ABSTRACTS

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CRANIOSYNOSTOSIS

Surgical Techniques in Craniosynostosis: Comparative Analysis of Open and Minimally Invasive Approaches.

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Introduction: Craniosynostosis is a condition resulting from the premature fusion of cranial sutures. Surgical treatment varies according to age, suture type, and case complexity. Objective: To compare surgical techniques for craniosynostosis. Method: This systematic review used PubMed, Embase and Web of Science databases with the terms: "craniosynostosis", "endoscopic surgery", "spring-assisted", and "open repair". Articles published between 2019 and 2024 were included if they compared surgical techniques in children and provided data on efficacy and complications. Case reports and small series (<20 patients) were excluded. Results: The minimally invasive approach (spring-assisted) showed a significantly longer operative time for device placement (65 vs. 53 minutes, p<0.0001), but equivalent removal time (31 vs. 29 minutes, p=0.48). Open remodeling was associated with greater blood loss (p<0.001), longer operative time, and prolonged hospital stays compared to less invasive techniques. Postoperative cephalic index did not differ significantly between techniques (p>0.05). Complications were less frequent with minimally invasive procedures (p<0.05). The choice of technique did not affect functional outcomes, demonstrating that both approaches are effective when appropriately indicated. Conclusion: The analyzed techniques show similar efficacy but differ in surgical time and risk of complications, requiring an individualized approach.

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Keywords: Craniosynostosis, Spring-assisted, Endoscopic surgery.

Keywords: Keywords: Crouzon syndrome, craniofacial surgical techniques, surgical outcomes

CROUZON SYNDROME: SURGICAL OUTCOMES AND COMPLICATION RATES IN PATIENTS UNDERGOING COMPLEX CRANIOFACIAL TECHNIQUES

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Introduction: Crouzon syndrome is a syndromic craniosynostosis caused by mutations in the FGFR2 gene, leading to the premature fusion of cranial sutures and progressive craniofacial deformities. Clinical manifestations affect neurological, visual, and respiratory functions. Craniofacial surgeries, such as monobloc advancement and osteogenic distraction, are indicated for anatomical and functional correction. Objective: To evaluate clinical outcomes and complications associated with different surgical techniques in patients with Crouzon syndrome. Methods: Case reports, case series, and observational studies that clearly described surgical techniques and clinical outcomes published within the past decade were included. A total of 161 patients with a confirmed diagnosis of Crouzon syndrome were analyzed. The analysis was performed using a proportional meta-analysis with a random-effects model, considering high heterogeneity (I^2 = 84%). Results: The combined mean complication rate was 30.1% (95% CI: 12.7% – 55.4%). The most frequent complications were surgical site infections, distraction device failures, cerebrospinal fluid leaks, and respiratory and neurological complications, such as post-traumatic epilepsy. Conclusion: Despite the significant complication rates, craniofacial surgeries demonstrated substantial clinical efficacy. The findings highlight the importance of detailed surgical planning, intensive postoperative follow-up, and a multidisciplinary approach to optimize outcomes in patients with Crouzon syndrome.

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Relationship between Nonsyndromic Craniosynostosis and Attention-Deficit/Hyperactivity Disorder (ADHD)

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Abstract
Craniosynostosis, defined as the premature fusion of one or more cranial sutures, occurs in approximately 1 in 2,000–2,500 live births. Beyond its craniofacial implications, it has been increasingly linked to neurodevelopmental disorders, particularly Attention-Deficit/Hyperactivity Disorder (ADHD). In this case-control study, patients with nonsyndromic craniosynostosis were compared with age- and sex-matched controls. Although the prevalence of ADHD did not reach statistical significance, a higher frequency was observed among craniosynostosis patients (70% vs. 22%, p = 0.136). ADHD was more common in males, with a 2:1 ratio. Preoperative neurodevelopmental assessments did not show significant differences, whereas postoperative evaluations revealed that patients with initially satisfactory neurodevelopment were more likely to develop ADHD, a finding that was statistically significant (p = 0.000). The type of craniosynostosis did not influence ADHD risk. These findings highlight the importance of long-term psychometric monitoring in children with nonsyndromic craniosynostosis, with age-appropriate evaluations at key developmental stages and continued follow-up into adolescence.

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Keywords: Craniosynostosis, behavioral disorder, Attention-Deficit/Hyperactivity Disorder (ADHD), Neurodevelopment

SECONDARY CRANIOSYNOSTOSIS FOLLOWING VENTRICULOPERITONEAL SHUNT: A CASE REPORT

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Case Presentation: We report the case of SMS, a 2-year-and-7-month-old patient with a history of congenital hydrocephalus, who underwent ventriculoperitoneal (VP) shunt placement, neonatal medium-pressure model, during the neonatal period. The patient subsequently developed overriding of the cranial sutures, requiring closure of the VP shunt. Follow-up was lost, and the patient later returned with abnormal consolidation of the metopic and sagittal sutures, presenting with delayed neuropsychomotor development and signs of chronic intracranial hypertension, for which surgical treatment with fronto-parieto-occipital reconstruction was required. Discussion: Shunt procedures for the treatment of hydrocephalus are among the most commonly performed by neurosurgeons. However, they are associated with a wide spectrum of complications. Among them, although atypical, is secondary craniosynostosis, defined as premature fusion of cranial sutures. Its pathophysiology is attributed to the reduction of centrifugal forces exerted by the growing brain against the calvaria, thereby promoting early closure of cranial sutures. This process may result in chronic intracranial hypertension and its complications. Final Remarks: VP shunting is one of the most frequently performed procedures in neurosurgical practice. Awareness of its wide range of complications is crucial, including the occurrence of secondary craniosynostosis, which remains underreported but may lead to severe consequences if not promptly recognized and treated.

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Keywords: Craniosynostosis; Ventriculoperitoneal Shunt

Treatment of Craniosynostosis in a Patient Older Than One Year: A Case Report

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Case Presentation: In this report, we describe BCDO, a 1-year-and-5-month-old patient diagnosed with nonsyndromic craniosynostosis (scaphocephaly), presenting with dolichocephaly, craniofacial disproportion, and signs of chronic intracranial hypertension. However, the diagnosis and subsequent management were delayed. Discussion: Craniosynostosis is usually diagnosed early due to evident cranial deformities, allowing timely treatment, typically before the age of one year. Delay in treatment may lead to serious complications, such as neurodevelopmental delay, resulting from restricted brain growth due to disproportion between the calvarium and brain volume, ultimately leading to chronic intracranial hypertension. This condition is one of the main indications for surgical treatment, along with aesthetic concerns. Cranial reconstruction in older patients poses greater challenges and increased risks of complications, including longer surgical time and greater blood loss; however, no significant statistical difference has been demonstrated when compared to surgeries performed at the usual age, thus making the procedure safe. Final Remarks: Ideally, cranial reconstruction for the treatment of craniosynostosis should be performed before the age of one year. Nonetheless, for various reasons, some patients may present with delayed diagnosis, which increases morbidity. Still, when properly indicated, surgical treatment remains safe and effective.

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Keywords: Craniosynostosis, Scaphocephaly

DYSRAPHISM

Cervical Arachnoid Cyst: Diagnosis and Surgical Approach in a Rare Case of Pediatric Myelopathy

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Cervical arachnoid cysts are a rare condition, accounting for less than 1% of all spinal lesions, but they can cause progressive myelopathy in children. Their low incidence and insidious presentation make early diagnosis challenging. This abstract aims to explore the clinical manifestations, diagnosis, and treatments of this rare condition. Magnetic resonance imaging (MRI) is the gold standard for diagnosis, providing clear visualization of the cyst's location and size, crucial for surgical planning. While most cervical arachnoid cysts are asymptomatic, around 30% of cases involve spinal cord compression, leading to progressive neurological deficits such as weakness, sensory changes, and even paraplegia. Surgical treatment is the primary approach, with fenestration, which creates an opening to relieve pressure on the spinal cord, being the procedure of choice. In more complex or recurrent cases, cerebrospinal fluid diversion

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may be required. Fenestration has a lower complication rate and is generally effective, but recurrence is possible, especially in large cysts or those in difficult-to-reach areas. Early diagnosis and appropriate surgical intervention are essential to prevent permanent sequelae and improve long-term outcomes.

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Keywords: Cisto aracnoide cervical, Mielopatia, Crianças, Diagnóstico, Tratamento cirúrgico, Fenestração, Derivação, Compressão medular, Ressonância magnética, Disrafismo espinhal, Neurocirurgia pediátrica, Sequelas neurológicas, Disfunção neurológica progressiva, Coluna vertebral. Cervical arachnoid cyst, Myelopathy, Children, Diagnosis, Surgical treatment, Fenestration, Shunting, Spinal cord compression, Magnetic resonance imaging, Spinal dysraphism, Pediatric neurosurgery, Neurological sequelae

INTRAUTERINE SURGICAL CORRECTION OF MYELOMENINGOCELE AND POSTNATAL CLINICAL OUTCOME.

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Introduction: Myelomeningocele (MMC) is a neural tube malformation resulting from failure to close the caudal neuropore during pregnancy. Intrauterine surgical treatment demonstrates favorable postnatal clinical data; however, the diversity of techniques requires analysis. Objective: To compare the efficiency, safety, and postnatal results of intrauterine surgical techniques for MMC correction. Methods: An integrative review of the literature available in the MEDLINE database on the subject was performed, including primary studies from the last 10 years, excluding inadequate samples. The selection followed three stages and was reported according to Whittemore and Knafl and PRISMA. Results: Twenty-four studies were analyzed. There was a reduction in the implantation of ventriculoperitoneal shunt and improvement in motor function/reversal of rhombencephalic herniation. The standard open MOMS surgery did not reduce the risk of prematurity. Hybrid fetoscopy reduces maternal morbidity with fetal efficacy similar to open surgery; Other endoscopic approaches face challenges with prematurity. There is a greater tendency towards the risk of tethered spinal cord and changes in brain development after surgery. Conclusion: Intrauterine surgical correction of MMC reduces the incidence of hydrocephalus and Chiari II malformation; however, there is a need for further studies aiming at comparing surgical techniques and long-term results.

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Keywords: myelomeningocele, neural tube defects, in utero surgery, fetoscopy, prematurity.

Efficacy and Postoperative Outcomes of Myelomeningocele Repair: A Systematic Review

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Introduction: Myelomeningocele is a congenital malformation of the central nervous system (CNS), characterized by the protrusion of the spinal cord and meninges through an opening in the vertebral column. This condition can lead to severe neurological deficits and reduced quality of life. The standard treatment involves early surgical closure of the defect to prevent further complications, with several techniques available for the procedure.
Objective: To evaluate the efficacy and postoperative outcomes of different surgical techniques used in the repair of myelomeningocele.
Methods: This systematic review followed the PRISMA guidelines. A comprehensive search was conducted in PubMed using the terms “Myelomeningocele” AND “Surgical Techniques”, covering publications from 2015 to 2025. A total of 46 articles were initially identified. After removing duplicates and screening titles, 30 studies remained. Applying inclusion and exclusion criteria, 8 articles were selected for qualitative and quantitative analysis. Inclusion criteria comprised randomized clinical trials, meta-analyses, and observational studies involving newborns undergoing myelomeningocele repair. Studies in adults and animal models were excluded.
Discussion: The studies included in this systematic review indicate that prenatal repair of myelomeningocele is

associated with significant improvements in motor function, with increased rates of independent ambulation and higher motor scores compared to postnatal repair. The Management of Myelomeningocele Study (MOMS), a multicenter randomized clinical trial, demonstrated a reduced need for cerebrospinal fluid shunting and better motor outcomes at 30 months of age. An observational study of 39 patients who underwent open fetal surgery between 2015 and 2019 reported considerable obstetric risks, such as preterm birth (up to 80%) and premature rupture of membranes. In this context, fetoscopic repair has emerged as a promising, less invasive alternative. Recent studies show that standardized fetoscopic techniques result in a mean gestational age at delivery of 39 weeks, compared to 35.9 weeks in the iterative technique group (P<0.01). Fetoscopy was also associated with lower rates of dehiscence (1% vs. 26%) and perinatal mortality (5% vs. 14%) compared with open repair. In the long term, 79% of children undergoing fetoscopic repair achieved community ambulation, although only 26% retained normal bladder function. Deficits in executive functions and the need for additional interventions were associated with poorer motor prognosis. The size and location of the defect directly influence functional recovery, and although mobility improves, urinary and bowel dysfunction often persist. Despite these limitations, early surgery has been linked to better quality-of-life outcomes, highlighting the importance of early prenatal intervention in specialized centers.
Conclusion: Prenatal techniques, including open surgery and fetoscopy, provide significant benefits in motor function and reduce the need for cerebrospinal fluid shunting. Fetoscopy stands out for its lower maternal morbidity and mortality, as well as improved gestational preservation. Nevertheless, challenges remain regarding neurodevelopment and bladder function, underscoring the need for multidisciplinary care and further studies to refine existing techniques.

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Keywords: Myelomeningocele, Spinal Dysraphism, Postoperative Complications, Treatment Outcome, Surgical Procedures

Prenatal versus Postnatal Surgery in the Correction of Myelomeningocele: A Comparative Systematic Review of Functional Outcomes

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INTRODUCTION: Myelomeningocele is a neural tube defect characterized by spinal cord exposure. Prenatal surgery is an alternative to postnatal repair.
OBJECTIVE: To compare the functional outcomes of prenatal versus postnatal surgery for myelomeningocele. METHODS: This is a comparative systematic review conducted in the PubMed and LILACS databases using the PICOTS strategy: ("Myelomeningocele" OR "Spina Bifida") AND ("Fetal Surgery" OR "Prenatal Repair") AND ("Treatment Outcome" OR "Neurologic Function") AND ("Ventriculoperitoneal Shunt" OR "Hydrocephalus"). Randomized clinical trials and cohort studies from the last 10 years were included. After PRISMA-based screening, 5 studies were selected from 108 identified. RESULTS: Intrauterine surgery showed better outcomes, with less leg length discrepancy and reduced use of orthoses at 12 (37.7% vs. 53.9%) and 30 months (78.2% vs. 89.8%). The ventriculoperitoneal shunt rate was lower in the prenatal group (44% vs. 84%), as was the revision rate within 1 year (15.4% vs. 40.2%). At school age, greater independent ambulation (51.3% vs. 23.1%) and improved function were observed. These results confirm the superiority of prenatal repair in neurological and functional outcomes. CONCLUSION: Despite obstetric risks, prenatal surgery for myelomeningocele leads to better neurological outcomes than postnatal repair.

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Keywords: Myelomeningocele, Fetal Surgery, Ventriculoperitoneal Shunt

Spina Bifida in Brazil: Analysis of Child Deaths between 2019 and 2023

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Introduction: Spina bifida is the most common neural tube defect and presents high morbidity and mortality. It is characterized by a cleft in the vertebral column, with a

corresponding defect in the skin, so that the meninges and spinal cord are exposed. Data from DATASUS (2019-2023) records 3,238 live births with the anomaly, and 297 infant deaths. Factors such as access to early surgical treatment and multidisciplinary follow-up are critical for reducing mortality. Objective: To compare infant deaths from spina bifida with affected live births, by Brazilian region (2019-2023). Methodology: descriptive epidemiological study via DATASUS, filters: diagnosis "spina bifida"; period "2019-2023"; data on live births and infant deaths by region. Result: The infant mortality rate was 9.17% (297/3,238). The North (15.6%) and Central-West (13.3%) had the highest regional infant mortality rates. Regarding the absolute number of deaths, the Northeast (114) and Southeast (76) regions accounted for 64% of them. Conclusion: The high infant mortality reflects challenges in access to specialized treatments: high mortality rates in the North and Central-West regions highlight regional inequalities. Therefore, regional policies for early diagnosis and a comprehensive support network are urgently needed.

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Keywords: spinal dysraphisme, epidemiology, Brasil

Case Report: Is Severe Encephalocele incompatible with life? When to operate?

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Case Presentation: A premature newborn at 35 weeks presented with a large apical encephalocele and was stable at birth. Surgery was performed on the 8th day of life, with a good postoperative course and discharge after 21 days. The patient later developed complications related to significant cerebral loss, leading to death at 5 months of age.
Discussion: Encephalocele is a rare congenital malformation of the central nervous system with a multifactorial etiology. Treatment is surgical, taking into account the clinical condition and family wishes. Prognosis varies depending on location, herniated neural tissue, and associated malformations. In this case, the family was informed of the surgical risks and chose to proceed with surgery. Resection of the encephalocele and correction of the cranial defect were performed despite intraoperative hemodynamic instability. The postoperative period was uneventful, and the patient was discharged. However, due to extensive cerebral malformation, the patient developed infectious and respiratory complications, leading to death at 5 months of age.
Final Comments: The surgical decision in severe encephalocele cases should consider not only prognosis but also the clinical condition and family wishes. In this case, despite a guarded prognosis, the newborn's good condition and parental desire allowed for five months of meaningful interaction.

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Keywords: Encephalocele, Neural tube defect, Case report

Epidemiological Analysis of Deaths in Children and Adolescents with Spina Bifida by Region in Brazil; Análise Epidemiológica dos Óbitos em Crianças e Adolescentes Espinha Bífida por região no Brasil.

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Epidemiological Analysis of Deaths in Children and Adolescents with Spina Bifida by Region in Brazil
Introduction: Spina bifida (SB) is a congenital defect of the spine resulting from partial development of the neural tube, which occurs when it does not close completely during pregnancy and can be fatal. It is essential to evaluate the epidemiology of deaths due to SB. Objective: To understand the epidemiological profile of deaths in children and adolescents with SB by region in Brazil. Methods: Cross-sectional ecological study using DATASUS TABNET. Results: Infant deaths in Brazil due to SB from 2014 to 2024 totaled 222 deaths in the age group of 0 to 19 years. The Northeast region had the highest prevalence, while the North region, despite ranking 3rd in the prevalence of deaths, had the highest mortality rate (3.69). Results related to color/race showed a higher incidence among mixed-race individuals,

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but with a higher mortality rate for Black and Indigenous individuals.
Conclusion: SB remains a significant health challenge in Brazil. The disparities highlighted in this study emphasize the need for more effective and targeted public policies, especially in the North and Northeast regions, to ensure equitable access to healthcare and effective prevention. This includes expanding access to healthcare, early diagnosis, and appropriate treatment.

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Keywords: Spina bifida, deaths, children; Espinha bífida ,óbitos, crianças

ESPINA BÍFIDA NO BRASIL: UM ESTUDO ECOLÓGICO DE SÉRIE TEMPORAL (2010–2023); ESPINHA BÍFIDA NO BRASIL: UM ESTUDO ECOLÓGICO DE SÉRIE TEMPORAL (2010–2023)

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Introduction: Spina Bifida (ICD-10 Q05) often requires complex neurosurgical interventions, making its analysis essential for understanding the demand for these procedures in the country. Objective: To analyze the temporal trend of the Q05 detection rate from 2010 to 2023 in Brazil and its regions. Methodology: This is an ecological study using data on Q05 cases in Brazil from 2010 to 2023, obtained from the Live Birth Information System. The selected variables were the Q05 detection rate per 100,000 live births, year, and region. The modified Mann-Kendall trend test was performed using Python 3.9 software. Results: A total of 9,968 Q05 cases were recorded in Brazil between 2010 and 2023. A temporal increasing trend (p=0.001; Sen's Slope=0.56) in the Q05 detection rate was identified nationwide. Individually, three regions also showed an increasing trend: Northeast (p<0.001; Sen's Slope=1.23), Central-West (p=0.008; Sen's Slope=0.65), and North (p=0.01; Sen's Slope=0.41). Conclusion: A positive temporal trend in the Q05 detection rate was observed in Brazil and, individually, in the Northeast, Central-West and North regions.

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Keywords: Spina Bifida; Epidemiology; Brazil Disrafismo Espinhal; Epidemiologia; Brasil

SPINA BIFIDA IN BRAZIL: AN ECOLOGICAL TIME SERIES STUDY (2010–2023) ; ESPINHA BÍFIDA NO BRASIL: UM ESTUDO ECOLÓGICO DE SÉRIE TEMPORAL (2010–2023)

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SPINA BIFIDA IN BRAZIL: AN ECOLOGICAL TIME SERIES STUDY (2010–2023)

Introduction: Spina Bifida (ICD-10 Q05) often requires complex neurosurgical interventions, making its analysis essential for understanding the demand for these procedures in the country. Objective: To analyze the temporal trend of the Q05 detection rate from 2010 to 2023 in Brazil and its regions. Methodology: This is an ecological study using data on Q05 cases in Brazil from 2010 to 2023, obtained from the Live Birth Information System. The selected variables were the Q05 detection rate per 100,000 live births, year, and region. The modified Mann-Kendall trend test was performed using Python 3.9 software. Results: A total of 9,968 Q05 cases were recorded in Brazil between 2010 and 2023. A temporal increasing trend (p=0.001; Sen's Slope=0.56) in the Q05 detection rate was identified nationwide. Individually, three regions also showed an increasing trend: Northeast (p<0.001; Sen's Slope=1.23), Central-West (p=0.008; Sen's Slope=0.65), and North (p=0.01; Sen's Slope=0.41). Conclusion: A positive temporal trend in the Q05 detection rate was observed in Brazil and, individually, in the Northeast, Central-West and North regions.

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Keywords: Spina Bifida; Epidemiology; Brazil Disrafismo Espinhal; Epidemiologia; Brasil

SAFER Technique for Myelomeningocele Repair: Advances and Neurological Benefits; Técnica SAFER para Correção de Mielomeningocele: Avanços e Benefícios Neurológicos

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SAFER Technique for Myelomeningocele Repair: Advances and Neurological Benefits

Introduction: Myelomeningocele, a severe form of spina bifida, presents a challenge for pediatric neurosurgery. The SAFER technique (Skin-over-biocellulose for Antenatal FEtoscopic Repair), developed in Brazil, is an innovation in the treatment of this condition. This approach uses biocellulose as a substitute for the dura mater in fetal endoscopic correction, helping to preserve neurological functions and reduce complications. Objective: To evaluate the effectiveness of the SAFER technique in the treatment of myelomeningocele, its impact on improving neurological outcomes, and reducing maternal-fetal complications. Methods: This is an observational and retrospective study, based on an integrative literature review. The PubMed, Jornal da USP, and RSD Journal databases were consulted using keywords related to the topic. Results: The SAFER technique demonstrated significant benefits for both fetuses and mothers. Studies indicate that more than 50% of treated fetuses are able to walk without assistance after birth. Additionally, a significant reduction was observed in the need for ventriculoperitoneal shunting for the treatment of hydrocephalus, a common complication of myelomeningocele. Conclusion: The SAFER technique represents a significant advancement in fetal neurosurgery, as it improves neurological outcomes, reduces maternal complications, and lowers the need for postnatal interventions. These findings reinforce the potential of the technique as a promising alternative in the treatment of myelomeningocele.

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Keywords: Técnica SAFER, Mielomeningocele, Neurocirurgia fetal ; SAFER Technique, Myelomeningocele. Fetal Neurosurgery.

ENDOSCOPY

CHOROID PLEXUS CAUTERIZATION ON TREATMENT OF HYDRANENCEPHALY AND MAXIMAL HYDROCEPHALUS: A RETROSPECTIVE ANALYSIS

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Objective: analysis of the effectiveness of choroid plexus coagulation in controlling hydrocephalus in patients with hydranencephaly and extreme hydrocephalus. Methods: the cohort included patients operated on between 2006 and 2024. The inclusion criteria were: at least three months of post-operative follow-up and complete medical records. Results: sixty patients underwent surgery during the period, 41 of whom were included. Their mean age was 93 days, the median was 44 (3 to 618) and 51% were male. In the cohort, 26 (63.4%) patients had hydranencephaly and 15 (36.6%) had extreme hydrocephalus. Seven (17.1%) underwent IIIVT simultaneously. During follow-up, 14 (34.1%) required PVD, at a median of 75 (30 to 365) and an average of 107 days after surgery. Of those who underwent IIIVT, the rate was 42.8%. Of those with hydranencephaly, this rate was 30.7%, while in extreme hydrocephalus it was 40%. Three (7,3%) had complications, with 1 case of fistula and 2 infections. There were no deaths associated with the surgery. Conclusion: choroid plexus coagulation is an effective method for controlling head circumference in patients with hydranencephaly and extreme hydrocephalus.

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Keywords: Hydrocephalus, Neuroendoscopy, Choroid plexus, Hydranencephaly

EPILEPSY

Outcomes of vagus nerve stimulation and responsive neurostimulation in pediatric patients with drug-resistant epilepsy

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Introduction: The use of neurostimulation devices has become an alternative for drug-resistant epilepsy. The use of vagus nerve stimulation (VNS) and responsive neurostimulation (RNS) in the pediatric population are the most widely used practices in large research centers. Objective: This systematic review aims to evaluate the

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results of neurostimulation in patients with drug-resistant epilepsy. Methods: A search was performed on PubMED (MEDLINE) and Cochrane Central Register of Controlled Trials (CENTRAL) databases, and the results were recorded according to the PRISMA protocol. Results: The parameters used to evaluate the satisfactory response to treatment were: reduction in seizures, electroencephalogram dynamics, clinical follow-up time, device tolerance, and adverse effects. After implantation of VNS and RNS devices, most patients had ≥ 50% reduction in seizures, and the rates increased with clinical follow-up ≥ 12 months. Conclusion: RNS is increasingly being used as an alternative to VNS, with VNS being most commonly used as the first option in newborns and children, and RNS for adolescent and young adult populations. Combined VNS + RNS therapy is being studied for its therapeutic potential.

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Keywords: Drug-resistant epilepsy, Neurostimulation, Pediatric

REFRACTORY EPILEPSY IN CHILDHOOD: CONTRIBUTIONS OF PREOPERATIVE EVALUATION TO PROGNOSIS – A SYSTEMATIC REVIEW

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INTRODUCTION: Refractory epilepsy in children requires therapeutic approaches beyond pharmacological treatment, with surgery being a promising alternative. However, the decision for surgical intervention demands a thorough preoperative evaluation to localize the epileptogenic zone and assess potential impacts on neurodevelopment. OBJECTIVE: To analyze the contribution of preoperative evaluation modalities to surgical planning and neurodevelopmental outcomes. METHODS: A systematic review was conducted following PRISMA guidelines, using the databases NHI/Medline, Cochrane Library, and Wiley. The PICO strategy guided the search, with the descriptors "Preoperative Evaluation," “Refractory Epilepsy,” “Neurodevelopment,” “Pediatrics,” and “Surgical Prognosis,” combined using the Boolean operators “AND” and “OR.” After applying eligibility criteria, 4 studies were included out of the 44 identified, consisting of cohort studies and clinical trials. RESULTS: Surgery, when guided by techniques such as magnetoencephalography and stereoelectroencephalography, yields better seizure control outcomes due to greater precision in identifying the epileptic focus. However, in cases of cortical malformations, postoperative outcomes tend to be less predictable. CONCLUSION: It is concluded that surgery supported by functional brain mapping and multimodal evaluation is safe and effective, with clinical outcomes strongly influenced by the etiology of epilepsy and the individual response to treatment.

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Keywords: Keywords: Refractory Epilepsy, Neurodevelopmental Disorders, Pediatrics, Refractory Epilepsy, Developmental Disorders

Estudo epidemiológico comparativo das internações e mortalidade por epilepsia nas regiões Sudeste e Nordeste do Brasil (2020–2024)

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INTRODUÇÃO: Epilepsia é a doença neurológica mais prevalente do mundo, gerando predisposição permanente para gerar crises epilépticas. Entender sua distribuição nas duas regiões mais populosas do Brasil pode promover a identificação de desigualdades regionais e a avaliação da eficácia do sistema de saúde. OBJETIVO: Analisar o padrão de internações e mortalidade por epilepsia nas regiões Sudeste e Nordeste do Brasil entre os anos de 2020 e 2024, destacando os estados com maiores quantidades de internações. METODOLOGIA: Estudo observacional transversal com dados do DataSUS, filtrando internações e óbitos por epilepsia nos anos de 2020 e 2024. RESULTADOS: No período analisado, as regiões Sudeste e Nordeste apresentaram grande aumento das internações (aumentos de 33,9% e 46,3%, respectivamente), bem como aumento na taxa de mortalidade (aumentos de 0,24% e 0,57%, respectivamente). Os estados que apresentaram maiores números de internação foram São Paulo (52% das

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internações no Sudeste) e Bahia (27,2% dos casos no Nordeste). CONCLUSÃO: Apesar de mais recursos humanos e financeiros no Sudeste, ainda há dificuldades em reduzir internações e mortalidade por epilepsia, sugerindo falhas na prevenção e diagnóstico precoce. No Nordeste, o aumento pode refletir melhor notificação. Os dados destacam a necessidade de estratégias regionais para manejo eficaz da epilepsia.

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Epilepsy surgery on the treatment of "incurable" disease

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Clinical Presentation: 9-year-old presenting with focal epileptic seizures on the left hemibody since 5 years of age. At the age of 7, she progressed to having short-term focal seizures in a very high frequency, almost continuum. The clinical diagnosis at the time was Rasmussen Syndrom. Even after adjusting anticonvulsive therapy, the patient progressed with worsening duration and frequency of the seizures, regressing neuropsychological development, and presented with dysarthria and dysphagia, complicating with multiple pneumonia secondary to bronchoaspiration. A right hemispherectomy was performed about a year ago, with the anatomopathological diagnosis of Focal Cortical Dysplasia type IIa. After surgical resection, the patient progressed with better control of the seizures and recovered the neuropsychological development.
Discussion: Even in situations of diseases such as Rasmussen's syndrome, known as Untreatable Focal Epilepsy, surgery with a large resection area is an effective therapeutic choice, ensuring a better quality of life and development of those patients.
Final Comments: After surgery, the patient reduced the number of seizures and recovered steps on the neuropsychological development, allowing even the dose reduction of the anticonvulsive medication despite the reserved prognosis of Rasmussen's syndrome.

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Keywords: Epilepsy, Rasmussen Syndrom, Hemispherectomy

Intraoperative electrocorticography (ECoG) in the determination of the resection area on extensive lesions

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Clinical Presentation: 6-year-old presenting with severe epileptic encephalopathy secondary to an extensive structural lesion on the left hemisphere due to herpetic meningocephalitis. First seizure at 2 years of age with drop-attacks followed by tonical movements of the right hemibody about 20 times a day. In July of 2024, intraoperative electrocorticography presented multiple epileptogenic discharges beginning from the medial frontal gyrus and superior frontal gyrus. We proceeded with surgical resection of the epileptogenic focus on the frontal lobe preserving the rolandic area, pars opercularis, and pars triangularis of the inferior frontal gyrus (Broca Area), in addition to disconnection of the postcentral gyrus and the parietal lobe. The post-ressection ECoG showed no abnormal discharges. In the months immediately after surgery, the patient had only one or two nocturnal seizures a day.
Discussion: Transoperative electrocorticography helps delimitate the resection area and allows a low-cost and more precise functional surgery.
Final Comments: The patient has been without seizures since December of 2024, reducing anticonvulsive medications.

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Keywords: Epilepsy, ECoG, Transoperative Electrocorticography

REFRACTORY EPILEPSY IN CHILDHOOD: CONTRIBUTIONS OF PREOPERATIVE EVALUATION TO PROGNOSIS – A SYSTEMATIC REVIEW

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INTRODUCTION: Refractory epilepsy in children requires therapeutic approaches beyond pharmacological treatment, with surgery being a promising alternative. However, the decision for surgical intervention demands a thorough preoperative evaluation to localize the epileptogenic zone and assess potential impacts on neurodevelopment. OBJECTIVE: To analyze the contribution of preoperative evaluation modalities to surgical planning and neurodevelopmental outcomes. METHODS: A systematic review was conducted following PRISMA guidelines, using the databases NHI/Medline, Cochrane Library, and Wiley. The PICO strategy guided the search, with the descriptors "Preoperative Evaluation," “Refractory Epilepsy,” “Neurodevelopment,” “Pediatrics,” and “Surgical Prognosis,” combined using the Boolean operators “AND” and “OR.” After applying eligibility criteria, 4 studies were included out of the 44 identified, consisting of cohort studies and clinical trials. RESULTS: Surgery, when guided by techniques such as magnetoencephalography and stereoelectroencephalography, yields better seizure control outcomes due to greater precision in identifying the epileptic focus. However, in cases of cortical malformations, postoperative outcomes tend to be less predictable. CONCLUSION: It is concluded that surgery supported by functional brain mapping and multimodal evaluation is safe and effective, with clinical outcomes strongly influenced by the etiology of epilepsy and the individual response to treatment.

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Keywords: Refractory Epilepsy, Neurodevelopmental Disorders, Pediatrics, Electroencephalography, Presurgical Evaluation

FUNCTIONAL

Deep brain stimulation versus vagus nerve stimulation in the treatment of refractory depression: A comparative meta-analysis of efficacy and safety

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Introduction: Depression is a disease that affects more than 300 million people around the world. This disorder is considered refractory when it doesn't respond properly to a course of antidepressant treatment. Thus, alternative methods of therapy have emerged, including deep brain stimulation and vagus nerve stimulation.
Methods: A systematic review and meta-analysis were conducted in accordance with the PRISMA 2020 guidelines. PubMed, Embase, Scopus, and Web of Science databases were searched to identify studies published from January 2015 to December 2024. For inclusion, studies must address DBS or VNS in the treatment of refractory depression. The study compared the effectiveness of these interventions using the HDRS scale.
Results: Studies showed that DBS had a significant mean difference of 2.80 to 23.10, with high heterogeneity, while VNS had a consistent mean difference of 8.30 to 17.00, with moderate heterogeneity, suggesting superior performance of 6.07 to 13.49 units compared to DBS.
Conclusion: Although both interventions showed significant efficacy, DBS showed greater variability in results, while VNS showed more homogeneous effects, suggesting a more consistent response among patients. Thus, VNS may be a more predictable option for symptom reduction, while DBS requires individualization due to high heterogeneity.

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Keywords: "Systematic Review", "Neurosurgery", "Deep Brain Stimulation", "Depression"

Comparative study between traditional surgical techniques and complementary approaches used in the decompression of Chiari malformation type 1

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Introduction: Chiari malformation type I is defined by a displacement of at least 5 mm of the cerebellar tonsils through the foramen magnum. The most common surgery performed in these cases is posterior fossa decompression (PFD), which may require additional techniques in addition to traditional surgery. Objective: The objective of this systematic review is to perform a comparative analysis

between the surgical techniques used in the approach to decompression in Chiari type 1 malformation. Methods: We conducted a search in the PubMED (MEDLINE) and Cochrane Central Register of Controlled Trials (CENTRAL) databases, registering according to the PRISMA protocol. Results: Performing PFD alone may be a safer initial surgical option, as it has fewer risks of complications and infections, but when associated with syringomyelia, PFD with duraplasty was the most effective option reported. In cases with symptoms of myelopathy, intra-arachnoid dissection is an alternative. Conclusion: The choice of surgical technique will depend on the clinical findings, imaging tests, and whether there are other conditions associated with the initial malformation, requiring individual investigation to propose the best surgical strategy.

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Keywords: Chiari malformation, Surgical Techniques, Decompression

DEEP BRAIN STIMULATION IN PEDIATRIC DYSTONIA: SYSTEMATIC REVIEW OF CLINICAL EFFICACY, FUNCTIONALITY, AND SAFETY ACROSS DIFFERENT ETIOLOGICAL CONTEXTS

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Introduction: Deep brain stimulation (DBS) has emerged as a promising therapeutic alternative for children with refractory dystonia. However, outcomes vary widely depending on etiology and the evaluation instruments used. Objective: To assess the clinical efficacy, functionality, and safety of DBS in pediatric patients with dystonia of multiple causes. Methods: Systematic review conducted in accordance with PRISMA guidelines. The PICO strategy guided inclusion criteria. PubMed, Cochrane Library, and BVS databases were searched using MeSH/DeCS terms related to dystonia, DBS, and pediatric population. A total of 1389 studies were identified, of which 8 met the eligibility criteria, totaling 101 patients. Results: DBS demonstrated clinical efficacy and overall safety, with variations in response profiles by etiological subtype. Acquired (n=54) and genetic (n=31) dystonias were most frequent. Clinical improvement was observed in up to 91% of cases, with average BFMDRS reductions of 35–50% and functional gains measured by tools such as COPM. Metabolic and rare genetic dystonias (n=16) showed benefits from multi-target DBS. Reported complications were rare, usually mild, and manageable. Conclusion: DBS is an effective and safe therapeutic option for pediatric dystonia, with favorable outcomes in well-defined subgroups.

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Keywords: Dystonia, Deep brain stimulation, Pediatrics, Movement disorders, Functional neurosurgery.

DEEP BRAIN STIMULATION IN THE TREATMENT OF PRIMARY GENERALIZED DYSTONIA IN CHILDREN: A SYSTEMATIC REVIEW OF CLINICAL OUTCOMES

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Introduction: Primary generalized dystonia is a chronic and progressive neurological condition that compromises motor function and quality of life. Deep brain stimulation of the internal globus pallidus (DBS-GPi) has proven to be an effective neurosurgical approach. Objective: To evaluate clinical and functional outcomes and surgical accuracy of DBS-GPi in children with primary generalized dystonia. Methods: A systematic review was conducted following the PRISMA protocol, guided by the PICOTT model, with searches in the MedLine, BVS, and Cochrane databases. Studies published from 2020 to 2025 were included. After screening 21 articles, 3 were selected. Results: A mean reduction of 66.9% in dystonia severity was reported in patients with the DYT1 mutation, along with cognitive preservation and decreased medication use. Positive clinical responses occurred in up to 90% of cases with varied etiologies. High surgical accuracy was achieved with robotic assistance, alongside improvements in motor fluency and functional performance. It was identified that stimulation in the posterior GPi, with stronger motor and sensory connectivity, resulted in better clinical results. Conclusion: DBS-GPi is a safe, effective, and precise intervention for pediatric primary dystonia. When performed early and with detailed neuroanatomical planning, it provides lasting benefits in motor function and quality of life.

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Keywords: Deep Brain Stimulation, Globus Pallidus Internus, Dystonia, Child, Pediatric.

Motor Function After Intrathecal Umbilical Cord Cell Infusion in Children and Adolescents With Cerebral Palsy: A Systematic Review of Eight Randomized Double-Blind Trials

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Cerebral palsy (CP) is a chronic encephalopathy that impairs motor development and represents one of the leading causes of physical disability in childhood. Cell therapy with human umbilical cord-derived mesenchymal stem cells (MSCs) has emerged as an innovative therapeutic approach. Experimental evidence suggests that the motor function benefits observed are predominantly mediated by paracrine signaling, through which MSCs release a set of bioactive molecules capable of modulating the neural microenvironment, promoting neuroprotection, reducing inflammation, and enhancing synaptic plasticity. Objective: To analyze the efficacy of treatment with umbilical cord mesenchymal stem cells (UC-MSCs) on motor function in children and adolescents with CP. Methods: This systematic review was conducted based on randomized double-blind clinical trials indexed in PubMed, following the PRISMA 2020 guidelines. The search strategy was independently carried out by two reviewers (D.M.A. and F.F.S.), using controlled DeCS/MeSH descriptors combined as follows: “children cerebral palsy” AND “cell transplantation.” Initially, 106 studies were identified in PubMed. After applying filters — randomized clinical trials published within the last ten years — 95 studies were excluded. Titles and abstracts of the remaining 11 studies were independently assessed by two additional reviewers (D.M.A. and I.F.S.). Inclusion criteria required that studies had an available abstract, were peer-reviewed, and involved children with cerebral palsy treated exclusively with UC-MSCs administered intrathecally. After screening, four studies met all criteria and were included in this review. Results and Discussion: A total of 88 individuals aged 6 months to 20 years participated in the included clinical trials. Significant improvement was observed in both muscle strength (MS) and gross motor function, assessed by the GMFM-66 scale, in the experimental group (n = 32) compared with placebo, with differences noted at 1, 3, and 6 months of follow-up (0.94 vs. –0.35; 2.71 vs. 0.65; 8.54 vs. 2.60; $p < 0.01$, respectively; Figures 1 and 2). Two studies published in 2021 and 2022, involving 72 children aged 4 to 14 years, reported sustained positive effects after 12 months of intervention with single doses of MSCs (2×10^7 and 5×10^6). The experimental groups (n = 36) showed significant improvement in GMFM-66 scores compared with baseline ([10.65; 95% CI: 5.39–15.91] and [9.62; 95% CI: 6.75–12.49]) and with control groups ([8.07; 95% CI: 1.62–14.52; Cohen’s d = 0.92] and [1.23; 95% CI: –3.33–5.80], respectively). Furthermore, one trial involving eight pairs of monozygotic twins demonstrated similar results at 1 and 6 months. Conclusion: Umbilical cord-derived cell therapy is safe and effective for the management of children with cerebral palsy.

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Keywords: Cerebral palsy, Umbilical cord mesenchymal stem cells, Intrathecal infusion, Motor function, Randomized controlled trials

Motor Function After Intrathecal Umbilical Cord Cell Infusion in Children and Adolescents With Cerebral Palsy: A Systematic Review of Eight Randomized Double-Blind Trials

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Keywords: Cerebral palsy, Umbilical cord mesenchymal stem cells, Intrathecal infusion, Motor function, Randomized controlled trials

HYDROCEPHALUS

Application of Machine Learning Predictive Models to Prevent Ventriculoperitoneal Shunt Failure in Pediatric Hyd

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Pediatric hydrocephalus affects approximately 0.5–1.5 per 1,000 live births, with ventriculoperitoneal (VP) shunting as the standard treatment. Up to 40% of shunts fail within the first year, increasing morbidity and readmissions. We aimed, through a narrative literature review, to assess the performance of machine learning (ML) models in the early prediction of VP shunt failure in children. Studies applying ML algorithms (such as logistic regression, decision trees, and neural networks) to pediatric cohorts undergoing VP shunting were included. Analyzed variables encompassed demographic data, intracranial pressure parameters, neuroimaging features (CT and MRI), and infection history. Model accuracy, sensitivity, and specificity were extracted. In 70% of studies, predictive models achieved accuracy above 85%, mean sensitivity of 82%, and specificity of 80%. ML use reduced shunt failures by up to 25% by enabling preventive interventions, such as pressure adjustments or targeted antibiotic prophylaxis. ML models demonstrate potential to predict VP shunt failure, individualize follow-up, and reduce complications. Integration of clinical data and neuroimaging optimizes therapeutic decisions. Prospective multicenter studies are needed to validate these algorithms and standardize their clinical application in pediatric neurosurgery.

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Keywords: Hidrocefalia pediátrica; Derivação ventriculoperitoneal; Aprendizado de máquina; Modelos preditivos; Falha de shunt; Neuroimagem; Medicina personalizada Pediatric hydrocephalus; Ventriculoperitoneal shunting; Machine learning; Predictive models; Shunt failure; Neuroimaging; Personalized medicine

Ventriculo-Biliary Shunt as an Alternative in Complex Hydrocephalus: A Case Report

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Case Presentation
A 15-year-old male adolescent with complex hydrocephalus associated with Chiari type I malformation and multiple central nervous system anomalies had previously undergone several failed ventriculoperitoneal shunt procedures due to recurrent infections and peritoneal adhesions. He presented with abdominal pain and progressive distension. A CT scan revealed a large septated abdominal CSF pseudocyst measuring approximately 32.2 × 19.9 × 17.4 cm (estimated volume: 5,831 mL), extending from the epigastrium to the

iliac fossae. Given the technical impossibility of using conventional drainage sites, a ventriculo-biliary shunt was performed in collaboration with the laparoscopic surgery team. The postoperative course was uneventful, with satisfactory follow-up imaging.
Discussion
The ventriculo-biliary shunt is an uncommon but valuable therapeutic alternative for managing hydrocephalus in complex cases where traditional CSF diversion sites are no longer feasible. It is indicated particularly in scenarios involving multiple shunt failures, peritoneal adhesions, or recurrent infections. Although rare, this technique is documented in the neurosurgical literature as effective when selected appropriately, requiring meticulous anatomical evaluation, surgical planning, and close postoperative monitoring. Special attention must be given to confirming proper distal catheter positioning to prevent rare complications such as inadvertent intravesical placement.
Final Comments
This case highlights the ventriculo-biliary shunt as a viable and safe alternative in refractory hydrocephalus, emphasizing the need for technical expertise and multidisciplinary follow-up.

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Keywords: Neurosurgery, Hydrocephalus, Cerebrospinal Fluid Shunts, Nervous System Diseases, Brain Diseases

Choroid plexus cyst in an infant: Case report

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Case presentation: A previously healthy 5-month-old male infant presented with irritability, vomiting, and sudden-onset drowsiness. Imaging exams revealed hydrocephalus, and magnetic resonance imaging identified a choroid plexus cyst obstructing the foramen of Monro and the third ventricle. Endoscopic cyst resection combined with third ventriculostomy was successfully performed without complications. The patient exhibited a good postoperative recovery and remained asymptomatic during a 4-year follow-up period, without recurrence or need for further intervention.
Discussion: This case emphasizes that acute-onset obstructive hydrocephalus in infants may be associated with choroid plexus lesions, confirmed by magnetic resonance imaging. Additionally, treatment using an endoscopic approach reduces long-term complications.
Final Comments: Choroid plexus cysts may represent an underdiagnosed etiology of obstructive hydrocephalus in infants. Endoscopic resection combined with third ventriculostomy proved to be effective and associated with an excellent prognosis.

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Keywords: Choroid Plexus, Infant, Hydrocephalus

The role of Liliequist's membrane in endoscopic third ventriculostomy: Case report

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Case presentation: A previously healthy 4-year-old male patient presented with headache and vomiting lasting one month, without abnormalities on physical examination. Diagnostic imaging revealed obstructive hydrocephalus caused by a posterior fossa tumor. An external ventricular drain was placed, followed by tumor resection and endoscopic third ventriculostomy (ETV). Despite the procedure, postoperative MRI demonstrated persistent ventricular dilation and lack of cerebrospinal fluid flow due to inadequate opening of Liliequist's membrane, necessitating surgical revision. Discussion: ETV is an effective technique for treating obstructive hydrocephalus by allowing cerebrospinal fluid diversion through an opening created in the floor of the third ventricle. However, anatomical barriers such as Liliequist's membrane may compromise procedural success. This case highlights the importance of intraoperative evaluation of this structure, as its obstruction can lead to technical failure and necessitate surgical reintervention. Final Comments: ETV combined with appropriate surgical revision contributes significantly to optimizing clinical outcomes.

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Keywords: Ventriculostomy, Hydrocephalus, Neurosurgery.

Endoscopic third ventriculostomy versus ventriculoperitoneal shunt in pediatric hydrocephalus: a systematic review of efficacy and safety across clinical contexts

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Introduction: Endoscopic third ventriculostomy (ETV) and ventriculoperitoneal shunt (VPS) are widely used procedures in the management of pediatric hydrocephalus. The choice between techniques depends on factors such as age, etiology, and others. Objective: To compare the efficacy and safety of ETV versus VPS in different clinical presentations of hydrocephalus in children. Methods: Systematic review conducted in accordance with PRISMA guidelines. The PICO strategy was used to define eligibility criteria. PubMed, Cochrane Library, and BVS databases were searched using the descriptors: ("Endoscopic Third Ventriculostomy" OR "ETV") AND ("Ventriculoperitoneal Shunt" OR "VPS") AND ("Hydrocephalus") AND ("Child" OR "Infant" OR "Adolescent" OR "Pediatrics" OR "Children"). A total of 386 studies were identified; 63 after filters, 13 fully reviewed, and 10 included. Results: A total of 795 pediatric patients were analyzed, with 527 treated with ETV (with or without CPC) and 268 with VPS. ETV showed comparable efficacy to VPS, with better outcomes in obstructive hydrocephalus due to posterior fossa tumors and myelomeningocele. In postinfectious hydrocephalus, ETV+CPC showed similar cognitive outcomes and failure rates to VPS. ETV tended to fail earlier and VPS later. Conclusion: Both are effective and safe techniques, with specific advantages depending on clinical context.

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Keywords: Hydrocephalus, Ventriculostomy, Ventriculoperitoneal shunt, Pediatric neurosurgery, Endoscopy.

COMPARATIVE EVALUATION OF CLINICAL OUTCOMES OF NEUROSURGICAL TECHNIQUES IN HYDROCEPHALUS AFTER INTRAVENTRICUL

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Introduction: Post-intraventricular hemorrhage hydrocephalus (POH) is a frequent complication in premature neonates. The main surgical strategies include external ventricular drain (EVD), ventriculo-subgaleal shunt (VSG), ventriculoperitoneal shunt (VPS) and neuroendoscopy. Objective: To compare the clinical and neurological outcomes associated with the main neurosurgical techniques in neonatal HPH. Method: A systematic review was carried out according to the PRISMA protocol, guided by the PICOTT model, with searches in the NiH/MedLine, VHL, Cochrane and Wiley databases, including studies between 2015 and 2025. After screening 29 articles, 6 were selected for analysis. Results: EVD had a higher rate of infection (50%) and reintervention (66.7%) compared to SVG (8.3% for both). Neuroendoscopy, when combined with EVD, showed a reduction in permanent shunt dependency and complications. In the long term, early permanent shunting resulted in lower cognitive scores. Early shunting and lower accumulated ventricular volume correlated with better cognitive and motor scores. Conclusion: The choice of technique, the timing of the intervention and the control of ventricular size are determining factors for clinical and neurocognitive outcomes. Neuroendoscopy is a promising alternative for reducing sequelae and the need for definitive shunts, due to the early removal of debris.

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Keywords: Posthemorrhagic Hydrocephalus, Neurosurgical Procedures, Prematurity

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Anti-inflammatory and neuroprotective effects of glucocorticoids in a kaolin-induced model of hydrocephalus

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Hydrocephalus is a neurological condition characterized by the pathological accumulation of cerebrospinal fluid into the ventricles, leading to structural and functional alterations in the central nervous system. Glucocorticoids, such as dexamethasone, are widely used for their anti-inflammatory and immunosuppressive properties; however, their potential neuroprotective effects remain unclear. This study aimed to evaluate the impact of dexamethasone in a kaolin-induced hydrocephalus model, focusing on neuroinflammation, astrogliosis, and demyelination. Wistar rats were allocated into four groups: control (C), control treated with dexamethasone (CTD), untreated hydrocephalic (HNT), and hydrocephalic treated with dexamethasone (HTD). Hydrocephalus was induced via intracisternal kaolin injection, and treated animals received dexamethasone (0.5 mg/kg/day) via intraperitoneal administration. Cognitive performance was assessed using Morris water maze, while immunohistochemical and ELISA analyses were conducted for GFAP and MBP. The HTD group exhibited reduced weight gain and impaired spatial memory. Immunohistochemistry and ELISA revealed increased GFAP expression in hydrocephalic groups, with a reduction in the treated group, whereas MBP analysis indicated decreased myelin preservation in treated animals. These findings suggest that dexamethasone does not exert a significant neuroprotective effect in experimental hydrocephalus and may even aggravate demyelination, so its therapeutic use is not recommended.

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Keywords: Dexamethasone, Glucocorticoids, Hydrocephalus, Neuroprotection, Neuroinflammation

Pediatric Hydrocephalus: Diagnostic and Therapeutic Approaches (2019-2024)

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Introduction: Pediatric hydrocephalus is a neurological condition characterized by abnormal accumulation of cerebrospinal fluid, leading to ventricular dilation and increased intracranial pressure. Its etiology may be congenital or acquired, with significant impact on neurodevelopment and high morbidity and mortality rates.
Objective: To review the current literature on diagnostic and therapeutic strategies for pediatric hydrocephalus, focusing on epidemiology and main management approaches.
Methodology: An integrative literature review was conducted in PubMed, SciELO, Google Scholar, and MedRxiv, covering the period 2019–2024. The search included the terms hydrocephalus, pediatric, diagnosis, and treatment. Nine eligible studies were selected.
Results: Advanced MRI achieved up to 95% diagnostic accuracy, while cranial ultrasound proved effective for early detection in preterm neonates. Lumbar puncture was useful for infection-related hydrocephalus. Therapeutically, endoscopic third ventriculostomy (ETV) showed fewer complications compared to ventriculoperitoneal (VP) shunting, though shunts maintained an overall efficacy of 76%, with high failure rates within two years. Modern devices with adjustable valves and anti-siphon systems reduced complications. Emerging alternatives, such as intraventricular fibrinolysis with urokinase and endoscopic ventricular lavage, demonstrated potential to reduce shunt dependence but require specialized expertise.
Conclusion: Advances in imaging and surgical techniques have improved the management of pediatric hydrocephalus, yet challenges persist regarding shunt failure and the lack of effective pharmacological options. Future directions include longitudinal studies, genetic and molecular therapies, and the development of less invasive and more efficient treatment modalities.

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Keywords: Pediatric Hydrocephalus; Imaging Diagnosis; Ventriculoperitoneal Shunting; Endoscopic Third Ventriculostomy; Intraventricular Fibrinolysis; Endoscopic Ventricular Lavage.

Deaths from Congenital Hydrocephalus in Brazil from 2014 to 2023: An Interregional and Age-Based Analysis Using DATASUS Records

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Introduction: Congenital hydrocephalus is a severe neurological condition associated with high infant morbidity and mortality. In Brazil, analyzing its mortality is essential to identify regional disparities and age-related vulnerabilities. Objective: To describe the profile of deaths from congenital hydrocephalus in children aged 0 to 4 years in Brazil (2014–2023), focusing on regional and age-related variations.
Methods: Descriptive study using data from the SIH/SUS (DATASUS), including cases of congenital hydrocephalus (ICD-10 Q03) in children aged 0–4 years from 2014 to 2023. Deaths were analyzed by region and age groups: 0–6 days, 7–27 days, 28–364 days, and 1–4 years. Descriptive statistics were performed using Microsoft Excel. Results: From 2014 to 2023, 2,579 deaths were recorded, with the highest proportion in the Northeast (30.98%), followed by the Southeast (28.46%). The 28–364-day age group accounted for 44.1% of deaths—2.1 times higher than the average of the other age groups (20.9%). For temporal analysis, the period was divided into two quinquennia (2014–2018 and 2019–2023), with 469 fewer deaths in
the latter, representing an 18.18% reduction. Conclusion: Despite technological advances, mortality from congenital hydrocephalus in Brazil remains significant, especially during the first year of life, requiring timely interventions.

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Keywords: Hydrocephalus, Epidemiology, Child, Public Health Administration Hydrocephalus, Epidemiologic Methods, Child, Public Health Administration

Comparison of Complications and Efficacy Between ETV and VPS in Pediatric Hydrocephalus: A Systematic Review.

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Introduction: Hydrocephalus, characterized by the accumulation of cerebrospinal fluid (CSF) in the ventricular system, requires early neurosurgical intervention. The main treatment options include ventriculoperitoneal shunt (VPS) and endoscopic third ventriculostomy (ETV). Objective: To compare complications and outcomes of ETV and VPS. Methodology: This systematic review was conducted using PubMed, Embase, and Web of Science databases. The following search terms were used: "Endoscopic third ventriculostomy", "Ventriculoperitoneal shunt", "Pediatric hydrocephalus". Articles published between 2019 and 2024 were included if they directly compared ETV and VPS in pediatric patients. Case reports, small series (<20 patients), and studies without comparative statistical analysis were excluded. Results: ETV showed a lower risk of infection (OR: 0.19) and complications (4.6% vs. 27.1% in VPS), as well as a longer reoperation-free survival (751.55 vs. 454.49 days, p=0.013). Primary success rates were equivalent (81.8% ETV vs. 86.7% VPS, p=0.93). Factors such as elevated CSF protein and FOIR index changes (7.28% VPS vs. 4.40% ETV, p=0.001) were predictive of reoperation. Mortality rates were similar between techniques (OR: 0.77). Conclusion: ETV demonstrated a lower risk of infection and complications compared to VPS, with inconclusive efficacy.

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Keywords: Ventriculoperitoneal shunt, Endoscopic third ventriculostomy, Pediatric Hydrocephalus.

Evaluation of the anti-inflammatory and neuroprotective effects of glucocorticoids in kaolin-induced hydrocephalus

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Hydrocephalus is a neurological condition characterized by the pathological accumulation of cerebrospinal fluid into the ventricles, leading to structural and functional alterations in the central nervous system. Glucocorticoids, such as dexamethasone, are widely used for their anti-inflammatory and immunosuppressive properties; however, their potential neuroprotective effects remain unclear. This study aimed to evaluate the impact of dexamethasone in a kaolin-induced hydrocephalus model, focusing on neuroinflammation, astrogliosis, and demyelination. Wistar

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rats were allocated into four groups: control (C), control treated with dexamethasone (CTD), untreated hydrocephalic (HNT), and hydrocephalic treated with dexamethasone (HTD). Hydrocephalus was induced via intracisternal kaolin injection, and treated animals received dexamethasone (0.5 mg/kg/day) via intraperitoneal administration. Cognitive performance was assessed using Morris water maze, while immunohistochemical and ELISA analyses were conducted for GFAP and MBP. The HTD group exhibited reduced weight gain and impaired spatial memory. Immunohistochemistry and ELISA revealed increased GFAP expression in hydrocephalic groups, with a reduction in the treated group, whereas MBP analysis indicated decreased myelin preservation in treated animals. These findings suggest that dexamethasone does not exert a significant neuroprotective effect in experimental hydrocephalus and may even aggravate demyelination, so its therapeutic use is not recommended.

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Keywords: Dexamethasone; hydrocephalus; neuroprotection.

Therapeutic Alternative for Cases of Complex Hydrocephalus: Ventriculoatrial Shunting via the Suprahepatic Vein

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Case Presentation: A preterm infant (32 weeks, 900g), twin, with severe neonatal complications, including anoxia, enterocolitis, and hydrocephalus due to grade III intraventricular hemorrhage. Initially treated with a ventriculoperitoneal shunt (VPS), the patient required multiple reoperations due to infections, dysfunctions, and cerebrospinal fluid-related complications. Various procedures were performed, including ventriculoatrial (VAS), ventriculosinus, ventriculosubgaleal, and external ventricular shunts. The patient developed neuropsychomotor delay and refractory epilepsy. At 13 years, persistent ventricular dilation led to further interventions, culminating at 14 years in a ventriculoatrial shunt via ultrasound-guided puncture of the left suprahepatic vein with catheter placement in the right atrium, a method not previously described in the literature. The patient is currently under follow-up without further hydrocephalus-related interventions. Discussion: Ventricular shunts are the standard treatment for pediatric hydrocephalus, but frequent reoperations pose a significant challenge for pediatric neurosurgeons. This study is based on a literature review and medical record analysis of a patient treated at a tertiary university hospital to explore therapeutic alternatives for complex hydrocephalus. Final Remarks: This case highlights ventriculoatrial shunting via the suprahepatic vein as a viable option for complex hydrocephalus, demonstrating satisfactory outcomes despite being a rarely described technique.

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Keywords: ventriculoatrial shunt; hydrocephalus; suprahepatic vein

Endoscopic Surgery versus Ventriculoperitoneal Shunt in Pediatric Hydrocephalus

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Ventriculoperitoneal shunt (VPS) and Endoscopic Third Ventriculostomy (ETV) are among the main surgical approaches for pediatric hydrocephalus. This study serves as an initial investigation aimed at comparing the success rates, complications, and need for re-interventions between ETV and VPS in the treatment of pediatric hydrocephalus. We utilized the PICO and PRISMA methods, along with inclusion and exclusion criteria, for study screening. Data were extracted from the PubMed database, synthesized into a table, and analyzed to evaluate the efficacy and safety of VPS versus ETV. Findings indicate that ETV demonstrated success rates similar to or slightly higher than VPS, with a lower risk of complications, such as infection and the need for reoperation. Although ETV had a higher failure rate in some studies, VPS showed more late failures. Patient age was a significant factor, with better outcomes for ETV in older children. The choice between ETV and VPS should consider the patient's age, comorbidities, and the risk of complications. Both methods are viable, but ETV may be preferable in certain contexts, especially in older children and in locations with a high risk of infection.

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Keywords: Pediatric Hydrocephalus, Endoscopic Third Ventriculostomy, Ventriculoperitoneal Shunt, Efficacy, Complications

Therapeutic Alternative for Complex Hydrocephalus Cases: Ventriculo-Atrial Shunting via the Suprahepatic Vein

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Case Presentation: A premature twin patient born at 32 weeks of gestation (900g) presented with severe neonatal complications, including anoxia, enterocolitis, and hydrocephalus due to grade III intraventricular hemorrhage. Initially treated with a ventriculo-peritoneal shunt (VPS), the patient underwent multiple reoperations due to infections, dysfunctions, and cerebrospinal fluid-related complications. Several surgical procedures were performed, including ventriculo-atrial (VAS), ventriculo-sinus, ventriculo-subgaleal, and external ventricular shunts. The patient developed neuropsychomotor delay and refractory epilepsy. At 13 years of age, persistent ventricular dilation necessitated new approaches, culminating at age 14 in a ventriculo-atrial shunt placement via ultrasound-guided puncture of the left suprahepatic vein with catheter insertion into the right atrium—a method not previously described in the literature. The patient is currently under follow-up without requiring further interventions for hydrocephalus. Discussion: Ventricular shunting is the standard treatment for pediatric hydrocephalus; however, frequent reoperations pose significant challenges for pediatric neurosurgeons. This study is based on a review of scientific literature and an analysis of the medical records of a patient treated at a tertiary-level university hospital to explore therapeutic alternatives for complex hydrocephalus. Final Remarks: This case highlights ventriculo-atrial shunting via the suprahepatic vein as a viable option for complex hydrocephalus, demonstrating satisfactory outcomes despite being a minimally described technique.

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Keywords: Ventriculo-atrial shunting, hydrocephalus, suprahepatic vein

MANEJO DE COMPLICAÇÕES RELACIONADAS À DERIVAÇÃO VENTRICULOPERITONEAL EM CRIANÇAS: UMA REVISÃO SISTEMÁTICA

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INTRODUÇÃO: A derivação ventriculoperitoneal (DVP) é amplamente utilizada no tratamento da hidrocefalia pediátrica. Embora eficaz, pode gerar complicações que afetam negativamente o neurodesenvolvimento infantil. OBJETIVO: Analisar as principais complicações associadas à DVP em crianças e suas implicações nos desfechos clínicos e neurodesenvolvimentais. MÉTODO: Realizou-se uma revisão sistemática segundo PRISMA, com buscas nas bases Library, BVS, SciELO e MEDLINE, guiadas pela estratégia PICO e nos descritores “derivação ventriculoperitoneal”, “complicações pós-operatórias”, “hidrocefalia”, “obstrução de shunt” e “pediatria”, combinados pelos operadores booleanos “AND” e “OR”. Após aplicação dos critérios de elegibilidade, 6 estudos foram incluídos dentre os 332 encontrados, entre eles ensaios clínicos, estudos observacionais e randomizados. RESULTADOS: Na hidrocefalia pós-hemorrágica (HPH), a derivação precoce do LCR está associada a melhor cognição, maior volume hipocampal e menor tamanho ventricular. Todavia, pacientes com hidrocefalia pós-infecciosa (HPI) apresentaram coleções subdurais, volumes cerebrais reduzidos e piores escores cognitivos. Shunts VP mostraram maior risco de acúmulo subdural comparado à ventriculostomia endoscópica do terceiro ventrículo e cauterização do plexo coróide. A inserção guiada por ultrassom foi mais precisa que a técnica convencional. CONCLUSÃO: As complicações associadas à DVP impactam os desfechos clínicos e neurodesenvolvimentais, sendo a intervenção precoce e o uso de técnicas precisas decisivas para melhores resultados.

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Keywords: Complicações Pós-Operatórias, Derivação Ventriculoperitoneal, Hidrocefalia, Obstrução de Shunt.

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MANEJO DE COMPLICAÇÕES RELACIONADAS À DERIVAÇÃO VENTRICULOPERITONEAL EM CRIANÇAS: UMA REVISÃO SISTEMÁTICA

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INTRODUCTION: Ventriculoperitoneal shunting (VPS) is widely used in the treatment of pediatric hydrocephalus. Although effective, it can lead to complications that negatively affect child neurodevelopment. OBJECTIVE: To analyze the main complications associated with VPS in children and their implications for clinical and neurodevelopmental outcomes. METHODS: A systematic review was conducted according to PRISMA, with searches in the Library, BVS, SciELO, and MEDLINE databases, guided by the PICO strategy and using the descriptors “ventriculoperitoneal shunt,” “postoperative complications,” “hydrocephalus,” “shunt obstruction,” and “pediatrics,” combined with the Boolean operators “AND” and “OR.” After applying the eligibility criteria, 6 studies were included from the 332 identified, including clinical trials, observational, and randomized studies. RESULTS: In post-hemorrhagic hydrocephalus (PHH), early cerebrospinal fluid diversion is associated with better cognition, increased hippocampal volume, and reduced ventricular size. However, patients with post-infectious hydrocephalus (PIH) presented subdural collections, reduced brain volumes, and lower cognitive scores. VP shunts showed a higher risk of subdural accumulation compared to endoscopic third ventriculostomy with choroid plexus cauterization. Ultrasound-guided insertion was more accurate than the conventional technique. CONCLUSION: Complications associated with VPS impact both clinical and neurodevelopmental outcomes, with early intervention and the use of precise techniques being decisive for better results.

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Keywords: Complicações Pós-Operatórias, Derivação Ventriculoperitoneal, Hidrocefalia, Obstrução de Shunt

IMPACT OF INTRAUTERINE SURGERY FOR MYELOMENINGOCELE IN REDUCING HYDROCEPHALUS: A COMPARATIVE ANALYSIS

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Objective: to compare the outcomes of in utero and postnatal repair for myelomeningocele in secondary hydrocephalus development.
Methods: this retrospective cohort included patients who underwent in utero or postnatal myelomeningocele repair between 2019 and 2025. Inclusion criteria were a birth head circumference less than Z+3 and at least six months of postnatal follow-up. The authors followed the same protocol and technique of the MOMS trial, except the fetus’ larger ventricular diameter should be equal or less than 17mm.
Results: the study included 20 prenatal and 50 postnatal patients. In the prenatal group, 70% of subjects were preterm (median gestational age (GA) of 34 weeks and 6 days). One case of dehiscence (5%) occurred, with no additional complications. During the observation period, one patient (5%) developed hydrocephalus and required ventriculoperitoneal shunt (VPS), with no further complications. In the postnatal group, 16% of subjects were preterm (median GA of 38 weeks and 2 days). Seven cases of wound dehiscence (14%) and 10 cases of cerebrospinal fluid fistulas (20%) were identified. Furthermore, 36 (72%) patients developed hydrocephalus, 86,1% of whom during their initial hospitalization. Of these patients, 32 (89%) required VPS, with 12 cases of infection (37,5%), 7 cases requiring a subsequent third ventriculostomy (21,9%) and 12 cases requiring VPS revision (37,5%). The remaining 4 (11%) of the postnatal patients underwent upfront third ventriculostomy, with 1 (25%) requiring a subsequent VPS.
Conclusion: prenatal surgery proved to be superior to posnatal surgery in preventing the development of hydrocephalus, despite the higher rate of prematurity.

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Keywords: Myelomeningocele, Hydrocephalus, Fetal surgery

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STUDY OF OXIDATIVE STRESS IN HYDROCEPHALIC RATS WITH AND WITHOUT CSF SHUNT TREATMENT

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Introduction: Hydrocephalus results from an imbalance between cerebrospinal fluid (CSF) production and absorption, leading to ventriculomegaly, increased intracranial pressure, and neurological damage. Brain tissue compression reduces blood flow, promoting hypoxia, ischemia, and oxidative stress mediated by reactive oxygen species (ROS). Endogenous antioxidants can attenuate these effects, and CSF shunting restores CSF dynamics, but also causes tissue reperfusion, which can generate additional ROS.
Objective: The study investigated oxidative stress in hydrocephalic rats, with or without surgical treatment by ventriculosubcutaneous shunt (VSS), by measuring malondialdehyde (MDA).
Methods: Sixty male rats were divided into the following groups: control, hydrocephalic without treatment, and hydrocephalic treated with VSS. Hydrocephalus was induced by kaolin injection and confirmed by ultrasonography. The brains were collected 24h, 48h or 7 days after VSS.
Results: The results showed an increase in MDA 24h after VSS ($p<0.05$), a decrease in 48h ($p<0.02$) and a new increase after 7 days ($p<0.003$), although smaller than in the first peak. On the other hand, hydrocephalic patients without treatment showed a gradual increase in MDA.
Conclusions: The results may indicate that CSF shunt causes tissue decompression and consequent acute reperfusion, which would lead to an increase in ROS production.

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Keywords: hydrocephalus, oxidative stress, csf shunt treatment

Cavum septum pellucidum cyst in children: a diagnostic and therapeutic challenge in obstructive hydrocephalus

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Introduction: The cavum septum pellucidum (CSP) cyst is characterized by the accumulation of cerebrospinal fluid (CSF) in a midline cavity located between the lateral ventricles. In most cases, it is an incidental and asymptomatic finding. However, in rare situations, it may obstruct CSF flow and lead to obstructive hydrocephalus.
Objective: To evaluate the effectiveness of endoscopic treatment for cavum septum pellucidum cysts based on the available scientific evidence.
Method: Was conducted a systematic review of cases of CSP cysts associated with obstructive hydrocephalus that were treated endoscopically. The findings were compared with a clinical case managed by the authors.
Results: Has been reported the case of a 6-year-old female patient presenting with signs of intracranial hypertension. Magnetic resonance imaging revealed a large CSP cyst obstructing the foramen of Monro. The patient underwent endoscopic treatment, resulting in resolution of the hydrocephalus and significant clinical improvement. The literature review identified 39 similar cases, supporting the efficacy and safety of the endoscopic approach.
Conclusion: Endoscopic treatment has proven to be an effective and safe option for symptomatic cavum septum pellucidum cysts, standing out as a minimally invasive therapeutic alternative with favorable clinical outcomes.

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Keywords: Hydrocephalus, cavum septum pellucidum cyst, endoscopic neurosurgery, fenestration

MISCELLANEOUS

Robotic Surgery in Pediatric Neurosurgery: Advances, Safety and Clinical Applications

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Introduction: Robotic surgery (RS) has gained relevance in medicine due to its technological advances. In the area of pediatric neurosurgery, especially in spinal procedures, RC

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has demonstrated benefits such as greater precision, reduced surgical time, better implant positioning and lower rate of postoperative complications. This minimally invasive technique provides greater safety, better recovery and lower reintervention rates, reducing exposure to intraoperative radiation. Objective: To evaluate the efficacy of RC in pediatric neurosurgical procedures. Methods: Systematic review conducted according to the PRISMA protocol, using the MEDLINE (PubMed) databases and the DeCS/MeSH descriptors: (robotic neurosurgery) AND (pediatric) OR (spine surgery). A total of 47 articles in English and Portuguese were identified, of which 11 were selected for the final synthesis, excluding articles unrelated to the topic. Results: Robotic technology has demonstrated efficacy in several pediatric neurosurgical procedures. In biopsies, it has been shown to be less invasive and more controlled, especially when performed by experienced teams. Assisted ablation for epilepsy has shown high accuracy and safety, while tumor resection surgeries have also benefited from the technology at a lower cost. In patients with unilateral cerebral palsy, improvements in gait and brain connectivity were observed. In addition, the placement of screws in the spine has shown promise, reinforcing the stability of the procedures. Conclusion: CR has the potential to become an essential tool in pediatric neurosurgery, offering greater accuracy and safety. However, continuous training of neurosurgeons is essential for the effective implementation of the technology and improvement of clinical results.

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Keywords: robotic neurosurgery, pediatric, surgery

Gene and Cellular Therapies in the Treatment of Congenital Neurological Diseases

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Introduction: Congenital neurological diseases (CNDs) represent a significant challenge for pediatric neurosurgery, as many of them result in severe neurological complications, requiring early interventions to minimize functional deficits. Gene and cell therapies emerge as promising approaches to repair neurological damage and improve brain plasticity. Objective: To evaluate the impact of gene and cell therapies in the treatment of CNDs and their possible applications in pediatric neurosurgery. Methods: Systematic review carried out according to the PRISMA guidelines, with a search in the MEDLINE (PubMed) database using the DeCS/MeSH descriptors: (congenital neuroinfection) OR (Cell- and Tissue-Based Therapy) AND (neuroinfections). Fifteen articles published in English and Portuguese were analyzed, of which 4 were selected for final synthesis. Results: Studies indicate that pharmacological inhibition of certain enzymes can reduce viral replication, mitigating the neurological impact. Furthermore, modulation of reactive astrocytes has demonstrated neuroprotective potential, contributing to the reduction of neuroinflammation. Cellular therapies, such as neural stem cell transplantation, have shown regeneration of damaged brain tissue. In pediatric neurosurgery, it optimizes functional recovery and long-term prognosis, such as ventriculoperitoneal shunts for secondary hydrocephalus and brain reconstruction techniques. Conclusion: Gene and cellular therapies have significant potential in pediatric neurosurgery, and can be combined with surgical interventions to improve neurological outcomes in children with NCD. However, their clinical implementation still requires further studies and standardization of protocols to ensure long-term safety, efficacy, and viability. Keywords: Neurosurgery; Pediatric; Cell- and Tissue-Based Therapy

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Keywords: Neurosurgery; Pediatric; Cell and Tissue-Based Therapy

Eosinophilic Meningitis Following Suboccipital Craniotomy with Bovine Dural Graft for Chiari Malformation Type I: A Case Report

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Case Presentation:
A 1.5-year-old child was referred to neurosurgery due to an unsteady gait persisting for four months. Brain and spinal cord MRI revealed a 1 cm tonsillar herniation and a C5–T1 syrinx, consistent with Chiari malformation type I. The patient underwent suboccipital craniectomy with duraplasty using a bovine dural graft, with good postoperative recovery.

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Forty days later, the child presented with fever, headache, and vomiting. Intravenous antibiotics were initiated. Ten days after discharge, the patient returned with severe headache. CT revealed hydrocephalus, and CSF analysis showed 12,960 cells/µL with 15% eosinophils. Corticosteroids and new antibiotics were started, with gradual clinical improvement and resolution of the inflammatory process.
Discussion:
Eosinophilic meningitis is a rare condition, usually associated with parasitic infections but may also result from immune reactions to foreign materials such as heterologous dural grafts. The delayed symptom onset, favorable response to corticosteroids, and absence of identifiable pathogens in the CSF support the hypothesis of an inflammatory reaction to the implanted material, without the need for surgical removal.
Final Comments:
This case highlights the importance of considering eosinophilic meningitis in the differential diagnosis following surgery with heterologous grafts. Conservative management with corticosteroids can be effective, potentially avoiding reoperation. Outpatient follow-up confirmed complete clinical recovery.

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Keywords: Neurosurgery, Infant, Meningitis, Nervous System Diseases, Congenital Abnormalities

Congenital Anomalies of the Central Nervous System: Temporal, Regional, Ethnoracial, and Sex-Based Variations in Brazilian Capital Cities (2023–2024)

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Introduction:
Congenital anomalies of the central nervous system (CNS) are significant causes of morbidity and mortality in childhood. Epidemiological analysis of these conditions can guide prevention strategies and early clinical or surgical interventions.
Objectives:
To analyze the frequency and distribution of CNS congenital anomalies in Brazilian capital cities between 2023 and 2024, according to sex, race/ethnicity, and temporal trends.
Methods:
A cross-sectional study using data from DATASUS, including hospital admissions of infants under one year of age diagnosed with spina bifida and other CNS malformations. Data from 2023 and 2024 were compared regarding geographic distribution, sex, and race/ethnicity.
Results:
A total of 1,732 admissions were recorded in 2023 and 1,617 in 2024, representing a 6.6% reduction. The capitals with the highest number of cases were São Paulo, Salvador, Recife, and Rio de Janeiro. The most marked variation occurred in Boa Vista (–92.9%), while Rio Branco showed a notable increase (+66.7%). Sex distribution remained balanced, with a slight predominance of females in 2024 (51%). In both years, the majority of cases occurred in infants identified as mixed-race (67.7% in 2023; 73.0% in 2024), particularly in Salvador and Recife. Indigenous cases were rare and concentrated in a few cities, such as Natal and Porto Velho.
Conclusion:
Hospitalizations for CNS anomalies revealed a regionally uneven pattern, with a predominance among mixed-race patients and stable distribution between sexes, highlighting disparities that warrant targeted public health responses.

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Keywords: Neurosurgery, Congenital Abnormalities, Epidemiology, Brain Diseases, Nervous System Diseases

Meningococcal Meningitis in an Infant Progressing to Epidural Abscess and Infected Arachnoid Cyst: A Case Report.

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Case Presentation
A previously healthy 5-month-old male infant was admitted with meningococcal meningitis. After seven days of appropriate antibiotic therapy, he persisted with fever,

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without focal neurological signs. A cranial CT scan on 02/23/2025 revealed a left frontoparietal extra-axial hypodense collection, up to 0.5 cm thick, suggesting subdural empyema or chronic hematoma. A follow-up CT on 02/27 showed persistence of the lesion. Brain MRI on 03/07 confirmed a frontal epidural abscess. Craniotomy was performed on 03/11, revealing an arachnoid cyst containing yellow-citrus fluid, with no visible pus. Postoperative CT on 03/12 showed no residual collections and favorable evolution.

Discussion

Epidural abscess as a complication of meningococcal meningitis in infants is rare, particularly in the absence of suggestive clinical signs or contiguous infectious foci. Persistent fever alone prompted further imaging, which proved essential for diagnosis. CT had limited specificity, whereas MRI was crucial for lesion characterization. The intraoperative finding of an arachnoid cyst with suspected secondary infection post-meningitis, although uncommon, has been reported in isolated cases, expanding the spectrum of intracranial complications in this age group.

Final Comments

This case underscores the importance of clinical vigilance and early imaging in infants with persistent fever during meningitis. The association of an epidural abscess with a potentially infected arachnoid cyst represents a rare and relevant finding.

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Keywords: Neurosurgery, Meningitis, Infant, Nervous System Diseases, Brain Disease

Prematurity-related hemorrhage and different neurosurgical approach techniques: A Systematic Review

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INTRODUCTION: Germinal Matrix Hemorrhage (GMH) is common in preterm infants, especially those born before 32 weeks of gestation and with low birth weight. Grades III and IV of the Papile classification are associated with worse outcomes, such as hydrocephalus and intraparenchymal brain lesions. Surgical treatment aims to reduce intracranial hypertension and preserve neurological function, although the ideal timing for intervention remains controversial. OBJECTIVE: Evaluate neurosurgical approaches used in preterm infants with GMH and their implications for neurological sequelae. METHODS: A systematic review was conducted based on the PICO framework, following PRISMA guidelines, with a search in the MEDLINE database for studies from the last 10 years. RESULTS: Fourteen studies were included, analyzing a total of 71,037 neonates. The main sequelae were cerebral palsy, developmental delay, hydrocephalus, and cognitive impairments. Factors such as sepsis, mechanical ventilation, and gestational age influenced outcomes. Among surgical procedures evaluated, ventricular shunts, fibrinolytic injections, and neuroendoscopy stood out, with varying efficacy and risks. CONCLUSION: GMH can lead to severe neurological sequelae, requiring individualized surgical interventions. The choice of technique and timing should consider clinical conditions. The review highlights the importance of personalized approaches and multidisciplinary teams. Further research is essential to standardize strategies and improve outcomes.

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Keywords: Prematurity, Germinal matrix hemorrhage, Neonatal, Hydrocephalus, Neuroendoscopy.

Artificial Intelligence as an Auxiliary Tool in the Preoperative Planning of Pediatric Neurosurgeries: An Integrative Review

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Introduction: Pediatric neurosurgery presents unique challenges that require high precision in surgical planning. Artificial intelligence (AI) has emerged as a promising ally in

this context, with applications including anatomical segmentation, outcome prediction, and surgical simulations. Objective: To analyze the role of AI as a support tool in the preoperative planning of pediatric neurosurgeries. Methods: An integrative review was conducted using the NIH/MedLine database, considering publications from 2021 to 2025. Search strategy: ("Artificial Intelligence" OR "Machine Learning" OR "Deep Learning") AND ("Neurosurgery" OR "Brain Surgery" OR "Surgical Planning" OR "Preoperative") AND ("Pediatric" OR "Child" OR "Infant"). A total of 363 articles were identified, with 5 selected according to the inclusion criteria. Results: In craniosynostosis, computational models using machine learning and finite element analysis have been employed to predict surgical outcomes and personalize treatments. In hydrocephalus, neural networks help predict shunt failure, infections, and endoscopic third ventriculostomy success, as well as automatically segment brain ventricles. Other applications include the prediction of postoperative complications such as cerebral vasospasm.Conclusion: AI has the potential to transform pediatric neurosurgical planning, offering greater precision and safety.

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Keywords: Artificial inteligence, IA, Machine Learning, Neurosurgery, Surgery Planing.

Middle Fossa Meningoencephalocele with Cerebrospinal Fluid Otorrhea in a Pediatric Patient Following Mastoidectomy: Case Report and Systematic Literature Review

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Introduction:
Middle fossa meningoencephalocele is rare in children and occurs due to herniation of brain tissue and meninges through temporal bone defects, often associated with cerebrospinal fluid (CSF) otorrhea and meningitis.
Objectives:
To report an uncommon pediatric case following mastoidectomy and to systematically review the clinical, diagnostic, and therapeutic aspects of middle fossa meningoencephalocele.
Methods:
Case report of a pediatric patient accompanied by a systematic literature review conducted according to PRISMA guidelines using PubMed and Embase databases.
Results:
A 12-year-old patient developed persistent CSF otorrhea and headaches following mastoidectomy performed due to chronic otitis media. CT and MRI revealed a middle fossa meningoencephalocele. Surgical treatment included middle fossa craniotomy, resection of herniated brain tissue, and skull base reconstruction using autologous bone graft. Complete symptom resolution was achieved without recurrence. The review included 13 patients from 8 studies. CSF otorrhea and hearing loss were common findings. Various surgical techniques (transmastoid, middle fossa, and combined) demonstrated similar efficacy.
Conclusion:
Although uncommon in pediatric populations, middle fossa meningoencephalocele should be suspected in persistent postoperative otorrhea cases. Middle fossa craniotomy proved to be a safe and effective definitive treatment.

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Keywords: Neurosurgery, Child, Middle Cranial Fossa

INTRAOPERATIVE ULTRASOUND, A HIGH-IMPACT TOOL IN PEDIATRIC NEUROSURGERY, APPLICATIONS AND USE.

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OBJECTIVE: To demonstrate the usefulness and scope of intraoperative ultrasound in pediatric patients. INTRODUCTION: Intraoperative ultrasound (IOUS) allows to optimize neurosurgical treatment. MATERIAL AND METHODS: Retrospective study of 39 pediatric patients who received neurosurgical treatment (2024-2025). RESULTS: Intraoperative ultrasound was used in patients diagnosed with Vascular malformations 10 (26%), Brain tumor 11 (28%), Vascular access 8 (20%), Shunt surgery 6 (15%), Intraspinal tumors 1 (3%), Tethered spinal cord 1 (3%), Subdural hygroma 1 (3%), Filum Lipoma 1 (3%). There were

no cases of surgical site infection or injuries associated with the use of the transducer. CONCLUSION: Intraoperative ultrasound is an available tool, with short learning curves, that allows in vascular surgery: to identify subcortical AVMs, using the color effect it measures the nidal and drainage vein flow (shunt) and also allows the femoral approach in cerebral angiography. Tumor pathology: it allows to identify limits, size, identify the relationship with vascular structures and show areas of residual tumor. Spinal pathology: in tumors it allows to identify affected levels, in medullary anchorage it allows to identify the anchorage area and free edges for a safe dissection. It is an excellent tool to identify intracranial collections and to place catheters safely, verifying intraventricular and intraabdominal position.

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Keywords: intraoperative ultrasound, Arteriovenous malformation, Brain tumor, Utility, Pediatric.

SUPRACILIARY ORBITAL APPROACH IN PEDIATRIC PATIENTS: TECHNICAL NOTE, UTILITY, AND RESULTS.

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INTRODUCTION: The development of minimally invasive techniques has been shown to reduce morbidity in neurosurgical patients. OBJECTIVE: To highlight the technique used, advantages, and results obtained from the supraciliary orbital approach for the treatment of anterior skull base injuries. MATERIAL AND METHODS: Five orbitosupraciliary approaches were performed for the surgical treatment of 5 brain tumors: 4 craniopharyngiomas and 1 brain sarcoma (2023-2024). RESULTS: Sellar tumors, the average tumor diameter was 30 x 28 x 28 mm, average surgical incision length: 3.6 cm, average bone platelet size was 3.5x2.9 cm. The average intraoperative bleeding: 300cc. The main complications presented by the approach were: transient periorbital edema in 5 (100%), altered frontal sensitivity in 3 (60%) cases, CSF fistula in 1 (20%), we had no cases of operative wound infection. CONCLUSIONS: Extending the supraciliary minicraniotomy to the orbital bar significantly improves the surgical angle of view, avoiding excessive brain retraction and minimizing the possibility of parenchymal damage and damage to vascular and nervous structures. The orbitosupraciliary approach is a short, safe procedure that allows adequate visualization of the vascular and nervous structures of the skull base, offering good cosmetic results.

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Keywords: orbitosupraciliary approach, minicraniotomy, sellar tumor, anterior skull base tumor, Pediatric.

Neurosurgical Aspects of Coffin-Siris Syndrome 3: A Case Report

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Case Presentation: A 5-year-old male patient with a genetic diagnosis of Coffin-Siris Syndrome 3 (pathogenic variant in the SMARCB1 gene) presents with neuropsychomotor delay, developmental regression, and dysmorphic features. Notable potential neurosurgical manifestations include central hypotonia, risk of structural brain anomalies (e.g., thin corpus callosum, ventriculomegaly), and possible refractory epilepsy. Neuroimaging (brain MRI) is essential for evaluating associated malformations. Discussion: The SMARCB1 gene is part of the BAF complex, which plays a crucial role in neurogenesis. Anomalies in this complex may predispose individuals to central nervous system (CNS) malformations, such as cortical dysplasias or hydrocephalus. Hypotonia and motor delay may mask spinal cord compression, necessitating neuroimaging evaluation. Cases reported in the literature describe epileptic seizures, sometimes requiring surgical intervention in refractory cases. Final Remarks: This case highlights the need for thorough pediatric neurosurgical evaluation in patients with Coffin-Siris Syndrome 3 to identify treatable complications (e.g., hydrocephalus, surgically amenable epilepsy). The integration of genetics and pediatric neurosurgery is essential to optimize outcomes.

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Keywords: Coffin-Siris syndrome type 3, brain malformations, SMARCB1, pediatric neurosurgery,

Kawasaki Disease with Neurological Manifestations: A Case Report

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Case Presentation: A previously healthy 1-year-old male patient presented with persistent fever, exanthem, cervical lymphadenopathy, and marked irritability. Laboratory and imaging findings revealed coronary aneurysms and pericardial effusion, with a significant inflammatory response, confirming Kawasaki Disease (KD). During hospitalization, the patient developed neurological manifestations, requiring specialized follow-up. Discussion: Although KD is classically associated with cardiac complications, it can also present with neurological involvement, including irritability, aseptic meningoencephalitis, and facial palsy due to cerebral vasculitis. These manifestations may precede the typical clinical picture, complicating early diagnosis. Detailed neurological evaluation and neuroimaging are essential to identify complications such as intracranial aneurysms or cerebral ischemia, which require a multidisciplinary approach. Final Remarks: This case highlights the importance of recognizing neurological manifestations in KD, particularly for neurosurgeons who may encounter complications such as cerebral vasculitis or pediatric stroke. Early diagnosis and treatment are crucial to minimizing sequelae, emphasizing the need for close collaboration between pediatricians and neurologists.

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Keywords: Kawasaki disease, Neurological manifestations, Pediatric vasculitis

Distribuição especial e temporal das neurocirurgias em crianças até os 5 anos no Brasil de 2000 a 2024; Spatial and Temporal Distribution of Neurosurgeries in Children Aged 5 Years and Under in Brazil from 2000 to 2024.

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Introduction: The distribution of neurosurgeries in children under 5 years old in Brazil (2000-2024) reflects aspects of pediatric health, requiring procedures that consider their neurological and emotional development. Objective: To analyze the distribution of neurosurgeries in children under 5 years old in Brazil (2000-2024), identifying patterns of frequency, demographic profile, mortality, and regional inequalities. Method: An epidemiological, quantitative, descriptive, and retrospective study on neurosurgeries in children under 5 years old in Brazil, between 2000 and 2024. The data were extracted from DATASUS through SIH/SUS, considering sex, age, year, and location of the procedures, and analyzed descriptively. Results: Between 2008 and 2024, 15,539 hospitalizations for congenital malformations of the central nervous system were registered. The Southeast had the highest number of cases (5,380), followed by the Northeast (5,154). The majority of patients were under 1 year old (8,922) and female (51.58%). The mortality rate was 6.99%, with 1,064 deaths, and 2020 had the highest number of records (248). The data indicate a concentration of procedures in the Southeast and South, reflecting inequality. Conclusion: The study highlights the concentration of neurosurgeries in the Southeast and South, emphasizing regional inequalities and the importance of early diagnosis.

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Keywords: Neurocirurgia pediátrica, Malformações congênitas, Sistema nervoso central/ Pediatric neurosurgery, Congenital malformations, Central nervous system.

Implementation of Specialized Pediatric Neurosurgery Consultations; Implementação de Consultas Específicas de Neurocirurgia Pediátrica.

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Implementation of Specialized Pediatric Neurosurgery Consultations.

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Introduction: The implementation of specialized consultations in pediatric neurosurgery improves the quality of care, considering histological, anatomical, and pathophysiological particularities. Although there is a lower incidence of expansive lesions in traumatic brain injuries, hydrocephalus in childhood is complex. This study aims to analyze the relevance of these consultations in pediatric neurosurgery. Objective: To evaluate the impact and advancements of implementing specialized consultations in pediatric neurosurgery. Methodology: This is a systematic review of the PubMed, LILACS, and ScienceDirect databases (2019–2025), using MeSH/DeCS descriptors and the search strategy: ("Pediatric Neurosurgery Consultation" OR "Neurosurgery Pediatric Protocols") AND ("Implementation" OR "Protocol Development"). Randomized clinical trials, observational studies, and implementation studies were included, excluding articles without quantitative data or those not addressing the pediatric population. The selection followed PRISMA guidelines, with bias risk assessment using the Cochrane Risk of Bias Tool. Results: Specialized consultations improved treatment accessibility, reducing waiting times and optimizing clinical outcomes. The approach enabled early diagnoses and minimally invasive interventions. Furthermore, centralization and standardization reduced complications, resulting in better recovery and increased survival rates. Conclusion: The implementation of these consultations positively impacted the care of children with neurological conditions, promoting early diagnoses and better prognoses.
Implementação de Consultas Específicas de Neurocirurgia Pediátrica.

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Keywords: Specialized consultations, Pediatric neurosurgery,Protocol implementation; Consultas especializadas, neurocirurgia pediátrica, implementação de protocolos

Costs and results of treating children under 18 with cerebral hemorrhage in the North and South of Brazil between 2019 and 2024

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Introduction: Cerebral hemorrhage in children under 18 can have causes such as trauma, child abuse, vascular malformations, among others. Regardless of its origin, it is a serious event, often with adverse outcomes. However, there are few studies analyzing public spending and its effectiveness in caring for and preserving the lives of these patients.
Objective: To analyze public health spending in the North and South of Brazil, assessing its capacity to preserve life.
Method: Study using data from SIH/SUS, made available by DATASUS, considering the average cost per hospitalization and mortality rates by region.
Results: In the period analyzed, there were 466 hospitalizations for cerebral hemorrhage in the North region and 875 in the South. The costs were R$1,825,436.18 (North) and R$3,819,800.47 (South). The average cost per hospitalization was R$3,917.24 (North) and R$4,365.48 (South). The mortality rate was 15.45 (North) and 8.34 (South).
Conclusion: Despite similar costs, mortality was 85% higher in the North. This may indicate poor regional allocation and distribution of resources, requiring studies to justify this discrepancy and propose strategies for better preservation of life.

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Keywords: Keywords: Cerebral Hemorrhage, Children, Brazil, Health Care Costs

Neurocognitive Profile in Pediatric Cerebral Arteriovenous Malformations According to Angioarchitectural Features

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Introduction
Cerebral arteriovenous malformations (cAVMs) are congenital anomalies that alter cerebral hemodynamics [1]. In pediatric patients, they are a major cause of hemorrhage, with high morbimortality [2]. Although often asymptomatic, cAVMs can present with headaches, seizures, and cognitive deficits [3,4].
Objective
Evaluate cognitive deficits in pediatric patients with cAVMs and their potential association with angioarchitectural features, particularly, venous drainage patterns.
Methods
A retrospective observational study was conducted with 17 pediatric patients (ages 6–18) diagnosed with cAVMs. Cognitive function was assessed using the Brief

Neuropsychological Assessment Battery (6-12 and >12 years-old versions), evaluating attention, working memory, verbal fluency, memory, praxis, language, perception, and arithmetic skills. Performance was compared to age- and education- adjusted normative data. Descriptive statistics and the Wilcoxon test were applied.
Results
Patients with deep venous drainage cAVMs had lower scores in attention, working memory, verbal fluency, global memory, arithmetic ability, and both oral and written language. In contrast, those with superficial drainage demonstrated lower performance in episodic-semantic memory, praxis, and perception. Only oral language was significantly associated with deep venous drainage (p = 0.037).
Conclusion
Deep venous drainage in pediatric cAVMs may be associated with a tendency toward oral language deficits. Further studies are needed to validate and clarify these findings.

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Keywords: cerebral arteriovenous malformation, pediatric patients, cognitive deficits, neuropsychological assessment

Efficacy of Indirect Revascularization Techniques in Pediatric Moyamoya Disease: Angiographic Outcomes Using the Matsushima Scale—A Systematic Review and Meta-Analysis

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Background:
Moyamoya disease is a rare progressive cerebral vasculopathy characterized by narrowing or occlusion of the internal carotid arteries, leading to the formation of fragile collateral vessels and a high risk of ischemic events, especially in pediatric patients. Although direct revascularization techniques are commonly used, they are technically challenging in children due to vascular fragility and anatomy. Indirect revascularization techniques favor the formation of new blood vessels through alternative flow routes. Their efficacy is usually assessed using the Matsushima scale, which measures the degree of revascularization achieved. This study aims to analyze the effectiveness of these techniques in pediatric patients with Moyamoya, based on angiographic results.
Methods:
A systematic review and meta-analysis was performed following PRISMA guidelines, searching six databases (PubMed, Embase, Scopus, Web of Science, CENTRAL and Google Scholar) for observational studies that evaluated indirect revascularization techniques in pediatric patients with Moyamoya disease. Seventeen studies comprising 1,360 hemispheres were included. Primary outcomes were the proportions of angiographic revascularization according to grades A, B, and C of the Matsushima scale. Secondary outcomes included postoperative clinical complications such as stroke, transient ischemic attacks (TIAs), seizures, bleeding, mortality, and functional status assessed using the modified Rankin scale (mRS ≤2). Meta-analyses were performed with random-effects models in R study and risk of bias was assessed with the MINORS tool. Meta-regression was applied to explore possible predictors of outcomes. The certainty of evidence was assessed with the GRADE approach.
Results:
The combined proportions of hemispheres achieving Matsushima grades A, B and C were 47.1% (95% CI: 38.4-55.9; I^2 = 84.4%), 38.2% (95% CI: 32.0-44.9; I^2 = 84.4%) and 12.3% (95% CI: 9.3-16.0; I^2 = 47.0%), respectively. Postoperative complications were low: stroke 8.3%, TIA 7.2%, seizures 2.5%, bleeding 2.7% and mortality 0.8%. Good functional status (mRS ≤2) was achieved in 82.1% of patients. Meta-regression revealed that unilateral vs. bilateral procedures significantly predicted Matsushima grade B outcomes (p=0.002). The risk of bias was low to moderate. The certainty of evidence was generally low to moderate, except for mortality which showed high certainty.
Conclusions:
Indirect revascularization techniques in pediatric Moyamoya show favorable angiographic and clinical results, with low complications and high functional independence. According to the Matsushima scale, about 47% of the hemispheres achieved grade A, 38% grade B and 12% grade C. Pial synangiosis and EDAMS were more effective in grade A, whereas EDAS showed a lower proportion in grade A and slightly more in grade C. Postoperative complications were low and most patients achieved good functional status (mRS ≤2). These findings suggest the safe and effective use of indirect techniques, although the high heterogeneity and methodological limitations evidence the need for

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randomized studies to validate and optimize these results in the long term.

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Keywords: Pediatric Moyamoya, Indirect revascularization, Matsushima scale, Angiographic outcomes

CHOROID PLEXUS CAUTERIZATION ON TREATMENT OF HYDRANENCEPHALY AND EXTREME HYDROCEPHALUS: A RETROSPECTIVE ANALYSIS

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Objective: analysis of the effectiveness of choroid plexus coagulation (CPC) in controlling macrocephaly in patients with hydranencephaly and extreme hydrocephalus.
Methods: the cohort included patients operated on between 2006 and 2024. The inclusion criteria were: at least three months of post-operative follow-up and complete medical records. All patients were submited to endoscopic CPC. Endoscopic thirdventriculostomy (ETV) was added when feasible. Success was defined when no other surgical treatment was required.
Results: sixty patients underwent surgery during the period, 41 of whom were included. Their mean age was 93 days, the median was 44 (3 to 618) days and 51% were male. In the cohort, 26 (63.4%) patients had hydranencephaly and 15 (36.6%) had extreme hydrocephalus. Seven (17.1%) underwent endoscopic thirdventriculostomy (ETV) simultaneously. During follow-up, there was a 65,8% rate of therapeutic success, including 23 (67,6%) patients that underwent CPC and 4 patients (57,2%) that underwent CPC+ETV. Meanwhile, 14 (34.1%) patients required shunt insertion, at a median of 75 (30 to 365) and an average of 107 days after surgery. Of those with hydranencephaly, the rate of therapeutic failure was 30.7%, while in extreme hydrocephalus it was 40%. Six (14,6%) patients had major complications, with one case of cerebrospinal fluid leak, three cases of infections and two cases of electrocautery skin burns. Seven (17,1%) patients had minor complications, with one case of epileptic seizure, two cases of laryngospasm, two cases of bradypnea and two cases of thermal fluctuations. There were no deaths associated with the surgery.
Conclusion: choroid plexus coagulation is an effective method for controlling macrocephaly in two-thirds of patients with hydranencephaly and extreme hydrocephalus.

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Keywords: Hydrocephalus, Neuroendoscopy, Choroid plexus, Hydranencephaly

Middle cerebral artery aneurysm in an infant

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A 1-year and 2-month-old infant experienced their first seizure in October 2024. A cranial computed tomography (CT) scan revealed subarachnoid hemorrhage (SAH). Magnetic resonance angiography (MRA) identified a saccular aneurysm in the middle third of the M2 segment of the left middle cerebral artery, with a dome measuring 9.1 mm and a neck of 3.2 mm. Additionally, areas of recent parenchymal insult were observed in the left frontal and parietal lobes, along with cortical hemosiderin deposition. Echocardiography showed no abnormalities. In December 2024, the patient underwent microsurgical clipping using three straight clips without complications. The patient's clinical course has been stable, with no neurological deficits. Follow-up arteriography demonstrated no residual aneurysm. The patient was discharged on the 13th postoperative day, without new symptoms.
Cerebral aneurysms in children younger than two years are rare. When present, they tend to be larger, located in internal carotid artery and have a fusiform shape. Clinical presentation with seizures reinforces the importance of early neurovascular investigation in acute neurological events during childhood.
Despite their low incidence, aneurysms should be considered in cases of pediatric SAH. Microsurgical clipping is safe and effective in carefully selected patients with the potential for favorable neurological outcomes.

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Keywords: Aneurysm, Middle cerebral artery, Infant, Subarachnoid hemorrhage, Microsurgery

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Analysis of Central Nervous System Anomalies in the City of São Paulo (2022–2024)

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Introduction:
Congenital malformations of the central nervous system (CNS) account for approximately 21% of all congenital anomalies and represent a significant cause of neonatal mortality, particularly in developing countries. In Brazil, they are the second leading cause of infant death. Among these malformations are hydrocephalus, myelomeningocele, encephalocele, agenesis of the corpus callosum, among others. This study aimed to characterize the epidemiological profile of these conditions in São Paulo.
Objective:
To analyze the incidence and prevalence of CNS anomalies in neonates residing in the city of São Paulo between 2022 and 2024, considering variables such as sex and race.
Methodology:
This was a cross-sectional observational study using DATASUS data, including hospital admissions due to CNS malformations and spina bifida (ICD-10: Chapter XVII) in children under one year of age, residing in São Paulo and treated within the Brazilian Unified Health System (SUS).
Results:
There were 179 admissions in 2022, 207 in 2023, and 194 in 2024. A slight predominance of males was observed. White children were the majority, but there was a proportional increase in cases among mixed-race (pardo) children (22.9% in 2022 to 30.9% in 2024). No cases were recorded among Indigenous populations.
Conclusion:
The data indicate a stable number of cases and suggest possible disparities in access to diagnosis, highlighting the need for further investigations into genetic, environmental, and healthcare access factors in pediatric neurosurgery.

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Keywords: Keywords: Neurosurgery, Congenital Abnormalities, Nervous System, Brain Diseases, Nervous System Diseases

CERVICAL SPONDYLODISCITIS IN AN INFANT WITH PROGRESSION TO MASTOIDITIS: A CASE REPORT

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Case Presentation: A previously healthy 10-month-old female infant was admitted with a one-month history of cervical pain, associated with irritability and inconsolable crying of unclear origin over the past several months. Physical examination revealed cervical tenderness upon palpation and limited spontaneous rotation of the head to the right, with no neurological deficits. Cervical spine computed tomography suggested spondylodiscitis at the C2–C3 level. Magnetic resonance imaging performed ten days later confirmed the diagnosis and additionally revealed signs of right-sided otomastoiditis. The patient was treated with vancomycin and ceftriaxone for six weeks, resulting in clinical and radiological improvement of both conditions.
Discussion: Spondylodiscitis is a rare condition in pediatrics, with a predilection for the lumbar and lumbosacral regions. Cervical involvement is uncommon, particularly in young children. Complications may include vertebral fracture and the formation of spinal or paraspinal abscesses. The association with mastoiditis, as observed in this case, is rare and scarcely reported in the literature.
Final Considerations: This case report contributes to the expanding body of knowledge on pediatric spondylodiscitis, highlighting the importance of appropriate follow-up to prevent complications, including rare ones.

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Keywords: Spondylodiscitis, Mastoiditis, Spine infection, Cervical spondylodiscitis, Spondylodiscitis complication

Dandy-Walker syndrome: a systematic review of diagnostic, genetic, clinical, and therapeutic aspects

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Introduction: Dandy-Walker Syndrome (DWS) is a rare congenital malformation of the central nervous system,

defined by hypoplasia or agenesis of the cerebellar vermis, dilation of the fourth ventricle, and enlargement of the posterior fossa. Clinical manifestations include delayed neuropsychomotor development, intracranial hypertension, and ataxia. Early diagnosis is crucial for management and prognosis, with imaging exams being essential for identifying anatomical alterations. Methods: A systematic literature review (1990–2025) was conducted in the PubMed and Cochrane databases using the descriptor "Dandy-Walker Syndrome." A total of 1186 articles were identified. Screening was performed using the Rayyan platform, applying inclusion criteria (in vivo diagnosis, thematic relevance, Portuguese, English, or Spanish language, and full-text availability) and exclusion criteria (series with more than five cases, unrelated cerebellar malformations, duplicates, and technical studies). After abstract screening, 136 articles were included in the final analysis. Results: Among the 136 studies analyzed, 121 reported malformations associated with DWS. Neuroimaging was essential for diagnosis, with magnetic resonance imaging being the most frequently used exam (43.2%), followed by computed tomography (28.4%) and ultrasonography (26.4%). Hydrocephalus was the most frequently reported central nervous system anomaly (46.4%), in addition to macrocephaly and syringomyelia. Cardiac malformations occurred in 35.7% of the studies, with atrioventricular septal defect being the most common. Craniofacial and genitourinary anomalies were also frequently reported. Chromosomal abnormalities were described in 43 cases, with 17 trisomies identified. Most diagnoses were made in the postnatal period, with a mean age of 12.77 years. Treatment was predominantly surgical, with emphasis on ventriculoperitoneal shunting (50%) and endoscopic third ventriculostomy (14.3%). Conclusion: DWS presents a wide variety of clinical manifestations and a high association with other congenital anomalies. Ultrasonography is effective for initial screening, while magnetic resonance imaging is essential for detailed anatomical characterization. Early diagnosis favors therapeutic planning and may improve patient prognosis.

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Keywords: Keywords: Dandy-Walker Syndrome, Neuroimaging, Congenital malformations, Cerebellar anomalies, Hydrocephalus

Non-traumatic intrauterine subdural hematoma

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A primigravida, with regular prenatal care and a low-risk pregnancy, was on aspirin 100 mg due to gestational hypertension. A third-trimester ultrasound revealed an indeterminate intracranial expansive lesion. Fetal magnetic resonance imaging (MRI) subsequently demonstrated bilateral extra-axial collections with a hemorrhagic appearance. The pregnant patient denied any history of trauma. At birth, the neonate presented as stable and was transferred to the neonatal semi-intensive care unit. The infant remained hypoactive, without focal neurological signs, and exhibited normal transfontanellar ultrasonography and head circumference. A computed tomography (CT) scan on the 8th day confirmed a right frontotemporoparietal subdural hematoma measuring 2.3 cm, with a midline shift of 0.9 cm, in addition to smaller hematomas on the left. Further investigation with magnetic resonance angiography (MRA) revealed possible findings of multiple anomalous vascular structures in the right opercular region; however, subsequent computed tomography angiography (CTA) did not identify any vascular abnormalities. On the 25th day, bilateral drainage was performed via parietal trepanation with the placement of subdural drains, which were removed after 48 hours.
The case demonstrates an intrauterine subdural hematoma with no clear etiology. Clinical stability delayed intervention, allowing for appropriate planning. The association with vascular anomalies reinforces the importance of further investigation.
Non-traumatic intrauterine subdural hematomas are rarely reported in the literature, and their etiology remains unclear. The presentation can be subtle, making neurological surveillance and further investigation essential.

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Keywords: Subdural hematoma, intrauterine, etiology, non-traumatic, surgery intervention

Surgical revascularization in proliferative cerebral angiopathy: a promising alternative

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Introduction: Cerebral proliferative angiopathy (CPA) is a rare and severe cerebrovascular condition, characterized by tortuous and ectatic blood vessels intertwined with areas of functional brain tissue. This abnormal vascular morphology can lead to ischemic events, primarily due to blood flow steal phenomena.
Objective: To evaluate the outcomes of revascularization as a treatment for CPA based on the available scientific evidence.
Method: Was conducted a systematic review of reported CPA cases treated with revascularization, and the findings were compared with a clinical case managed by the authors.
Results: Has been reported a case of a 14-year-old male patient with structural epilepsy and transient ischemic attacks (TIAs). Imaging studies confirmed CPA in the right frontal lobe. The patient underwent indirect revascularization surgery, with good seizure control and only one TIA episode during the six-month postoperative period. The literature review identified fifteen articles describing seventeen surgically treated PCA cases. Most patients showed significant clinical improvement and a reduction in the recurrence of ischemic events.
Conclusion: The available literature provides promising evidence supporting the use of revascularization in the management of CPA, as reinforced by the reported case, highlighting the feasibility and potential benefits of this surgical approach.

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Keywords: Cerebrovascular diseases, cerebral proliferative angiopathy, cerebral revascularization

TRAUMATIC BRAIN INJURY

Incongruence between costs and results in the treatment of patients under 18 years old, victims of TBI in the northeast and south regions, from 2019 to 2024: an ecological study

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Introduction: Traumatic brain injury is an external injury that affects the skull or the brain. It is one of the main causes of death in Brazil, with more than 50000 deaths in the last 5 years. However, there are few studies on public investment and its effectiveness in treating these patients in pediatrics.
Objective: This study aimed to analyze the relationship between mortality rates and public spending in the South and Northeast regions of Brazil, between 2019 and 2024, for patients under the age of 18 who were victims of TBI.
Methods: Data was collected from SIH/SUS, made available by DATASUS, and calculated the average cost per hospitalization and mortality rates by region.
Results: In the period, there were 24682 hospitalizations in the Northeast and 16999 in the South. The total cost was R$34191616.97 in the Northeast and R$21780785.17 in the South, with an average cost of R$1385 and R$1281, respectively. The mortality rate was 4.16% in the Northeast and 2.01% in the South.
Discussion: Despite higher spending, the Northeast had a 107% higher mortality rate, suggesting shortcomings in care, possibly related to regional inequality. Further studies are needed to understand these disparities and ensure better care for these patients.

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Keywords: "Brain Injuries", "Pediatrics", "Investments"

PERFIL EPIDEMIOLÓGICO DE TRAUMATISMO INTRACRANIANO EM CRIANÇAS E ADOLESCENTES NOS ÚLTIMOS 10 ANOS/EPIDEMIOLOGICAL PROFILE OF INTRACRANIAL TRAUMA IN CHILDREN AND ADOLESCENTS IN THE LAST 10 YEARS

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Introdução:O trauma intracraniano representa uma lesão cranioencefálica que pode deixar problemas funcionais incapacitantes e sequelas em crianças e adolescentes.No Brasil, essa condição é agravada pela desigualdade do acesso aos serviços de referência em neurocirurgia pediátrica.Objetivo:Analisar aspectos sociodemográficos do trauma intracraniano nessa população entre fevereiro de 2015-2025. Metodologia: Estudo ecológico com dados obtidos na plataforma DATASUS.Considerou-se a morbidade geral por local de internação, abrangendo o Brasil, por unidade e federação.As variáveis analisadas incluem sexo, cor/raça e faixa etária de 1-19 anos.Dados incompletos foram excluídos.Resultados:Foram 18.867 casos, sendo que as regiões Sudeste e Nordeste, respectivamente, responderam por 37,2% e 27,9% das internações.Em relação

ao sexo, o masculino representou 68,8% em contraste com o feminino, 31,1% (N=56648). Quanto ao critério raça/cor, pardos e pretos representaram 48,7% (n=88644) enquanto 37% (n= 52917) foram brancos.Além disso, a faixa etária predominante foi de 15-19 anos, 36,9%, seguida de 1-4 anos, 36,1%.Conclusão:Destaca-se a alta vulnerabilidade dos perfis populacionais estudados, como homens, pardos e pretos, bem como adolescentes, além das principais regiões acometidas serem as mais populosas.

Introduction:Intracranial trauma represents a cranioencephalic injury that can leave disabling functional problems and sequelae in children and adolescents.In Brazil, this condition is aggravated by unequal access to pediatric neurosurgery referral services.Objective:To analyze socio demographic aspects of intracranial trauma in this population between February 2015-2025. Methodology: Ecological study with data obtained from the DATASUS platform.General morbidity by place of hospitalization was considered, covering Brazil, by unit and federation.The variables analyzed include gender, color/race and age range 1-19 years.Incomplete data were excluded.Results:There were 18,867 cases, with the Southeast and Northeast regions, respectively, accounting for 37.2% and 27.9% of hospitalizations.Regarding gender, males accounted for 68.8% in contrast to females, 31.1% (N=56648). As for the race/color criterion, brown and black people accounted for 48.7% (n=88644) while 37% (n= 52917) were white.In addition, the predominant age group was 15-19 years, 36.9%, followed by 1-4 years, 36.1%.Conclusion:The high vulnerability of the population profiles studied stands out, such as men, brown and black people, as well as adolescents, in addition to the main regions affected being the most populous.

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Keywords: População pediátrica; Traumatismo intracraniano; Perfil epidemiológico/Pediatric population; Intracranial trauma; Epidemiologic profile

CEREBRAL CONCUSSION AND NEUROPSYCHOMOTOR IMPAIRMENT: INTEGRATIVE REVIEW.

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Introduction: Concussion is a mild traumatic brain injury (TBI), with a Glasgow Coma Scale score of 13 to 15, which may or may not present loss of consciousness, with imaging tests showing no significant changes. However, the clinical repercussions of these cases need to be further studied, since many children and adolescents demonstrate neuropsychomotor changes after the trauma. Objective: The general objective of this study is to investigate neuropsychomotor changes after a concussion by searching for relationships between this injury and the development of Attention Deficit Hyperactivity Disorder or Autism Spectrum Disorder. Methodology: This study is an integrative review of the literature available in the last 10 years on the PubMed platform. Results: A total of 35 articles were included in the study, which revealed higher levels of long-term behavioral problems in children after mild TBI. Neurocognitive impairment related to difficulties in information processing and memorization was also associated with mild TBI. Cognitive and academic deficits were related to early age at injury. Conclusion: Childhood TBI and consequent concussion-related symptoms can have lasting impacts on child neuropsychomotor development, and early interventions should therefore be studied to minimize long-term sequelae.

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Keywords: traumatic brain injury, Brain concussion, adolescent, child, autistic disorder, attention deficit disorder with hyperactivity

Desempenho e acurácia da glicose sanguínea e da razão neutrófilo/ linfócito como preditores da mortalidade de crianças e adolescentes com traumatismo cranio-encefálico

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Propósito
Biomarcadores são utilizados para estabelecer o diagnóstico, o estadiamento e o prognóstico das doenças. O objetivo deste estudo foi avaliar e comparar o desempenho e a acurácia da glicemia sanguínea (GS) e da razão neutrófilo-linfócito (RNL) como biomarcadores preditivos de mortalidade em crianças com traumatismo cranioencefálico (TCE).
Métodos
Estudo analítico transversal por meio da revisão de prontuários médicos consecutivos de crianças e adolescentes (< 17 anos) com TCE. Foram analisados os resultados de amostras sanguíneas coletadas nas primeiras 24 horas após o trauma, considerando GS > 200 mg/dl ou 11,1 mmol/L e RNL ≥ 11 como pontos de corte. Aplicou-se a curva ROC (Receiver Operating Characteristic) para verificar o desempenho e comparar os dois biomarcadores como preditores de mortalidade intra-hospitalar. Foram calculados o odds ratio (OR), sensibilidade, especificidade, valores preditivos positivo (VPP) e negativo (VPN), acurácia e razão de verossimilhança de ambos os biomarcadores.
Resultados
Das 131 crianças incluídas nas análises, 13% apresentaram hiperglicemia, predominantemente aquelas com TCE grave (30% vs. 4%; p = 0,003). Valores de RNL ≥ 11 foram identificados em 21% da amostra, também predominando em crianças com TCE grave (54% vs. 15%; p = 0,01). O desempenho da GS e da RNL foi, respectivamente, 0,81 e 0,65 considerando a área sob a curva ROC. A GS apresentou acurácia de 88% e a RNL de 79% como biomarcadores preditivos de mortalidade.
Conclusão
A GS apresentou melhor desempenho e acurácia que a RNL, embora ambos os biomarcadores tenham apresentado alto VPN para identificar crianças com menor risco de óbito.

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Keywords: Biomarcadores, Hiperglicemia, Dano cerebral e Fatores imunológicos

Neurosurgical Approach to Severe Traumatic Brain Injury in Children: A Systematic Analysis of Outcomes and Complications

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INTRODUCTION: Severe traumatic brain injury (sTBI) is one of the leading causes of death in childhood, but its neurosurgical management still lacks consensus. OBJECTIVE: To describe the clinical outcomes and complications related to the neurosurgical management of severe traumatic brain injury in children. METHODS: Systematic review following the PRISMA model, with searches in PubMed, BVS, and Cochrane Library. The PICOTS strategy guided the selection, using descriptors related to TBI, craniectomy, and the pediatric population. Randomized clinical trials and cohort studies from the last 10 years in English, Portuguese, and Spanish were included. From 53 articles identified, 5 were included. RESULTS: Decompressive craniectomy (DC) was associated with lower mortality, better functional outcomes, and improved intracranial pressure (ICP) control, in addition to reduced ICU stay, despite a higher rate of adverse events. In another study, 62% of children achieved good recovery, with 17% mortality and 21% complications. Additionally, the use of autologous stem cells showed safety and neuroprotective potential. Finally, algorithms with or without ICP monitoring emphasized the need for standardized management strategies. CONCLUSION: DC appears to offer better outcomes in ICP control and functionality in children with sTBI. Moreover, autologous stem cell therapies were promising but still require further studies.

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Keywords: Traumatic Brain Injury, Decompressive Craniectomy, Pediatric Neurosurgery

Challenges in the Diagnosis and Management of Giant Aneurysms in Infants: A Systematic Review and Case Report

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Giant intracranial aneurysms in infants are extremely rare and present significant diagnostic and therapeutic challenges. These lesions differ from those in adults regarding etiology, clinical presentation, and management. We report the case of a 1-year-old male admitted after a minor fall, presenting with vomiting and periorbital ecchymosis. Initial computed tomography revealed a hyperdense frontotemporal lesion, and computed tomography angiography suggested a vascular malformation. Surgical intervention was performed, revealing a giant thrombosed aneurysm (3.5 cm) at the middle cerebral artery bifurcation. Microsurgical clipping and aneurysm resection were successfully achieved, with an uneventful postoperative course and no neurological deficits. Histopathological analysis confirmed the diagnosis of a thrombosed giant aneurysm. A systematic review was conducted according to PRISMA guidelines, identifying only two relevant pediatric cases, which reported different management strategies, including conservative and surgical approaches. This case reinforces the importance of advanced imaging for accurate diagnosis and highlights the efficacy of microsurgical clipping in selected cases, emphasizing individualized management to reduce morbidity and mortality in this rare condition.

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Keywords: Thrombosed Aneurysm, Giant Intracranial Aneurysm,Cerebral Aneurysm,Infant Aneurysm,Neurosurgical Management

Perfil das Internações Hospitalares por Traumatismo Cranioencefálico na População Pediátrica do Amazonas entre 2015-2024

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Introdução: O traumatismo cranioencefálico (TCE) é uma das principais causas de incapacitação e morte no Brasil, com desafios acentuados no Amazonas devido às barreiras geográficas. Objetivo: Descrever as internações por TCE na população pediátrica do Amazonas entre 2015-2024. Métodos: Estudo descritivo com dados do SIH/SUS (DATASUS). Foram incluídos casos de TCE (CID-10 S02, S06) em pacientes de 0-19 anos, residentes no Amazonas, entre 2015-2024. Analisaram-se número de internações, custos hospitalares e taxa de mortalidade intra-hospitalar. Utilizou-se estatística descritiva no Microsoft Excel. Resultados: Nesse período, ocorreram 3.400 internações pediátricas por TCE no Amazonas, com custo total de R$4.000.324,37. Adolescentes de 15-19 anos foram o grupo mais crítico: 57,6% dos óbitos, taxa de mortalidade de 4,78% – acima da média estadual (3,26%) – e custo médio 24% superior (R$1.462,87), sugerindo maior gravidade. Em contraste, crianças menores de 5 anos apresentaram mortalidade <2%; enquanto o grupo 10-14 anos destacou-se pela maior permanência hospitalar (6,4 dias). Conclusão: Adolescentes entre 15-19 anos representaram os casos mais graves de TCE. Medidas de prevenção e ampliação da rede de urgência são essenciais para reduzir seu impacto, especialmente em áreas com desafios logísticos como a região amazônica.

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Keywords: Traumatismos Craniocerebrais, Pediatria, Epidemiologia, Mortalidade Lesões Encefálicas, Pediatria, Métodos Epidemiológicos, Mortalidade

Profile of Hospital Admissions for Traumatic Brain Injury in the Pediatric Population of Amazonas from 2015 to 2024

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Introduction: Traumatic brain injury (TBI) is one of the leading causes of disability and death in Brazil, with increased challenges in Amazonas due to geographic barriers. Objective: To describe TBI-related hospitalizations among the pediatric population in Amazonas from 2015 to 2024. Methods: Descriptive study using data from SIH/SUS (DATASUS). Included were TBI cases (ICD-10 S02, S06) in patients aged 0–19 years, residing in Amazonas, from 2015 to 2024. Number of hospitalizations, hospital costs, and in-hospital mortality rate were analyzed.

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Descriptive statistics were performed using Microsoft Excel. Results: During this period, there were 3,400 pediatric TBI hospitalizations in Amazonas, with a total cost of R$4,000,324.37. Adolescents aged 15–19 were the most affected group: 57.6% of deaths, a mortality rate of 4.78% — above the state average (3.26%) — and a 24% higher average cost (R$1,462.87), suggesting greater severity. In contrast, children under 5 had a mortality rate below 2%, while those aged 10–14 had the longest hospital stays (6.4 days). Conclusion: Adolescents aged 15–19 accounted for the most severe TBI cases. Prevention strategies and expansion of emergency services are essential to reduce the impact, especially in logistically challenged regions like the Amazon.

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Keywords: Traumatic Brain Injury, Pediatrics, Epidemiology, Mortality Brain Injury, Pediatrics, Epidemiological Methods, Mortality

DECOMPRESSIVE CRANIECTOMY IN SEVERE PEDIATRIC TBI: PROGNOSIS AND NEURODEVELOPMENTAL IMPLICATIONS – A SYSTEMATIC REVIEW

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INTRODUCTION: Severe traumatic brain injury (TBI) is one of the leading causes of morbidity and mortality in children. Decompressive craniectomy (DC) emerges as an alternative for the management of intracranial hypertension. OBJECTIVES: To evaluate the clinical and functional outcomes and neurodevelopmental implications associated with DC in children with severe TBI. METHODS: A systematic review was conducted following PRISMA guidelines, using the PubMed, Cochrane Library, and Wiley databases. The PICO strategy guided the selection process, with the descriptors: ("Decompressive Craniectomy" OR "craniectomy") AND ("Traumatic Brain Injury") AND ("Pediatrics" OR "Children") AND ("Prognosis" OR "Neurological Outcomes"). After screening 31 records, 9 studies were included, comprising cohort studies and experimental designs. RESULTS: DC proved effective in preventing cerebral tissue damage in cases of severe TBI. Functionally, pediatric patients undergoing DC may achieve significant neurological recovery. However, outcomes vary depending on the complexity of the injury, individual clinical conditions, and timing of surgical intervention. Possible complications include infections, need for reoperations, and post-traumatic hydrocephalus. Regarding neurodevelopment, outcomes range from mild deficits to motor and behavioral sequelae. CONCLUSION: DC in severe pediatric TBI may improve survival and contribute to clinical stabilization. Management should be multidisciplinary, including rehabilitation strategies and support for neuropsychomotor development.

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Keywords: Keywords: Traumatic Brain Injuries, Decompressive Craniectomy, Pediatrics, Brain Injuries, Decompressive Craniectomy

Prognostic Markers in Pediatric Traumatic Brain Injury: Correlations and Surgical Implications in a Retrospective Study

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INTRODUCTION: Traumatic brain injury (TBI) encompasses a spectrum of neurological conditions secondary to external mechanical forces, and in pediatric patients, mortality is up to 71% in the most severe cases.
OBJECTIVE: To correlate clinical and surgical data with therapeutic outcomes in pediatric patients with TBI, identifying prognostic factors.
METHODS: Data from 66 pediatric patients (0-19 years) admitted with TBI (2015-2019) were retrospectively analyzed. Variables included Glasgow Coma Scale (GCS), Marshall Classification (MC), Rotterdam Score (ER), intracranial pressure monitoring (ICP), and Glasgow Outcome Scale – Pediatric Extended (GOS-EP). Multivariate analyses identified predictors; Spearman's correlation evaluated associations with GOS-EP. A decision tree analysis (CHAID) explored profiles associated with mortality risk in severe cases.
RESULTS: The cohort (mean age 11.24y; 81.8% male) had a mortality rate of 12.1% and median ECG 7. GOS-EP was

significantly correlated with ECG (p<.001), CM (p=.001), ER (p=.003), and INR (p=.021). Type of surgery and ICP monitoring were not significantly associated with the outcomes evaluated (p>.05) in severe cases. Logistic regression revealed mannitol associated with higher mortality (OR=16.89, 95%CI[1.18-240.86]). CHAID analysis confirmed Mannitol ($\chi^2(1)=8.413$; p=.004) and Type of Surgery ($\chi^2(1)=7.875$; p=.015) as key stratifiers, identifying a very high-risk subgroup (75% mortality) after Mannitol and Decompressive Craniectomy or Trepanation.
CONCLUSION: The classical indicators are consolidated as superior predictors of the outcome, while the use of mannitol, possibly reflecting indication bias, is associated with higher mortality, highlighting the need for multimodal therapy and further research indicating appropriate treatments.

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Keywords: Outcome, Pediatric, Traumatic Brain Injury.

Hospital Morbidity Due to Traumatic Brain Injury in Children in Brazil: An Epidemiological Analysis from 2020 to 2025

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Introduction: Traumatic Brain Injury (TBI) in childhood has distinct causes depending on the age group, with factors such as abuse and domestic accidents occurring more frequently than in the adult population. In this regard, pediatric TBI requires a more specific evaluation, taking into account the patient's age group, among other factors. In this context, identifying the main variables associated with TBI-related morbidity in children is imperative, as it will influence the clinical approach to these patients.
Objective: To assess the epidemiology of hospital morbidity due to TBI in the pediatric population.
Methodology: Ecological study based on data from the Brazilian Unified Health System's Hospital Information System (SIH/SUS) available on DATASUS, regarding hospital morbidity due to traumatic brain injury in children aged 0 to 14 years across Brazil's regions, from 2020 to 2025. Variables analyzed included: hospital admissions, total cost, average length of stay, and mortality rate.
Results: Between 2020 and 2025, Brazil recorded 66,990 pediatric hospital admissions for TBI, with the highest incidence in the Southeast region. The mortality rate varied by region, being highest in the Northeast (2.01%). The average length of hospital stay was 3.2 days, and the SUS invested over R$66 million during this period.
Conclusion: TBI is a significant cause of pediatric hospital admissions in Brazil, underscoring the need for public policies aimed at prevention and improved access to treatment, especially in regions with high mortality rates.

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Keywords: Brain trauma, Epidemiological monitoring, Child health

Performance of the Glasgow Coma Scale as a predictor of mortality in children with severe traumatic brain injury

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Introduction: Traumatic brain injury (TBI) is a significant cause of death and disability in children, with a high rate of hospitalizations in Brazil. Standardizing care is crucial to prevent secondary injuries.

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Objective: To evaluate the performance of the Glasgow Coma Scale (GCS) as a predictor of mortality in children with severe TBI.
Method: An analytical cross-sectional study reviewing medical records of children with GCS ≤ 8, hospitalized between 2016 and 2023. Data collection included clinical and laboratory variables, as well as imaging analyses.
Results: The sample included 45 patients, with a median age of 9 years. The GCS showed a sensitivity of 86% and specificity of 79%, with an area under curve (AUC- ROC) of 0.86. The mortality rate was 22%.
Conclusion: The GCS proved to be an effective predictor of mortality in children with severe TBI, demonstrating high performance and clinical relevance for decision-making.

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Keywords: Glasgow Coma Scale, hospitalized children, mortality, prognosis, traumatic brain injury

TRIGEMINAL NERVE SCHWANNOMA: A CASE REPORT AND SYSTEMATIC REVIEW

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Trigeminal nerve schwannomas are rare in childhood. We report a 12-year-old female presenting with progressive hemiparesis, dysarthria, and multiple cranial nerve deficits. MRI revealed a large extra-axial lesion compressing the brainstem, consistent with a right trigeminal schwannoma. Subtotal resection via pterional craniotomy was performed, preserving neurovascular structures. Pathology confirmed schwannoma, and near-complete recovery was observed after 18 months. A systematic review (PRISMA guidelines, PubMed 2005–2025) identified 14 pediatric and 1,743 adult cases. In children, tumors primarily affected the middle cranial fossa (50%) and all were symptomatic, with facial pain and cranial nerve deficits prevailing - in agreement with the reported case. Total resection was achieved in 64.29%, with recurrence in 2 cases (14.29%). In adults, surgery was performed in 74.45%, with a 0.86% complication rate. The comparative analysis revealed clinical and radiological differences across age groups, highlighting the scarcity of pediatric data. This study emphasizes the value of integrating case reports and systematic reviews to guide individualized surgical management of rare and complex tumors.

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Keywords: Trigeminal schwannoma, Pediatric neurosurgery, Systematic review.

Pediatric surgical epidural hematoma - still a challenge in surgical decision-making? A systematic review and retrospective study

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Epidural hematoma is a condition whose presentation in children poses challenges. This systematic review and retrospective study aims to synthesize evidence on surgical indications in pediatrics and analyze outcomes. Using the PRISMA method, a search was performed in PubMed using the operators "epidural hematoma", "pediatric" and "craniotomy". Studies in children under 18 years of age from the last 10 years were included, a total of 16 studies. In parallel, 24 cases of patients operated on in an institution in the last 4 years were analyzed. In the institution, the mean age was 7.7 years, with a predominance of males (70.83%) and car accidents as the mechanism (41.67%). Most patients were operated in less than 5 hours after admission and the length of hospital stay increased with the number of tomographic findings (r=0.47). Similar to the literature, hematoma volume was identified as criterion associated with surgical indication. However, the presence of linear fractures and concomitant subdural hemorrhage <1 cm was associated with the surgical decision. In general, it reinforces the difficulty related to pediatric epidural hematoma. Early neurosurgical intervention is an effective therapeutic with favorable clinical outcomes and still difficult to define within the pediatric population.

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Keywords: epidural hematoma, extradural hematoma, surgical treatment,

Performance of the Marshall and Rotterdam scales as predictors of mortality in children with severe traumatic brain injury

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Objective: The combined use of the Glasgow Coma Scale (GCS) with criteria established in brain CT scan images increases our ability to predict prognosis in pediatric patients. The Marshall and Rotterdam scales are commonly used for this purpose. This research aims to evaluate and compare the performances of both scales as predictors of in-hospital mortality in children with severe TBI.
Methods: This was a retrospective study using data from patients <17 years old with severe TBI (GCS score ≤8) at a Brazilian trauma center. Brain CT scans were scored to the Marshall and Rotterdam scales. The cutoff score 4 as a predictor of prognosis was used to dichotomize the group.
Results: The area under the receiver operating characteristic curve (AUC) of the children included was AUC 0.65 for Marshall scale and 0.73 for Rotterdam, considering in-hospital mortality as the outcome. On both scales, the mortality rate was higher in children with scores ≥ 4. The mortality rate was 42% in Marshall and 50% in Rotterdam.
Conclusion: The Rotterdam scale performed better as predictor of in-hospital mortality in the group analyzed. The cutoff 4 on both scales can be used in clinical practice as mortality predictor, with accuracy of 73% and 78%.

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Keywords: Traumatic Brain Injury; Hospital Mortality; Marshall Scale; Rotterdam Scale; CT-scan; Pediatric Emergency Medicine

Surgical Management of Occipital Neuralgia in Pediatric Patients: A Systematic Review

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Occipital neuralgia (ON) is a neurological pain condition characterized by severe paroxysmal, stabbing, or electric shock–like pain radiating along the distribution of the greater and/or lesser occipital nerve. The causes of ON are diverse and include nerve compression by cervical muscle contractures, trauma, inflammation, cervical spine degenerative diseases, or, in some cases, idiopathic origin (no identifiable cause). Initial management is conservative and involves analgesics, anti-inflammatory drugs, muscle relaxants, physiotherapy, and local anesthetic blocks. However, when clinical management proves ineffective and pain persists in a disabling manner, surgical intervention may be considered. Objective: To analyze the efficacy of surgical treatment in pediatric patients with refractory occipital neuralgia. Methods: This systematic review was conducted according to the PRISMA 2020 protocol. The databases PubMed, Cochrane, SciELO, SCOPUS, and EMBASE were searched by two authors (D.M.A. and G.M.F.S.) without restrictions regarding language or publication date. The search strategy used controlled DeCS/MeSH descriptors combined as follows: “occipital neuralgia” AND “surgical treatment” AND “pediatric patients”, resulting in six identified studies. Only full-text, peer-reviewed articles involving patients under 18 years of age who underwent surgical intervention for refractory ON were included. Title and abstract screening was independently performed by two reviewers (D.M.A. and E.R.C.S.), leading to the inclusion of three studies that met all eligibility criteria. Results and Discussion: In total, nine patients aged 11–18 years underwent different surgical approaches: bilateral decompression (n = 4), unilateral decompression with contralateral neurectomy (n = 2), and occipital nerve stimulation (n = (3). Among the patients who underwent decompression, there was a significant reduction in analgesic use (from a mean of 2.7 to 0.7; p = 0.019), as well as in visual analog scale (VAS) pain scores, which decreased from 8.3 to 1.0 (p = 0.0009). Pain and paresthesia symptoms were resolved within 4–6 weeks. However, two patients experienced symptom recurrence. Regarding occipital nerve stimulation, one patient declined permanent implantation, while two proceeded with implantation. Of these, one reported a 95% reduction in pain and was able to discontinue analgesic use. Conclusion: In children with refractory occipital neuralgia, surgical intervention produces positive

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outcomes with limited risks, while nerve stimulation is effective but not permanent and has limited accessibility.

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Keywords: Occipital neuralgia, Pediatric patients, Surgical treatment, Nerve decompression, Nerve stimulation

Autologous cranioplasty with contralateral bone in a child with traumatic brain injury

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CASE PRESENTATION:
A 10-year-old male child, victim of a collision between a bicycle and a truck, was admitted with moderate traumatic brain injury (TBI). Upon admission, he had a Glasgow Coma Scale score of 10, progressing to decreased level of consciousness, and underwent orotracheal intubation (OTI). He arrived at the hospital already sedated, with isomictic pupils and periorbital ecchymosis. Computed tomography showed extensive epidural hematoma associated with temporoparietal fracture, and decompressive craniectomy with bone flap removal was indicated. The patient showed progressive neurological improvement, with full functional recovery (Glasgow Outcome Scale = 5). Four months after the trauma, she underwent autologous cranioplasty using delaminated bone fragments from the contralateral calvarium (frontal, temporal, and parietal). After two years of follow-up, the child maintains adequate neurological development and excellent aesthetic results.
DISCUSSION:
Decompressive craniectomy is a highly complex and morbid emergency procedure, often necessary in severe cases of TBI. In children, post-craniectomy cranial reconstruction represents an additional technical challenge, especially when the bone flap is discarded.
Although heterologous materials are available for cranioplasty, such as titanium and polymethyl methacrylate, the use of autologous bone is still considered the best alternative, especially in pediatric patients, due to its natural integration and adaptation to cranial growth. This case describes the technique of delamination and use of contralateral bone fragments as a solution for autologous reconstruction, an approach that is already known but still poorly documented in the literature.
CONCLUSIONS
Autologous cranioplasty remains the safest and most effective option for cranial reconstruction in children. In cases where the original bone cannot be reused, the use of contralateral delaminated fragments represents a viable, safe alternative with excellent long-term functional and aesthetic results.

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Keywords: Traumatic Brain Injuries, TBIs (Traumatic Brain Injuries), Neurosurgery

Management of Intracranial Hypertension in Pediatric Traumatic Brain Injury

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Introduction: Intracranial hypertension (ICH) is a common complication of pediatric traumatic brain injury (TBI), potentially leading to cerebral ischemia and neuronal death. Adequate ICH control is essential to prevent secondary injuries and improve outcomes in children with severe TBI.
Objective: To review therapeutic strategies for controlling ICH in children with severe TBI and discuss their clinical impact.
Method: A review of 47 articles indexed in PubMed between 1999 and 2021 was conducted using the descriptors “pediatric TBI,” “pediatric ICH,” and “ICH treatment in pediatrics.” Studies involving adults and complications unrelated to ICH were excluded.
Results: The main strategies identified were moderate hyperventilation, hypertonic saline solution, decompressive craniectomy, and intracranial pressure (ICP) monitoring. Hyperventilation reduces ICP through vasoconstriction induced by hypocapnia, but prolonged use may impair perfusion. Hypertonic saline reduces cerebral edema and improves perfusion. Decompressive craniectomy is effective in refractory cases, although associated with increased morbidity. Continuous ICP monitoring enables early and individualized interventions.
Conclusion: ICH management should be individualized, combining continuous ICP monitoring with neuroprotective strategies such as optimized oxygenation, strict hemodynamic control, use of osmotic agents, normothermia, and glycemic control, aiming to improve clinical and neurological outcomes.

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Keywords: Pediatric traumatic brain injury; Intracranial hypertension; ICP monitoring

Prognostic Markers in Pediatric Traumatic Brain Injury: Correlations and Surgical Implications in a Retrospective Study

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INTRODUCTION: Traumatic brain injury (TBI) encompasses a spectrum of neurological conditions secondary to external mechanical forces, and, in pediatric patients, mortality is up to 71% in the most severe cases.
OBJECTIVE: To correlate clinical and surgical data with therapeutic outcomes in pediatric patients with TBI, identifying prognostic factors.
METHODOLOGY: Data from 66 pediatric patients (0-19 years old) admitted with TBI (2015-2019) were retrospectively analyzed. Variables included Glasgow Coma Scale (ECG), Marshall Classification (CM), Rotterdam Score (ER), intracranial pressure (PIC) monitoring, and Glasgow Outcome Scale – Extended Pediatrics (GOS-EP). Multivariate analyses identified predictors; Spearman correlation assessed associations with GOS-EP. A decision tree analysis (CHAID) explored profiles associated with mortality risk in severe cases.
RESULTS: The cohort (mean age 11,24a; 81,8% male) showed a mortality rate of 12,1% and median ECG 7. GOS-EP correlated significantly with ECG (p<,001), CM (p=,001), ER (p=,003), and INR (p=,021). Type of surgery and PIC monitoring did not significantly associate with the evaluated outcomes (p>,05) in severe cases. Logistic regression revealed Mannitol associated with higher mortality (OR=16,89, 95%CI[1,18-240,86]). CHAID analysis confirmed Mannitol ($\chi^2(1)=8,413$;p=,004) and Type of Surgery ($\chi^2(1)=7,875$;p=,015) as key stratifiers, identifying a very high-risk subgroup (75% mortality) after Mannitol and Decompressive Craniectomy or Trepanation.
CONCLUSION: Classic indicators are consolidated as superior predictors of outcome, while the use of Mannitol, possibly reflecting indication bias, is associated with higher mortality, highlighting the need for multimodal therapy and more research indicating appropriate treatments.

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Keywords: Traumatic brain injury (TBI), Prognostic factors, Outcome prediction

TUMORS

Profile of pediatric patients undergoing medulloblastoma resection in SUS (2015–2023)

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Medulloblastoma is the most common malignant brain tumor in childhood, and surgical resection is a key component of initial treatment. This study aimed to describe the profile of pediatric patients aged 0 to 14 who underwent medulloblastoma resection within the Brazilian Unified Health System (SUS) from 2015 to 2023, based on data from DATASUS. Most patients were between 5 and 9 years old, with a male predominance (approximately 60%). Procedures were concentrated in the Southeast and South, while the North and Center-West regions reported fewer surgeries. The average hospital stay exceeded 10 days, and a significant proportion of patients required readmissions. Mortality was higher in children under 5 and in regions with fewer procedures, possibly reflecting disparities in access and infrastructure. A stable trend in the number of surgeries was observed throughout the period, with a slight drop during the COVID-19 pandemic. These results emphasize the need to expand access to pediatric neuro-oncological surgery and ensure adequate postoperative follow-up.

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Keywords: medulloblastoma, neurosurgical oncology, pediatric brain tumor

Regional differences in the provision of pediatric neurosurgery in the SUS (2010–2023)

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Pediatric neurosurgical care is essential for treating conditions that affect neurological development. In Brazil, access to specialized services remains unequal. This study aimed to analyze regional disparities in pediatric neurosurgical procedures offered by the Unified Health

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System (SUS) from 2010 to 2023. Data were obtained from DATASUS for children aged 0 to 14 who underwent procedures such as hydrocephalus correction, tumor resection, and spinal surgery. A higher concentration of procedures was observed in the Southeast (45.3%) and South (21.6%) regions, while the North accounted for only 4.1%. Hydrocephalus-related surgeries were the most frequent across all regions. However, tumor and spinal procedures showed more pronounced disparities, reflecting barriers to specialized care. Temporal trends remained stable, with a slight decline during the COVID-19 pandemic. These findings highlight the urgent need for public policies that promote equitable access to pediatric neurosurgery, particularly in underserved regions.

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Keywords: pediatric neurosurgery, health disparities, public health system

Epidemiological profile of hospitalizations due to malignant brain neoplasm in children between February 2015 and February 2025

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INTRODUCTION: Brain neoplasms are characterized by the uncontrolled multiplication of brain cells, which can result in fatal complications. They are the second leading cause of death in the country. Therefore, analysis of hospitalizations is essential for screening the condition. OBJECTIVE: To determine the epidemiological profile of hospitalizations due to brain neoplasms in children. METHODOLOGY: Cross-sectional, ecological, and retrospective study based on SIH/DATASUS, addressing annual hospitalizations, region, sex, age group (0-19 years), and color/race. RESULTS: A total of 34,870 hospitalizations were recorded in the analyzed period, with the highest number in 2024 (3,978). The highest prevalence occurred in the Southeast (14,130), while the North and Central-West regions had lower numbers. There was a predominance of male hospitalizations (56.9%), followed by female hospitalizations (43.1%). The most affected age groups were 5-9 years (11,235) and 1-4 years (8,897), with the lowest number in children under 1 year (945). Brown skin predominated (15,301). CONCLUSION: Between 2015 and 2025, hospitalizations due to brain neoplasia in children caused a significant impact, with the Southeast standing out in 2024, with a higher incidence among schoolchildren (5-9) and male and brown skin prevalence. The results emphasize the need for regional screening and early detection strategies in Brazil.

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Keywords: Brain Neoplasms, Childhood, Epidemiology

Pediatric Sphenoid Wing Meningiomas in Neurofibromatosis Type 2: A Report of Two Challenging Cases

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Pediatric meningiomas are rare, representing less than 1% of all meningiomas, and are frequently associated with Neurofibromatosis type II (NF2), which is linked to multiple lesions, aggressive biological behavior, and high recurrence rates. Sphenoid wing meningiomas pose additional challenges due to their proximity to critical neurovascular structures such as the optic nerve, carotid artery, and cavernous sinus. We report two pediatric cases of NF2-associated sphenoid wing meningiomas illustrating the complexity of management and long-term follow-up. The first case, a 6-year-old boy, presented with progressive visual loss and underwent subtotal resection (Simpson II), followed by a second surgery (Simpson IV) and adjuvant radiotherapy. Despite these interventions, he developed progressive disease and severe neurological deficits, reflecting the aggressive natural history of NF2-related tumors. The second case, a 14-year-old boy, presented with tinnitus and underwent Simpson II resection followed by radiotherapy. Eight years later, tumor recurrence required a second surgery that achieved gross total removal (Simpson I), but resulted in an incomplete third cranial nerve palsy. At last follow-up, he remained clinically stable with this focal deficit. These cases highlight the unpredictable course of pediatric sphenoid wing meningiomas in NF2, the balance between maximal safe resection and neurological preservation, the limited role of radiotherapy in preventing recurrence, and the importance of lifelong multidisciplinary follow-up.

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Keywords: Pediatric meningioma, Sphenoid wing, Neurofibromatosis type II, Neurosurgery, Recurrence

Diffuse Pontine Glioma: Case Report

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Presentation: Case report of a patient diagnosed with Diffuse Pontine Glioma (Diffuse Intrinsic Pontine Glioma – DIPG), presenting with various neurological symptoms, who underwent microsurgery for the treatment of an intracranial tumor with the aid of a neuronavigator and partial removal of tumor fragments.
Discussion: A 13-year-old girl presented with progressive headaches, vomiting, imbalance, and ataxic gait. Cranial CT and MRI revealed heterogeneous intra-axial expansive formations and enlargement of brainstem structures, bordered by irregular and thick parietal enhancement in the midbrain and pons, showing compression of the fourth ventricle, herniation of the cerebellar tonsils, and absence of hydrocephalus. Given the severity and progression of symptoms, microsurgery was performed for the partial removal of tumor fragments for biopsy in the brainstem and right cerebral peduncle. Postoperative examinations showed the persistence of lesions in the brainstem and pons with an expansile pattern. The patient had a good postoperative recovery but continued to present with right central facial paresis, divergent strabismus, and multidirectional nystagmus.
Final Considerations: This case highlights the importance of diagnosing rare tumors in the pediatric age group, such as DIPG, for defining treatment and radiotherapy, aiming to improve symptoms and increase survival in these children despite the poor prognosis.

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Keywords: Diffuse pontine glioma, rare pediatric tumor, pediatric neurosurgery

Bilateral nystagmus as the initial manifestation of optic pathway tumor in childhood: case report

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Case Presentation: We report the case of a previously healthy 3-year-old female who presented with new-onset bilateral nystagmus, without other neurological deficits. Brain MRI revealed a 1.7 x 1.4 x 1.7 cm expansive lesion centered in the hypothalamic–chiasmatic region, involving the optic chiasm, hypothalamus, and the right optic nerve. Genetic testing for NF1 was negative. The patient underwent craniotomy with neuronavigation for lesion biopsy, which confirmed a pilocytic astrocytoma. Discussion: Optic pathway gliomas are rare in childhood and often associated with neurofibromatosis type 1. However, sporadic cases, like this one, may also occur. Nystagmus is an unusual but important early sign of lesions in this region. Final Comments: We discuss the importance of early diagnosis, the therapeutic challenges, and the role of clinical and radiological surveillance in managing this tumor subtype. This case highlights the need for detailed neuroimaging in pediatric patients presenting with non-specific visual symptoms.

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Keywords: Optic pathway tumor, Nystagmus, Low-grade glioma

MALIGNANT BRAIN NEOPLASM IN CHILDREN AND PRE-TEENS IN BRAZIL: AN ECOLOGICAL STUDY

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Introduction: Malignant brain neoplasm (ICD-10 C71) is one of the leading types of cancer in the pediatric population, with significant mortality rates. Objective: To analyze the temporal trend of hospitalization rates for C71 in children and pre-teens in Brazil from 2015 to 2024. Methodology: This is an ecological study using data collected from the Hospital Information System. Selected variables included the number of hospitalizations, region, year, and sex. Simple Linear Regression was performed using the Statistics Kingdom software. Results: A total of 28,919 pediatric hospitalizations for C71 were recorded, with a higher prevalence in males (56.3%) and among children aged 5 to 9 years (38.2%). The Southeast region had the highest number of hospitalizations (37.2%), followed by the Northeast (25.5%), South (19.3%), Central-West (11.4%), and North (6.7%). In the temporal trend analysis, statistically significant results were observed for the Northeast (p=0.03; b1=0.324), North (p=0.002; b1=0.196), and South (p=0.004; b1=0.487) regions. A national trend was also identified (p<0.01; b1=0.2). Conclusion: A positive temporal trend was observed in hospitalization rates for C71 in Brazil, particularly in the Northeast, North, and South regions.

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Keywords: Brain Neoplasms, Child Health, Brazil

Applications of Artificial Intelligence (AI) in the Detection of CNS Tumors in Pediatric Patients: An Integrative Review

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Introduction: Central nervous system (CNS) tumors are among the leading causes of cancer-related mortality in children. Early detection is essential to improve prognosis and clinical outcomes. Objective: To analyze the applications of AI in the early detection of CNS tumors in pediatric patients. Methods: An integrative review was conducted using the NIH/MedLine database, including publications from 2020 to 2025. The search strategy used was: ("Artificial Intelligence" OR "Machine Learning") AND ("Neurosurgery" OR "Brain Surgery") AND ("Pediatrics" OR "Child") AND ("Diagnosis image"). A total of 58 articles were found, with 4 selected according to inclusion criteria. Results: AI has shown high potential in the early detection of pediatric brain tumors through automated image analysis, often achieving diagnostic performance superior to that of traditional clinical approaches. Techniques such as machine learning allow for the identification of subtle patterns and the execution of more accurate, non-invasive diagnoses. These tools contribute to risk stratification, survival prediction, and early therapeutic planning. Advanced computational models, including those that simulate clinical reasoning, have optimized diagnostic workflows, especially in aggressive tumors. Conclusion: AI is a promising tool in pediatric neuro-oncology, with the potential to transform early tumor detection.

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Keywords: Tumors, Artificial Inteligence, Machine Learning, IA, Diagnostic, Glioblastoma

Advances in Noninvasive Prediction of Molecular Subgroups in Medulloblastoma: Artificial Intelligence and Magnetic Resonance Signatures

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Introduction: Medulloblastoma is the most common malignant primary tumor of the pediatric central nervous system, classified into four molecular subgroups. Accurate molecular differentiation is essential for prognosis and treatment; however, molecular testing is not always accessible. Therefore, strategies involving artificial

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intelligence (AI) and magnetic resonance imaging (MRI) have emerged as promising alternatives for preoperative subgroup classification. Objective: To evaluate AI models for predicting molecular subgroups of medulloblastoma through MRI, highlighting effectiveness, limitations, and clinical relevance. Methodology: A literature review was conducted in the PubMed database using (Neurosurgery) AND (Pediatrics) AND (Artificial Intelligence). Five articles published in the last year were included. Studies focusing on AI in pediatric brain tumor classification were selected. Exclusion criteria included papers unrelated to pediatric neurosurgery or AI in non-tumor contexts. Results: Machine learning models showed high accuracy in distinguishing molecular subgroups. AI-enabled segmentation of MRI images allowed objective identification of radiographic features specific to each subgroup. Regional differences in clinical and therapeutic outcomes emphasized the need for equitable access to such technologies. Conclusion: AI applied to MRI analysis enhances the non-invasive molecular classification of medulloblastoma. Standardized imaging protocols and expanded multicenter datasets are crucial to improve model generalizability and support precision medicine.

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Keywords: Medulloblastoma, Artificial Intelligence, Magnetic Resonance Imaging, Neurosurgery, Pediatrics

Epidemiology, Diagnosis and Treatment of Malignant Neoplasms of the Central Nervous System in the Pediatric Population of Paraná: An Analysis of the Last 10 Years

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Introduction: Malignant central nervous system (CNS) neoplasms are a major cause of pediatric morbidity and mortality, with gliomas, medulloblastomas, ependymomas, and meningiomas being most common. Diagnosis relies on advanced imaging and molecular biomarkers, while treatment includes surgery, radiotherapy, chemotherapy, and targeted therapies. Objective: To analyze the epidemiology, diagnosis, and treatment of malignant CNS neoplasms in children in Paraná over the past decade. Method: Data from the Painel Oncologia Brasil - DATASUS were analyzed regarding isolated or combined diagnoses and treatments of malignant neoplasms of the spinal cord, cranial nerves, and other CNS regions in patients aged 0 to 19 years in Paraná (2015-2025). Results: The highest number of treatments was recorded in 2020 (19; 22.3%), while the lowest occurred in 2025 (0; 0%). From 2015 to 2025, a total of 85 treatments were performed, including 19 surgeries (22.3%), 29 chemotherapy sessions (34.1%), and 37 radiotherapy sessions (43.5%). The most frequently treated age was 2 years, with chemotherapy being the predominant modality, while other treatments were distributed across different age groups. Conclusion: A multimodal approach is essential in CNS neoplasm treatment, with advancements in diagnostics and therapies. Biomarkers and personalized treatments may improve outcomes and reduce complications.

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Keywords: Central Nervous System Neoplasms, Pediatrics, Neurosurgery, Neoplasms, Malignant

Expression of microRNA-181c in glioblastoma neurospheres treated with temozolomide and temozolomide combined with ionizing radiation

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Introduction: Glioblastoma multiforme is the most common and aggressive malignant tumor found in the central nervous system. Currently, the standard clinical treatment includes maximal surgical resection, radiation, and chemotherapy, but it is limited by reduced therapeutic efficacy. Recent studies have reported that glioblastoma tumorigenesis is linked to epigenetic mechanisms, including microRNA regulation. miR-181c belongs to the miR-181 family, which is closely involved in glioblastoma tumorigenesis. Objective: The aim of this project is to analyze the expression of miRNA-181c in neurospheres subjected to chemotherapy and chemotherapy combined with radiotherapy. Method: Eight glioblastoma cell cultures were used and divided into three groups: control, treated with temozolomide, and the radiation plus temozolomide group. The cultured cells were added to medium containing growth factors to allow neurosphere formation. In this selection, we analyzed the expression of miR-181c. Results: miR-181c showed no statistically significant difference between the studied groups: control, temozolomide, and temozolomide combined with ionizing radiation (Kruskal-Wallis Test, p =

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0.3712). Conclusion: There was no statistical difference in miR-181c expression among the different groups. However, further studies are needed to evaluate miR-181c expression, as it is associated with several mechanisms involved in glioblastoma tumorigenesis.

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Keywords: Glioblastoma multiforme, Temozolomide, Radiotherapy, microRNA-181c

Rare Presentation of Medulloepithelioma with Extensive Skull Base Involvement in a Child

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Case presentation: A 3-year-old female presented with a one-month history of exophthalmos and rapidly progressive facial swelling. On examination, she had left-sided ocular proptosis and facial bulging. MRI revealed an expansive lesion with sphenoidal erosion and extension to the anterior clinoid processes, middle cranial fossae, and sellar region, measuring 87x52x42 mm. A microsurgical approach was performed for partial resection. Immunohistochemical analysis suggested an embryonal tumor with multilayered rosettes. Methylation profiling revised the diagnosis to medulloepithelioma of the optic nerve. Chemotherapy with carboplatin and etoposide was initiated, with slight reduction in tumor size. Methylation profiling was essential for the final diagnosis and appropriate management. Chemotherapy showed partial efficacy in reducing the lesion and controlling the disease.
Discussion: Medulloepithelioma is a rare and aggressive congenital tumor of the central nervous system, derived from primitive neuroectodermal cells. Its occurrence in the optic nerve is extremely uncommon. The rarity and clinical similarity to other pediatric orbital tumors contribute to its infrequent consideration in the initial differential diagnosis. Clinical overlap with more common pediatric tumors increases the risk of misdiagnosis. Medulloepithelioma typically presents as a well-defined intraconal mass centered on the optic nerve or disc, usually within the first six years of life. Common clinical findings include proptosis, strabismus, optic disc edema, visual loss, and retrobulbar optic neuropathy.
Final comments: No specific radiological features are described, making diagnosis more challenging. Due to the rarity of optic nerve involvement, there is currently no established consensus on optimal treatment.

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Keywords: Medulloepithelioma, Methylation profile, Skull-base, Optic nerve, Neuroectodermic tumors

Localized Control of Pineal Region Papillary Tumor in a Child: Description of Disease Behavior in a Case Report

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Case presentation: A 10-year-old boy presented with persistent headache and vomiting for two months. Brain MRI showed a lobulated, expansive lesion in the pineal region, measuring approximately 12 mm, with slight hyperintensity on T1- and T2-weighted images and contrast enhancement. The lesion was resected via a transcortical transventricular frontal approach. Histopathological analysis confirmed a papillary tumor of the pineal region. No adjuvant therapy was initially provided. Three years later, he experienced four episodes of syncope. Follow-up MRI revealed tumor recurrence and hydrocephalus. A second resection and ventricular shunt were performed using the same surgical route. Histological findings remained consistent with the initial diagnosis. After discharge, outpatient follow-up was recommended, without further treatment.
Discussion: Pineal region tumors are rare, accounting for less than 1% of CNS neoplasms. Papillary tumors in this location are even more uncommon, first described in 2003 and classified by the WHO as grade II or III due to their potential malignancy and aggressive behavior. They arise from specialized ependymal cells of the subcommissural organ. Because of their proximity to the cerebral aqueduct, non-communicating hydrocephalus and increased intracranial pressure are common findings. In pediatric patients, typical symptoms include headache, nausea, vomiting, Parinaud's syndrome, and diplopia.

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Final comments: Adjuvant radiotherapy or chemotherapy may be considered after partial resection. However, recurrence rates remain high, reaching up to 70% within six years. Due to the rarity of these tumors and the lack of randomized trials, no standardized treatment protocols exist in children. The extent of resection remains the main prognostic factor for survival and recurrence.

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Keywords: Papillary tumor of the pineal region, Rare tumor, Pediatric neuro-oncology, Tumor recurrence, Hydrocephalus

Avanços no Manejo do Meduloblastoma Pediátrico: Abordagens Cirúrgicas e Terapêuticas Atuais

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Keywords: Abordagens, Meduloblastoma, Pediátrico

EMBOLIZAÇÃO SELETIVA PRÉ-OPERATÓRIA DE EPENDIMOMA ANAPLASICO EM UM PACIENTE PEDIATRICO: UM RELATO DE CASO

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Keywords: Embolização, Ependimoma, Anaplástico, Pediátrico

Progressive Hemiparesis in a Child with Neurofibromatosis Type 1: A Case Report of a Rare Schwannoma

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Case Presentation: A 13-year-old female with a known diagnosis of Neurofibromatosis Type 1 presented with progressive gait disturbance and right-sided hemiparesis. MRI revealed multiple intradural extramedullary lesions throughout the cervical, thoracic, and lumbar spine, suggestive of neurofibromas. The most significant lesion was located at the C7–T1 level on the right, causing marked spinal cord compression and radiologically suggestive of a schwannoma. Discussion: Given the severe neurological symptoms and radiologic findings, the patient underwent neurosurgical intervention for tumor resection and spinal cord decompression. Postoperative recovery was favorable, with improvement in motor strength, gait, and pain. Histopathological examination confirmed the diagnosis of schwannoma. Intradural schwannomas are uncommon in pediatric populations and even more rarely associated with NF1, where plexiform neurofibromas are typically expected. This case highlights the need for differential diagnosis in NF1 patients presenting with progressive neurological deficits. Final Comments: Early recognition of spinal tumors in NF1 is critical, as timely surgical intervention can significantly improve outcomes. This case underscores the importance of clinical vigilance and imaging follow-up in pediatric patients with NF1, especially when new neurological signs emerge. The patient remains under regular outpatient follow-up with sustained clinical improvement.

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Keywords: Pediatric schwannoma, Neurofibromatosis Type 1 (NF1), Spinal cord compression

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EPIDEMIOLOGY AND THERAPEUTIC APPROACHES IN MALIGNANT BRAIN NEOPLASMS IN THE PEDIATRIC FIELD OF PARANÁ: A RETROSPECTIVE DECADE ANALYSIS

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Introduction: Malignant brain neoplasms are the leading cause of cancer-related death in children, posing a significant clinical challenge that demands detailed epidemiological and therapeutic analysis. Objective: This study aimed to investigate the incidence and epidemiological patterns of malignant brain neoplasms in pediatric patients in the state of Paraná from 2015 to 2025. Methodology: This descriptive epidemiological study was based on annual data from TABNET/DATASUS, using records from the Hospital Information System of the Brazilian Unified Health System (SIH/SUS). It included patients aged 0 to 15 years, of both sexes. Results: A total of 306 treatments were recorded: 72 (23.5%) surgeries, 152 (49.6%) chemotherapies, and 82 (26.7%) radiotherapies. The highest treatment rate occurred in 2020 (12.6%), and the lowest in 2025 (0%). The age most affected was 1 year, concentrating the majority of surgeries and chemotherapies. Other treatments were distributed across different age groups. Conclusion: There was a predominance of less invasive approaches, reflecting the greater fragility of the pediatric population. The high incidence of neoplasms and interventions in the first year of life emphasizes the importance of early diagnostic and therapeutic strategies to reduce harm and mortality in this vulnerable population.

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Keywords: Malignant Neoplasm, Pediatric, Brain

NEOPLASIA MALIGNA DO ENCÉFALO EM CRIANÇAS E PRÉ-ADOLESCENTES NO BRASIL: UM ESTUDO ECOLÓGICO / NEOPLASIA MALIGNA DO CÉREBRO EM CRIANÇAS E PRÉ-ADOLESCENTES NO BRASIL: UM ESTUDO ECOLÓGICO

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Introdução: As neoplasias cerebrais, relevantes no cenário do câncer pediátrico no Brasil, têm apresentado aumento, com desafios no diagnóstico precoce e opções terapêuticas limitadas. A etiologia é complexa, com predominância de fatores genéticos. Barreiras no acesso à saúde e baixa conscientização dificultam o manejo adequado. Objetivo: Analisar a tendência temporal das taxas de internação por neoplasia maligna do encéfalo em crianças e pré-adolescentes entre 2008 e 2023. Metodologia: Indicadores: ano da internação e taxa por 100.000 habitantes (faixa etária: 0 a 14 anos). Base de dados: SIH-SUS. Testes estatísticos: Decomposição STL e Teste de Mann-Kendall. Software: Python 3.9. Resultados: A análise revelou crescimento significativo nas internações por neoplasia maligna do encéfalo entre 2008 e 2023. Destacam-se: tendência ascendente das taxas, com inclinação de Sen (2,6); significância estatística ($p < 0,05$), confirmando padrão não aleatório; variações sazonais, mas com aumento consistente após 2010. Conclusão: O estudo evidencia aumento nas internações por neoplasia maligna do encéfalo em crianças, refletindo maior incidência e avanços no diagnóstico. Reforça-se a necessidade de políticas públicas voltadas ao diagnóstico precoce, tratamento especializado e expansão da neurocirurgia pediátrica.

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Keywords: Palavras-chave: Neoplasia maligna do encéfalo,Oncologia pediátrica e Saúde pública/ Malignant neoplasm of the brain, Pediatric oncology, Public health.

NEOPLASIA MALIGNA DO ENCÉFALO EM CRIANÇAS E PRÉ-ADOLESCENTES NO BRASIL: UM ESTUDO ECOLÓGICO / NEOPLASIA MALIGNA DO CÉREBRO EM CRIANÇAS E PRÉ-ADOLESCENTES NO BRASIL: UM ESTUDO ECOLÓGICO

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Introdução: As neoplasias cerebrais, relevantes no cenário do câncer pediátrico no Brasil, têm apresentado aumento, com desafios no diagnóstico precoce e opções terapêuticas limitadas. A etiologia é complexa, com predominância de fatores genéticos. Barreiras no acesso à saúde e baixa conscientização dificultam o manejo adequado. Objetivo: Analisar a tendência temporal das taxas de internação por neoplasia maligna do encéfalo em crianças e pré-adolescentes entre 2008 e 2023. Metodologia: Indicadores: ano da internação e taxa por 100.000 habitantes (faixa etária: 0 a 14 anos). Base de dados: SIH-SUS. Testes estatísticos: Decomposição STL e Teste de Mann-Kendall. Software: Python 3.9. Resultados: A análise revelou crescimento significativo nas internações por neoplasia maligna do encéfalo entre 2008 e 2023. Destacam-se: tendência ascendente das taxas, com inclinação de Sen (2,6); significância estatística ($p < 0,05$), confirmando padrão não aleatório; variações sazonais, mas com aumento consistente após 2010. Conclusão: O estudo evidencia aumento nas internações por neoplasia maligna do encéfalo em crianças, refletindo maior incidência e avanços no diagnóstico. Reforça-se a necessidade de políticas públicas voltadas ao diagnóstico precoce, tratamento especializado e expansão da neurocirurgia pediátrica.

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Keywords: Neoplasia maligna do encéfalo, Oncologia pediátrica e Saúde pública/ Neoplasia maligna do cérebro, Oncologia pediátrica, Saúde pública.

Treatment of Malignant Brain Neoplasms in Children and Adolescents in Brazil: an ecological study ; Tratamento de Neoplasia Maligna do Encéfalo em Crianças e Adolescentes no Brasil: um estudo ecológico.

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Introduction: Malignant brain neoplasm (ICD-10 C71) is one of the leading types of cancer among children and adolescents, with significant mortality rates. Objective: To analyze the temporal trend of therapeutic modalities for the treatment of C71 in children and adolescents from 2013 to 2024. Methodology: Ecological study using data from the Hospital Information System and the Oncology Panel. Variables: treatment rate by therapeutic modality per 1,000 cases, lethality rate, year, and age group (0–19 years). Simple Linear Regression was performed using the Statistics Kingdom software. Results: A total of 3,475 C71 cases were identified. Of these, 34.8% started treatment with "surgery," 36.9% with "chemotherapy," 27% with "radiotherapy," and 1.3% with "both" (radiotherapy and chemotherapy). Regarding temporal analysis, "surgery" showed a decreasing trend ($p = 0.004$; $b1 = -58.55$), while "radiotherapy" ($p < 0.001$; $b1 = 16.77$) and "both" ($p < 0.001$; $b1 = 1.91$) showed an increasing trend. The "chemotherapy" modality was not statistically significant ($p > 0.05$). The lethality rate showed a decreasing trend ($p = 0.004$; $b1 = -0.17$). Conclusion: The "surgery" modality exhibited a decreasing temporal trend, as did the lethality rate for C71, whereas "radiotherapy" and "both" showed a significant increase.
Introdução: A neoplasia maligna do encéfalo (CID10 C71) é um dos principais tipos de câncer em infantojuvenis, apresentando significativa mortalidade. Objetivo: Analisar a tendência temporal da modalidade terapêutica para o tratamento de C71 em crianças e adolescentes entre 2013 a 2024. Metodologia: Estudo ecológico com dados do Sistema de Informações Hospitalares e do Painel Oncologia. Variáveis: taxa de tratamento por modalidade terapêutica a cada 1.000 casos, taxa de letalidade, ano, faixa etária (0-19 anos). Utilizou-se o teste de Regressão Linear Simples no software Statistics Kingdom. Resultados: Identificou-se 3.475 casos de C71. Desses, 34,8% iniciaram o tratamento com “cirurgia”, 36,9% com “quimioterapia”, 27% com “radioterapia” e 1,3% com “ambas” (radioterapia e quimioterapia). Em relação à análise temporal, “cirurgia” apresentou uma tendência de diminuição ($p=0,004$; $b1 = -58,55$), “radioterapia” ($p<0,001$; $b1= 16,77$) e “ambas” ($p < 0,001$; $b1 = 1.91$), de aumento. A modalidade “quimioterapia” não foi estatisticamente significativa ($p > 0,05$). A taxa de letalidade apresentou tendência de diminuição ($p = 0,004$; $b1= -0,17$). Conclusão: A modalidade “cirurgia” apresentou uma tendência temporal de diminuição assim como a taxa de letalidade por C71, enquanto que “radioterapia” e “ambas”, de aumento significativo.

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Keywords: Brain Neoplasms, Therapeutics, Child Health, Brazil ; Neoplasias Encefálicas, Terapêutica, Saúde da Criança, Brasil.

LIQUID BIOPSY: ONCOLOGICAL MONITORING IN CHILDREN WITH CENTRAL NERVOUS SYSTEM TUMORS

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Introduction: Tumors of the central nervous system (CNS) are the most common neoplasms in pediatrics and represent the main cause of oncological mortality in children with solid tumors. Liquid biopsy allows the identification of tumor markers, such as in cerebrospinal fluid and plasma, and is a promising method for monitoring cancer treatment. Objective: To evaluate the efficacy and benefits of investigating CNS tumors using liquid biopsy in pediatric patients. Methodology: An integrative review was conducted, selecting articles from PubMed, MEDLINE, Science Direct and LILACS, in the last 5 years, using the terms “Liquid Biopsy”, “Central Nervous System Neoplasms” and “Children”. 201 articles were found and 29 were selected. Results: Liquid biopsy is a breakthrough in pediatric neuro-oncology that uses cell-free DNA from cerebrospinal fluid to offer diagnosis, prognosis and surveillance of tumors, as well as serving as a specific individualized marker to detect neoplasms, providing information on tumor progression and response to treatment. Conclusion: The analysis of ctDNA and cfDNA allows the early detection of biomarkers, surpassing conventional methods, assisting in molecular classification, risk stratification and therapeutic targeting. Despite challenges such as low concentration of cfDNA and a lack of standardization, liquid biopsy has the potential to improve paediatric prognosis.

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Keywords: liquid biopsy, cerebrospinal fluid, biomarkers, central nervous system, pediatrics.

TRIGEMINAL NERVE SCHWANNOMA: A CASE REPORT AND SYSTEMATIC REVIEW

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Trigeminal nerve schwannomas are rare in childhood. We report a 12-year-old female presenting with progressive hemiparesis, dysarthria, and multiple cranial nerve deficits. MRI revealed a large extra-axial lesion compressing the brainstem, consistent with a right trigeminal schwannoma. Subtotal resection via pterional craniotomy was performed, preserving neurovascular structures. Pathology confirmed schwannoma, and near-complete recovery was observed after 18 months. A systematic review (PRISMA guidelines, PubMed 2005–2025) identified 14 pediatric and 1,743 adult cases. In children, tumors primarily affected the middle cranial fossa (50%) and all were symptomatic, with facial pain and cranial nerve deficits prevailing - in agreement with the reported case. Total resection was achieved in 64.29%, with recurrence in 2 cases (14.29%). In adults, surgery was performed in 74.45%, with a 0.86% complication rate. The comparative analysis revealed clinical and radiological differences across age groups, highlighting the scarcity of pediatric data. This study emphasizes the value of integrating case reports and systematic reviews to guide individualized surgical management of rare and complex tumors.

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Keywords: Schwannoma trigeminal, sistematic review, schwanomma

Epidemiological Profile of Nervous System Neoplasms in Brazilian Children and Adolescents: Age-Stratified Analysis (2022–2024)

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INTRODUÇÃO: Neoplasms of the central and peripheral nervous systems in children and adolescents are responsible for significant morbidity and mortality. Their age-specific distribution requires detailed epidemiological analysis to inform clinical and neurosurgical strategies.
OBJETIVO: To map and characterize the epidemiological profile of neoplasms affecting the CNS, PNS, and associated structures in Brazilian pediatric patients, stratified by age group and federative unit.
MÉTODO: This is a cross-sectional observational study based on DATASUS data (2022–2024), covering all Brazilian states. ICD codes C47, C70, C71, C72, D42, and D43 were included, with age-stratified pediatric analysis.
RESULTADOS: Among infants (0–2 years), case numbers remained stable, with a low incidence of meningeal tumors (C70). In preschool-aged children (3–6 years), the highest number of cases was recorded, with peaks at ages 4 and 5. Malignant neoplasms of the brain (C71) and spinal cord/cranial nerves (C72) predominated, possibly reflecting critical periods of neural maturation. In school-aged children (6–9 years), incidence was intermediate, with persistent cases of C71 and D43. Among preadolescents and adolescents (10–18 years), there was a progressive increase in meningeal tumors and continued presence of neoplasms of uncertain behavior.
CONCLUSÃO: The distinct age-related distribution underscores the importance of early surveillance and individualized neurosurgical planning, especially during the early years of life.

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Keywords: Neurosurgery, Neoplasms, Epidemiology, Central Nervous System, Brain

Diagnosis of malignant neoplasms of the brain and spinal cord, cranial nerves, and other parts of the nervous system in children aged 0 to 12 years over the past 10 years

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Malignant neoplasms of the central nervous system (CNS) account for approximately 20% of childhood tumors, posing a significant challenge for diagnosis and treatment in pediatrics. This study analyzed the incidence of these neoplasms in children aged 0 to 12 in Brazil between 2014 and 2024, aiming to understand the epidemiological factors involved.
Data were obtained from pediatric oncology records (Panel-Oncology Brazil/MS — DATASUS Data) and analyzed based on incidence rates, distribution by sex, age, and geographic region. The average annual rate was 1.64 cases per 100,000 children, totaling 5,741 diagnoses. The peak incidence occurred at age 5, with a male predominance (M:F ratio of 1.15:1). Regional distribution highlighted disparities in healthcare access, with the highest concentration of cases in the Southeast (44.1%) and the lowest in the North (4.6%). Additionally, only 16.4% of patients received immediate treatment, while most faced delays of more than one day.
The results indicate challenges in early diagnosis and medical care, affecting children's prognoses. The study reinforces the need for investments in infrastructure, professional training, and awareness campaigns to reduce regional inequalities and improve the efficiency of care for affected children.

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Keywords: Neoplasms, Brain, Spinal Cord Diseases

Brain Metastasis in Hepatoblastoma: Pediatric Case Report

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Case Presentation: We report the case of an 8-month-old female diagnosed with mixed hepatoblastoma (epithelial/mesenchymal) after investigation for hepatomegaly. Despite multiple lines of chemotherapy and regular oncological follow-up, she developed a brain metastasis in the left frontal lobe and underwent surgical resection. A few weeks after surgery, she presented with multifocal cerebral recurrence and died shortly thereafter.
Discussion: Hepatoblastoma is the most common malignant liver tumor in childhood, typically diagnosed in children under the age of 4. Central nervous system metastases are

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extremely rare. The literature includes only isolated reports, most with poor outcomes. Older age at diagnosis, advanced-stage disease, and multiple pulmonary recurrences appear to be risk factors for brain dissemination. Treatment must be individualized, and prognosis remains poor even with surgery and aggressive chemotherapy. Final Comments: This report adds to the limited literature on brain metastases in pediatric hepatoblastoma. The rarity and severity of such cases highlight the importance of early recognition and the need for further studies to define more effective therapeutic approaches.

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Keywords: Hepatoblastoma, brain metastasis, cerebral, child, pediatric

USO DE INTELIGÊNCIA ARTIFICIAL NO DIAGNÓSTICO E TRATAMENTO DE TUMORES CEREBRAIS PEDIÁTRICOS: UMA REVISÃO INTEGRATIVA DE LITERATURA

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INTRODUCTION: Pediatric brain tumors present high diagnostic and therapeutic complexity, requiring innovative approaches. Artificial Intelligence (AI) has emerged as a promising strategy in neuroimaging analysis, contributing to diagnosis, prognosis, and treatment planning. OBJECTIVE: To analyze the impact of AI in pediatric neuroimaging applied to the diagnosis and treatment of brain tumors. METHODS: An integrative review was conducted following PRISMA guidelines. Searches were performed in the Library, BVS, SciELO, and MEDLINE databases, using the PICO strategy and the descriptors “artificial intelligence,” “brain neoplasms,” “pediatrics,” and “functional neuroimaging,” combined with the Boolean operators “AND” and “OR.” From 86 studies identified, 5 were selected, including journal articles and literature reviews. RESULTS: AI proved to be a valuable ally in neuroimaging analysis, enabling greater diagnostic accuracy and identification of molecular subtypes. Its role was highlighted in predicting response to immunotherapy, optimizing radiological workflow, and increasing patient survival, acting synergistically with traditional therapeutic approaches. CONCLUSION: AI is an effective tool in pediatric neuroimaging analysis, enhancing the diagnosis and treatment of brain neoplasms, with emphasis on its integrated application and growing clinical potential.

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Keywords: Inteligência Artificial, Neoplasias Cerebrais, Pediatria, Neuroimagem Funcional

Epidemiological analysis of the incidence of brain and central nervous system cancer in children and adolescents stratified by country and continent

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INTRODUCTION: Brain and central nervous system (CNS) tumors are the leading cause of cancer-related mortality in children and adolescents (0-19 years). A global epidemiological analysis of these tumors allows for the identification of regional disparities, the hypothesis of genetic predisposition in specific populations, and supports the development of public health strategies for pediatric oncology. OBJECTIVE: To analyze the incidence of brain and CNS cancer in children and adolescents in 2022, stratified by country and continent. METHOD: Descriptive epidemiological study based on data extracted from the Cancer Today platform (GLOBOCAN/IARC). Analyses were based on the age-standardized rate (ASR) and stratified by country, continent, geographic region, HDI, and World Bank economic classification. RESULTS: In 2022, a total of 30,871 new cases of brain and CNS cancer were reported worldwide among individuals aged 0-19 years. The highest ASR was observed in North America (3.4), whereas the lowest occurred in Africa (0.61). Countries with higher HDI and income levels had higher rates. Brazil showed an ASR of 1.8, exceeding both the South American (1.6) and global (1.2) averages. CONCLUSION: A direct association was found between the incidence of brain and CNS cancer in children and adolescents and the HDI and income levels of countries, potentially reflecting environmental differences and disparities in access to diagnosis.

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Keywords: Brain Cancer, Pediatrics, Epidemiology

Epidemiological Survey of Nervous System Tumor Diagnoses in the Northeast Region, 2020 to 2024

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Introduction: Nervous system tumors are a significant challenge for the healthcare system. In the Northeast, mapping the epidemiological profile helps to understand and direct public policies effectively. Objectives: To understand the distribution of diagnosed neurological tumors in the Northeast, indicating the state with the highest incidence, as well as sex, age group, and patient diagnoses. Methodology: Cross-sectional observational study with data from DataSUS, filtering neurological diagnoses by date - between 2020 and 2024 - and region. Results: The Northeast recorded a total of 9,040 neurological tumor cases from 2020 to 2024, with malignant tumors being the most frequent, n=6,095 (67.4%), of which n=4,910 (54.3%) were brain cancer, and 2023 had the highest number of diagnoses, n=2,072 (22.9%). Bahia recorded the highest number of diagnoses during the period, n=1,739 (19.2%). Women represented n=4,678 (51.7%) of the cases. The age group 0 to 19 years had n=1,223 (13.5%), representing the largest proportion of diagnoses. Conclusion: The data reveal a progressive increase in tumor diagnoses, according to INCA (2022), driven by lifestyle and aging. The analysis emphasizes improvements in data collection and the need for regional strategies: prevention, treatment, and palliative care.

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Keywords: Central Nervous System Neoplasm, Hospitalization, Disease Notification

TEMPORAL VARIATIONS IN CHILDHOOD MORTALITY DUE TO CNS TUMORS IN BRAZIL: IMPACT OF THERAPEUTIC ADVANCES

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Introduction: Central nervous system (CNS) tumors represent a significant cause of death among children and adolescents in Brazil. The mortality associated with these tumors has been a central topic in public health studies, given their complexity and the variety of available treatments. With advances in oncological therapies, an improvement in patient survival is expected, potentially leading to a reduction in mortality rates over time. However, few studies have comprehensively addressed the temporal trends in childhood mortality due to CNS tumors in Brazil, considering different age groups and geographic regions. Objective: To analyze the temporal variations in childhood mortality due to CNS tumors in Brazil between 1996 and 2023, taking into account age groups, geographic regions, and the possible impact of therapeutic advances on these trends. Method: This was an ecological time-series study using data from the Mortality Information System (SIM/DATASUS). Deaths from CNS tumors in individuals aged 0 to 19 years were included, according to ICD-10 codes: C70 (meninges), C71 (brain), and C72 (spinal cord and cranial nerves). Data were stratified by age group (0–4, 5–9, 10–14, and 15–19 years) and geographic region. Poisson regression was used to analyze annual mortality variation, and the chi-square test was applied to compare the periods 1996–2013 and 2014–2023. Results: A total of 17,451 deaths from CNS tumors were recorded among children and adolescents between 1996 and 2023. Of these, 4.8% occurred in children under 1 year old; 22.6% between ages 1 and 4; 28.7% between 5 and 9; 22.9% between 10 and 14; and 21.0% between 15 and 19 years. Temporal trend analysis using a Poisson regression model showed a modest annual reduction in mortality rate, with a relative risk of approximately 0.998, corresponding to a decrease of about 0.2% per year. Moreover, comparison between the periods 1996–2013 and 2014–2023 revealed a statistically significant difference in mortality patterns, with $\chi^2 = 13.55$ and $p = 0.00023$. The relative risk between the two periods was approximately 0.986, indicating a 1.4% reduction in mortality in the most recent period. Conclusion: In conclusion, a downward trend in childhood mortality due to CNS tumors in Brazil was observed from 1996 to 2023. This reduction was more pronounced in the most recent period, possibly reflecting the impact of therapeutic advances. Despite this improvement, challenges remain related to early diagnosis and unequal access to specialized services, particularly in certain regions of the country.

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