. Rates of infection, revision, obstruction, pullout and haemorrhage were identified. Outcomes were calculated using random effects meta-analysis models.
Results: Of 254 articles identified, 15 studies were included in final analysis (2797 patients; 1614 bolt EVD, 1183 tunnelled EVD). Combined infection rates were 13.8% ($N = 90/652$) in the bolt EVD group and 12.6% ($N = 139/1107$) in the tunnelled EVD group. There was no difference in infection rates between bolt and tunnelled EVD groups (8 studies, RR 0.87, 95% CI 0.67–1.09, $I2 = 0\%$, $p = 0.199$). Combined revision rates were 8% ($N = 50/624$) in the bolt group and 14% ($N = 148/1091$) in the tunnelled EVD group. There was no difference in revision rates between bolt and tunnelled EVDs (7 studies; RR 0.54, 95% CI 0.17–1.70, $I^2 = 85\%$, $p = 0.238$). Combined obstruction rates were 9% ($N = 24/278$) in bolt EVD group and 15% ($N = 61/394$) in the tunnelled group. There was no difference in obstruction rates between groups (4 studies, RR 0.46, 95% CI 0.15–1.44, $I2 = 52\%$, $p = 0.119$). There was no difference in pullout/displacement rates (6 studies, RR 0.39, 95% CI 0.06–2.33, $I2 = 73\%$, $p = 0.232$), haemorrhage (4 studies, RR 1.18, 95% CI 0.32–4.28, $p = 0.716$), or optimal placement (RR 1.26, 95% CI 0.93–1.71, $I2 = 40\%$, $p = 0.09$).
Conclusion: Bolt-connected EVDs have equivalent, but not superior, outcomes to tunnelled EVDs. Further prospective studies are required to validate findings.

TM1-7
WITHDRAWN

TM1-8

Innovating for accessibility: SMART hands, the first low-cost microsurgical simulation training for medical students in Nepal and its educational impact

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Objective: Global Surgery 2030 highlights major gaps in the surgical workforce, particularly in LMICs like Nepal, where acess to surgical and microsurgical training for medical students is limited. Students rarely encounter microsurgery due to equipment shortages, uneven microscope distribution, and a lack of trained educators. Workforce entry and retention are affected by limited exposure and insufficient mentorship. Early, low-cost simulation can build skills, spark neurosurgical interest, and improve accessibility. S.M.A.R.T. hands (Surgical Mastery and Accuracy Through Refined Training) piloted as the first low-cost, smartphone-based microsurgical simulation workshop for Nepalese

medical students, aimed at evaluating its effectiveness and educational value.
Method: Six medical students attended a half-day workshop with four rotating 5-minute microskills stations involving rice grain transfer evaluating precision, needle eye threading for steadiness, gauze fiber detangling for dexterity, and glove-based microsuturing using 6-0 Prolene under smartphone magnification. Stations emphasized ergonomics and posture. All materials were locally sourced with total equipment costs under £40. An anonymised pre- and post-workshop survey assessed confidence, microsurgical knowledge, satisfaction, and perceived barriers. Mann-Whitney U tests compared confidence scores, and descriptive statistics summarized knowledge outcomes ($\alpha = 0.05$).
Results: Participants evaluated their self-rated confidence in microsurgical skills (1= not confident to 5= very confident). Mean confidence increased from 3.00 to 3.58 ($\Delta + 0.58$). The Largest gains were in knot-tying ($\Delta + 1.33$) and suturing precision ($\Delta + 1.04$, $p < 0.05$). Knowledge improved: Suture-size identification 62.5% to 100 %, familiarity with magnification tools 0% to 83%, and instrument recognition 75% to 100%. Satisfaction was high; all participants would recommend the workshop. Barriers included limited equipment, mentorship, and local training opportunities.
Conclusion: The SMART hands pilot workshop demonstrates that low-cost, smartphone-based microsurgical simulation is feasible, affordable, and educationally beneficial in a low-resource setting. Its simplicity and minimal resource requirements support replication across institutions in Nepal and similar LMIC settings, promoting early exposure and greater equity in surgical education.

TM2 – SPINE

TM2-1

Outcomes from the use of intraoperative neuromonitoring for intramedullary spinal cord tumours – a single surgeon case series

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Objective: To assess the benefits of spinal cord monitoring during resection of intramedullary spinal cord tumours (IMST).
Design: Retrospective review of a prospectively collected database of patients undergoing surgical intervention for IMSTs.
Subjects: This study is taken from a single-surgeon case series of 250 intramedullary spinal cord operations between 1994 and 2025. 39 patients who underwent intraoperative neuromonitoring (IONM) during surgery were included and compared with 39 patients who underwent surgery without IONM.
Method: Case notes, imaging and histology were reviewed. Data collected included demographics, presenting symptoms, tumour histology and location, use of IONM, extent of resection (EOR), presence of new neurological deficit, complications and recurrence/progression. Patients with non-neoplastic IM lesions or medullary lesions with spinal cord extension were excluded.
Results: There was no significant difference between the groups in the baseline characteristics. Ependymoma was the most common pathology (49%), followed by astrocytoma (13%) and haemangioblastoma (9%). Tumours were most frequently located in the cervical (37%) and thoracic (36%) spinal cord. Gross total resection was achieved in 59% of cases. At discharge, 73% of patients were neurologically stable or improved. Postoperative complications included new paraparesis (9%), surgical site infection (5%), cerebrospinal fluid leak (2.6%), and epidural haematoma (1%). There were no significant differences between the IONM and non-IONM groups in EOR ($p = 0.81$), immediate postoperative neurological status ($p = 0.63$), neurological status at discharge ($p = 1.00$), development of new deficits ($p = 1.00$), or new paraparesis ($p = 0.11$).
Conclusion: The overall outcomes in this single surgeon series are comparable with other large, published studies. IONM is increasingly used and subjectively may sometimes encourage a gentler touch, or lesser or greater resection, but in this series at least it was not associated with improved resection or better neurological outcomes, suggesting its use could be optional rather than obligatory.

TM2-2

From alert to outcome: a service evaluation of intra-operative monitoring findings and associated recovery trajectories in resection of spinal lesions

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Objective: Intraoperative neurophysiological monitoring (IOM) is widely used during resection of spine lesions to detect real-time neural compromise and guide intraoperative decision-making. However, its predictive value for postoperative outcomes remains uncertain.
Method: We conducted a retrospective service evaluation of 85 patients who underwent spine lesion resection at a tertiary neurosurgical centre. Patients were stratified by presence or absence of IOM signal changes. Symptom burden was quantified by the number of affected categories (pain, motor, sensory, gait, bowel/bladder) at three timepoints: pre-operative, immediate post-operative, and most recent follow-up. Statistical comparisons were performed using Mann–Whitney and Welch's *t*-tests.
Results: IOM signal changes occurred in 49/85 patients (57.6%), most commonly involving transcranial motor evoked potentials (TcMEPs) (57.1%) and (FrEMG) (55.1%). These patients had significantly higher immediate post-operative symptom burden (mean difference: 0.89 symptom categories; $p = 0.007$) and longer hospital stay (mean difference: 7.8 days; $p = 0.030$). At follow-up, symptom burden remained higher in the

IOM group (mean difference: 0.63 categories; $p = 0.032$), though changes from pre-operative and immediate post-operative status were not significantly different between groups. Radiological outcomes and subjective improvement rates were comparable.
Conclusion: IOM signal changes are associated with increased immediate postoperative deficits and prolonged hospitalisation, but do not reliably predict long-term recovery. A pragmatic symptom domain framework enables reproducible outcome tracking and highlights the need for multimodal assessment. These findings support context-sensitive interpretation of IOM alerts and underscore the importance of integrating intraoperative data with clinical judgement.

TM2-3

Myxopapillary ependymoma – should we consider earlier intervention for small lumbar intradural tumours?

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Objective: To identify factors influencing outcomes following surgery for myxopapillary ependymoma and to assess whether the WHO reclassification of CNS tumours (2021) necessitates a change in current management paradigms.
Design: Single surgeon retrospective case note and radiological review of all patients undergoing surgery for myxopapillary ependymoma from 2008 to 2025.
Subjects: 40 patients who underwent surgery with a histologically confirmed myxopapillary ependymoma.
Method: Clinical records, imaging and histology were reviewed. Factors assessed included extent of resection (of largest lesion in metastatic cases), perioperative complications, recurrence or progression, adjuvant therapy and McCormick disability grading.
Results: Gross total resection (GTR) was achieved in 36 patients (90%). None of our cohort had a deterioration in McCormick grading post-operatively; 27 (67.5%) remained stable and 13 (32.5%) improved. 4 patients demonstrated progression during follow-up, only one who had undergone a GTR of their primary lesion. GTR was found to be significant indicator of progression free survival(PFS) (χ^2 13.6, $p = 0.0002$) but not disability outcomes (χ^2 3.7, $p = 0.053$). 4 (10%) patients underwent radiotherapy to either locally recurrent or metastatic disease. Radiotherapy had no significant impact on either PFS or disability outcomes. 7 patients had metastatic disease at some stage during treatment (4 pre-operatively, 3 on post-op surveillance). Progression occurred in 42% (3/7) of patients with metastatic disease compared to 3% (1/33) of those without.
Conclusion: GTR remains the mainstay of treatment for myxopapillary ependymoma. Those who underwent a subtotal resection or had metastatic disease have a reduced progression free survival. Earlier intervention may reduce these risks and improve outcomes.
The WHO reclassification and increasing use of radiotherapy for piecemeal resected tumours brings in to question the conservative management and interval surveillance of small, incidentally discovered, histologically uncertain lumbar intradural tumours. Patients must at least be warned that conservative care might lead to spread of disease and more difficult treatment.

TM2-4

K-line guided approach selection and outcomes assessment for Cervical Ossification of Posterior Longitudinal Ligament (OPLL)

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TM2-5

Perioperative imaging in arachnoid web resection: cord signal change and clinical correlation in a single-centre series

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Objective: Arachnoid webs are rare intradural pathologies that cause focal cord compression and signal change. Surgical resection is standard, but the prognostic value of perioperative imaging features and whether cord signal change correlates with compression, syrinx formation, or neurological outcomes remains unclear.
Method: We retrospectively reviewed patients undergoing arachnoid web resection at a single centre (2023–2025). Data were extracted from operative notes, PACS, and EPIC records. Imaging parameters included level, cord signal change, compression, syrinx formation, and postoperative signal evolution. Clinical outcomes were assessed from documentation and compared with intraoperative and imaging findings.
Results: Six patients underwent preoperative MRI; one also had CT. Five webs were thoracic, one cervical. Cord signal change was present in all cases: two above, one at the level, and three below the web. Compression was mild in three, moderate in two, and absent in one. Two patients had syrinx and caudal cord expansion; one resolved postoperatively, the other persisted. Disc protrusion within two segments of the web was seen in three patients. Postoperative imaging (five cases) showed signal resolution in one, persistence in two, and worsening in one despite decompression. All webs were completely resected. Four patients improved neurologically; the two without improvement reflected persistent or worsened signal change.
Conclusion: In this small series, no consistent pattern linked cord signal change location or severity to postoperative outcomes. These findings challenge assumptions about prognostic value and highlight the need for larger multicentre studies to clarify whether imaging can guide surgical timing or predict recovery.

TM2-6

Freehand pedicle screw fixation in dorso-lumbar trauma: a prospective 480-patient study evaluating accuracy, safety, and clinical outcomes

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Objective: The study aims to evaluate the accuracy, efficacy, safety and reliability of the free hand technique of pedicle screw fixation for dorsolumbar spine in terms of immediate post operative radiology, pedicle breaches, implant readjustment i.e. fatigue/fracture, sagittal balance, local and regional khyphotic deformities and post operative clinical status which includes neurology, functional outcome wound status and CSF Leaks.
Design: Simple descriptive.
Subjects: Thoracolumbar fractures management with Pericles screws and rods.
Method: A prospective observational study was conducted on a total of500 patients who presented to the emergency department of Ayub Teaching Hospital Abbottabad, between January 2005- December 2020 with history of trauma to the back, diagnosed and confirmed on radiology (X-Ray and MRI T2W Axial sagittal cuts) to have dorsolumbar spine fractures causing cord compression qualifying for surgery were randomly allocated. Inclusion criteria encompassed those with history of trauma aged 18y-70y, with compromised neurology in terms of motor, sensory and reflex changes.
Results: A total of $n = 500$ subjects were enrolled 65% males, 35% females, with Trauma to the back diagnosed cases of dorsolumbar spine fractures qualifying for transpedicular fixation. Trauma to the back was reported to be the most common aetiology 55%, followed up by history of RTA 25%and alleged physical assault 5% with a median time of referral to the ED of 2–3hours. Dorso-lumbar junction was reportedly the most common effected zone (65%) followed up by lower dorsal (15%) and then lumbar spine (10%) Pre hospital care was inadequate in terms of application of dorsolumbar spine corset and immobilization of the effected patient was noted in only 20% of the cases. Tight adherence to the spine trauma protocols were found at the ED and the in-ward patient management scheme which improved outcome in 64% of patients with complication rate of 25% in terms of implant readjustment, removal, re-exploration of wounds for pedicle breaches and CSF leaks with an overall mortality rate of 5–10%.
Conclusion: The study concludes free hand technique of pedicle screw fixation to be accurate, cost effective and highly reliable in experienced hands. it is free of radiation risks that comes handy with image guided techniques and is generally less time consuming. It has been of paramount importance to the developing world where resources in general are in scarcity especially in the pace of geological catastrophes as was seen in the earthquake of 2005 when state wide economy was almost on the verge of collapse, and incorporating image guidance to such commonly performed procedures would result in a rather steeper fall of the already cracked economy. It is hereby strategized that the Technique on larger scale should be incorporated into the learning curriculum in the teaching hospitals both in the developed and developing worlds in the form of regular hands-on classes so as to minimize the reliance on the overuse of technology and indulges it with the technology for more complex cases.

TM2-7

Spinal surgery in nonagenarians: insights from a 10-year retrospective cohort study

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Objective: As life expectancy increases, more patients in the 90's (nonagenarians) are requiring spinal surgery. This population is at high risk, yet there is limited evidence to guide surgical decisions. We aimed to assess complications and outcomes in nonagenarians undergoing spinal surgery.
Design: A 10-year retrospective review of patients aged 90 and above who underwent spinal surgery at Leeds General Infirmary. This project has been approved as quality improvement initiative and cleared by the hospital's ethics department.
Subjects: Patients 90 years or older who had spinal surgery.
Method: Data were extracted from electronic records, including biodata, surgery indications, procedure type, ASA scores, and complications. Analysis was performed using IBM SPSS Statistics (Version 30.0).
Results: Forty-four spinal procedures were performed on 43 patients, with a mean age of 91 years. The majority were female (63%). Indications for surgery were trauma (18%), degenerative spinal disease (80%), and spinal tumour (2%). Most patients (84%) had an ASA score of 3. Elective surgery was performed in 72%, with 28% requiring acute operative care. Single-level procedures were more common (53%), while 47% had multilevel surgeries, including procedures for tandem spinal stenosis. The average hospital stay was 11.4 days. Complications occurred in 28% of cases, including chest infections, confusion, dural tears, sepsis, UTIs, and screw malposition. The 3-month mortality rate was 11.6%. Longer hospital stays were associated with higher mortality (OR $=1.11$, $p = 0.035$), and each additional surgical level increased mortality risk by 50% (HR $=1.50$, $p = 0.049$). Degenerative causes and elective admissions were independently associated with significantly lower mortality risk, with reductions of 79% and 67%, respectively, compared with traumatic aetiology and acute admissions.
Conclusion: Spinal surgery in carefully selected nonagenarians is associated with acceptable morbidity and mortality. Age alone should not be a contraindication for surgery in this patient cohort.

TM2-8

Endoscopic lumbar discectomy: early clinical outcomes and patient satisfaction- preliminary results from West of Scotland neurosurgical unit

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Objective: To evaluate early clinical outcomes of endoscopic lumbar discectomy for single-level lumbar disc herniation, using Oswestry Disability Index (ODI) and visual analogue scale (VAS) scores for leg and back pain. To assess patient satisfaction using the Modified MacNab scale at early follow-up. To determine early changes in opioid and neuropathic pain medication use following endoscopic discectomy.
Design: Prospective observational cohort study of patients who underwent single level interlaminar endoscopic lumbar discectomy in a UK tertiary neurosurgical centre.
Subjects: Patients who underwent single level interlaminar endoscopic lumbar discectomy for symptomatic lumbar disc herniation (L4/5 or L5/S1) and completed early follow-up with consent for data use ($n = 20$).
Method: Outcome measures were assessed at baseline, post-operative day 1, week 6, and week 12. Primary outcomes included Oswestry Disability Index (ODI) score, back pain and leg pain Visual Analogue Scale (VAS, 0–10) and patient satisfaction (Modified MacNab scale). Secondary outcomes were achievement of minimal clinically important difference (MCID: ODI $\geq$20-point reduction, VAS $\geq$2-point reduction) and medication discontinuation (opioid and/or neuropathic agents from baseline to week 6). Statistical analysis employed Wilcoxon Signed Rank tests (primary), paired *t*-tests and Spearman correlation. Effect sizes (Cohen's d) were calculated.
Results: ODI improved from pre-operative mean of 67.2 to week 6 mean of 32.0, with 85% achieving MCID ($\geq$20-point reduction). Leg pain VAS declined from baseline 8.2 to post-operative day 1 mean of 1.2 and week 6 mean of 1.9. Patient satisfaction was excellent-70% overall satisfaction with strong correlation between disability improvement and satisfaction, $p = 0.0002$. Medication discontinuation by week 6 was achieved in 44% of opioid analgesia users and 40% of neuropathic medication users.
Conclusion: These outcomes exceed published benchmarks of 55–85% for both endoscopic and microscopic discectomy, supporting endoscopic discectomy as efficacious, safe and minimally invasive for appropriately selected patients with single-level lumbar disc herniation.

TM2-9

Does duration of lumbar microdiscectomy operation affect postoperative outcomes?

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Objective: Lumbar microdiscectomy is a common surgical procedure for patients with symptomatic lumbar disc herniation. While multiple studies have examined the impact of preoperative factors such as the duration of symptoms before surgery on postoperative outcomes, little is known about whether the duration of surgery itself influences clinical and functional outcomes. This study aims to investigate whether the operative duration affects postoperative outcomes in patients undergoing lumbar microdiscectomy.
Method: A retrospective single-centre cohort study was conducted on 92 patients undergoing lumbar microdiscectomy. Patients were grouped by operative duration: $<$2 hours ($n = 56$), 2–3 hours ($n = 28$), and $>$3 hours ($n = 8$). Postoperative outcomes assessed included length of hospital stay, complications, infections, reoperations, and clinical recovery. Statistical significance was set at $p < 0.05$.
Results: There were no statistically significant differences across groups in hospital stay ($p = 0.615$), complications or infections ($p = 0.389$), reoperation rates ($p = 0.259$), or recovery outcomes ($p = 0.165$). The mean hospital stay was longest in the $>$3-hour group (10.2 ± 23.3 days), compared with 3.36 ± 6.10 days in the 2–3-hour group and 3.18 ± 6.47 days in the $<$2-hour group; however, these differences were not statistically significant. Recovery outcomes showed a trend toward higher rates of good recovery in the $>$3-hour group (62.5% vs 50% and 37.5% in the 2–3-hour and $<$2-hour groups, respectively), although this did not reach statistical significance.
Conclusion: Operative duration was not significantly associated with postoperative outcomes, suggesting it is not a major determinant of recovery. Although not statistically significant, the longer hospital stay in the $>$3-hour group may still be clinically relevant, suggesting the need for greater postoperative care, hospital resources, and healthcare costs. Larger multicentre studies with standardised outcome measures are needed to validate these results.

PARALLEL LECTURE THEATRE
TP1 – GLOBAL

TP1-1

The global epidemiology and outcomes after traumatic brain injury (GEO-TBI) registry: a TBI audit and research platform – status update and ongoing research

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Objective: The epidemiology of traumatic brain injury (TBI) is unclear, treatments vary, and outcomes differ significantly between hospitals. The Global Epidemiology and Outcomes after Traumatic Brain Injury (GEO-TBI) registry was established in 2022 to produce an accurate picture of the burden of TBI as well as intervention outcomes. Benchmarking against a global standard, demonstrating best practices and facilitating evidence-based prioritisation of TBI in decision-making are the main goals of the registry.
Method: GEO-TBI is a readily accessible, standardised platform for TBI data collection, audit and collaborative research, which was constructed via a consensus-based process. GEO-TBI: Incidence, the first study run on the platform has recently concluded.
Results: The registry has been active for two years and currently includes the 2606 patients with TBI from 27 centres situated in Africa, Asia, Americas and Europe. Patients from low-to-middle income countries were younger than those from higher income countries, and differences in TBI mechanisms were evident. Participant site profiles differed notably.
Conclusion: We will present the second-year report of the GEO-TBI dataset, with epidemiological and outcome data from different healthcare settings. Core data analyses began in September 2025, with publication planned at the end of 2025. Further information is available on https://geotbi.org.

TP1-2

Risk factors for prolonged hospital stay in patients with head trauma: a single center study in a low-middle income

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Objective: Traumatic brain injury (TBI) poses a significant global health concern, particularly in low- and middle-income countries (LMICs), where prompt and specialized care is often constrained. Prolonged hospital length of stay (HLOS) among TBI patients can further strain already overburdened healthcare systems. This study aims to identify clinical predictors of prolonged hospitalization in patients with head trauma at a tertiary care center in Pakistan, addressing a critical gap in health care delivery, thereby informing strategies to optimize care and resource allocation.
Design: A prospective, cross-sectional study.
Subjects: The study was conducted at the neurotrauma unit of a tertiary care hospital from June to November 2024, where data from 216 adult patients admitted with TBI were collected via clinician-reported questionnaires.
Method: Prolonged HLOS was defined as hospitalization exceeding 10 days. Statistical analysis included independent *t*-tests, chi-square tests, and binomial logistic regression to identify independent predictors of extended stay.
Results: Prolonged HLOS was substantially associated with lower Glasgow Coma Scale (GCS) scores at admission (median: 7 vs. 10, $p < 0.001$), early intubation ($p = 0.001$), and ventilator support ($p < 0.001$). Logistic regression revealed that each additional day of ventilator support increased the odds of prolonged stay (OR: 1.328, 95% CI: 1.151–1.532, $p < 0.001$), while intubation independently predicted extended hospitalisation (OR: 3.138, 95% CI: 1.148–8.578, $p = 0.026$). Age, GCS, blood pressure, and associated extracranial injuries were not significant predictors in the adjusted model.
Conclusion: In LMIC settings, ventilator support duration and early intubation significantly influence predictors of prolonged HLOS among TBI patients. Early identification of high-risk individuals and implementing strategic respiratory interventions may reduce hospital stays and optimize resource utilization.

TP1-3

Coagulopathy in moderate and severe traumatic brain injury; a prospective study in a trauma centre of a developing country

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Objective: To determine the incidence and the effect of coagulopathy on outcome of moderate to severe traumatic brain injury.
Design: Prospective study.
Subjects: Patients with isolated moderate and severe traumatic brain injury.
Method: All consecutive patients with isolated moderate and severe traumatic brain injury admitted to the trauma centre over a period of 12 months(January 2020-January 2021) were recruited into the study. The patients were categorised into moderate and severe traumatic brain injury subgroup using the Glasgow coma score. The patients' coagulation profile (PT,APTT,fibrinogen and D-dimer) in each subgroup were done on the day of admission and on day three. Serum fibrinogen level was also done to determine the consumption of clotting factors and d-dimer level was done to determine ongoing fibrinolysis. Coagulopathy

was defined as prothrombin time(PT) or/and activated partial thromboplastin time (APTT) more than 1.5 times the normal control.
All patients were managed according to the institution protocol for managing traumatic brain injured patients and they were followed up for 30 days. Early Glasgow outcome score was recorded at day 30. Data collected were analysed using SPSS (R) VERSION 22 statistical software and the results were presented.
Results: A total of ninety five patients were enrolled in the study. The mean age was 28+/- 14 years. Coagulopathy was present in 63 patients with an overall incidence of 66.3%. This was also found to be significantly higher in the severe traumatic brain injury subgroup 28(80%).($p = 0.03$). Coagulopathy was also found to be significantly associated with unfavourable outcome (Glasgow outcome score of 1–3 at 30days) $p = 0.01$.
Conclusion: The study has shown a high incidence of coagulopathy in patients with traumatic brain injury and this has been found to be associated with unfavourable outcome.

TP1-4

Non-operative neurosurgical ICU admissions in geriatrics: an observational study of patterns, indications, and outcomes

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Objective: To report the first regional data on the patterns, indications, and outcomes of non-operative neurosurgical ICU admissions in geriatrics, to support more efficient, evidence-based resource use.
Design: Retrospective Cohort Study.
Subjects: Geriatric neurosurgical patients admitted to the ICU in Khoula Hospital, Muscat, Oman.
Method: A retrospective study was conducted on all non-operative neurosurgical ICU admissions in patients aged ≥65 years at Khoula Hospital between January 2017 and December 2024. Patients included emergency admissions, in-hospital deteriorations, and inter-hospital transfers. Collected variables included demographics, diagnosis, comorbidities, Glasgow Coma Scale (GCS), Eastern Cooperative Oncology Group performance status (ECOG), complications, and mortality. Analyses were performed using R Studio. Chi-square, Kruskal-Wallis, and Mann-Whitney U tests were used to assess categorical and continuous variables. Survival was examined using Kaplan-Meier analysis.
Results: A total of 116 patients were included; 23 (19.8%) were admitted from home, and 93 (80.2%) were hospital transfers. The most common indications for ICU admission were airway protection and hemodynamic instability. Baseline admission severity, including GCS, ECOG, and frailty, was comparable between groups. Overall ICU mortality was high (41.4%), with no significant difference between the two groups ($p = 0.819$). Kaplan-Meier curves demonstrated marked early mortality.
Conclusion: Non-operative neurosurgical ICU admissions in elderly patients exhibit high early mortality, underscoring the need for careful triage and more efficient ICU resource allocation.

TP1-5

Clinical and neurological determinants of ICU mortality in elderly neurosurgical patients: a retrospective study

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Objective: The main objective of this study is to examine demographic and clinical predictors of ICU mortality among elderly neurosurgical patients admitted to a neurocritical care unit.
Design: Retrospective study.
Subjects: Geriatric neurosurgical patients admitted to the ICU in Khoula Hospital, Muscat, Oman.
Method: A retrospective analysis was conducted on 116 geriatric neurosurgical patients (≥65 years) admitted to the ICU, Khoula Hospital, Muscat, Oman. Variables analyzed included age, sex, diagnosis, reason for ICU admission, Glasgow Coma Scale (GCS) at admission, neurological deficits, pupillary response, Clinical Frailty Scale (CFS), and pharmacologic interventions. Bivariate and multivariate logistic regression analyses were performed to identify independent predictors of ICU mortality.
Results: The cohort had a mean age of 76.28.2 years, with 59.5% male patients. ICU mortality was observed in 41.38% of cases. In multivariate analysis, impaired pupillary response (OR =0.609, $p = 0.041$), higher frailty scores (CFS) (OR =0.277, $p = 0.012$), and the clinical reason for ICU admission (OR=-0.180, $p = 0.049$) were significant predictors of ICU mortality. GCS at admission did not retain significance after adjustment ($p = 0.624$).
Conclusion: Among geriatric neurosurgical patients, frailty, pupillary reactivity, and the reason for ICU admission independently predicted ICU mortality. These findings highlight the importance of neurologic assessment.

TP1-6

Impact of hurricane Melissa on neurosurgery care in Jamaica: implications for disaster preparedness

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Background: Natural disasters, including hurricanes, are becoming increasingly severe as a result of climate change, and can have a devastating impact on healthcare systems. In October 2025, a category five hurricane struck Jamaica and caused extensive damage throughout the island, including to many of its hospitals. This study reports on the nationwide impact of the hurricane on the healthcare system, to reflect on the lessons learned and to support future disaster preparedness.
Methods: A multi-centre, prospective case series including all acute neurosurgical units across Jamaica. The study includes all patients whose neurosurgical care was impacted by the hurricane over a period of 2 weeks either side of the event. A questionnaire was distributed to clinicians delivering acute neurosurgical care to assess the impacts of the hurricane on their clinical practice.
Results: Twenty-one patients across Jamaica received neurosurgical care which was impacted by the hurricane, of which eight required surgical intervention. This included a variety of traumatic injuries, most commonly caused by tree-falling-on-head (TFOH) injuries. Delayed presentations were common, and non-traumatic conditions and elective operations were affected. Logistical and operational issues relating to the hurricane could be divided into: infrastructure, equipment, staff, communication, capacity, transport, and education.
Conclusions: This study highlights the clinical and logistical difficulties that could be expected for a neurosurgical unit affected by a hurricane. Disaster preparedness should include the stockpiling of essential equipment, stable long-range communication with rescue teams, and preparation to receive complex cranial and spinal trauma immediately after the event.

TP1-7

Establishment of National Brain Tumour Centre in Nepal: building a comprehensive brain tumour registry and care network

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Objective: To describe the establishment of the National Brain Tumour Centre (NBTC) in Nepal and evaluate its early role in developing a national brain tumour registry, strengthening data collection, improving care, and advancing brain tumour research.
Design: Multi-centre, prospective descriptive analytical study.
Subjects: All brain tumour patients (primary and secondary) treated at eight neurosurgical centres across Nepal between June 2023 and June 2025.
Method: The NBTC established a standardized national brain tumour registry using a web-based data portal and remote server uploads. Tumours were classified according to the WHO 2021 Classification of Central Nervous System Tumours. Multiple tertiary hospitals across Nepal participated in data submission. Demographic data, geographical distribution, clinical presentation, histopathology, and treatment details were prospectively collected and centrally analysed.
Results: A total of 1,791 brain tumour cases were registered during the study period, with an estimated national annual incidence of 2,500–2,600 cases. The calculated incidence ranged from 11.4% to 11.8% per 100,000 population with nearly equal distribution among males and females. Gliomas(39%) and meningiomas(29%) were the most common histopathological diagnoses. High-grade gliomas accounted 56%, while Low-grade gliomas comprised 44%. The mean age of presentation was 46 years. Data demonstrated a wide age distribution, and significant delays in presentation, highlighting gaps in early diagnosis and access to advanced treatment. Data revealed the occurrence of brain tumours more in the central region of Nepal (36.3%). National data were formally released and made public on World Brain Tumour Day, 8 June 2025.
Conclusion: The National Brain Tumour Centre represents the first coordinated national effort to systematically collect brain tumour data and improve brain tumour care in Nepal. Establishing a centralized registry is feasible in an LMIC setting and provides critical evidence for policy development, resource allocation, research, and future expansion of specialized neuro-oncology services.

TP2- CSF AND PAEDIATRICS

TP2-1

Can common household devices alter the settings of programmable shunt valves?

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Objective: Various household devices contain magnets or emit electromagnetic fields and it is hypothesised that the strength of these magnets may be enough to affect the settings on programmable cerebrospinal fluid shunt valves. The aim of this study is to identify changes to the valve settings of seven commonly used

programmable valves, when they are near common household devices generating a magnetic field.
Method: Several commonly encountered household devices were used, with and without rotational movement, with reference to seven commonly used programmable valves (the Codman Certas and Hakim, Sophysa SPV and SM8, Medtronic Strata II Regular and Small, and the Miethke M.Blue Plus). The valve settings were checked before and after the interference with the household device, by using either the manufacturers tool kit for reading the settings or x-rays.
Results: We demonstrated that the only valve which was not affected by any of the household devices, regardless of the distance or rotational movement, was the Miethke M. Blue Plus. In addition, the programmable shunts were more likely to experience change to their settings with rotational movement as opposed to no movement, and the two devices most likely to induce this change were a smart watch and kids toy magnets.
Conclusion: Everyday household devices have the potential to affect the settings on programmable shunts, leading to concerns around the maintenance of shunt settings both in and out of hospital due to household and healthcare electromagnetic fields. Surgeons, and other healthcare professionals involved in the care of those with programmable CSF shunts, should be aware of the potential risks and utilise this information when making clinical decisions and advising patients.

TP2-2

Efficacy of the Ventrifix device as a method of securing external ventricular drains

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Objective: External ventricular drain (EVD) insertion is a common and critical neurosurgical procedure used to treat a variety of acute neurosurgical pathologies. Various methods of securing the EVD catheter to the scalp are available and the method chosen may have a direct impact on post-operative complications associated with EVDs. At our institution the typical method of securing EVDs is by use of simple silk sutures. Ventrifix is an adjunct that can be used to help secure the EVD catheter to the scalp however there is no data showing how it compares to the traditional method of securing EVDs in human subjects.
Design: Retrospective study at a single neurosurgical centre.
Subjects: Adult and paediatric patients who underwent insertion of an EVD between March 2018 and December 2019.
Method: Operative and medical records were analysed to compare the rate of post-operative complications for EVDs secured using simple sutures and Ventrifix.
Results: 294 EVDs were included in the final analysis. 166/294 patients (56.5%) had the EVD catheter secured with simple silk sutures whilst 128/294 patients (43.5%) had the EVD catheter secured using Ventrifix. 15/166 (9.0%) EVDs migrated in the simple sutures cohort versus 4/128 (3.1%) EVDs migrating in the Ventrifix cohort ($p < 0.05$). Similarly, 5/166 (3.0%) EVDs became disconnected from the drainage set in the simple sutures cohort whilst no EVDs became disconnected in the Ventrifix cohort ($p < 0.05$). There was no significant difference in the rates of CSF leak, blockage, access complications or EVD-related infection between the two groups.
Conclusion: When compared to securing EVDs using the simple silk sutures method, the Ventrifix device significantly reduced rates of post-operative EVD migration and disconnection whilst showing no significant difference in other measured post-operative complications. This data suggests that the Ventrifix device is a suitable alternative when securing EVDs.

TP2-3

Use of GLP-1 receptor agonists in idiopathic intracranial hypertension: a systematic review and meta-analysis

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Objective: Idiopathic intracranial hypertension (IIH) is a neurological disorder characterised by raised intracranial pressure (ICP), headaches, visual disturbances, and papilloedema. Obesity represents the most significant risk factor for IIH. Glucagon-like peptide-1 receptor agonists (GLP-1 RAs), established treatments for obesity, may represent a potential treatment option for IIH.
Design: A PRIMSA-compliant systematic review and meta-analysis was conducted (PROSPERO CRD420251065225).
Method: MEDLINE, EMBASE, and Cochrane database were searched between inception and September 2025. Clinical studies of patients $\geq$16 years with IIH and GLP-1 RAs and a dual glucose-dependent insulinotropic polypeptide (GIP)/GLP-1 RA (Tirzepatide) were included. Data was extracted independently by 2 authors. The primary outcomes were headache, papilloedema, visual changes and ICP. Meta-analysis was done using the DerSimonian-Laird random effects model.

Results: We included eight studies (14,807 patients) comprising two clinical trials and six observational studies. GLP1-RAs and Tirzepatide consistently reported an improvement in headache outcomes, papilloedema and reduced risk of visual disturbance, deficit and blindness at follow-up. One RCT noted a decrease in ICP (-3.4 ± 3.5 mmHg, $p = 0.042$) with GLP-1RA at up to 24 hours after administration. Weight and BMI were significantly reduced in all studies, typically at 6 months. Adverse effects were commonly mild gastrointestinal symptoms. Studies varied in the GLP-1 RAs used, with most studies derived from the same patient data registry (TriNetX). On pooled analysis, GLP1-RAs were associated with a reduced risk of papilloedema (RR 0.25, 95% CI 0.15–0.45, $p < 0.001$) and visual disturbance/blindness (RR 0.41, 95% CI 0.18–0.92, $p = 0.031$), but not headaches (RR 0.60, 95% CI 0.34–1.05, $p = 0.075$).
Conclusion: GLP-1 RAs and Tirzepatide for IIH reduce headache frequency, visual symptoms, and papilloedema. GLP-1 RAs are an effective and safe treatment option in IIH. Larger population RCTs, assessing individual GLP-1 RAs and their long-term effects, are needed to define best treatment paradigms.

TP2-4

Headache and non-hydrocephalus symptomatic pineal cysts: a retrospective observational study

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Objective: This study aims to investigate the associations between pineal cyst (PC) size, their magnetic resonance imaging (MRI) features, and headache presentation.
Design: Retrospective observational study.
Subjects: Patients with PC were identified from MRI reports performed between 2011 and 2020 at the Institute of Neurological Sciences, Glasgow, a large tertiary neurosurgical centre serving the West of Scotland. Clinical follow-ups were up to December 2024.
Method: Demographic data, clinical presentations, and diagnoses were extracted from electronic clinical records. MRI reports were reviewed to document cyst characteristics, including size at diagnosis, atypical features (multiloculation / internal septation, rim enhancement, and calcification), and evidence of local mass effect (tectal plate indentation, cerebral aqueduct narrowing, and hydrocephalus). Univariate logistic regression analyses were performed to assess whether headache was associated with local mass effect on MRI and whether local mass effect was associated with a diagnosis of migraine.
Results: A total of 598 patients were included in the analysis, with a median cyst size at diagnosis of 11.0 mm. Headache was the most common indication for MRI referral, reported in 35.1% of patients. Among those presenting with headache, 28.1% (59/210) described severe, life-disturbing symptoms requiring referral to a headache specialist, corresponding to 9.9% (59/598) of the overall cohort. Of these patients, 52.5% (31/59) were diagnosed with migraine by a neurologist. Larger pineal cyst size was significantly associated with headache presentation, tectal plate mass effect ($\beta = 4.77$, $p < 0.001$), and atypical MRI features. Logistic regression analysis demonstrated a statistically significant association between tectal mass effect and migraine diagnosis ($p = 0.006$).
Conclusion: In patients with non-hydrocephalus symptomatic pineal cysts (nhSPCs), larger cyst size (>10 mm) was strongly associated with headache and migraine diagnosis. However, the observational nature of this study limits casual inference. Routine MRI surveillance appeared to have limited role in nhSPCs.

TP2-5

The natural history of pineal cysts in paediatrics: a population-based retrospective study

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Objective: This study aims to characterise the natural history of pineal cyst in the paediatric population managed at a tertiary paediatric neurosurgical centre over a 10-year period.
Design: Retrospective observational study.
Subjects: Paediatric patients (<18 years at diagnosis) with pineal cysts identified from magnetic resonance imaging (MRI) reports between 2011 and 2020, with follow-ups up to June 2025.
Method: Demographic and clinical variables, including age, sex, presenting symptoms were collected from clinical records. MRI reports were reviewed for cyst features at diagnosis and during follow-up, including cyst size (mm), presence of atypical features (rim enhancement, calcification, septation/multiloculations), and evidence of local or global mass effect (tectalplate indentation, cerebral aqueduct narrowing, or hydrocephalus).
Results: A total of 296 patients were identified, with a median age 8 years old (IQR 4–12). 32.1% ($n = 95$) underwent MRI follow-up(s). The median cyst size at diagnosis was 8 mm (IQR 5–10) increasing slightly to 9mm (IQR 7–11) at last follow-up, with a median follow-up duration 36.5 months (IQR 13–65.8). However, tectal indentation was observed in 8.4% ($n = 25$), aqueductalnarrowing in 1.0% ($n = 3$), and hydrocephalus in two patients (0.007%), both of whom required endoscopic third ventriculostomy (ETV). Biopsy in one case confirmed diagnosis of germinoma. The second patient, who underwent ETV and cyst fenestration, experienced remission of symptoms (headache and hydrocephalus),

and 5-year MRI follow-up showed no recurrence of the cyst.
Conclusion: Pineal cysts in the paediatric population show a benign and stable natural history. In this large population-based cohort most cysts remained small with minimal growth and did not progress to clinically significant mass effect. Radiological features such as tectal indentation, aqueductal narrowing and hydrocephalus were rare and few patients required surgery. These findings support conservative management for most children and suggest that unnecessary imaging and intervention can be avoided with appropriate clinical assessment.

TP2-5

Pineal cysts: Stable, silent, and over-investigated

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Objective: Pineal cysts are commonly identified on MRI and may present with hydrocephalus or non-specific symptoms such as headaches, fatigue, or dizziness, although many are found incidentally. While most are benign and stable, the current approach is to perform follow-up MRI at 12–24 months and assess tumour markers. However, such surveillance may contribute to unnecessary healthcare resource utilisation and patient anxiety, and evidence supporting this approach is limited. The role of interval imaging in detecting clinically meaningful growth in pineal cysts without neurological signs remains unclear. This study aims to assess whether routine surveillance adds value to the management of incidental pineal cysts.
Design: We retrospectively reviewed MRI scans from 166 patients in whom a cyst was first identified between 2002 and 2025. Most patients underwent follow-up imaging more than one year later.
Subjects: The cohort includes 91 females and 75 males, aged 0–24 years (mean 10 years).
Results: Presenting symptoms included headaches (71 patients), developmental delay (11), visual disturbances (6), and fatigue (4), while 37 cysts were incidental findings. Of the 126 patients with follow-up MRI beyond one year, 122 showed no change in cyst size and 4 showed a reduction; no patient demonstrated interval growth. Sixty-one patients had tumour markers tested, all of which were normal.
Conclusion: These findings indicate that, for patients without hydrocephalus or neurological signs, routine MRI surveillance and tumour markers do not offer added clinical benefit. A less intensive follow-up strategy for incidentally discovered cysts may reduce healthcare burden and patient anxiety without compromising care.

TP2-7

Endocrine complications after laser interstitial thermal therapy for hypothalamic haematomas

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Objective: Hypothalamic haematomas (HH) cause medically refractory gelastic seizures and progressive neurocognitive decline, and are treated with MRI-guided laser interstitial thermal therapy (LITT). LITT offers superior seizure control and lower morbidity than open surgery. This study aimed to quantify the relationship between ablation extent, anatomical distribution, and postoperative endocrine dysfunction.
Design: Single-centre retrospective cohort study.
Subjects: 32 patients (median age 5.6 years; 63% male) at Great Ormond Street Hospital between 2019 and 2024.
Method: Pre- and postoperative ($\leq$24 h) 3D T1-weighted MRI were rigidly co-registered and mapped to the Billot hypothalamic atlas to quantify global and subregional overlap within tubular (feeding circuits) and paraventricular (neuroendocrine control) divisions. Primary endpoints were postoperative endocrine disturbances: weight gain (BMI *z*-score increase $\geq$0.67), hyperphagia, and central hypothyroidism. Multivariable regressions adjusted for ablation volume, baseline BMI, age, and HH type, with Firth penalisation for low event rates; sensitivity analyses excluded repeat procedures, small hypothalami, and cases without measurable overlap.
Results: No patient developed persistent endocrine dysfunction, though transient disturbances were common (weight gain 50%, hyperphagia 45%, hypothyroidism 16%, hyperthermia 3%, adrenal suppression 3%; diabetes insipidus 0%). Across all global and subregional models, hypothalamic overlap showed no significant association with any endocrine outcome. Ablation volume correlated with HH size but not with postoperative dysfunction. All complications resolved within 12 months.
Conclusion: These findings suggest LITT achieves effective disconnection while preserving sufficient hypothalamic integrity to maintain neuroendocrine stability, contrasting with the high permanent morbidity of open surgery. Nevertheless, limited statistical power and atlas-resolution constraints mean subtle dose-response effects cannot be excluded. Larger multicentre studies with nucleus-level segmentation and extended follow-up are required to define safe ablation thresholds and optimise hypothalamus-sparing surgical planning.

PT2-8

Long term multidimensional outcomes following selective dorsal rhizotomy in children with cerebral palsy: a single-centre prospective study

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Objective: To investigate the long-term effects of selective dorsal rhizotomy (SDR).
Design: Prospective, single-centre cohort study (2012–2025).
Subjects: All children aged 3–18 years with bilateral cerebral palsy with spasticity undergoing SDR at a tertiary paediatric neurosurgery centre.
Method: Objective (GMFM-66, TUG, 6MWT, PEDI Self-care and Mobility, FMS, Gillette FAQ, SPCM and ABILHAND) and subjective (Pain, CPQoL, CPCHILD, CCHQ) outcomes were collected at 12 months, 2 years, 5 years and 10 years after SDR. A linear mixed effects model was used to assess longitudinal changes. Improvement was defined as positive individual-level change from baseline; MCID thresholds applied where available.
Results: 151 children had follow-up data at 24 months available (mean age 7.0 years, 62% male), 64 at 5 years and 7 at 10 years. Compared to baseline, at 24 months, SDR produced significant improvements in mean gross motor outcomes, including GMFM-66 (+4.3 units exceeding MCID thresholds of 0.8–1.3 units, $p < 0.001$; 120/151, 79.5% of patients demonstrated improvement). Mean mobility outcomes also improved in TUG (–10.1 s, $p < 0.001$; 73/83, 88.0% improved), 6MWT (+55.3 m, exceeding MCID threshold of 6–23 m, $p < 0.001$; 81/106, 76.4% improved), Gillette FAQ (+0.4 units, $p = 0.013$; 78/146, 53.4% improved) and FMS across distances (+0.45 points, $p < 0.001$; 46/144, 31.9% improved). Mean functional independence increased, demonstrated by improvements in PEDI Self-Care (+7.0 points, $p < 0.001$; 92/118, 78.0% improved), PEDI Mobility (+4.2 points, $p < 0.001$; 72/119, 60.5% improved). Mean caregiver-related outcomes also improved, including CPCHILD (+8.8 units, $p < 0.001$; 35/44, 80.0% improved) and CCHQ (–0.3 units, $p < 0.001$; 87/133, 65.4% improved). All remaining outcomes showed no significant change at 24 months. Of the 13 outcome variables assessed, 6 demonstrated sustained significant improvement at 5 years ($p < 0.05$).
Conclusion: SDR may lead to improvements in gross motor performance, quality of life, and overall functional outcomes at 24 months. Future multi-centre, prospective registries are required to investigate the effect and safety of SDR.

TP2-9

Pattern of paediatric neurosurgery in Zaria: a 5 year retrospective study

F. Labo

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Objective: To determine the pattern, distribution, and frequency of paediatric neurosurgical procedures performed at ABUTH Zaria between March 2019 and April 2025.
Method: The clinical records (case notes and operation registers) of all the patients aged 18 years and below, who had neurosurgical procedures in ABUTH Zaria between March 1st, 2019, and April 30th, 2025, were reviewed,variables including age, sex, diagnosis and type of surgery performed were collected The data were entered into SPSS version 29 and analyzed.
Results: A total of 275 patients had surgery during the study period, about 2/3 (65%) were under-fives ($n = 178$), while about 6.6% (18) were neonates. The most performed surgery was VP-shunt insertion, accounting for 38.2% (105), followed by Craniotomy for trauma (57, 20.7%) and Excision of Myelomeningocele/Encephalocele (53, 19.3%). The most common procedures in the Neonatal patients wereMyelomeningocele Excision (55.6%) and VP-shunt Insertion (33.3%). While VP-shunt insertion was most common among under-fives, craniotomy for trauma was most common among school-age children (39.3%) and adolescents (48%).
Conclusion: Surgery for congenital anomalies was more common in the neonatal age group and among under-fives, while acquired conditions like infection, trauma, and tumors were more common among school-age and adolescents, indicating an expected demographic dichotomy in the pattern of patient presentation in our environment. The low number of patients in our series over a 5-year period indicates the need to improve pediatric care by ensuring adequate referral and health insurance coverage for this vulnerable population.

TP2-10

Guidelines for the referral of Children and Young People (CYP) for consideration of Neurosurgical Interventions in the Management of Posture and Tone (NIMPTs) – a UK wide consensus report

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Objective: Guidance is currently lacking in the UK regarding which children and young people (CYP) should be referred for consideration for Neurosurgical interventions in the management of posture and tone (NIMPTs). We aimed to establish a consensus amongst centres providing these interventions (namely Intrathecal baclofen (ITB), Deep Brain Stimulation (DBS)

and Selective Dorsal Rhizotomy (SDR)) as to which CYP should be referred for consideration of these interventions.
Method: Centres in the UK offering NIMPTs were identified through the BPNA and contacted. Suggestions for referral criteria were requested from staff with experience in the assessment/delivery of NIMPTs. These suggestions formed the basis of a delphi process. Following the first round of this delphi process, criteria not meeting a threshold of 75% agreement were modified based on comments received and sent out for a second round. Purposeful sampling was used at all times, ensuring representative sampling in terms of centre geography, professional group and experience with each NIMPT.
Results: A total of 36 professionals from 14 centres provided 402 suggestions for referral criteria. These formed the basis of 34 statements for the delphi process (15 general suggestions, 8 relating to DBS, 8 to ITB and 3 to SDR). The first round of the delphi received 50 responses, with 24 statements reaching the threshold for approval. A total of 42 responses were received in the second round of the delphi process, with agreement reached on a further 10 statements.
Conclusion: We present the first national guidance for referral of CYP for consideration of NIMPTs, generated through a transparent representative consensus process. These recommendations are intended to encourage the referral of CYP for these procedures. Future work is required to disseminate these recommendations and ensure an equity of access to NIMPTs for CYP across the UK.

TP2-11

Development of a paediatric neurosurgery transition service: early insights

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Objective: Transitioning care from paediatric to adult neurosurgical services is a crucial process which poses risks of patient and parental anxiety and loss to follow up. In Nottingham, we have created a Neurosurgical Transition Clinic to ensure continuity of care and ease the transition for patients in accordance with NICE guidance, and hope our experience can help other teams looking to set up their own service.
Method: We currently facilitate the service via a telephone clinic, using the national 'Ready, Steady, Go' framework as a prompt. The focus is on encouraging patient autonomy, ensure understanding of their diagnosis, the setup of adult care, providing safety net advice and encourage questions. Contact information is updated for the patients and details of adult service specialist nurses and consultant secretaries are provided to the patient. Discussions about next stages of life outside of the hospital also occur such as going to university, travelling and careers. It also aims to ensure parents are supported through the transition process. Currently neuro-oncology and epilepsy patients, are not included as they have a separate transition pathway.
Results: The feedback collected during the clinics has identified themes for focus and improvement. Patients are keen for their contact details to be changed. Teenage patients have educational commitments in the daytime so transition services should consider this. Formalised transition questionnaires should be adapted to the patients' individual needs. A source of parental anxiety is the sleeping arrangements on adult wards.
Conclusion: We aim to collect feedback with a QR code on patient letters. We aim to ensure engagement and allow development catered to patient needs through evening clinics avoiding educational disruption, tours of the adult department and developing diagnosis specific paperwork.

FRIDAY 17TH APRIL
MAIN LECTURE THEATRE
FM1 – ONCOLOGY GLIOMA

FM1-1

Predicting sites of tumour progression in the invasive margin of glioblastomas (PRaM-GBM study): a multicentre imaging study

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Objective: Despite advances in surgery and radiotherapy, glioblastoma patients often experience progression within a year, adjacent to the resection cavity. Conventional imaging techniques are not sensitive enough to detect invasive tumour, leaving occult tumour undetected. We have developed a diffusion tissue signature technique using diffusion tensor MRI (DTI) that can locate occult tumour and predict their pattern of progression. This multicentre study aims to qualify DTI as a biomarker for tumour progression to improve surgical and radiotherapy treatment volumes.
Design: A prospective, pragmatic multicentre imaging biomarker qualification study.
Subjects: Patients with imaging findings of glioblastoma for whom the operating surgeon thought they could resect >90%, and that the patient would be suitable for chemoradiotherapy.
Method: Patients were imaged preoperatively and at progression using diffusion tensor imaging (DTI). The DTI was processed to generate anisotropic diffusion tissue maps (DTI-q). Both sets of images were coregistered, and each pre-operative voxel was classified based on the imaging at progression on a voxel-by-voxel basis. Voxels were classified as true positives, true negatives, false positives, and false negatives. This

allowed calculation of the sensitivity and specificity for each patient. These were combined, and confidence intervals were calculated based on 1000 bootstrap samples.
Results: In total, 139 patients were recruited from 5 neurosurgical units. 54 patients had to be withdrawn (the commonest reason was that patients did not go on to receive chemoradiotherapy), leaving 85 evaluable patients. 82% of patients underwent complete resection of the enhancing tumour. Overall, the sensitivity of DTI-q to predict sites of tumour progression was 78.7% (95% CI: 77.7–90.1%), and the specificity was 93% (92.5–94.2%).
Conclusion: This study has shown that diffusion tissue signatures can identify sites of tumour progression with high sensitivity and specificity. Future studies to change the resection and the radiotherapy treatment volumes are underway. This may allow us to personalise treatment volumes for glioblastomas.

FM1-2

Preoperative cognitive phenotypes predict survival benefit of surgical resection in glioblastoma

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Objective: Glioblastoma patients frequently suffer from cognitive deficits. Gross-total resection (GTR) is associated with improved survival. It is unclear whether preoperative cognition influences survival and surgery. We hypothesised that patients with better cognition derive greater survival benefit from aggressive surgical resections.
Design: Single-centre prospective study.
Subjects: 50 patients (42 resection patients) receiving surgery with a pathological diagnosis of IDH-wildtype glioblastoma at Cambridge University Hospitals.
Method: Patients underwent preoperative testing with OCS-Bridge, a neuropsychological screening tool. Domains tested included attention, executive function, visuospatial function and memory.
Principal component analysis (PCA) and Gaussian mixture modelling (GMM) were used to cluster patients into phenotypes with shared deficits in latent cognitive dimensions. Survival analysis was performed to assess the relationship between cognitive phenotypes, progression-free-survival and overall survival for resection patients who completed Stupp chemoradiotherapy ($n = 25$).
Results: PCA identified three main dimensions: 1. visuospatial memory, 2. verbal working memory and 3. executive function.: GMM identified two distinct preoperative phenotypes: 1. Preserved cognition ($n = 17$), 2. Impaired cognition ($n = 8$).
In patients with preserved cognition, GTR was associated with improved PFS compared to subtotal resection (STR) (Median PFS 12.4 [95% CI: 10.0 -] versus 6.9 months [2.7 -], $p = 0.01$). Patients with Impaired cognition ($n = 8$) did not have a survival advantage with GTR compared to STR (Median PFS: 18.8 [13.1 -] versus 4.2 [4.2 -], $p = 0.3$). OS was not significantly different for GTR patients, compared to STR patients with preserved (median OS 22.8 [17.9 -] versus 11.6 months [9.6 -] $p = 0.07$) or impaired cognition (median OS 31.3 [19.6 -] versus 15.3 [9.8 -] months $p = 0.3$).
Conclusion: We present a novel data-driven method for risk-stratifying patients prior to surgery to determine who will benefit most from aggressive surgical resections. Patients with better (preserved) cognition experience an improved survival benefit after aggressive surgical resections.

FM1-3

How does revised 2021 WHO classification of CNS tumours influences management of high-grade glioblastomas in NHS Grampian?

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Objective: This audit evaluated the impact of the 2021 WHO CNS tumour classification (CNS5) on diagnosis, histological–molecular integration, treatment, and outcomes of high-grade glioblastoma in NHS Grampian. It assessed molecular testing (IDH, MGMT, TERT, EGFR, +7/−10), tumour reclassification, MDT-guided treatment decisions, and effects on overall survival (OS) and progression-free survival (PFS).
Design: A retrospective clinical audit comparing diagnostic, treatment, and outcome data for glioblastoma patients before and after CNS5 implementation.
Subjects: Cases from three years pre- (2018–2020) and post-CNS5 (2022–2024) were included, excluding 2021 due to uncertainty in guideline adoption, yielding a cohort of 146 patients.
Method: Patients were identified through neuro-oncology MDT meetings, and data was extracted from TrakCare, SCI Store, and electronic clinical records. All data was anonymised and stored on encrypted NHS servers. Variables included demographics, tumour histology, molecular markers, treatment, and survival outcomes. Data was organised in Excel and analysed descriptively using percentages.
Results: Molecular testing remained high, with IDH analysis in 100% pre-CNS5 and 96.6% post-CNS5, and MGMT in 98.8% and 96.6%. Extended molecular panels (TERT, EGFR, +7/−10) were introduced post-CNS5, resulting in molecular upgrading of 3.4% of tumours lacking high-grade features. Reclassification to astrocytoma, IDH-mutant, CNS WHO grade 4 occurred in 4.6% pre-CNS5 and 1.7% post-CNS5. Biopsy-only procedures in IDH-wildtype glioblastoma increased from 34.9% to 48.2%, and temozolomide use in MGMT-methylated tumours rose from 78.9% to 84.6%, while radiotherapy rates remained stable (~71%). Median OS for IDH-wildtype glioblastoma was 251 versus 209 days, and median PFS 157 versus 174.5 days. Reclassified IDH-mutant astrocytomas showed substantially longer survival, with median PFS not reached post-CNS5.

Conclusion: CNS5 implementation maintained high molecular testing rates and improved tumour classification, enabling precise MDT-guided management. Whilst outcomes for IDH-wildtype glioblastoma remained poor, reclassified IDH-mutant astrocytomas demonstrated markedly improved survival, highlighting the prognostic and clinical value of integrated histological–molecular diagnosis.

FM1-4

Stereotactic biopsy in IDH-wild type glioblastoma (GBM) – a survival analysis and interrogation of prognostic variables

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Department of Neurosurgery, Southampton, UK

Objective: Maximal safe cytoreduction remains the optimal surgical strategy in GBM. Despite this, a significant proportion of patients are not amenable to resection. Stereotactic biopsy remains essential to provide an integrated diagnosis and guide further treatment. There is a paucity of recent literature examining survival variables of this cohort post the WHO 2021 classification.
Method: Single centre retrospective study of stereotactic biopsies in IDHwt-GBM patients between January 2014-December 2024. Patient demographic, performance status (PS), radiological, histological and outcome data were collected. MGMT-hypermethylated tumours were stratified into 5–10% vs >10% cohorts. Univariate and Kaplan-Meier survival analyses were performed. Basal ganglia, thalamus, brainstem and corpus callosum defined midline structures.
Results: 413 cases were identified. Median age was 66 with a male:female ratio =1.74:1, 299 (72.4%) cases were PS0–1. Multifocal tumours accounted for 66.8% (276) of cases, of which 101 were multicentric. 183(44.3%) patients had midline involvement. Median survival(mOS) with further treatment and best supportive care was 7.15 months and 2.13 months (Logrank Mantel-Cox-$p < 0.0001$). Kaplan-Meier and univariate survival analysis demonstrated significant improved survival distributions for age less than 65 (Logrank-Mantel-Cox, $p = 0.0014$) and pre-biopsy PS 0–1 (Logrank-mantel-cox, $p < 0.0001$). These were also predictive of undergoing further treatment. Involvement of midline structures had reduced mOS compared to non-midline lesions (Logrank Mantel-Cox, $p = 0.039$). MGMT hypermethylation was associated with improved mOS in patient undergoing adjuvant treatment (8.5 vs 7.4850months, Logrank Mantel-Cox $p = 0.0177$). Whilst degree of MGMT-hypermethylation did not demonstrate significance in mOS for the adjuvant treatment cohort (8.2 vs 8.6 months, $p = 0.1828$), >10% MGMT-hypermethylation cohort demonstrated improved 2-year OS (17.5% vs 6.3%).
Conclusion: Despite recent advances in therapeutics, inoperable GBM remains a challenging entity to treat. Here we quantify pertinent peri-operative factors which may be utilised to council patients and manage prognostic expectations. Poorer prognostic cohorts may be better served with enrolment in clinical trials or best supportive care.

FM1-5

Glioblastoma recurrence detection with Fourier Transform Infrared Spectroscopy Liquid Biopsy technique and Machine Learning: Pilot study

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Objective: Evaluating the role of Fourier Transform Infrared Spectroscopy (FTIR) as a liquid biopsy technique to detect glioblastoma recurrence.
Design: Experimental research.
Subjects: Adult patients with histopathologically diagnosed glioblastoma who consented for Brain Tumour North West (BTNW) biobanking and had completed chemoradiotherapy following surgery.
Method: Serum from 43 patients (22 tumour progression [TP], 13 stable disease [SD], 8 radiation necrosis [RN] [defined by RANO 2.0]) were obtained from BTNW biobank. 1 microlitre of serum analysed in triplicate using FTIR. The spectra were then pre-processed, underwent dimension reduction, feature extraction, and machine learning (ML) model generation to compare 'TP vs SD' and 'TP vs RN' using Python software V3.
Results: 387 spectra were averaged to 129 spectra, truncated to $1800cm^{-1}$–$900cm^{-1}$, smoothed, baselined, and normalised. Principal component analysis (PCA) used to reduce feature dimensions to nine principal components (PCs). Linear Discriminant Analysis (LDA) is fitted using the nine PCs showing maximum class separation in component one (Canonical correlations coefficient: 0.85). 18 peaks identified, of which TP has been consistently associated with increase in DNA/RNA related functional groups. Peaks-based PCA-LDA model built showing accuracy of 88% for TP vs SD (Sensitivity: 79%, Specificity: 95%, AUC 0.93). When comparing TP vs RN, accuracy of 79% were achieved (Sensitivity: 85%, Specificity: 42%, AUC 0.8). When using the nine PCs instead of peaks; for TP vs SD, Random Forest (RF) achieved AUC of 0.96 compared to Support Vector Machine (SVM) (AUC 0.90) and LDA (AUC 0.88). When comparing TP vs RN, RF (AUC 0.90) were better than SVM (AUC 0.89) and LDA (AUC 0.77).
Conclusion: FTIR has demonstrated capability as a liquid biopsy technique to be used in monitoring of GBM for recurrence. Biological peaks identified for tumour progression were consistently associated with DNA/RNA related functional groups. Coupled with machine learning, we achieved satisfactory accuracy in class labelling.

FM1-6

Establishing a novel small molecule inhibitor DYR1055 to target stemness and proliferation of GBM

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Objective: Glioblastoma persists as one of the most aggressive tumours to treat, with poor overall outcomes despite standard of care treatment. Vast majority of Multikinase Inhibitors fail to progress through further clinical trials due to development of drug resistance. The large population of cancer stem cells found within glioblastoma tumours are thought to confer significant resistance against current therapies, resulting in high rates of tumour recurrence. DYR726 is the first-in-class brain penetrant small molecule Multikinase Inhibitor shown to target the PI3K-Akt-mTOR, and the Wnt pathway involved in cancer stemness(PMID:40196701). Derivative DYR895 was later introduced with oral bioavailability and led to the development of DYR1055 which was hypothesized to have an improved performance.
Design: GraphPad Prism software used to perform statistical analysis as 2-way Anova with Tukey's multiple comparisons.
Method: In-vitro laboratory techniques were applied to primary patient-derived glioblastoma cells GBM6, GBM22 and GBM143, to profile characteristics and benchmark performance of DYR1055 against previous derivative DYR895.
Results: Previous data shows DYR1055 inhibits the Wnt pathway with 11nm $IC_{50.}$ Cytotoxicity assays, show an almost 4 fold reduction in EC_{50} values between DYR895(EC_{50}=2.12μM) and DYR1055(EC_{50}=0.54μM) in GBM6. Western blots demonstrate ablation of P-AKT Thr308 and P-AKT Ser473 with increasing drug concentrations. GBM22 cells also demonstrate ablation of SOX2 with increasing concentrations. Proliferation assays show significant reduction in DYR1055(0.5μM) GBM6 proliferation by day 7{0.319 to 0.419($p < 0.0001$)}. GBM6 3D Spheroid invasion assays demonstrate that DYR1055(0.5μM) inhibits invasion at day 6 compared to control{1.180 to 1.572($p < 0.0001$)}. GBM6 colony formation assays show that DYR1055(0.5μM) exhibits additive cytotoxicity in combination with temozolomide(50μM) {0.773 to 0.860,($p < 0.0001$)}.
Conclusion: DYR1055 shows promise as a multi-kinase inhibitor for glioblastoma, addressing key challenges posed by drug resistance. In particular, ablation of SOX2, a key driver of cancer stemness, may suggest targeting of the Wnt pathway.

FM2 – FUNCTIONAL
FM2 – 1

Combined bilateral versus unilateral rTMS for post-stroke motor recovery: a systematic review and meta-analysis

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Objective: Repetitive transcranial magnetic stimulation (rTMS) is increasingly used to enhance motor recovery after stroke, and has emerged as a potentially transformative tool for motor rehabilitation. However, optimisation of stimulation protocols is urgently needed to maximise its therapeutic impact. In particular, the comparative effectiveness of combined bilateral stimulation versus conventional high-frequency (HF), low-frequency (LF), or sham stimulation remains unclear. This systematic review and meta-analysis therefore evaluated whether combined rTMS protocols offer additional benefit in upper-limb motor outcomes compared with single-frequency approaches.
Method: We conducted a systematic review and meta-analysis according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Guidelines. We included only randomized controlled trials comparing combined bilateral rTMS (HFS + LFS) with HF-real, LF-real, or sham stimulation in adult stroke survivors. Data extracted included demographics, stimulation parameters and motor outcomes such the Fugl-Meyer Assessment (FMA). Motor outcomes were analysed using Hedges' g with random-effects modelling.
Results: Five studies met the inclusion criteria. Combined rTMS protocols typically used 10 Hz or iTBS over ipsilesional M1 paired with 1 Hz over contralesional M1. The median number of pulses was 600 (range 600–1000) and the median RMT was delivered at 90% (range 80–90%). Pooled results showed no significant advantage of combined rTMS over HF-real (g = 0.23, 95% CI −0.79 to 1.25) or LF-real (g = 0.16, 95% CI −0.62 to 0.94) although with a trend towards improvement. In contrast, combined stimulation showed a moderate, borderline-significant improvement over sham (g = 0.60, 95% CI 0.00 to 1.20).
Conclusion: Combined bilateral rTMS demonstrates moderate superiority over sham but does not significantly outperform unilateral HF or LF stimulation in post-stroke motor recovery. However, current evidence is limited due to the small number of trials and significanty heterogeneity in stimulation parameters. This study highlights the need for further harmonized trials to determine optimal stimulation strategies.

FM2-2

Reoperation after failed hemispherotomy in epilepsy surgery: a systematic review, and individual patient data meta-analysis

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Objective: To synthesize seizure outcomes after secondary procedures for recurrence following index hemispheric disconnection surgery (hemispherectomy/hemispherotomy, HDS) and to compare redo hemispheric surgery (RHS) with minimally invasive alternatives-MRI-guided laser interstitial thermal therapy (LITT) and vagus nerve stimulation (VNS).
Method: We systematically searched five databases (January 1990–April 2025). Eligible studies enrolled patients of any age who underwent an index HDS, experienced seizure recurrence, and reported outcomes after secondary interventions (RHS, LITT, or VNS). Studies were prespecified as aggregate (study-level) or individual-patient data (IPD). Aggregate proportions were pooled using random- and common-effects meta-analyses; IPD were analyzed with Kaplan–Meier survival and log-rank testing. Risk of bias used Newcastle–Ottawa Scale and JBI-tools.
Results: From 998 records, 25 studies met inclusion criteria, reporting RHS ($n = 151$), LITT ($n = 9$), and VNS ($n = 9$). The pooled incidence of RHS was 18% (95% CI 14–23; $I^2 = 15.5\%$). At last follow-up after RHS, Engel I was 46% (95% CI 35–58; $I^2 = 36.4\%$), and favorable outcome (Engel I–II) was 64% (95% CI 56–71; $I^2 = 0.0\%$). In IPD contributors, the Kaplan–Meier median duration of Engel I was 4.5 years (95% CI 3.0–6.8), and the median time to loss of Engel I–II was 6.8 years (95% CI 4.5–10.6). Median Engel I survival was longer after RHS than LITT (4.5 vs 1.4 years; log-rank $p = 0.02$). Only two VNS studies were available, permitting narrative synthesis only.
Conclusion: To our knowledge, this is the first synthesis dedicated to seizure outcomes after secondary interventions for failed HDS. Collectively, the current evidence favours RHS as the principal salvage strategy, whereas LITT is a promising minimally invasive adjunct with less certain durability of seizure control. VNS appears primarily palliative, where RHS is unsuitable. These estimates provide pragmatic benchmarks for preoperative counselling and shared decision-making within multidisciplinary epilepsy surgery programs.

FM2-3

Right or left?: dominant versus non-dominant side implantable pulse generator pockets in deep brain stimulators and pocket complication rates

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FM2-4

The impact of biological effective dose (BED) variability in the stereotactic radiosurgical treatment (SRS) of trigeminal neuralgia: a cohort study

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Objective: Biological Effective Dose (BED); a calculation based on Physical Dose (PD), dose fractionation and tissue sensitivity, oriented planning is emerging as a potential key consideration in future planning strategies, aiming to achieve optimal, personalised stereotactic radiosurgery treatment (SRS) plans. In this study, planning parameters and BED variations in previously treated patients were investigated to determine the factors that affect the treatment results to achieve better patient outcomes (pain free, numbness free, longer time to relapse).
Method: A single centre, highly refined cohort of 191 idiopathic, type 1 (classic) trigeminal neuralgia (TN) patients who have undergone SRS with a physical dose (PD) of 80 Gy as a first-line invasive treatment were investigated. Follow-up data was obtained from the patient records retrospectively.
Results: As the shot distance from the root entry zone (REZ) increases by each millimetre, the hazard ratio (HR) for relapse increases by 16.3%. For every 10% increase in the BED the REZ receives, the HR reduces by 4%. The odds of being medication-free at the end of the follow-up reduced by 21.5% for every millimetre the shot was positioned more distally. Conversely, multivariate analysis showed that the maximum BED applied to the nerve was a positive predictor for causing new numbness, when corrected for pain duration before SRS, plugging and age at treatment.
Conclusion: For patients with TN, positioning the shot closer to the REZ and applying a higher BED to this area provides better pain control in the long term compared to more distally placed shots. As expected, higher maximum BEDs applied to the nerve is associated with an increased risk of developing facial numbness. Should greater consideration be given with regard to treatment planning to BED rather than PD when planning SRS treatments in order to optimise pain freedom, mitigate relapse risk and avoid complications.

FM2-5

Lest we forget – suicide in trigeminal neuralgia

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Objective: Undergraduate textbooks frequently highlight the possibility of suicide in cases of trigeminal neuralgia (TGN), but neurosurgeons and neurologists are probably unaware of the outcome of coronial proceedings in such cases. The author who has an interest in TGN also holds judicial office as a senior coroner, is uniquely placed to investigate the features of such cases that have come to inquest.
Design: Records from the Hull and East Yorkshire Coroner's Office were searched for all cases where suicide was found on the Record of Inquest, between 2021 and 2025. Cases where there was a history of TGN were selected for analysis.
Subjects: Three cases of TGN were identified in the cohort of cases in which suicide was recorded. There were two males and one female whose ages were 48 years, 56 years and 61 years. A secure diagnosis of TGN or atypical facial pain had been made.
Method: Medical records were examined for demographic details, time from diagnosis to suicide, clinical features, management/treatment provided, history of mental health issues, and mode of suicide.
Results: All cases had had extensive pharmacological and surgical treatments as well as referral to multidisciplinary pain clinics, after conventional therapeutic options had been exhausted or failed. One patient had bilateral TGN in the absence of demyelination. Two patients died from hanging and one died from a drugs overdose. One patient, in addition to intractable TGN had incapacitating anaesthesia dolorosa.
Conclusion: The majority of patients with TGN are either cured or their pain successfully managed by pharmacological and surgical means; a small minority have TGN which is intractable and refractory to treatment. In these patients, there is a clear risk of suicide and neurosurgeons, neurologists and pain medicine specialists should be aware of this; psychiatric referral or referral to centres offering non-first line treatments should be considered.

PARALLEL LECTURE THEATRE
FP1 – VASCULAR

FP1-1

Effect of intravenous milrinone infusion on brain tissue oxygenation in aneurysmal subarachnoid haemorrhage: a single centre retrospective cohort observational study

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Objective: To evaluate whether the addition of intravenous milrinone to standard induced hypertension was associated with improved brain tissue oxygenation ($PbtO_2$) as well as improved safety compared with standard therapy alone.
Design: Single-centre retrospective cohort study from 2020 to 2025.
Subjects: A total of 67 patients diagnosed with aSAH were included in the analysis, comparing milrinone + induced hypertension ($n = 40$) versus induced hypertension alone ($n = 27$).
Method: $PbtO_2$ was measured using Raumedic NEUROVENT-PTO probes, with hypoxia defined as $PbtO_2 < 20$ mmHg. Longitudinal changes in hourly $PbtO_2$ before and 24 hours after treatment were analyzed using a linear mixed-effects model. Safety and clinical variables were compared with Chi-squared and Mann–Whitney U tests.
Results: Compared with baseline, patients receiving milrinone (median age 59.0 years) demonstrated a greater improvement in mean $PbtO_2$ at 12 hours (between-group difference $=5.57$ mmHg, 95% CI 0.9 to 10.2 $p = 0.020$) and 24 hours (between-group difference $=9.25$ mmHg, 95% CI 3.6 to 14.9 $p < 0.010$). Those receiving milrinone had longer durations of: ICU stays (23.7 vs 18.8 days, $p = 0.026$), invasive ventilation (22 vs 14.5 days, $p = 0.043$), and induced hypertension (7 vs 4 days, $p = 0.017$). The milrinone group required a higher maximum noradrenaline dose (0.731 vs 0.545 mcg/kg/min, $p = 0.018$) and had a lower GCS at ICU discharge (11 vs 14, $p = 0.035$). Endovascular rescue therapy was required more often in the milrinone group with chemical angioplasty in 60.0% vs 29.6% patients ($p = 0.028$) and mechanical angioplasty in 50.0% vs 11.1% patients ($p < 0.010$). Troponin elevation occurred more often with milrinone (57.5% vs 29.6%; $p = 0.046$). No significant differences were seen in tachyarrhythmias, cerebral infarction rates, or 30-day mortality.
Conclusion: The addition of milrinone to induced hypertension was associated with improved $PbtO_2$ within 24 hours, albeit in patients who were more critically ill. However, we caution the safety and efficacy of intravenous milrinone, warranting future controlled prospective validation.

FP1-2

Machine learning-driven classification of aneurysm shape

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Objective: The relationship between aneurysm shape and rupture risk remains incompletely understood. Existing structural classifications are largely descriptive, historically derived, and lack robust correlation with clinical outcomes. Contemporary neuroimaging datasets, including those generated by large prospective studies such as the Risk of Aneurysm Rupture (ROAR) study, provide sufficiently detailed three-dimensional data to support unsupervised, morphology-based analysis of aneurysm structure.

Design: Exploratory imaging analysis from a prospective multicentre cohort.
Subjects: Fifty adults with unruptured middle cerebral artery (MCA) aneurysms enrolled in the ROAR study.
Method: A novel algorithm was applied to perform rapid automated segmentation of aneurysm sacs with 3D MR angiography data, using vessel centreline identification and iterative voxel dilatation to separate sac from surrounding vessels. From these sac segmentations, quantitative morphological features describing size, surface geometry and shape complexity were extracted and assembled into a feature matrix. Planned subsequent analyses include dimensionality reduction using principal component analysis (PCA) to identify dominant modes of morphological variation, followed by unsupervised clustering in reduced feature space to explore whether MCA aneurysms form natural structural groupings.
Results: Segmentation and morphological feature extraction were successfully completed across the cohort, producing consistent three-dimensional representations suitable for downstream analysis. Practical challenges relevant to planned unsupervised classification were identified, including ambiguity at vessel-aneurysm interfaces and sensitivity of higher-order shape metrics to segmentation quality.
Conclusion: This work establishes the imaging and feature-extraction foundation required for unsupervised structural classification of MCA aneurysms. It defines a framework for future morphology-driven classification and subsequent investigation of how aneurysm structure relates to rupture risk within large prospective cohorts.

FP1-3

Rapid versus gradual weaning of external ventricular drains in aneurysmal subarachnoid hemorrhage: a systematic review and meta-analysis

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Objective: To compare rapid versus gradual external ventricular drain (EVD) weaning strategies in aneurysmal subarachnoid haemorrhage (aSAH) and evaluate their effects on ventriculoperitoneal shunt dependence, infection rates, and hospital length of stay.
Design: A systematic review and meta-analysis including both prospective and retrospective observational studies as well as one randomised controlled trial, synthesising comparative data on rapid versus gradual EVD weaning in aSAH.
Subjects: Subjects we adult patients with aneurysmal subarachnoid haemorrhage who required an external ventricular drain across the included studies.
Method: A PRISMA compliant systematic review and meta-analysis was conducted (PROSPERO ID 1144244). Articles published in MEDLINE, Embase, and Cochrane Library between inception and July 2025 were included. Weaning definitions, infection rates, hospital stay, and VPS insertion rates were identified. Binary and continuous outcomes were calculated using random effects meta-analysis models.
Results: In total, six studies (1802 patients) were included. The most common definition of rapid weaning was immediate clamping (83.3%, $N = 5/6$). Rapid weaning was not associated with increased VPS requirement (RR 0.94, 95% CI 0.57–1.54, $p = 0.7547$), or Infection rates (RR 0.99, 95% CI 0.55–1.76, $p = 0.9462$). Rapid weaning was associated with reduced length of stay in hospital (5 studies, 25.6 days vs. 29.5 days, mean difference −4.3 [95% CI: −5.7, −3.0], $p < 0.001$).
Conclusion: Rapid weaning does not appear to be associated with reduced VPS dependence, or infection. Further studies are required to establish the ideal EVD weaning protocol to minimise infection, failure rates and hospital stay.

FP1-4

Trends in aneurysmal subarachnoid haemorrhage over a decade in Northern Ireland

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Objective: Aneurysmal subarachnoid haemorrhage (aSAH) remains a significant cause of morbidity and mortality. This study evaluates trends in incidence, management, and outcomes of patients with aSAH over a ten-year period in Northern Ireland.
Design: Retrospective review.
Method: Patients admitted or transferred with aSAH to the Regional Neurosurgical Unit at the Royal Victoria Hospital, Belfast, between 2015 and 2024 were identified using the Neurovascular Patient Database. Clinical data were obtained from the Northern Ireland Electronic Care Record, referral logs, and Encompass digital care records. Variables collected included age, sex, requirement for cerebrospinal fluid (CSF) diversion, length of stay, discharge destination, and mortality.
Results: Northern Ireland has a population of approximately 1.9 million and a single neurosurgical centre. The incidence of aSAH declined over the study period, with 105 cases in 2015 compared to 79 in 2024. There was a trend towards treating an older patient cohort, associated with increased hospital length of stay. The female-to-male ratio remained stable at 2:1.
Lumbar puncture was required for diagnosis in only 1–2 patients per year. Most ruptured aneurysms originated from the anterior cerebral artery complex. The majority of aSAH cases were treated with endovascular coiling, with a retreatment rate below 10%.
Hydrocephalus requiring surgical intervention occurred in 18–33% of patients, while hyponatraemia was observed in approximately 50%. A decompressive craniectomy was performed in 3–5 aSAH patients annually.
Overall mortality from aSAH has decreased over time. The annual mortality rate between 2021 and 2024 was 26%, representing an improvement from 33% reported between 2015 and 2017. Approximately 50% of patients were discharged directly home, while 30% required inpatient rehabilitation.

Conclusion: The incidence of aSAH in Northern Ireland has reduced over 10 years. We are treating an increasing number of elderly patients who have an increased length of stay but the overall mortality is falling.

FP1-5

Management and outcomes of aneurysmal subarachnoid haemorrhages at a single centre in Johannesburg, South Africa

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Objective: Assess the demographics and clinical profile of patients with aSAH, evaluate the management and outcome, and explore predictive relationships.
Design: We retrospectively reviewed records of patients.
Data points collected: demographics, risk factors, clinical findings, clinical severity scores (Hunt & Hess, and WFNS), aneurysmal characteristics, radiological findings, management, and outcomes (length of stay and modified Rankin Score).
Statistical analyses were performed in R (version 4.5.0). Logistic regressions were performed to contrasted coiling versus clipping as the primary management strategy. In addition, multinomial regression was used to evaluate the predictors for clipping, coiling and medical therapy. Univariate associations and multivariable modelling was used between each predictor and outcome.
Subjects: A total of 137 patients with aSAH were identified. We included all patients admitted with aSAH at Charlotte Maxeke Johannesburg Academic Hospital, a central hospital located in the City of Johannesburg Metropolitan Municipality, South Africa. We excluded all patients with subarachnoid haemorrhages secondary non-aneurysmal aetiologies, such as trauma.
Method: Approval from the University ethics committee was obtained with a certificate clearance (M230276).
Results: Mean age of 47.6 years, 65.0% were female and 80.3% were Black. Hypertension was the most prevalent risk factor (56.9%). Headaches was the leading presenting symptom (81.8%), and most patients (71.5%) presented with WFNS of 1 to 3. Most aneurysm were in the anterior circulation (94.9%) and saccular in morphology (90.5%). Management was predominantly endovascular, with coiling preformed in 87.6% of cases. A good functional outcome (mRS 0–2) was seen in 67.2% of patients. Higher WFNS and H&H grades, and IPH was associated with clipping. WFNS and H&H had the strongest association with poor outcomes, contrary to epidemiological and risk factors showing no associations.
Conclusion: This study contributes to understanding endovascular management in Africa. The importance of clinical severity scores in prognostication and early CT studies in management strategies is demonstrated.