

Pediatric malignant CNS tumors in German neurosurgical departments: a nationwide analysis of 31,463 cases [Abstract]

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insertion of a VP-shunt with a low-pressure valve, symptoms of elevated ICP were relieved, yet the frontal horn of the right lateral ventricle collapsed and persistent irritative symptoms and hyperarousal was observed. After insertion of an adjustable valve, multiple upregulations of valve resistance, attempting to treat what was interpreted as over drainage, resulted in worsening of symptoms. An MRI-scan at age 4 years revealed frontotemporal polymicrogyria. The genetic analysis disclosed the diagnosis; mTOR-related megalencephalopathy with hydrocephalus, which changed the treatment strategy into downregulation of valve resistance. Furthermore, the patient could be offered experimental adjusting treatment with the mTOR-inhibitor, rapamycin.

Conclusions: As illustrated above, understanding the specific molecular genetic mechanism of hydrocephalus in individual patients is an important diagnostic adjunct that may aid in establishing the correct diagnosis, explain additional neurological symptoms that cannot be assigned to hydrocephalus or shunt treatment, and enable a personalised treatment strategy.

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1277

Session 4: Pediatric neurooncology, October 1, 2026, 8:00 AM - 9:30 AM Brain and Spine 6 (2026) 106691

Extending Intraoperative CEUS to Pediatric Posterior Fossa Surgery: Enhancing Safety Through Perfusion-Based Residual Assessment

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Posterior fossa tumors are the most common brain neoplasms in children and are surgically challenging due to the narrow anatomy and proximity to critical neurovascular structures. Maximizing extent of resection (EOR) while preserving neurological function is essential. Intraoperative MRI is effective but costly and rarely available in pediatric centers, while conventional ultrasound (US) is accessible but limited by artifacts and low specificity. Contrast-enhanced ultrasound (CEUS), based on intravascular microbubble agents, improves vascular assessment in adult neurosurgery. In the United States, intravenous CEUS is FDA-approved for selected pediatric indications, whereas in Europe it is not approved for intracranial pediatric use and therefore requires off-label administration. Pediatric posterior fossa experience remains limited.

Methods: Between January and December 2025, eight children (1–16 years) with posterior fossa tumors were enrolled. Because ultrasound contrast is not approved for pediatric intracranial use in Europe, SonoVue® (0.03 mL/kg) was administered off-label under institutional authorization and informed parental consent. All surgeries were performed in sitting position. CEUS was acquired using low-mechanical index imaging with a small-footprint convex probe, both before resection (vascular mapping) and after resection (residual assessment). The primary endpoints were feasibility and safety; secondary endpoint was surgical usefulness.

Results: Diagnostic-quality CEUS was obtained in all cases without adverse events. CEUS improved tumor delineation and vascular characterization compared with B-mode imaging. The main added value emerged during residual assessment. In highly vascular tumors, hyperechoic areas on B-mode suggested possible remnants; CEUS demonstrated absence of enhancement in these regions, supporting intraoperative interpretation of small ischemic or contusive areas rather than viable tumor. Findings correlated with postoperative MRI.

Conclusions: Intraoperative CEUS is feasible, safe, and particularly valuable for distinguishing true residual tumor from non-perfused postoperative changes, enabling radical yet safe resection in pediatric posterior fossa surgery.

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1528

Session 4: Pediatric neurooncology, October 1, 2026, 8:00 AM - 9:30 AM Brain and Spine 6 (2026) 106692

Postoperative seizures after transcortical versus interhemispheric approach for pediatric deep-seated brain tumors

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Postoperative seizures are common and dangerous postoperative complication that occurs in patients after removal of brain tumors. Seizures often occur delayed after tumor removal. There are many factors contributing to the development of seizures. Minimally invasive approaches to the removal of deep-seated tumors provide less damage to brain tissue, which can prevent theoretically the development of seizures after tumor removal and positively affect the quality of life after surgery.

Methods: A single-center retrospective review containing results of treatment of 123 pediatric patients with deep-seated brain tumors from 2010 to 2023. The neurosurgical treatment was performed using two different approaches: transcortical 52 (42.3%) and interhemispheric 71 (57.7%). The study included 32 girls (45.1%), and 39 (54.9%) boys the median age in both groups was 8 years. We collected and analyze different parameters which contributing to their development of postoperative seizures such as age, preoperative seizure history; type of approach, postoperative complications. Univariate and multivariate analyses we used to identify significant independent risk factors for postoperative seizures (PS).

Results: Of the 123 patients, 18 (14.6%) had preoperative seizure history, 22 (17.9%) were observed PS, 18 (81.8%) early and 4 (18.2%) delayed. In 14 (63.6%) of 22 seizures occurred for the first time in life, in 8 (36.7%) had preoperative seizure history. Preoperative seizure history was a predictor for postoperative seizures ($p < 0.01$). The primary postoperative seizures were manifesting on average within 5 days. Postoperative surgical complications were diagnosed in 32 patients (26.0%), of whom 13 (40.6%) had PS. Postoperative complication was a prognostic factor for PS ($p < 0.001$). PS developed in 13 (25%) of 52 patients who underwent the transcortical approach and in 9 (12.7%) of 71 patients who underwent the interhemispheric approach. The development of PS in the early postoperative period did not depend on the type of approach used ($p > 0.05$). We did not identify a statistically significant effect of age on the risk of seizures in the postoperative period.

Conclusions: Univariate analysis demonstrated that preoperative seizure history and postoperative complications were strong predictors of the development of early and delayed seizures after tumor removal. In univariate, analysis the type of approach was not a significant risk factor for postoperative early and delayed seizures. However, the impact of approach on the risk of developing PS requires further study.

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1574

Session 4: Pediatric neurooncology, October 1, 2026, 8:00 AM - 9:30 AM Brain and Spine 6 (2026) 106693

Pediatric Malignant CNS Tumors in German Neurosurgical Departments: A Nationwide Analysis of 31,463 Cases

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Malignant central nervous system tumors represent one of the most serious diseases treated in pediatric neurosurgery. This study aimed to present a nationwide analysis of pediatric malignant CNS tumors treated in neurosurgical departments in Germany between 2019 and 2025.

Methods: A retrospective cross-sectional analysis was conducted using nationwide German InEK data from 2019 to 2025. Our study focused on patients below

18 years diagnosed with malignant CNS tumors (ICD-10-GM code C71). Data included demographics, primary and secondary diagnoses, as well as neurosurgical procedures. Mortality was defined as in-hospital fatality (discharge status: deceased). It should be noted that these are hospital cases rather than individual patients, and therefore multiple admissions of the same patient may be included.

Results: Between 2019 and 2025, a total of 31,463 pediatric cases of malignant CNS tumors were treated in German neurosurgical departments, with annual case numbers ranging from 3,701 cases in 2025 to 5,023 cases in 2024. Cerebellar tumors represented the most frequent localization, accounting for approximately 38–48% of cases, followed by brainstem tumors (14–19%) and tumors involving multiple brain regions. Neurosurgical treatment consisted primarily of tumor resections (2'206, 7.0% of cases), biopsies (416 stereotactic or open biopsies were recorded, amounting to 1.3%), and reoperations. Hydrocephalus was the most frequent neurological complication in 5,075 cases (16.1%), while epilepsy occurred in 1,819 cases (5.8%).

A total of 193 in-hospital deaths occurred during the study period, corresponding to an overall mortality rate of 0.61%, with annual mortality ranging from 0.50% to 0.78%.

Conclusions: This nationwide analysis demonstrates stable treatment patterns and consistently low in-hospital mortality for pediatric malignant CNS tumors treated in neurosurgical departments in Germany. Between 2019 and 2025, 31,463 cases were recorded. Cerebellar tumors represented the most frequent localization and neurosurgical treatment was dominated by tumor resections and biopsies. Hydrocephalus was the most common complication. Annual mortality remained below 1% throughout the observation period.

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251

Session 5: Celebrating the Special Issue Brain & Spine & Nerve, October 1, 2026, 8:00 AM - 9:30 AM

Brain and Spine 6 (2026) 106694

PEG-Assisted Neurotisation for Traumatic Brachial Plexus Injury: Early Sensory and Motor Outcomes in a Prospective Cohort

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Traumatic brachial plexus injury (BPI), particularly pan-plexus lesions, results in devastating motor and sensory deficits. Conventional nerve reconstruction relies on slow axonal regeneration and is limited by early Wallerian degeneration. Polyethylene glycol (PEG)-assisted axonal fusion has the potential to restore immediate axonal continuity and accelerate early functional recovery. This study evaluates early sensory and motor outcomes following PEG-assisted neurotisation in traumatic BPI.

Methods: A single-center prospective cohort study was conducted after ethical approval, enrolling 15 male patients with traumatic pan-brachial plexus injuries. The mean age was 25 years, and the mean time from injury to surgery was 7.8 months. Patients underwent PEG-assisted nerve transfers including spinal accessory to suprascapular nerve (SAN→SSN), phrenic to suprascapular nerve, spinal accessory to musculocutaneous nerve via sural graft (SAN→MCN), and intercostal to musculocutaneous neurotisation. Motor recovery was assessed using Medical Research Council (MRC) grading with focus on shoulder abduction, external rotation, and elbow flexion. Sensory recovery was evaluated by light touch and temperature mapping at postoperative day 11, 1 month, 2 months, and 3 months.

Results: Preoperatively, all patients demonstrated complete absence of voluntary motor activity and severely impaired sensation. Sensory recovery showed significant improvement, with light touch reaching $78 \pm 10\%$ and temperature sensation $72 \pm 9\%$ at 3 months ($p < 0.001$). Early motor recovery differed by target function. Following SAN→MCN transfer, no patient achieved joint movement by 3 months, although muscle tightening and flickering were observed in 53–67% of patients. In contrast, shoulder outcomes following suprascapular neurotisation were more favorable: at 3 months, 40% achieved 10–15° shoulder abduction, while 26.7% achieved 15–25°, and 53.3% demonstrated visible external rotation, though without functional strength.

Conclusions: This represents the first prospective clinical study of PEG-assisted neurotisation in traumatic brachial plexus injury. PEG fusion was safe and associated with significant early sensory recovery and measurable early proximal motor activation, particularly shoulder abduction and external rotation, while elbow flexion recovery remained delayed. These findings support PEG-assisted nerve repair as a promising adjunct in brachial plexus reconstruction, warranting larger controlled trials with long-term follow-up.

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409

Session 5: Celebrating the Special Issue Brain & Spine & Nerve, October 1, 2026, 8:00 AM - 9:30 AM

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Peripheral Nerve Injuries Due To Gunshots: A Single Tertiary Centre Series Of 225 Cases With Emphasis On Surgical Indications And Outcome

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Peripheral nerve injuries are a significant consequence of ballistic trauma, often resulting in persistent neurological deficits and functional impairment. Lower limb nerves, particularly the sciatic nerve, are most vulnerable. The impact of conservative versus surgical management and timing of intervention remains critical for outcome optimization.

Methods: A retrospective analysis included 225 patients with ballistic peripheral nerve injuries treated between January 2023 and June-2025. Data included demographics, nerve distribution, associated injuries, management strategy, surgical timing, and clinical outcomes. Comparative analysis evaluated morbidity and recovery between conservative and surgical management, with statistical significance set at $p < 0.05$.

Results: Patients were predominantly males (99%). Sciatic nerve injuries accounted for 50%, other lower limb nerves 35%, and upper limb nerves 15%. Associated injuries occurred in 71%. All patients received initial conservative management, while surgical intervention was required in 63/225 (28%). Functional recovery occurred in 140/225 (62%), while morbidity remained 85/225 (38%); mortality was 0.9%. Early surgery (3–6 months) demonstrated higher recovery (28/35, 80%) compared with delayed intervention ($p < 0.001$). Decompression and adhesiolysis represented 57% of procedures, followed by neuroma resection and grafting (38%).

Conclusions: Ballistic peripheral nerve injuries predominantly affect lower limbs and carry substantial morbidity. While conservative management is appropriate for many patients, timely surgical intervention improves neurological recovery. Multidisciplinary care and structured rehabilitation remain essential to minimize long-term disability.

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1583

Surgical Treatment of Patients with Gunshot Injuries of Peripheral Nerves.

Session 5: Celebrating the Special Issue Brain & Spine & Nerve, October 1, 2026, 8:00 AM - 9:30 AM

Brain and Spine 6 (2026) 106696

Two Years of Experience of the Neurosurgical Department of the Municipal Clinical Hospital No. 4, Dnipro

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Gunshot injuries of peripheral nerves are associated with severe functional impairment and neuropathic pain. Their incidence has increased during modern military conflicts, and optimal surgical strategies remain challenging. This study evaluates surgical management and outcomes in patients treated in a wartime neurosurgical center

Methods: We retrospectively analyzed 68 patients with gunshot-related peripheral nerve injuries treated between 2023 and 2025. Patients were aged 21–57 years. Injuries involved the ulnar ($n=8$), median ($n=17$), radial ($n=10$),