

hemostatic clips were applied followed by surgically disconnection. Finally, intraoperatively video angiography as well as spinal DSA were performed for confirmation. *Conclusions:* MIS disconnection with intraoperative DSA is a safe and effective technique for treating spinal dAVFs. Patients benefit from quicker recovery and shorter hospital stay.

## P.121

### Open surgical trans-venous Onyx embolization of Rolandic arteriovenous malformations: case report and review of literature

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*Background:* Premature occlusion of draining veins during surgical resection of arteriovenous malformations (AVM's) can lead to disastrous consequences. Interestingly, some authors have recently demonstrated effective endovascular trans-venous Onyx embolization of select AVM's. *Methods:* Case report *Results:* A 71-year old female presented to the hospital with sudden onset right sided weakness and sensory change. Investigations revealed right fronto-parietal ICH secondary to a parasagittal Rolandic AVM with arterial supply from ACA and MCA branches. Drainage occurs via a single large cortical vein to the superior sagittal sinus. Partial intra-arterial embolization was initially performed. Surgical resection of the remaining nidus was deemed high risk. A craniotomy was performed and the large cortical draining vein was cannulated with a 4Fr micro-puncture system under direct visualization. A DMSO compatible micro-catheter was navigated retrograde close to the nidus. The draining vein was occluded using a surgical clip, and Onyx was immediately injected. Retrograde complete embolization of the AVM was observed. A total of 3ml of Onyx was injected, and the catheter was left in-situ. Patient was discharge 2 weeks later with minimal deficits. *Conclusions:* Open trans-venous embolization is a viable option for select AVM's with a single draining vein and are not favorable candidates for trans-arterial embolization, surgery or radiation.

## PEDIATRIC NEUROSURGERY

### P.122

#### Restricted diffusion of white matter in infants with subdural hematoma

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*Background:* Inflicted head injury is a major cause of infant morbidity and mortality. The extent of traumatic brain injury in infants is often best characterized by diffusion weighted magnetic resonance imaging. In this cases series we describe four infants aged 6-19 months, with small unilateral subdural hematomas secondary to abusive head trauma accompanied by extensive areas of restricted diffusion weighted imaging isolated to the cerebral white matter. *Methods:* Retrospective, single-centre case series of four children

with small unilateral subdural hematomas with early and delayed MR imaging with diffusion weighted imaging. *Results:* In three cases there was acute diffusion restriction ipsilateral to the subdural, while in one case diffusion restriction was present bilaterally. All patients had multiple seizures and bilateral multilayered retinal hemorrhages. After non-surgical treatment, all patients survived albeit with significant motor and cognitive deficits and significant cortical atrophy on long-term followup imaging. *Conclusions:* These four cases highlight that relatively small subdural hematomas following child abuse can manifest with extensive white matter injury only evident at early stages with diffusion weighted imaging. We propose that selective white matter injury as a result of either reperfusion or axonal degeneration in response to the initial insult accounts for this novel pattern of infantile traumatic brain injury.

### P.123

#### Assessing level of awareness, attitudes and beliefs toward pediatric congenital neurosurgical conditions

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*Background:* Community awareness, attitudes and beliefs toward pediatric patients diagnosed with congenital neurosurgical conditions is not known in the Saudi population and the number of studies is few worldwide. Such attitudes have a direct impact on the quality of life of patients with these congenital conditions. This study aims to demonstrate the variation in awareness, attitudes and beliefs in the public and among health-care professionals towards patients diagnosed with congenital neurosurgical conditions and its associated factors. *Methods:* A survey consisting of 36 questions pertaining to Hydrocephalus, Brain Tumors and Spina Bifida awareness, attitudes and beliefs was distributed to Saudi citizens living in the eastern province older than 15 years of age among hospitals visitors, medical students, nutritionists, physicians, dentists, pharmacists, and nurses. *Results:* The analysis of the 1002 respondent of the questionnaire shows clear social stigmata and improper awareness, attitudes and beliefs toward pediatric patients diagnosed with congenital neurosurgical conditions. There are variable parameters on interest measured and analyzed and there are certain patterns observed as well. *Conclusions:* The analysis showed the importance of health education for the public to increase the level of awareness and it justifies why these factors should be addressed in the middle of patients' management, community awareness and health planning.

### P.124

#### Meta-analysis comparing predictors of good postoperative seizure control in children with dysembryoplastic neuroepithelial tumors and gangliogliomas

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*Background:* Dysembryoplastic neuroepithelial tumors (DNETs) and gangliogliomas are the most common cause of tumor-related seizures in children and adolescents. Little is known about predictors of surgical success, in terms of seizure freedom. All relevant papers since 1995 were identified. *Methods:* Over 4000 abstracts were screened on MedLine to identify data comparing tumor type (DNET vs. ganglioglioma)

and predictors of post-operative seizure freedom. *Results:* Seventeen papers were identified encompassing 97 DNET and 95 ganglioglioma patients. Fifteen patients were found with other neuroglial tumors (NGT) or NGT not-otherwise-specified. DNET patients were found to have less frequent seizures, more likely to have second lobe involvement, and to achieve gross total resection. Seizure freedom was achieved in roughly 80% of patients, with no distinction by tumor type, with no surgery-related or peri-operative deaths. For DNETs, seizure freedom was associated with shorter seizure duration, simple lesionectomy, gross total resection, and shorter duration of follow-up. In ganglioglioma patients, seizure freedom was associated with younger age at surgery, secondary generalization (unexpectedly), absence of dysplasia, and gross total resection. Gross total resection was the strongest predictor. *Conclusions:* Epilepsy surgery for DNET and ganglioglioma had similar outcomes with gross total resection being the strongest predictor.

## P.125

### A severe case of Menkes: an infant's presentation with intraventricular hemorrhage

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*Background:* Menkes disease is a rare, X-linked recessive disorder of the ATP7A gene, a copper transporter; resulting in systemic copper deficiency. The deficient function of copper-dependent enzymes manifests clinically with failure to thrive, seizures, hypotonia, coarse hair, connective tissue abnormalities, and neurodegeneration. Cerebral arteries are often elongated, tortuous, and fragile. *Methods:* This case report was prepared using the patient's hospital chart, and a review of the literature undertaken using PubMed. Our case was subsequently compared and contrasted to known Menkes' literature. *Results:* We present the case of a 2 month old male with Menkes disease who presented with new seizure onset in the setting of a Grade III intraventricular hemorrhage with hydrocephalus. He deteriorated into status epilepticus, and palliative care was instituted. On autopsy, pronounced tortuosity of his cerebral vasculature was noted, as well as a bilaterally cystic brain with an organizing hemorrhage on the ventral surface of the brainstem. *Conclusions:* Although Menkes disease often presents with seizures, neurologic deterioration, and abnormal cerebral vasculature; the quick demise subsequent to an intraventricular hemorrhage is somewhat unusual and discussed.

## P.127

### Management and outcome of spontaneous sub-aponeurotic fluid collections in infants: the Hospital for Sick Children experience and review of literature

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*Background:* Spontaneous sub-aponeurotic fluid collection (SSFC) is an uncommon and newly described entity of unknown etiology, observed in infants less than one year of age. In this paper, we report a series of 9 infants who presented to the Hospital for Sick Children with SSFC over the 2004 to 2015 period, focusing on the natural history of this rare condition. *Methods:* Data from

the HSC was retrospectively reviewed. Patient age and gender, birth history, past medical history, laboratory findings, imaging characteristics, management, and outcome were analyzed. *Results:* Our case series consists of 4 males and 5 females, ranging from 5 weeks to 11 months of age. All cases of SSFC developed spontaneously over a period of days, and the infants had no history of injuries or hair manipulation. Six patients had a remote history of forceps or vacuum-assisted births. One patient experienced fluctuating fluid collection size over 4 months, but in all the cases, the collections resolved spontaneously without structural or infectious complications. *Conclusions:* This is the largest series describing SSFC to date, and summarizes the experience of a large academic neurosurgical center. SSFCs develop spontaneously without immediate preceding trauma, and an extensive hematology or child abuse workup is not necessary. A conservative approach with outpatient follow-up is advocated.

## SPINE AND PERIPHERAL NERVE

## P.128

### The clinical utility of the spinal instability neoplastic score (SINS) and its role in surgical management of patients with spinal metastatic disease

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*Background:* The Spinal Instability Neoplastic Score (SINS) is used to assess mechanical instability based on radiographic and clinical factors. We conducted this study to evaluate the clinical utility of SINS in surgical decision-making in spinal metastasis and its association with metastatic epidural spinal cord compression (MESCC). *Methods:* We allocated 285 patients with spinal metastatic disease through a retrospective review. SINS was calculated using good-quality computed tomography. The degree of MESCC was assessed using 0 to 3 grading system. *Results:* Based on SINS, patients were categorized into stable (35.1%), potentially unstable (52.3%) and unstable (12.6%) groups. In the surgical intervention group, there was 69.5% treated with decompression and instrumented fusion, 17% with decompression alone, 8.5% with percutaneous vertebral augmentation and 5% with instrumented vertebral augmentation. A significantly higher proportion of patients with stable SINS (63.6%) were treated surgically without instrumentation ( $X^2=10.6$ ,  $P=0.005$ ), whereas instrumentation was utilized in 87.5% of patients with unstable SINS. Grade 3 MESCC occurred in 65.5% of patients with unstable SINS, whereas 71.4% of patients with stable SINS had grade 0 MESCC ( $X^2=42.1$ ,  $P<0.001$ ). *Conclusions:* SINS is associated with higher degrees of MESCC and plays an important role in surgical decision-making, facilitating assessment and recognition of spinal instability in need of urgent appropriate surgical interventions.