Oral presentation 10: DYSRAPHISM

A-0118

Myelomeningocele as an anomaly of secondary neurulation

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Introduction : Myelomeningocele (MMC) is the representative entity of open neural tube defects resulting from an error during primary neurulation. However, cases of MMC in the region of the secondary neural tube (below the junction of S1 and S2 vertebral bodies) are sometimes encountered. We aimed to analyze the clinical features of atypical 'low-lying' MMC and suggest possible pathoembryogenesis.

Material & Methods : We defined 'low-lying' MMCs as those with fascia or lamina defects below the S1-2 interspinous ligament. A retrospective review of the radiological and clinical information was performed.

Results : Thirty-one out of the 95 MMC patients were identified as having low-lying MMC. The percentage of low-lying MMC within the entire MMC group increased dramatically (19% from 1990 to 1999 and 48% from 2000 to 2020). Thirty-nine percent of the low-lying MMCs were associated with hydrocephalus, and 36% of the Chiari malformations were associated with relatively small proportions compared to the classic MMCs. Nine of the 12 patients with hydrocephalus underwent ventriculoperitoneal shunting, and none with Chiari malformation required foramen magnum decompression. Clean intermittent catheterization was being performed by 52% of the patients and 46% had a motor weakness.

Conclusions : We propose that open neural tube defect may be formed during secondary neurulation as a result of 1) persistent connection between the primitive streak and the caudal cell mass or 2) rupture of the terminal balloon of the degenerating medullary cord. We present cases of atypical MMC occurring in the region of secondary neurulation. These cases provide clues that secondary neurulation may lead to open neural defects.

Oral presentation 10: DYSRAPHISM

A-0133

Is tethered cord release recommended to maintain or improve urinary tract function in patients with myelomeningocele?

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Introduction : There is little evidence that tethered cord release (TCR) for tethered cord syndrome (TCS) can preserve or improve lower urinary tract function. Because the diagnosis of TCS is often difficult, the rate of TCR has been shown to vary widely between centers. We retrospectively analyzed the results of TCR based on urodynamic study (UDS) in children with myelomeningocele (MMC).

Material & Methods : Of 64 children who underwent MMC repair at Miyagi Children's Hospital from 2003 to 2016, 55 with more than 5 years of follow-up were included. Patient characteristics, risk factors for TCS, surgical indications, and outcomes of TCR were evaluated.

Results : Mean follow-up was 11.5±3.5 years. Of the 55 patients, 27 TCRs were performed in 22 patients. The mean age at the time of each TCR was 7.0±2.7 years for the first TCR (n=22), 11.2 years for the second TCR (n=4), and 15.9 years for the third TCR (n=1). There were no risk factors associated with TCS. Surgical indications for the first TCR were worsening lower extremity (LE) motor symptoms in one patient (4.5%), worsening LE sensory symptoms in two patients (9.1%), and worsening UDS findings in 22 patients (100%). Postoperatively, LE motor symptoms improved in one patient (100%), LE sensory symptoms improved in one patient (50%), and VUDS findings improved in 15 patients (68.2%), stabilized in six patients (27.3%), and worsened in one patient (4.5%). There were no patients with either augmentation cystoplasty (AC) or renal dysfunction.

Conclusions : Urodynamically based TCR can prevent AC and renal dysfunction in MMC patients.

Oral presentation 10: DYSRAPHISM

A-0007

A case of thoracic meningomyelocele associated with mature teratoma

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Introduction : Meningomyeloceles are rarely associated with teratomas. Herein, we report a case of mature teratoma diagnosed based on the pathological findings of a postoperative specimen after meningomyelocele repair.

Material & Methods : The fetus was born by cesarean section under general anesthesia at 38 weeks and 5 days of gestation. An opened spinal cord with a reddish protruding mass in a 6 × 5 cm skin defect was found in the midline of the back and lumbar region. Cranial magnetic resonance imaging (MRI) revealed enlarged lateral ventricles and Chiari malformation. Spinal MRI showed spinal cord traction on the dorsal surface from the lower thoracic spine to the lumbar spine, with a cystic lesion on the rostral side, which was diagnosed as a myelomeningocele. Spinal computed tomography showed spina bifida below the seventh thoracic vertebra.

Results : Myelomeningocele repair and CSF reservoir setting were performed. At the time of myeloplasty, the protruding mass was resected and examined histologically. Histopathological examination of the excised specimen revealed multilayered squamous epithelium, cartilage, and vasculature as well as adenotubular structures and central nervous system tissue, which led to the diagnosis of a mature teratoma. Based on these findings, the patient was diagnosed with myelomeningocele associated with a spinal intramedullary mature teratoma. At 37 days of age, ventriculoperitoneal shunting was performed. Spinal MRI on 10 months showed there were no recurrent findings.

Conclusions : Concurrence of mature teratomas with myelomeningocele is rare. As teratoma inside a myelomeningocele is a relatively benign neoplasm, the surgical approach to teratoma and removal must be carefully considered.

Oral presentation 10: DYSRAPHISM

A-0083

Neural Tube Defects cases in an Indonesian Referral Hospital : A 5-Year Epidemiological Study

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Introduction : Neural tube defects (NTDs) are the congenital malformations in humans affecting the development of the central nervous system that significantly increase the risk of death and disability in the 1st year of life. This retrospective study aimed to potray NTD cases based on the data obtained from one of the Indonesian referral hospital in the Riau Islands in hopes of providing useful information through epidemiological data.

Material & Methods : We retrospectively examined the demographic features, familial risk factors, physical examination, radiological findings, accompanying diseases and surgical managements of 27 patients with NTDs from Badan Pengusahaan Hospital Batam, Indonesia from January 2019 up to August 2023.

Results : Of the 27 patients hospitalized in a 5year period were male - dominated (55.5%). The median birth weight was 2800 g and the median delivery week was 37 weeks. 7 of the patients (26%) had meningomyelocele, 17 patients (63%) had posterior encephalocele, and 3 patients (11%) had anterior encephalocele. 11 of the patients (40.7%) had Congenital Hydrocephalus. 22% of the mothers had a history of periconceptional use of folic acid. The median time of making a diagnosis of NTD by prenatal ultrasonography was 20 (16–24) weeks. 7 of the patients (26.6%) had other organ disorders, some with multiple systemic disorders.

Conclusions : Based on the study, we revealed that our NTDs cases the majority affect male patients, with posterior encephalocele as the most common cause and just 22 percents of the mothers had a history of periconceptional use of folic acid.

Oral presentation 10: DYSRAPHISM

A-0103

Terminal Myelocystocele cases, personal experience in Northokkalapa General Hospital, Myanmar and Ibaraki Children's Hospital, Japan. Aye Mya Phyu, Kyi Hlaing, Takayuki Inagaki Northokkalapa General Hospital and Ibaraki Children's Hospital

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Introduction : Terminal myelocystocele is a rare and discrete spinal cord abnormally. It constitutes 4—8% of spinal dysraphism.TMC are cystic dilations of low lying extraspinal terminal cord covered with adipose tissue and intact skin. It can also constitutes spinal subarachnoid expansion, meningocele and hydromyelic cord. We discuss about surgical management and embryology based upon two cases of isolated terminal myelocystocele.

Material & Methods : Case1.Six month old boy presented with congenital lumbosacral swelling which increase in size with time.MRI shows fluid filled cystic mass without apparent nervous tissue which is typical appearance of terminal TMC. Case 2: One month old boy was presented with 3×4 cm intergluteal cleft swelling with hemangiomatous navi since birth. He was neurologically normal at diagnosis. MRI show terminal cyst with tethered cord into extra spinal compartment at dorsal side and covered by subcutaneous tissue and skin.

Results : Untethering and myleocystocele repair was done in both patients. There were no post operative CSF leak and other complications. No motor deficits was seen in both patients. Urinary incontienence was seen in one patient.

Conclusions : Since the report of TMC by McLone and Naidich, several reports were published. We presented two cases of TMC cases based upon first author's personal experience, here. These two cases are not associated with other anomalies. It is thought that TMC cases should be surgical treated at a few months old, since some patients of TMC may have severe tethered spinal cord and most of them are surgically treatable compared to complex lipomyelomeningocele.

Oral presentation 10: DYSRAPHISM

A-0163

Time Window for Neurosurgical Management of Currarino Syndrome: Case Illustration

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Introduction : The Currarino syndrome is defined by the triad of anorectal malformations, sacral bone deformities, and presacral masses. It is frequently associated with neuroanatomical anomalies. A complex combined anterior and posterior approach was suggested in some literature. Nevertheless, little is known of the neurosurgical attitude.

Material & Methods : A newborn girl of Currarino syndrome presented with constipation and a protruding mass out of her anus. Anal tube was used to facilitate the defecation. When the patient came to us at the age of 2 months, the anal mass has withdrawal into the rectum spontaneously and she was free of anal tube using. Based on this important history, neurosurgical intervention was postponed and undertaken at age of 7 months when MRI showed clear anatomical structure.

Results : During surgery, the filum terminale were tethered by an abnormal enlargement of neuroglial tissue and lipoma. Complete detethering was achieved. A space ventral to the transected caudal stump extended ventrally into the pelvic space. Continuous suture between the ventral dura and the caudal stump was made to obliterate the space. A favorable surgical outcome was achieved after a 28-month follow-up. An anterior surgical approach was not undertaken due to the asymptomatic and stationary presacral mass.

Conclusions : Neurosurgical management of Currarino syndrome may be wisely postponed till the surgical anatomy is favorable for a complete untethering and a secure dural repair if there is no potential risk of severe complications like recurrent meningitis, pyomyelia, or severe neurological deficits.

Oral presentation 10: DYSRAPHISM

A-0178

Occurrence and related treatment of Tethered cord in children with Anorectal malformation

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Introduction : This research reviewed children with anorectal malformation (ARM) complicated with congenital Tethered Cord Syndrome (TCS) to explore the incidence of ARM children with TCS and the significance of related treatment.

Material & Methods : Medical history and imaging data of 105 children with ARM from February 2018 to February 2022 were reviewed. According to the MRI results, the children were divided into TCS group and non-TCS group, and the relationship between TCS and ARM type and whether Tethered cord lysis could improve defecation function.

Results : All 105 children with ARM were classified into two groups according to the Wingspread classification. 36 cases were assigned to the intermediate and high risk group, while 69 cases were assigned to the low risk group. The difference between the two groups was statistically significant . Among TCS group, 2/29 cases with poor defecation function, 2 cases with good function, 11 cases with excellent function, and 14 cases with normal function. Among the 76 children in the non-TCS group, there were 3 cases with poor defecation function, 4 cases with good function, 23 cases with excellent function, and 46 cases with normal function. There was no significant difference between the two groups (P=0.244).

Conclusions : The incidence rate of middle and high ARM combined with TCS is high, and the incidence of TCS of all pathological types is similar, without statistical significance. It is suggested that routine lumbosacral MRI should be performed in children with ARMs to detect TCS.

Oral presentation 10: DYSRAPHISM

A-0096

Prevention of retethering in untethering surgery of a tight filum terminale

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Introduction : Retethering after Untethering surgery for a tight filum terminalehas been reported to occur. One of the major mechanisms is adherence of the cut end of the sectioned filum to the midline dorsal dural surface. In order to prevent retethering, we sectioned a filum terminale at the rostral level to the dural incision so as to keep the distance between the cut end of the sectioned filum and the dural incision. We investigated whether this procedure decreased the occurrence of retethering.

Material & Methods : Among the cases between 2012 and 2016, and followed up more than 5 years were included. Symptoms, preoperative imaging, surgical details, perioperative complications, and outcomes were reviewed retrospectively.

Results : A total of 342 cases were included. The median age at surgery was 11 months. Preoperative magnetic resonance imaging (MRI) revealed 255 cases had low set conus. There were 142 cases with filar lipoma and 42 cases. Syringomyelia was found in 29 patients. Two hundreds forty-six caseswere symptomatic and 96 cases were asymptomatic. The median postoperative follow-up was 88 months. There were 4 cases (1.2%) with retethering presented with bladder and bowel dysfunctions. The mean time from initial untethering to retethering was 54 months. All 4 cases underwent untethering surgery, and preoperative symptoms resolved in 3 patients.

Conclusions : The retethering rate after untethering surgery for a tight filum terminale in our series was lower than those of the previous reports. Sectioning the filum terminale at the rostral level to the dural incision was considered to be an effective way for prevention of retethering.

Oral presentation 10: DYSRAPHISM

A-0095

The optimal timing to record the baseline of intraoperative bulbocavernosus reflex monitoring

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Introduction : Intraoperative bulbocavernosus reflex (BCR) monitoring is useful for untethering surgery in children. The baseline BCR amplitude was recorded around dural incision in some previous reports, but the other reports did not mention the timing of recording the baseline. The aim of this study is to clarify the optimal timing to record the baseline of intraoperative BCR monitoring.

Material & Methods : Patients performed untethering surgeries between January 2021 to March 2023 were included. Patients with extradural lesion such as spinal lipoma were excluded. We reviewed patients' medical chart and analyzed retrospectively. Primary outcome was more than 50 % decrease of BCR amplitude at dural incision. The first segment (R1) of BCR waveforms was evaluated for intraoperative BCR monitoring in this study.

Results : There were total 113 untethering surgeries. 5 patients experienced bilateral BCR decrease (4.4%). The existence of urological symptom was significantly higher in decrease group. There were 226 BCR waveforms from 113 patients. 24 BCR was decreased at dural incision. BCR amplitude at registration was significantly higher in decrease group than not-decrease group.

Conclusions : Among tethered cord syndrome, the traction of spinal cord is believed to cause its hypoxia and nerve damage. The existence of urological symptoms before untethering surgery indicates nerve damage. BCR might be susceptible to decrease regardless of surgical procedures. The BCR amplitude at registration can be used as a baseline amplitude among most of patients. If the patient experienced urological symptoms before untethering surgery, the BCR amplitude just before dura was opened might be better to use as a baseline amplitude.

Oral presentation 10: DYSRAPHISM

A-0136

Image overlay surgery attempt of spinal dysraphism

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Introduction : In spine surgery, confirmation the level of spinal cord is important. However, in cases with severe deformity, the merkmal on the surface are deviated and the usefulness of the intraoperative support system is reduced. In recent years, there has been demanded for minimally invasive surgery, especially in the abdominal surgery. On the other hand, complications due to disorientation are concerned. Therefore, image overlay surgery (IOS), which projects a three-dimensional(3D) image onto the body surface, has been used and its utility has been reported.

Material & Methods : A 12year-old girl. She underwent repair of terminal myelocystocele. Subsequently, scoliosis progressed and was considered an indication for spinal fusion so that preventive untethering was decided. The skeleton was significantly deformed, and there were concerns about disorientation. But various intraoperative image support such as navigation was difficult, so we tried IOS projects 3D images directly onto the body surface. After induction of anesthesia, identify the palpable spinous processes of the cervical and upper thoracic vertebrae, confirm the spinous processes of the cervical and upper thoracic vertebrae with fluoroscopy, 3D-CT images are displayed using a projector. The lumbosacral vertebrae were identified by projecting it on the back and aligning it with the merkmar.

Results : Intraoperative findings revealed no discrepancies between the IOS projection image and the actual structure, and spinal cord untethering was performed.

Conclusions : We applied IOS to surgical procedure of spinal dysraphism with severe deformity, and it was very useful to confirm the level of spinal cord.

Oral presentation 10: DYSRAPHISM

A-0193

Human Tail with Tethered Cord Management: Experience in Two Cases

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Introduction : Human tail is rare cutaneous lesion which is associated with occult spina bifida. It may be accompanied with tethered cord, but the tail itself may not always be the cause of tethering. Its appearance is extremely infrequent, making reports meaningful to study their variations and determine the management.

Material & Methods : Authors report two cases of of vestigial tail with tethering based on MRI studies. Fat tissue was found to be attached to the radix, connected to the tail. Patients underwent surgical procedure to untether the spinal cord and excise the fat tissues without the use of IOM. Untethering and removal of the tail was done safely. Patient did not have any new neurological deficits post operatively.

Results : Human tail may be a sign of congenital anomalies surrounding the lesion which also require surgical treatment. Surgical management of human tail is not only for the sake to achieve good cosmetics, but also to treat other related anomalies, in this case tethered cord. Authors proposed that IOM is not always required as no neural structure within the tail should be preserved and fat tissue attached to the spinal cord or radix can be reduced safely before dural closure.

Conclusions : It is important to note that human tail may be a sign of occult spinal dysraphism. Understanding the underlying anatomy through imaging studies is critical prior surgical procedures. When structures appear to be separable based on the studies, IOM is not always necessary. Thus, surgical procedure of human tail can be safely done even in limited settings.

Oral presentation 10: DYSRAPHISM

A-0173

Two cases of vanishing cerebellum associated with myelomeningocele

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Introduction : Chiari type 2 malformation (CM2) is a common finding associated with myelomeningocele(MMC). However, it is uncommon to observe symptoms such as apnea just after birth. It seems to be rare but if there is a severe transforaminal herniation, this will results in a “degeneration” of cerebellar tissue called “vanishing cerebellum”(VC). We had a chance to treat two cases of MMC associated with VC which followed a different course compared to common MMCs.

Material & Methods : Representative case This baby girl was diagnosed hydrocephalus due to MMC in an ultrasound. She was intubated at the OR because of a respiratory disorder after birth. Primary closure and an Ommaya reservoir insertion was performed at the same day. She frequently shown apneic episodes. Usually decompression surgery is planed if the symptoms were due to CM2 however the cerebellar tissue was invisible except some remnant tissue. A tracheostomy was performed at day 89. She underwent VP shunt. Her respiratory problems are still remaining during follow up.

Results : There is another pathology which is called cerebellar agenesis. Compared to this condition, a small posterior fossa and the remnant cerebellar tissue is seen in VC which leads to an idea that this phenomenon is associated with damage of cerebellum due to CM2.

Conclusions : When VC is associated with MMC, the patient has a risk to develop respiratory problems in early age which the course is different with common cases. If this condition is seen in prenatal imaging, intrauterine repair may not be an option and careful treatment is necessary.

Oral presentation 11: EPILEPSY 1

A-0060

Appropriate Use of Different Surgical Approaches and Surgical Outcomes in Hemispherotomy

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Introduction : Hemispherotomy, a curative surgery for hemispheric epilepsy, has developed based on lateral approach. Subsequently, vertical approach was introduced. Both approaches involve disconnection of the corpus callosum, projection fibers and limbic system of one hemisphere, but the surgical maneuvers are quite different. The selection of surgical approach is determined depending on patients' characteristics or institutions. Here, we present the selection criteria for the surgical approach at our institution, with presenting some surgeries, and report the postoperative courses.

Material & Methods : We retrospectively reviewed our patients who underwent hemispherotomy from February 2015 to June 2023. Basically, vertical approach was selected. Lateral approach was applied when the brain structures including the interhemispheric fissure were deviated and intraoperative orientation might be poor, when the lateral approach was supposed to be easier due to severely atrophic or destructive hemisphere, or when a wide craniotomy was made. The completeness of hemispherotomy, surgical complications, and seizure outcome were evaluated.

Results : Twenty-one patients were included in the analysis. Age at surgery ranged from 0 to 38 years. Seventeen patients were applied vertical approach and 4 patients were applied lateral approach. In one patient with vertical approach, hemispherotomy was incomplete with requiring reoperation. The other 20 patients, hemispherotomy was completed by either approachs. Three patients required additional surgical intervention due to hydrocephalus, but no other complications were observed. Fifteen patients achieved seizure free after surgery.

Conclusions : Hemispherotomy can be completed with appropriate approach selection and step-by-step fiber dissection. The complication rate is low except for hydrocephalus and the seizure free rate is high.

Oral presentation 11: EPILEPSY 1

A-0005

Quantitative differences in triggered electromyography during selective dorsal rhizotomy in children with spastic cerebral palsy of different motor functions

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Introduction : To investigate the electromyography (EMG) responses of dorsal nerves with varying current intensity during Selective Dorsal Rhizotomy (SDR) and to compare the response differences in children with spastic cerebral palsy and with different motor functions.

Material & Methods : The trigger-EMG patterns of dorsal nerves during SDR were reviewed. The current intensity that could first evoke a 200 μV EMG amplitude in one of the monitored muscles was defined as Threshold-200, and we further defined Threshold-100 and Threshold-25 as the current intensity that could first evoke a 100 μV or 25 μV EMG amplitude in one of the monitored channels. The trigger-EMG patterns under the three thresholds were quantitatively analyzed to determine the consistency of the most innervated channel (largest EMG amplitude) and the spreading of trigger-EMG patterns under different stimulus strengths.

Results : The study included 185 dorsal nerve roots from 12 patients, with 5 classified as the mild group (Gross Motor Function Classification System levels 1-2) and 7 as the severe group (Gross Motor Function Classification System levels 3-4). The consistency of the most innervated channel at the three thresholds was 49.2% among all patients. The severe group had higher consistency than the mild group (56.6% vs. 38.7%, $P<0.05$). The spreading of trigger-EMG patterns under all three thresholds was greater in the severe group than in the mild group.

Conclusions : The study found that the patterns of trigger-EMG in spastic cerebral palsy with different motor functions are different. A quantitative and in-depth study of intraoperative electrophysiological data during SDR surgery is of great clinical significance.

Oral presentation 11: EPILEPSY 1

A-0135

Predicting Efficacy of Vagal Nerve Stimulation (VNS) Surgery among Medically Refractory Paediatric Epilepsy Patients in Hospital Tunku Azizah (HTA): A Cohort Observational Study

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Introduction : Vagus Nerve Stimulation (VNS) surgery has increasingly been considered a therapeutic approach for children with drug resistant epilepsy (DRE). Question is, who benefits the most? We describe a one-centre experience of VNS implantation in paediatric patients with DRE to investigate efficacy and potential predictive factors.

Material & Methods : 28 patients who underwent surgery from 2018 to 2021 were followed up for 18 months. Primary outcome measure was reduction in seizure frequency. Secondary outcome measure is post-operative outcome (McHugh classification) plus improvement in seizure severity. Third outcome is measurement of quality of life (QoL) of patient and carer.

Results : Seizure frequency was reduced by more than 50% in 44.7% of patient at 6 months and 57.1% at 18 months. There was improvement of seizure severity and with regards to seizure outcome, 23 patients that had earlier VNS implantation (< 5 years old) had good outcome; Class II and III McHugh classification).Out of 10 predictive factors investigated, age at seizure onset (≥ 3 years old) (p=0.008) and age at VNS implantation (< 5 years old) (p=0.035) were correlated with responders (p< 0.05) in univariate and multivariate analysis. Lastly, there is improvement in patient QoL score (p<0.001) and reduction in caregiver stress score(p<0.001).

Conclusions : VNS implantation has shown overall seizure reduction over 18 months at our centre. Younger age at implantation (< 5 years) and seizure onset age > 3 years old are two predictors of favourable clinical outcome in patients with epileptic encephalopathy. Lastly, there is improvement of QoL for both patient and carer after surgery.

Oral presentation 11: EPILEPSY 1

A-0011

Finger movement functions remain in the ipsilesional hemisphere and compensation by the contralesional hemisphere might not be expected after hemispherotomy -pre- and post-hemispherotomy evaluations in 8 cases-

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Introduction : We hypothesized that fine finger motor functions are controlled by the ipsilesional hemisphere, and that gross motor functions are compensated for by the contralesional hemisphere after brain injury in humans. The purpose of this study was to compare finger movements before and after hemispherotomy that defunctionated the ipsilesional hemisphere for patients with hemispherical lesions.

Material & Methods : We statistically compared Brunnstrom stage of the fingers, arm (upper extremity), and leg (lower extremity) before and after hemispherotomy. Inclusion criteria for this study were: 1) hemispherotomy for hemispherical epilepsy; 2) a ≥6-month history of hemiparesis; 3) post-operative follow-up ≥6 months; 4) complete freedom from seizures without aura; and 5) application of our protocol for hemispherotomy.

Results : Among 36 patients who underwent multi-lobe disconnection surgeries, 8 patients (2 girls, 6 boys) met the study criteria. Mean age at surgery was 6.38 years (range, 2–12 years; median, 6 years; standard deviation, 3.5 years). Paresis of the fingers was significantly exacerbated ($p = 0.011$) compared to pre-operatively, whereas that of the upper limbs ($p = 0.07$) and lower limbs ($p = 0.103$) was not.

Conclusions : Finger movement functions tend to remain in the ipsilesional hemisphere after brain injury, whereas gross motor movement functions such as those of the arms and legs are compensated for by the contralesional hemisphere in humans. This content has been accepted and published in Brain & Development

Oral presentation 11 : EPILEPSY 1

A-0012

Safety, accuracy and efficacy of robot-assisted stereo-electroencephalography in children of different ages

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Introduction : To explore the safety, accuracy and efficacy of robot-assisted stereoelectroencephalography in children of different ages.

Material & Methods : Patients were divided into 3 groups according to age at the time of robot-assisted SEEG procedures, group 1: ≤ 3 years of age (n=28), group 2:3-6 years of age (n=27), and group 3: >6 years of age (n=44). Clinical data, SEEG demographics, target point error (TPE) and entry point error (EPE), complications and seizure outcome were gathered for analysis. Seizure outcome was evaluated according to Engel's classification.

Results : A total of 675 electrodes were implanted, with a mean number of 6.8 ± 3.474 (2–16) electrodes implanted per patient. The mean age at SEEG was 84.1±52.404 months (8.0-205.0 months). The mean skull thickness was 4.1±1.461mm (1.6-10.4mm). There were no significant differences for the number of electrodes (P=0.052). The mean operation time of each electrode was 9.8 mins ± 1.291 mins (6.0–11.7 mins) in total patients. The average TPE and EPE of 675 electrodes were 1.93 mm ± 1.106 mm (range, 0.00–8.56 mm) and 1.30 ± 0.9738 mm (range, 0.00–9.54 mm). There were no significant differences for TPE and EPE (P=0. 536 and P=0. 549). The overall complication rate was 5.05%. There were no significant differences for complications in the three groups(P=0.587). No severe or long-term neurologic impairment existed in all patients. Clinical outcome was not statistically different among the three groups(p=0.191).

Conclusions : Robot-assisted SEEG is an effective and safe invasive approach. There is no significant difference in its safety, effectiveness and implantation error among children of different age groups.

Oral presentation 11: EPILEPSY 1

A-0079

Merit of Endoscopic Posterior Approach for Total Callosotomy

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Introduction : Endoscopic surgery is now getting popular among epilepsy surgeons. Our recent study reported that endoscopic corpus callosotomy (CC) requires smaller craniotomy and skin incision without increasing operative time and post-operative complications compared with conventional microscopic CC. However, an anterior approach to the corpus callosum, which is generally applied in total CC, usually needs interhemispheric arachnoid dissection at the cingulate gyri. It is sometimes difficult and could take a long time. On the other hand, a posterior approach to the corpus callosum needs less interhemispheric arachnoid dissection, or even none, because of the close anatomical relationship between corpus callosum and the falx cerebri.

Material & Methods : We presented a patient of 5-year-old girl with medically intractable epileptic spasms. Endoscopic total CC with posterior approach was performed to control her seizures.

Results : The patient was placed in the prone position and a 6-cm linear skin incision was performed. A craniotomy was made crossing the midline and the dura was opened. Endoscope was introduced with gentle retraction of the brain. The arachnoid of the interhemispheric fissure did not need to be dissected to reach the splenium of the corpus callosum. CC was started from the splenium and continued anteriorly until reaching the rostrum of corpus callosum. Total CC was performed completely. Post-operative status went well. Completeness of total CC was confirmed by MRI. She has achieved considerably seizure reduction.

Conclusions : We achieved endoscopic total CC via posterior approach without any complications. This technique appears more feasible as a less-invasive surgery because of the unnecessity of interhemispheric arachnoid dissection.

Oral presentation 11: EPILEPSY 1

A-0086

Detection of absence seizures using a glasses-type eye tracker

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Introduction : Epileptic seizures, including absence seizures, are often associated with a sustained upward deviation of the eyes. This methodological study tested the feasibility of using a mobile glasses-type eye tracker for detecting absence seizure events.

Material & Methods : A seven-year-old boy with childhood absence epilepsy simultaneously underwent eye-tracking and video-electroencephalography (EEG) monitoring. We determined how accurately and rapidly the sustained upward eye deviation observed by the eye tracker would detect the electrographic onset of absence seizure events marked by two board-certified epileptologists.

Results : The video-EEG captured nine absence seizure events. The eye tracker detected eight out of the nine seizure events with a mean delay of 2.87 seconds from the electrographic onset without a false alarm. It failed to detect an absence seizure event exhibiting a minimal clinical change on video.

Conclusions : This study demonstrated the eye tracker's feasibility for seizure detection for the first time to our best knowledge. Further studies of larger numbers of patients are warranted to determine if eye-trackers can provide useful complementary information to other detection methods and serve as a viable wearable seizure detection device at home.

Oral presentation 11: EPILEPSY 1

A-0015

Short-term change of tibial torsion in children with spastic cerebral palsy after selective dorsal rhizotomy

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Introduction : This retrospective study examined the effects of selective dorsal rhizotomy (SDR) on tibial torsion in children with spastic cerebral palsy (CP). Tibial torsion, a common condition in these children, affects lower limb morphology and motor function.

Material & Methods : The study included 148 children with spastic CP who underwent SDR at Shanghai Children's Hospital. Pre- and post-operative assessments measured joint range of motion, transmalleolar angle (TMA), muscle tone, and motor function.

Results : SDR resulted in decreased muscle tone and increased joint range of motion in the lower limbs. Bilateral TMA significantly increased after surgery. Before SDR, 86.8% of limbs had internal tibial torsion, 11.8% were normal, and 1.4% had external tibial torsion. Limbs with internal tibial torsion were more common in older patients and had higher muscle tone in the tibialis anterior and soleus muscles. Among limbs with internal tibial torsion, 21.0% normalized after SDR. One limb with external tibial torsion also normalized. Limbs that improved after SDR belonged to younger patients and had lower muscle tone in the hamstring muscles.

Conclusions : Older age and higher spasticity in the tibialis anterior and soleus muscles increase the risk of internal tibial torsion. SDR shows promise in improving tibial torsion in children with spastic CP. Limbs classified as internal tibial torsion are more likely to improve after SDR if they have lower muscle tone in the hamstring muscles and belong to younger patients.

Oral presentation 12: EPILEPSY 2

A-0020

CLINICAL OUTCOME OF EPILEPSY SURGERY OF THE TEMPORAL LOBE IN PEDIATRIC GROUP : A RETROSPECTIVE COHORT STUDY

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Introduction : All pediatric patients who underwent temporal lobe lobectomy or lesionectomy for epilepsy surgery at Hospital Kuala Lumpur were reviewed. All operations were done by a single senior consultant neurosurgeon at Hospital Kuala Lumpur.

Material & Methods : This study was a retrospective cohort study over a period of 8 years from 1st January 2012 until 1st July 2019. Engel Outcome Classification was used to identify seizure outcome at immediate, 3-6 months and one year post operation. Age, sex, age of seizure onset, age of operation, body weight, number of antiepileptic medications pre and post operation, duration of stay in ICU and ward, MRI and histopathological findings and complications were noted. Analytically, Fisher Exact test was used for categorical data. Wilcoxon Signed rank test was used for continuous but not normally distributed data.

Results : 29 pediatric patients met study criteria. The Mean time between seizure onset and surgery was 5.6 years. Outcome Classification, Engel 1 Outcome or Seizure Free was achieved in 28 patients (96.6%) at immediate follow up, 24 patients (82.8%) at 3-6 months follow up and 24 (82.8%) at 1-year follow up. Hippocampal Sclerosis was present in 13 patients (44.8%). Tumours were present in 16 patients (55.2%). The complication proportion was 14.4%. Only 2 (6.9%) patients underwent reoperations. There is significant changes in post operative Anti Epileptic Medications (AEDs) reduction in this study (P= 0.006).

Conclusions : The surgery outcome of epilepsy surgery of the temporal lobe in pediatric group was remarkable in this study. Careful patients' selection by multidisciplinary evaluations is mandatory.

Oral presentation 12: EPILEPSY 2

A-0035

Long-term Outcome of Resective Epilepsy Surgery in Patients With Lennox-Gastaut Syndrome

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Introduction : We aimed to evaluate the long-term outcome of resective epilepsy surgery in patients with Lennox-Gastaut syndrome (LGS).

Material & Methods : We reviewed the case reports of 90 patients with LGS who had undergone resective surgery between 2003 and 2014 at the Severance Children's Hospital and managed them for a minimum period of 2 years.

Results : At the time of surgery, the patients were between 3.0 and 23.5 years old (mean ± SD: 9.3 ± 4.4). The time from seizure onset to surgery ranged from 0.7 to 20.1 years (7.2 ± 4.3). On postoperative follow-up for an average period of 6.1 ± 2.2 years (range: 2.1–11.4 years), 45 patients (50.0%) had no seizures, and 15 (16.7%) reported infrequent seizures. Seizure-free outcomes were achieved in 15 of the 21 (71.4%) hemispherectomies, 23 of the 51 (45.1%) multilobar resections, and 7 of the 18 (38.9%) single lobar resections. On highresolution MRIs, 20 patients (22.2%) had negative findings, 8 of whom (40.0%) became seizure-free after resective surgery. Malformation of cortical development was the most common pathologic finding and was noted in 57 patients (63.3%). Seizure-free patients achieved better adaptive behavior and social competence than did patients with persistent seizures at the second (2–3 years after surgery) and third (4–6 years after surgery) followups, as indicated by social quotients ($P < .05$).

Conclusions : Resective surgery is a viable option in some patients to treat seizures that are associated with LGS, with a high probability of seizure control and better adaptive function.

Oral presentation 12: EPILEPSY 2

A-0090

Proper therapy selection improves epilepsy outcomes in patients with multilobar Sturge–Weber syndrome

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Introduction : Hemispherectomy is an optimal treatment for patients with Sturge-Weber syndrome (SWS) affecting the whole hemisphere; however, a consensus has not been reached regarding therapeutic choices for those with involvement of two to three lobes. In this study, we compared seizure and cognitive outcomes between antiepileptic drugs and surgical treatment groups in patients with multilobar involvement.

Material & Methods : We evaluated 50 patients (aged ≥6 years) with multilobar (2–3 lobes) involvement. Surgical indications included 1) antiepileptic drug (AED)-resistant seizures, 2) developmental delay, and 3) cortical atrophy. Twenty-nine patients were classified in the medical treatment group (MTG) and 21 patients were in the surgical treatment group (STG). Seizure type and frequency, SWS electroencephalography score (SWS-EEGS), and pre- and post-therapeutic SWS neurological scores (SWS-NS) were compared between groups. Median ages at the initial evaluation of the MTG and STG were 4 and 2 years, and at the final evaluation were 13 and 17 years, respectively.

Results : The STG had a higher incidence (76.2%) of focal to bilateral tonic-clonic seizures and status epilepticus, although no difference in SWS-EEGS. Seizure and cognitive subcategories of SWS-NS at initial evaluation were worse in the STG (p=0.025 and p=0.007). The seizure subcategory in MTG and STG improved after therapy (p=0.002 and p=0.001, respectively). Cognition was maintained in MTG and improved in STG (p=0.002). The seizure-free rates in MTG and STG were 58.6% and 85.7%, respectively.

Conclusions : Appropriate therapeutic choices improved seizure outcomes. Although patients who required surgery had more severe epilepsy and cognitive impairment, surgery improved both.

Oral presentation 12: EPILEPSY 2

A-0134

Epilepsy Surgery Outcome for Long-term Epilepsy-Associated Tumors (LEATs)

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Introduction : Brain tumors represent the second most frequent etiology in patients with focal seizure submitted to epilepsy surgery. To review the clinical and neurophysiologic features and surgical outcome in our patients with intractable tumoral epilepsy, LEAT: low-grade epilepsy-associated (neuroepithelial) tumors, low-grade, developmental, epilepsy-associated brain tumors.

Material & Methods : Patients with drug-resistant epilepsy who underwent resection of brain tumors, confirmed by surgical pathology, seen between 2010/12 and 2023/5 at Taipei Veterans General Hospital were selected. Medical records were reviewed for age at diagnosis, age at onset of seizures, delay between seizure onset and tumor diagnosis, types and frequencies of seizures, EEG results, use of anticonvulsants, extent of surgery, and pathologic diagnosis.

Results : Patients with drug-resistant epilepsy who underwent resection of brain tumors, confirmed by surgical pathology, seen between 2010/12 and 2023/5 at Taipei Veterans General Hospital were selected. Medical records were reviewed for age at diagnosis, age at onset of seizures, delay between seizure onset and tumor diagnosis, types and frequencies of seizures, EEG results, use of anticonvulsants, extent of surgery, and pathologic diagnosis.

Conclusions : Long-term follow-up of patients with intractable tumoral epilepsy in children suggests good response of seizures to surgery, which is unrelated to age at diagnosis, EEG, or pathology. Extent of tumor resection was significantly predictive of outcome, whereas early intervention showed better quality of life with higher possibility of discontinued anticonvulsants.

Oral presentation 12: EPILEPSY 2

A-0144

RESULTS OF TREATMENT OF INTRACTABLE EPILEPSY WITH HEMISPHEROTOMY SURGERY AT VIETNAM NATIONAL HOSPITAL OF PEDIATRICS

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Introduction : Overview: Intractable epilepsy is a common clinical problem and makes treatment difficult. In patients with intractableepilepsy whose diagnostic investigations involve diffuse unilateral hemispheric involvement, hemispherotomy surgery is a good option for improved treatment and is becoming more common. At Vietnam National Hospital of Pediatrics, which has been performing the hemispherotomy surgery since 2016;so we retrospectively evaluated the surgical outcome in the group of children who were performed the functional hemispherotomy at Vietnam National Hospital of Pediatrics for the purpose of evaluating the outcome of surgical treatment.

Material & Methods : Methods: A retrospective study was performed on a group of 12 pediatric patients who underwent hemispherotomy from 2016 to 2022. We collected patients' information through medical records, radiography imaging pre- and post-surgery and re-examination of the patients to evaluate the outcome.

Results : Results: Regarding gender, the ratio of male/female patients = 10/2; Mean age at surgery: 3.9±3.3 years old (9 months-10 years old); mean duration of epilepsy prior to surgery: 2.62 ± 2.29 years (8 months – 7.5 years); the group of seizure onset from neonatal accounts for the highest rate: 50%; preoperative diagnosis: hemimegalencephaly 58.3%, Rasmussen's encephalitis 16.7%, secondary hemiatrophy16.7%, and 1 case of negative magnetic resonance; 2 surgical techniques were performed were vertical hemispherotomy: 41.7%, peri-insular hemispherotomy: 58.3%; outcome of surgery: Engel I: 50%, Engel II: 50%.

Conclusions : Conclusion: Hemispherotomy surgery at Vietnam National Hospital of Pediatrics initially brought good results in seizure control in the treatment of intractable epilepsy.

Oral presentation 12: EPILEPSY 2

A-0150

Characteristics of the "Super Responders" to Vagus Nerve Stimulation in Pediatric Intractable Epilepsy

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Introduction : Vagus nerve stimulation (VNS) therapy is an important part of the multimodal treatment of intractable epilepsy in children. However, clinical responses to VNS therapy are unpredictable. A better understanding of the characteristics of good and poor responders to VNS in the pediatric population is critical to improve patient selection and response prediction.

Material & Methods : We attempted to identify distinctive features of the subset of children who become seizure free following VNS implantation, defined as "super-responders" (SRs). We investigated their clinical features with the aim of elucidating response-predictive factors in children with intractable epilepsy. Retrospective data were collected from 150 children who underwent VNS at a single pediatric institution.

Results : The patients' mean age at VNS device implantation was 12.0 years (3.09–17.9 years). Ten SRs (6.7%) were identified who achieved and maintained seizure freedom for longer than 1 year following implantation. The interval between epilepsy onset and VNS device implantation was significantly shorter in SRs than in the other children (mean epilepsy duration 5.72 vs. 8.44 years, respectively; p=0.032). SRs reported their seizure freedom relatively early (six patients within 6 months and all patients within 12 months after implantation) at relatively low device settings (mean output current 0.81mA at their last follow-up). Compared with conventional models, responsive VNS models with autostimulation features did not increase the ratio of SRs. No other clinical or imaging characteristic difference between SRs and the other children was found in this cohort.

Conclusions : The current study showed a significant association between shorter epilepsy duration and seizure freedom after VNS.

Oral presentation 12: EPILEPSY 2

A-0198

Hemispherectomy at less than 8 months of age contributes to earlier acquisition of language and motor functions

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Introduction : Hemispherectomy is indicated for refractory epilepsy with unilateral hemispheric epileptogenicity. Although early hemispherectomy promotes subsequent psychomotor development, a clear timeline for language and motor function development remains unknown. In addition to testing the hypothesis that early hemispherectomy is beneficial to neural development, this study also determined the age at which linguistic and motor functions develop after hemispherectomy.

Material & Methods : The inclusion criteria were as follows: 1) age < 15 years at hemispherectomy; 2) inability to speak any meaningful words or stand by themselves without help; 3) complete cessation of seizures after hemispherectomy; 4) at least 1-year follow-up postoperatively. Finally, 33 patients who met the inclusion criteria were classified into the following groups: 1) age at surgery: ≤8 months (≤8MO, n=18) and ≥9 months (≥9MO, n=15) and 2) left (n=18) and right (n=15) groups according to surgical side. Correlation analysis was performed between age at surgery (A_{Surg}) and the age at which children's speech evolved to single word articulation (A_{Word}), sentence construction ($A_{Sentence}$), independent standing (A_{Stand}), and independent walking (A_{Walk}).

Results : Significant linear correlations were observed between A_{Surg} and A_{Word} ($p=0.032$), $A_{Sentence}$ ($p=0.018$), A_{Stand}($p<0.0001$), and A_{Walk} ($p<0.0001$). Spearman's correlation coefficients were 0.430, 0.478, 0.716, and 0.722, respectively. In the ≤8MO group, language and motor function acquisition was significantly earlier than in the ≥9MO group.

Conclusions : A significant correlation was found between early surgery and the time of acquisition of neural function. This study demonstrated that early hemispherectomy promotes early neural development in patients with intractable hemispheric epilepsy.

Oral presentation 13: ARACHNOID CYST

A-0053

Arachnoid cyst presenting psychotic disorders in pediatric population: case series and systemic literature review

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Introduction : Arachnoid cysts in pediatric population are the most common intracranial cysts and their role in causing psychotic disorders is often underrecognized. However, the appearance of some references that focus on a possible link between arachnoid cysts and psychotic symptoms raised questions about the etiologies and the therapeutic approach involved.

Material & Methods : Between January 2020 and July 2023, 39 children, diagnosed with arachnoid cysts at MacKay Children's Hospital were enrolled and the representative symptoms including psychotic disorders were evaluated retrospectively. 19 out of 39 patients underwent cysto-cisternostomy or endoscopic fenestration.

Results : The clinical characteristics of the study were 26 male and 13 female patients. The mean age is 5.6 years of age, ranging from 2 weeks to 15 years old at diagnosis. The presenting symptoms included psychosis (7), precocious puberty (6), headache (4), seizure (4) and visual loss (1). The others (15) were asymptomatic. In seven patients with psychotic symptoms, four arachnoid cysts located in sylvian fissure, two retrocerebellar region, and one intraventricularly in which two patients with sylvian arachnoid cysts underwent cysto-cisternostomy and one with retrocerebellar cyst underwent endoscopic fenestration. During the mean 12-month follow-up, all three patients with psychotic disorders obtained improvement after cyst decompression.

Conclusions : Psychiatric symptoms are not usually an indication for neurosurgical intervention. However, it is demonstrated that mental symptoms account for a certain proportion of patients with arachnoid cysts in the study, and the subjective improved mental functions were not unusual after cyst decompression. Further prospective studies will help to understand the relationship between psychiatric symptoms and arachnoid cysts.

Oral presentation 13: ARACHNOID CYST

A-0115

Absence of membranous obstruction in the posterior fossa for pediatric blake's pouch cyst with hydrocephalus

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Introduction : Blake's pouch cyst (BPC) is considered a congenital disease related to the failure of perforation of posterior membranous area (PMA) to form Magendie's foramen. However, the existence of the cystic structure in the posterior fossa and the relationship between BPC and hydrocephalus remain controversial.

Material & Methods : We retrospectively analyze 13 pediatric BPC cases that underwent surgery for hydrocephalus at the Di Rocco Center of Pediatric Neurosurgery in Xuanwu Hospital.

Results : All patients underwent surgery due to hydrocephalus. The mean age of surgery was 1.34±1.07 years. A filiform structure in the posterior fossa was visible in magnetic resonance imaging in 69.2% of cases. Cerebrospinal fluid (CSF) flow studies were conducted for 9 patients, supporting an unobstructed CSF flow at the foramen magnum. Direct inspection of the 'cyst' was performed in 2 cases using a flexible ventriculoscope and in 1 case through open surgery. No evidence of obstruction was observed. Regarding treatment modalities, 8 patients received endoscopic third ventriculostomy (ETV), and one underwent posterior fossa exploration. However, all of them experienced failure and subsequently underwent ventriculoperitoneal shunt (VPS). The pulsation of the orifice after ETV was not strong in 75% of ETV cases, indicating minimal pressure difference of cerebrospinal fluid above and below the Liliequist membrane.

Conclusions : There is no evidence of membranous obstruction at the foramen magnum in postnatal pediatric BPC cases. The membranous structure may exist, but only for a short period of time during fetal development. The mechanism of hydrocephalus in BPC might initiate with obstruction but ultimately transition to a communicating factor.

Oral presentation 13: ARACHNOID CYST

A-0018

Prepontine arachnoid cyst in an 8-month-old infant presenting with third and fourth cranial nerve palsy

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Introduction : The incidence of intracranial arachnoid cysts in children is approximately 2.6%, with a slight male predominance. Small arachnoid cysts may be asymptomatic, but some patients may present with symptoms resulting from their mass effect. We present an 8-month-old patient with a prepontine arachnoid cyst presenting with ptosis, inability to look down and in, with a rare ipsilateral head tilt. These presentations are consistent with left third and fourth cranial nerve palsies.

Material & Methods : A pterional craniotomy was performed, and the sphenoid ridge was flattened to facilitate access to the skull base. The dura was opened in an inverse-U fashion. Under an operating microscope, a trans-Sylvian fissure route was utilized to approach the cystic lesion. Cyst fenestration was performed and released clear cystic fluid to allow further examination of skull base structures. Intradural left internal carotid artery, left middle cerebral artery, and left optic nerve were identified. Unfortunately, the cystic membrane bled easily, and therefore we stopped pursuing the visualization of other cranial nerves.

Results : The patient was successfully extubated within hours after surgery. Ptosis, extraocular movement, and head tilt were immediately improved. The patient's postoperative course was smooth, and was discharged on postoperative day 8.

Conclusions : Symptomatic intracranial arachnoid cysts should be treated immediately to prevent further neurological deficits. Our patient's clinical presentation of ptosis, inability to look down and in, and ipsilateral head tilt are consistent with third and fourth cranial nerve palsies. An ipsilateral head tilt should not exclude fourth nerve palsy, as this is a rarer compensatory mechanism.

Oral presentation 13: ARACHNOID CYST

A-0027

Expanding ventricular diverticulum overlying the cerebral hemisphere through an open-lip schizencephalic cleft: a presentation of two pediatric cases

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Introduction : Open-lip-type schizencephaly is characterized by trans-cerebral clefts filled with cerebrospinal fluid (CSF) between the subarachnoid space at the hemisphere surface and the lateral ventricles. Disorders related to CSF retention, including hydrocephalus and arachnoid cysts, have reportedly been associated with open-lip schizencephaly and have induced intracranial hypertension in some cases. However, detailed neuroimaging and surgical treatment findings have rarely been described.

Material & Methods : We present two pediatric cases of open-lip schizencephaly with an expanding CSF-filled cavity overlying the ipsilateral cerebral hemisphere that manifested as signs of intracranial hypertension.

Results : Detailed three-dimensional heavily T2-weighted imaging revealed thin borders between the CSF-filled cavity and the subarachnoid space but no separating structures between the cavity and the lateral ventricle, suggesting that the cavity was directly connected to the lateral ventricle through the schizencephalic cleft but not to the subarachnoid space. Neuroendoscopic observation of the CSF-filled cavity in Case 1 confirmed this finding. Endoscopic fenestration of the cavity to the prepontine cistern was ineffective in Case 1. Shunting between the lateral ventricle (Case 1) or CSF-filled cavity (Case 2) and the peritoneal cavity slightly decreased the size of the CSF-filled cavity.

Conclusions : We speculate that the thin borders along the margin of the CSF-filled cavity are membranes that previously covered the schizencephalic cleft and are now pushed peripherally. In addition, we speculate that the cavity is a ventricular diverticulum protruding through the cleft. Detailed magnetic resonance imaging can be useful for evaluating patients with schizencephaly associated with CSF retention disorders.

Oral presentation 13: ARACHNOID CYST

A-0031

Endoscopic Treatment for Symptomatic Suprasellar Arachnoid Cysts in Children; A Single Center Experience

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Introduction : Endoscopic ventriculo-cysto-cisternostomy (VCC) is considered to be effective method for suprasellar arachnoid cyst (SAC). The purpose of this report is the experience of symptomatic SACs that were successfully treated endoscopically in our institution.

Material & Methods : Between 2019 and 2022, endoscopic treatment was performed on 3 cases of SACs. 3 female patients ranged in age from 9 months to 8 years. Follow-up of the patients ranged from 1 year to 3 years.

Results : The clinical signs and symptoms observed were hydrocephalus in 2 cases, developmental delay in 2 cases, and visual field defect in 1 case. All 3 patients were treated by VCC connecting the cyst with the third ventricle and pre-pontine cistern, and had no perioperative complications. In all 3 patients showed improvement in postoperative clinical findings, and there were no recurrences or retreatments during the follow-up period.

Conclusions : The medium-term prognosis of all patients who underwent VCC was good. Among endoscopic treatment for SACs, VCC performed in our institution is reported to have less recurrence than ventriculo-cystostomy. We have to evaluate long-term follow-up outcomes.

Oral presentation 13: ARACHNOID CYST

A-0040

An infantile case of symptomatic cerebellopontine angle arachnoid cyst treated with microsurgical fenestration.

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Introduction : Surgical fenestration is indicated for symptomatic infantile arachnoid cyst. We report an infantile case of symptomatic right cerebellopontine angle arachnoid cyst treated with direct fenestration.

Material & Methods : An eight-month-old boy suffering from hearing impairment was referred to our hospital. Head MRI showed right cerebellopontine angle arachnoid cyst. He also had right abducens nerve palsy, so we planned surgical treatment.

Results : Microsurgical fenestration with a lateral suboccipital approach was performed. The dorsal and ventral sides of the arachnoid cyst were opened as much as possible. The endoscope was kept on standby during the operation, but was not used in the end. The postoperative course was uneventful, and he was discharged from the hospital on the 9th postoperative day. After the operation, sound response and abducens nerve palsy were improved, and the ABR also showed a shortened latency.

Conclusions : There are some reports that both endoscopic fenestration and microsurgical fenestration have good results for pediatric cerebellopontine angle arachnoid cyst. It was considered important to select a surgical method, based on the size of the cyst, the positional relationship between the cranial nerves and the cyst, the surgical experience of the surgeon, etc.

Oral presentation 13: ARACHNOID CYST

A-0071

Surgical treatment of a rare case of lateral thoracic meningocele.

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Introduction : Lateral meningocele is a rare congenital malformation classified as a closed neural tube defect. We present an unusual case of lateral thoracic meningocele associated with right upper limb hypoplasia.

Material & Methods : Case presentation: A boy aged one year and four months with congenital right upper limb hypoplasia was admitted to our department. Postnatal magnetic resonance imaging (MRI) demonstrated a right lateral meningocele associated with myeloschisis at the C7 to Th6 level. The meningocele was located in the subclavian space and compressed the right brachial plexus, resulting in upper limb hypoplasia. Due to developmental delay, the patient underwent untethering and meningocele repair.

Results : The surgery was performed under neurophysiological monitoring. The dural sac was exposed on the midline, and the dura was incised. The fibrous band extending from the bifid spinal cord to the wall of the meningocele was detached. The meningocele wall was separated from the normal dural sac, and the dura was tightly sutured. On postoperative MRI, the meningocele disappeared, and the patient could walk independently four months after the surgery and defecate at the age of three. During seven years of follow-up, no symptoms developed.

Conclusions : Thoracic meningocele is an uncommon entity that is difficult to treat surgically. When symptomatic, a careful radiological examination and a multidisciplinary approach are required.

Oral presentation 13: ARACHNOID CYST

A-0149

Surgical Treatment and Developmental Evaluation in Primary Interhemispheric Arachnoid Cysts with Dysgenesis of the Corpus Callosum

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Introduction : Interhemispheric arachnoid cysts (IHACs) in children are rare lesions which often associate with corpus callosum dysgenesis. It is still controversial about surgical treatments to IHACs. Our aim is to report our experience of pediatric IHAC patients and evaluate surgical courses and neurological developments.

Material & Methods : Pediatric IHACs treated between 2001 to 2021 were reviewed retrospectively. IHAC was observed until it represented neurological symptoms. Cyst fenestration was done by microscope or endoscope depending on the IHAC`s location. Cyst size and corpus callosum dysgenesis was evaluated with neuroimaging. Neurological development was evaluated from medical records at the last follow-up.

Results : Fifteen children received cyst fenestration surgery (mean age 11.4 months). Eleven patients (73.3%) who were under observation showed rapid cyst enlargement in a short period (median 5 months). Cysto-venriculostomy (CVS) and cysto-cisternostomy (CCS) regressed the cyst size significantly (p=0.003). Median follow-up duration was 51 months (range 14-178 months). Eleven patients had corpus callosum dysgenesis (complete=5, partial=6) which seven patients (63.6%) represented some degree of developmental delay, including four patients with speech delay.

Conclusions : Symptomatic IHACs frequently present within one year after birth, with rapid cyst enlargement. CVS and CCS was effective to regress the cyst size. Corpus callosum dysgenesis accompanied with IHAC might have a risk of language achievement, however, development delay could rely on multifactorial features, such as epilepsy and other brain anomalies.

Oral presentation 14: OTHERS

A-0034

Management of First Recurrence or Progression of Craniopharyngioma After Resection Alone in the Pediatric Population: A Systematic Review and Individual-Participant Data Meta-Analysis

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Introduction : It is generally accepted that the initial management of pediatric craniopharyngioma should be either gross total resection (GTR) or subtotal resection (STR) with radiotherapy (RT). However, the optimal management strategy for recurrent/progressive craniopharyngioma remains unclear. Hence, we aimed to compare the outcomes of surgery and/or RT for the first recurrence/progression of craniopharyngioma after resection alone in the pediatric population.

Material & Methods : PubMed and Embase were systematically reviewed for studies that reported individual-participant data on outcomes after surgery and/or RT for the first recurrence/progression of craniopharyngioma after resection alone in patients aged <18 years old at treatment for the first recurrence/progression. The exposure was the treatment that was administered for the first recurrence/progression, and the outcomes were tumor regrowth and overall survival (OS).

Results : Of the 2932 studies screened, 7 studies reporting 51 patients were included in the meta-analysis. The commonest treatment for the first recurrence/progression was RT alone (n=16, 31.4%), followed by STR with adjuvant RT (n=14, 27.5%), STR alone (n=11, 21.6%), GTR alone (n=7, 13.7%), and GTR with adjuvant RT (n=3, 5.9%). STR alone for the first recurrence/progression was associated with a significantly higher risk of tumor regrowth (p=0.015), while the rest of the treatment arms had an equally low risk of tumor regrowth. There was no significant association between the treatment arms and OS (p=0.760).

Conclusions : In pediatric patients with the first recurrence or progression of craniopharyngioma after resection alone, STR alone should be avoided if feasible in favor of GTR alone or RT with or without surgery, for improved local control.

Oral presentation 14: OTHERS

A-0043

The utility of prone flexion MRI after filum terminale transection surgery

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Introduction : The assessment of retethering after filum terminale transection surgery is primarily conducted through MRI. However, in supine position, the cut end of the terminal filament often shifts towards the dorsal side, making evaluation challenging. Since MRI in the prone flexed position is now possible due to devices of MRI imaging methods, we investigated the evaluation of retethering after filum terminale transection surgery by comparing the supine and the prone positions.

Material & Methods : The distance from the dorsal dura mater of the rostral end of the filum terminale after filum terminale transection surgery was measured in 33 patients evaluated by supine, prone, and prone flexion MRI at our hospital from October 2018 to January 2023.

Results : The mean age at filum terminale transection surgery was 9 years and 11 months (6 years 0 month - 17 years 6 months), and the mean age at MRI examination was 1 year and 10 months (7 days - 10 years 0 month). The distance (mm) from the dorsal surface of the dura mater was 0 mm in 33 patients (100%) in the supine position, 27 (82%) in the prone position, and 15 (45%) in the prone flexion position. If 2 mm or more was considered untethering, 0 (0%) patients in the supine position, 3 (9%) patients in the prone position and 18 (55%) patients in the prone flexion position were 2 mm or more.

Conclusions : Prone flexion position MRI appeared to be more useful than prone position MRI in the evaluation of retethering after filum terminale transection surgery.

Oral presentation 14: OTHERS

A-0188

Validation of the Kitea implantable ICP monitoring system in a chronic sheep model

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Introduction : Detecting shunt malfunction is potentially costly and inconvenient for patients, requiring hospitallisation and radiological imaging. The Kitea micro implant is designed to allow long term home monitoring of ICP with an inductively charged device. We aimed to determine efficacy of the device in a long term large animal study.

Material & Methods : 10 sheep had Kitea ICP implants placed alongside ventricular catheters. After recovery from surgery the animals were transferred to a farm. Here they underwent weekly ICP recordings utilising a wireless wand over a 6 month period.

Results : ICP recordings were able to be obtained at every attempt. Over the 6 months these recordings remained in the normal range and there was no evidence of drift.

Conclusions : Coupled with prior bench testing and animal studies showing accuracy and histological safety, this study confirms the Kitea ICP recording device can provide accurate data in vivo over prolonged periods of time. We anticipate this will lead to first in human trials in the near future.

Oral presentation 14: OTHERS

A-0003

Scope of pediatric neurosurgery as a subspeciality in a neurosurgical referral centre of a low income country

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Introduction : The field of neurosurgery is expanding rapidly in Nepal with more than 80 neurosurgeons registered in the Nepalese Society of Neurosurgeons. Subspecialization in different field is the next step to go about. So, in this study we have looked into various pediatric neurosurgeries performed in a tertiary centre done over the past 10 years to see if pediatric neurosurgery is a viable neurosurgical subspeciality in today's context.

Material & Methods : A retrospective study was performed at a tertiary level neurosurgical referral centre and all pediatric cases of age less than 18 who were operated over 10 years period were included. Data was collected from operation lists and patients discharge summaries.

Results : There were 601 pediatric neurosurgeries performed. Male to female ratio was almost 2:!. The youngest kid operated was 2 days old. Operative cases ranged from cranial and spinal trauma, hydrocephalus, posterior fossa tumors, sellar/suprasellar tumors, lobar mass, pineal tumors, brain abscess, vascular malformation, CVJ anomalies, spinal dysraphysm etc

Conclusions : There is enough variety as well as number of pediatric cases coming to a referral centre for surgery. Along with development of other subspeciality in neurosurgery, pediatric neurosurgery has an equal prospect as almost 40% of the population of Nepal is under 18 years.

Oral presentation 14: OTHERS

A-0061

Intracranial pressure based decision making: Prediction of suspected increased intracranial pressure with machine learning

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Introduction : Invasive intracranial pressure (ICP) monitoring is desirable for many neurosurgical pathologies but risky for children. As non-invasive measurements of optic nerve sheath diameter (ONSD) have been revealed to accurately predict increased ICP. However, no studies have indicated a relationship among age, brain, and ventricular parameters in normal children, nor a prediction of increased ICP with artificial intelligence.

Material & Methods : This study enrolled 400 normal children for control and 75 children with signs of increased ICP between 2009 and 2019. Measurements of the parameters including ONSD on CT were obtained. Supervised machine learning was applied to predict suspected increased ICP based on CT measurements.

Results : A linear correlation was shown between ln(age) and mean ONSD (mONSD) in normal children, revealing mONSD = 0.36ln(age)+2.26 (R2 = 0.60). This study revealed a linear correlation of mONSD with ln(age) and the width of the brain, not the width of the ventricles in control. The results of the group comparison between the control and suspected increased ICP revealed a statistical significance in mONSD and the width of the ventricles. The study indicated that supervised machine learning could be applied to predict suspected increased ICP in children, with an accuracy of 94%.

Conclusions : This study clarified three issues regarding ONSD and ICP. The mONSD was correlated with ln(age) and the width of the brain in normal children. The mONSD and the width of the ventricles were statistically significant in children with signs of elevated ICP. Finally, machine learning could be used to predict children with suspected increased ICP.

Oral presentation 14: OTHERS

A-0048

A case of Craniometaphyseal dysplasia successfully treated by preoperative study using a 3D printer

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Introduction : Craniometaphyseal dysplasia (CMD) is a rare congenital osteochondrodysplasia characterized by cranial thickening and tubular metaphyseal dysostosis Cranial expansion has been reported to be effective in treating the increased intracranial pressure (ICP) associated with cranial thickening. However, surgical intervention has also been reported to be ineffective because of surgical complications and recurrence due to rethickening. In addition, the treatment strategy depends on the age of the patient, as the disease is believed to weaken with growth.

Material & Methods : Case: 14-year-old boy. He had chronic headache, marked thickening of the skull and Chiari malformation type I. He had a characteristic facial appearance with bilateral eye deviation, flattened nasal bridge, and a prominent forehead. Exome analysis revealed mutations in the ANKH gene, and a diagnosis of CMD was made.

Results : Since the patient had severe and persistent headache symptoms and ICP monitoring showed a high resting ICP of 25 mmHg, we planned cranioplasty for cranial expansion. Preoperative studies using a 3D printer (3DP) revealed that sufficient cranial volume expansion could be achieved by removing the thickened intracranial plate and the interplanar layer. The staff members confirmed in advance the points where massive intraoperative hemorrhage was expected. We chose to perform a one-stage cranioplasty with endosteal plate removal. The operation was performed without trouble, and postoperative headache symptoms were alleviated.

Conclusions : Preoperative review using 3DP enabled us to select an effective surgical technique for a rare disease with no previous treatment experience. Intraoperative precautions were also shared in advance.

Oral presentation 14: OTHERS

A-0069

Regression of periventricular anastomosis after indirect revascularization in pediatric patients with moyamoya disease

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Introduction : The study aimed to assess the effects of indirect revascularization on pediatric patients with moyamoya disease, focusing on the regression of periventricular anastomosis (PVA), a risk factor for hemorrhage associated with moyamoya vessels.

Material & Methods : Pediatric patients who underwent indirect revascularization between 2011 and 2021 were included. Magnetic resonance angiography and arterial spin labeling images acquired before and one year after surgery were analyzed to evaluate collateral artery formation, moyamoya vessels, PVA regression, and cerebral blood flow (CBF) changes.

Results : Of 89 hemispheres in 58 patients (average age 8.0 ± 3.4 years, 37 females), 73.3% showed improved collateral artery formation and increased CBF post-surgery. PVA regression was significant ($P = 0.001$), especially for choroidal artery-derived PVAs ($P < 0.001$). Hemispheres with good collateral formation demonstrated substantial CBF improvement ($P < 0.001$) and PVA regression ($P = 0.015$). Younger patients tended to experience PVA progression ($P = 0.188$), and those with the RNF213 p.R4810K variant had a trend towards PVA regression ($P = 0.069$).

Conclusions : Overall, indirect revascularization in pediatric moyamoya patients led to favorable collateral artery formation, increased CBF, and regression of PVA, particularly in those arising from choroidal arteries. Further research is needed to establish whether postoperative changes in PVA translate to reduced hemorrhage risk over time.

Oral presentation 14: OTHERS

A-0080

A Case of Cerebellar Hemorrhage in A Newborn: Cerebellar hemorrhage association with suspected arterial dissection of the posterior inferior cerebellar artery

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Introduction : We herein report a 5-day-old baby boy presented with a massive cerebellar hemorrhage due to suspected posterior inferior cerebellar artery (PICA) dissection. In the literature search, there was no previous report about newborn's arterial dissection like this case.

Material & Methods : 【Case report】 The patient was born by vacuum extraction at the gestational age of 41 weeks with 3370 g birth weight. On the fifth day of life, he developed dyspnea with worsening vital signs. CT of the head showed massive cerebellar hemorrhage and then he was transferred to our hospital. Bilateral External ventricular drainages were emergently placed for his hydrocephalus on the first day of hospitalization, then cerebellar hematoma was evacuated with suboccipital craniotomy on day 11. Post-operative course was good, his neurological condition was remarkably improved after ventriculoperitoneal shunt.

Results : We suspected Lt. PICA dissection was the cause of cerebellar hemorrhage. Because under microscopic observation, the right PICA looked intact, whereas, the left PICA was swollen with dark red discoloration at the caudal loop, being a confirmative finding of arterial dissection. MRI, CT angiography/venography, and blood tests did not show any abnormalities such as tumors, vascular anomalies, or coagulopathies. Now he is 3 years old, there are no recurrence on imaging so far, and the left PICA is occluded.

Conclusions : We showed the world's first case of cerebellar hematoma in a newborn, most likely caused by ruptured PICA dissection. Although this is very rare, we suggest considering the possibility of arterial dissection when examining neonates for cerebral hemorrhage.

Oral presentation 14: OTHERS

A-0175

Clinical study on hybrid operation for brain arteriovenous malformations in children

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Introduction : To investigate the efficacy and safety of combined surgery in the treatment of brain arteriovenous malformation (BAVM) in children.

Material & Methods : From September 2018 to August 2022, the children (≦18 years old) with BAVM in the 900th Hospital of Joint Logistics Support Force and Fujian Children's Hospital were retrospectively analyzed. According to the admission criteria, 38 cases were included, and they were divided into microsurgery group (25 cases) and compound surgery group (13 cases) according to different treatment methods. The observation indexes include clinical features such as sex, age, first symptom, neurological dysfunction, GCS score, Hunt-Hess grade, imaging features such as the location of abnormal blood vessels, Spetzler-Martin (SM) grade, intraventricular hemorrhage, and treatment and prognosis indexes such as intraoperative bleeding, operation time, imaging cure, postoperative complications, hospitalization time, and postoperative 3m and 6m mRS scores.

Results : The proportion of female patients (P=0.042), the proportion of abnormal blood vessels in supratentorial position (P=0.034) and the proportion of SM grade above grade 3 (P=0.003) in the combined operation group were higher than those in the microsurgery group. The intraoperative blood loss (P<0.001), operation time (P<0.001) and postoperative hospitalization time of patients in the microsurgery group were higher.

Conclusions : Hybrid operation is effective and safe for the treatment of BAVM in children, and BAVM with high SM grade is more suitable for combined operation

Oral presentation 14: OTHERS

A-0176

A case of a large fenestrated aneurysm of the vertebrobasilar junction in a 5-year-old boy treated with stent-assisted coil embolization.

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Introduction : Arterial aneurysms of the vertebrobasilar junction are rare and clinically challenging, particularly in pediatric patients. We report a case of a large vertebrobasilar junction aneurysm successfully treated with coil embolization.

Material & Methods : A 5-year-old boy underwent brain magnetic resonance imaging (MRI) due to migraine, and a 20-mm aneurysm with fenestration was found at the junction of the vertebral arteries and the basilar artery, causing brainstem compression.

Results : He underwent endovascular coil embolization with stenting through the right vertebral artery to the basilar artery with the occlusion of the left vertebral artery. The procedure was completed with sufficient embolization and without complications. Two months after embolization, follow-up MRI demonstrated refilling of the coiled aneurysm. Additional coil embolization was performed, and antiplatelet therapy was continued after the procedure. There has been no recurrence for 5 years after the second embolization.

Conclusions : Stent-assisted coil embolization for a vertebrobasilar junction aneurysm is a safe and effective treatment option, even in pediatric patients. Continuation of antiplatelet therapy is a controversial issue.

Oral presentation 14: OTHERS

A-0194

Pediatric Basilar Aneurysm: Surgical Decision-Making and Technical Nuances for Optimal Management – A Case Report

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Introduction : Pediatric intracranial aneurysms are a rare clinical condition, with a reported prevalence ranging from 0.5% to 4.6%. Unlike their adult counterparts, these aneurysms tend to be larger and are more frequently located in the posterior fossa, posing unique challenges in management. Here, we present a unique case of a pediatric basilar trunk aneurysm that could only be effectively treated through microsurgery. Our objective is to report the case of a 9-year-old boy who initially presented with generalized tonic-clonic seizures. CT brain revealed diffuse subarachnoid hemorrhage with intraventricular bleeding, strongly suggestive of an aneurysmal bleed. Diagnostic cerebral angiogram confirmed the presence of a basilar trunk aneurysm. Given its specific location, microsurgery emerged as the most viable treatment option.

Material & Methods : The surgical approach involved a right pterional craniotomy, followed by dissection via the transylvian approach, transcavernous route, and transtentorium approach. To ensure optimal exposure and gain proximal control over the aneurysm, we performed extradural anterior clinoidectomy and intradural posterior clinoidectomy. During manipulation, an intraoperative rupture of the aneurysm occurred, necessitating the secure placement of multiple aneurysm clips. Subsequent reconstruction required only a single clip.

Results : Postoperatively, the child exhibited right eye ptosis and mild left upper limb monoparesis, which gradually improved with rehabilitation.

Conclusions : Pediatric basilar artery aneurysms are exceedingly rare and pose intricate challenges in their management. Surgical decision-making in such cases is far from straightforward, given the technical intricacies involved. This case underscores the importance of individualized treatment approaches and the skillful execution of microsurgery techniques in addressing these complex pediatric intracranial aneurysms.