

Applying MANTIS to an independent EPN validation dataset (n=100), we achieved a c-index of 0.75 ± 0.09 , an AUROC of 0.81 ± 0.05 , and an integrated brier score of 0.13 ± 0.02 , indicating high accuracy and discrimination of our model (Fig.1b). Stratifying patients according to their 5-year survival predictions into high (<0.5), intermediate (0.5-0.9) and low (>0.9) risk groups revealed significant heterogeneity between patient groups ($P=3.7e-7$; Fig.1c). Especially within posterior fossa type A (PF-A) patients (n=87), clinically meaningful heterogeneity was observed (c-index = 0.72 ± 0.10). Applying the model to a multi-region dataset of 19 PF-A tumors (59 regions total), we found that higher cell density was significantly associated with lower predicted survival probability across patients ($P=2.25e-5$). However, the average difference between tumor regions was small, with an estimated 10% reduction in 5-year survival probabilities, suggesting largely stable survival predictions across tumor regions. Additionally, we utilized sparse nanopore sequencing to generate survival predictions for EPN patients within hours after surgical tumor resection, achieving comparable results as obtained with DNA methylation array profiling.

Conclusions

By utilizing state-of-the-art machine learning and genome-wide epigenomic profiling, we created a tool to predict personalized survival curves for EPN patients within hours after initial surgery. Our tool enables clinicians to receive timely, patient-specific insights, guiding the selection of the most effective treatment strategies.

Optional Image

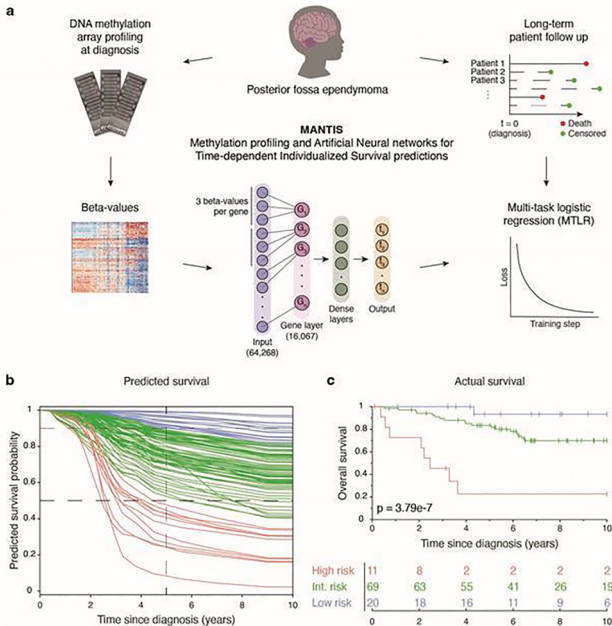


Figure 1: Overview of the MANTIS framework. DNA Methylation arrays from 709 EPN patients were collected at diagnosis. Beta-values were used as input for the neural network model. Using matched patient survival information, the model was trained utilizing multi-task logistic regression to obtain personalized time-resolved survival probability curves. b) Line plot showing predicted individual survival probabilities over a 10-year time period in an independent EPN dataset (n=100). Patients are stratified into three risk groups according to their 5-year survival probability. c) Kaplan-Meier survival curves showing patients actual survival time, stratified by risk group. The P-value was determined using a two-sided log-rank test.

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Hypnosis in Awake Surgery for Brain Tumors in Children

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Oral e-Poster Presentations - Booth 3: Pediatric, Exhibition Hall, October 6,

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Awake brain surgery in children presents unique challenges due to anxiety, limited cooperation, and the need for precise neurological assessment. Hypnosis has emerged as a non-pharmacological approach to improve patient comfort and reduce sedation-related risks. This study evaluates the feasibility and benefits of hypnosis in pediatric awake brain tumor surgery based on the experience with 8 patients.

Methods

Charts of 8 pediatric patients (ages 12–17) who underwent awake craniotomy from 2022 to 2025 for brain tumor resection were studied. In all cases, a trained hypnotherapist induced hypnosis preoperatively and maintained trance states intraoperatively through guided imagery, dissociation techniques, and positive suggestions. Local anesthesia (scalp block) and minimal sedation (dexmedetomidine, propofol, and remifentanyl) were administered. Patient cooperation, anxiety levels, intraoperative neurological monitoring, and postoperative recovery were evaluated.

Results

All children successfully maintained a hypnotic state throughout the critical phases of surgery. None required conversion to general anesthesia due to distress. Patients exhibited reduced preoperative and intraoperative anxiety, as reported by both medical staff and subjective patient and family feedback. During the surgical procedure, all patients required light sedation beyond local anesthesia, but all remained on spontaneous ventilation without any airway management device such as intubation or laryngeal mask. Patients experienced faster wakefulness, reduced postoperative nausea, and fewer emotional disturbances compared to conventional sedation protocols.

Conclusions

Hypnosis facilitated active patient participation, allowing continuous assessment of motor, language, and cognitive functions without excessive sedation. Hypnosis seems to be a promising adjunct in pediatric awake brain surgery, enhancing patient cooperation, minimizing sedation, and improving intraoperative monitoring. Larger studies are needed to validate these findings and standardize hypnosis protocols in pediatric neurosurgery.

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A Nationwide Analysis of Malignant Brain Tumors in Pediatric Population in Neurosurgical Departments in Germany, 2023

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Oral e-Poster Presentations - Booth 3: Pediatric, Exhibition Hall, October 6, 2025, 9:30 AM - 10:10 AM

Pediatric neuro-oncological diseases pose significant challenges due to their diverse mortality and morbidity rates. This study aims to assess in-hospital mortality and morbidity associated with these conditions in neurosurgical departments across Germany in 2023, focusing on pediatric patients undergoing neurosurgical procedures.

Methods

A cross-sectional study was conducted on pediatric neuro-oncological cases treated in German neurosurgical departments in 2023. The analysis targeted patients under 18 diagnosed with malignant brain tumors (ICD-10-GM code C71). Collected data included demographics, primary and secondary diagnoses, and neurosurgical procedures performed. In-hospital mortality was defined as a fatal outcome before discharge.

Results

In 2023, a total of 5,585 pediatric cases of malignant gliomas were reported in German neurosurgical departments, with 42.7% of patients being female. The highest incidence (28.4%; 1,586/5,585) was observed in children aged 6 to 9 years. The overall in-hospital mortality rate was 0.7%, with 39 patients succumbing to the disease. Among these cases, 1,981 involved cerebellar tumors. A significant male predominance was found in cerebellar tumor cases (62.8% vs. 37.2%, $p < .0001$, Chi-square test). Interestingly, 33.3% of cerebellar tumors were diagnosed in children aged 10 to 15 years. Commonly performed neurosurgical procedures included the excision and destruction of primary brain tumor tissue (5-015.0; 312/1,063 of the recorded procedures), biopsies (open and stereotactic combined; 1-510 and 1-511; 90/1,063), and reoperations (5-983; 111/1,063). Advanced intraoperative techniques were employed at varying

rates: microsurgery in 77.9% (5-984), intraoperative navigation systems in 58.9% (5-988.0, 5-988.2, 5-988.3), fluorescence guidance in 6% (5-989), and intraoperative neuro-monitoring (IONM) in 36.5% (8-925). The mortality rate for primary tumor resections was recorded at 1.92% (6/312). No fatalities were reported for biopsy or reoperation procedures.

Conclusions

This ongoing study provides crucial insights into the epidemiology and in-hospital outcomes of pediatric neuro-oncological cases in Germany. A notable predominance of cerebellar tumors in males was observed. While most pediatric brain tumors are diagnosed between the ages of 6 and 9 years, cerebellar tumors were more frequently identified in children aged 10 to 15 years. The most commonly performed surgical procedures were tumor resections, biopsies, and reoperations. The mortality rate for tumor resections reached up to 1.92%. However, advanced intraoperative techniques, including microsurgical approaches, intraoperative navigation systems, IONM, and fluorescence-guided surgery, were less frequently utilized in pediatric patients compared to adults.

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Surgical Outcomes of Endovascular Treatment of Cerebral Arteriovenous Malformation in Pediatric Patients with Intracranial Hemorrhage

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Arteriovenous malformations (AVMs) of the brain vessels are a relatively rare cerebrovascular pathology in children, occurring at a frequency of 0.89 to 1.34 cases per 100,000 individuals per year. The disease most commonly manifests as intracranial hemorrhage and is associated with a high degree of disability. There are three treatment methods for cerebral AVMs: endovascular embolization, microsurgical resection, and radiation therapy, which are actively used in the treatment of this pathology in adults. At the same time, considering the lack of randomized studies and clinical guidelines regarding the timing and choice of surgical treatment strategies in children, obtaining answers to these questions appears to be a relevant task for modern neurosurgery.

Methods

From January 2024 to December 2024, 13 patients under the age of 18 (mean age – 12 years) with AVMs of the brain vessels were treated at the St. Petersburg State Pediatric Medical University, among whom 36% were boys and 64% were girls. The hemorrhagic type of disease progression was observed in 93% of cases. In 80% of cases, the rupture of the malformation led to supratentorial hemorrhage. Clinical manifestations, features of surgical intervention, and treatment outcomes were assessed retrospectively.

Results

A total of 27 endovascular interventions were performed during the acute phase of hemorrhage, after the patient's condition stabilized. Total simultaneous embolization was conducted in 57% of cases (in patients with malformations of grades I-II according to SM). The clinical outcome in the early postoperative period directly depended on the patient's neurological condition after the hemorrhage.

Conclusions

The conducted study showed that endovascular intervention during the acute phase of intracerebral hemorrhage is an effective treatment method for AVMs in children, allowing for a reduction in the risk of rebleeding.

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Results of second-look surgery after pediatric intraventricular brain tumor resection

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Oral e-Poster Presentations - Booth 3: Pediatric, Exhibition Hall, October 6, 2025, 9:30 AM - 10:10 AM

The gross total resection of brain tumors is one of the most important prognostic factors of survival in neuro-oncology. However, the localization of primary and secondary intraventricular tumors is difficult to access, which may prevent gross total resection and unintentionally result in residual postoperative tumor tissue. The decision to perform a second-look operation is complicated and requires not only histological analysis but also an assessment of the risks of complications and the potential benefits of reoperation.

Methods

The study included the results of examination and treatment of 123 patients with primary or secondary ventricle tumors who underwent neurosurgical treatment from 2012 to 2023. The patients were divided into two groups based on the type of approach which used. The first group – transcortical, included 52 patients, 23 (44.2%) of them female and 29 (55.8%) male, the second group – interhemispheric, 71 patients of whom 32 were girls (45.1%), and 39 (54.9%) were boys the median age in both groups was 8 years. The volumetric neoplasm parameters, the extent of initial resection, the residual volume of the tumor, and the impact of the extent of second-look surgery were collected and analyzed.

Results

Tumors were located in the third ventricle in 50 (40.7%) cases, in the lateral ventricles in 46 (38.2%), in the subcortical nuclei and thalamus in 24 (19.5%) and in the pineal region in 3 (2.4%) patients. Histologically, different forms represented neoplasms. After initial resection, gross-total removal (GTR) in the transcortical access group (1) was achieved in 23 (44.2%) patients, near total in 8 (15.4%), subtotal in 12 (23.1%), partial in 9 (17.3%). In the interhemispheric group (2), 20 (28.2%) had total, 11 (15.5%) had near-total (NTR), 20 (28.2%) had subtotal (STR), 18 (25.3%) had partial, and 2 (2.8%) had biopsy. There were no differences in the total removal between the groups ($p=0.06$). 12 (15%) patients underwent second-look surgery. The surgeries were performed in the period from 5 to 107 days, the median was 27 days. After second-look operation, GTR was achieved in 1 (8.3%) patient, and NTR in 4 (33.3%). The remaining three patients (25%) STR. There were no differences in the radicality of second-look operations depending on the type of approach used.

Conclusions

Interhemispheric approaches prevent injury to the cerebral cortex and subcortical structures and allow gross total resection of the same volume of the tumor during initial removal as with transcortical approaches. Second-look surgery is a justified option that potentially increases survival rate.

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Sleep Disorder In Children Treated For Brain Tumour: A Polysomnography Study.

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Oral e-Poster Presentations - Booth 3: Pediatric, Exhibition Hall, October 6, 2025, 9:30 AM - 10:10 AM

The prevalence and characteristics of sleep disorders in pediatric patients treated for brain tumors remain understudied. Despite growing awareness of the neurological consequences of brain tumors, their impact on sleep architecture remains unclear. This study aimed to evaluate and define sleep profiles in this population, providing insights into potential mechanisms underlying these disturbances.

Methods

A polysomnographic (PSG) study was conducted in the pediatric department between October 2017 and March 2019. Patients aged 2–16 years who had completed brain tumor treatment at least six months prior to enrollment were included. All had undergone neurosurgical intervention. Exclusion criteria comprised seizure disorders, medications interfering with sleep, and adenotonsillar hypertrophy. Overnight PSG followed standardized guidelines set by the American Academy of Sleep Medicine to ensure consistency