HONG KONG MEDICAL JOURNAL 香港醫學雜誌
Volume 25 Number 2 **April 2019**
SUPPLEMENT 4

25th Annual Scientific Meeting of The Hong Kong Neurosurgical Society

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Division of Pediatric Neurosurgery
Ann & Robert H. Lurie Children's Hospital of Chicago, United States

Prof Kyu-chang WANG
Division of Pediatric Neurosurgery
Seoul National University Children's Hospital, Seoul, Republic of Korea

Guest for ASM Gala Dinner

Dr Jeffrey Hui
Chairperson, Hong Kong Institute of Marketing

SCIENTIFIC PROGRAMME

Venue: Ballroom I & II, 7/F, Cordis Hong Kong at Langham Place, Mongkok, Hong Kong SAR

7 December 2018, Friday

08:30 – 09:00	Registration	Poster Room **EXHIBITION AND POSTERS**
09:00 – 09:10	**WELCOME SPEECH** ***Dr YC Po***	
09:10 – 09:45	**KEYNOTE LECTURE I** **Sellar and Suprasellar Tumours (Other than Craniopharyngiomas)** ***Prof Tadanori Tomita*** Chairpersons: *Dr YC Po, Dr HT Wong*	
09:45 – 10:20	**KEYNOTE LECTURE II** **Craniopharyngioma in Children: Embryologic Origin of Tumour and Its Growth Pattern** ***Prof Kyu-chang Wang*** Chairpersons: *Dr PH Chan, Dr ST Wong*	
10:20 – 10:40	Tea Break	
10:40 – 11:20	**FREE PAPER I** Chairpersons: *Prof Gilberto Leung, Dr SC So*	
11:20 – 11:50	**FREE PAPER II** Chairpersons: *Dr KH Chan, Dr Wilson Ho*	
11:50 – 12:25	**KEYNOTE LECTURE III** **Paediatric Pineal Region Tumour and Its Management Strategies** ***Prof Tadanori Tomita*** Chairpersons: *Dr ST Chan, Dr Vincent Pang*	
12:25 – 12:55	**FREE PAPER III** Chairpersons: *Dr YC Po, Dr CC Wong*	
12:55 – 14:05	Lunch — Shanghai Room on 8/F	
14:05 – 14:40	**KEYNOTE LECTURE IV** **Vascular Malformations during Childhood** ***Prof Tadanori Tomita*** Chairpersons: *Dr KM Cheng, Dr CF Fung*	
14:40 – 15:15	**KEYNOTE LECTURE V** **Congenital Dermal Sinus: Clinical Manifestation and Differential Diagnosis from Similar Lesions** ***Prof Kyu-chang Wang*** Chairpersons: *Dr HM Chiu, Dr Simon Lee*	
15:15 – 15:35	Tea Break	
15:35 – 16:25	**FREE PAPER IV** Chairpersons: *Dr C Poon, Dr Jenny Pu*	
16:25 – 17:00	**KEYNOTE LECTURE VI** **Secondary Neurulation and Disease Entities from Its Disordered Development** ***Prof Kyu-chang Wang*** Chairpersons: *Dr WM Hung, Dr Daniel Ng*	
Venue for ASM Gala Dinner: 8/F, Shantung Room, Cordis Hong Kong at Langham Place		
17:00 – 17:30	Cocktail Reception	
17:30 – 18:30	**ASM FORUM** **Update on HKAM credentialing exercise in neurointerventional procedures** Chairperson: *Dr YC Po* Introduction: *Prof WS Poon* Presentation: *Dr WM Lui*	
18:30 – 21:00	**ASM GALA DINNER & LECTURE** ***Dr Jeffrey Hui***	

8 December 2018, Saturday

08:30 – 09:00	Registration		Poster Room **EXHIBITION AND POSTERS**
09:00 – 09:40	**FREE PAPER V** Chairpersons: *Dr Clarence Leung, Dr KM Leung*		
09:40 – 10:15	**KEYNOTE LECTURE VII** **Cerebellar and IV Ventricular Tumours in Children** ***Prof Tadanori Tomita*** Chairpersons: *Dr Michael Lee, Dr David Sun*		
10:15 – 10:50	**KEYNOTE LECTURE VIII** **Brainstem and Cerebellopontine Angle Tumours in Children** ***Prof Tadanori Tomita*** Chairpersons: *Dr KY Chan, Prof WS Poon*		
10:50 – 11:10	Tea Break		
11:10 – 11:45	**KEYNOTE LECTURE IX** **Moyamoya Disease in Children: General Aspect and Special Considerations** ***Prof Kyu-chang Wang*** Chairpersons: *Dr FC Cheung, Dr YW Fan*	**VENUE: BALLROOM III, 7/F** **NURSING SESSION** **Continuity, Holism and Advancement—We Care** Chairpersons: *Ms KY Cheung, Mr Nobel Hung*	
11:45 – 12:05	**HKNS & COC COMMISSIONED RESEARCH PROJECTS** Chairpersons: *Dr Danny Chan, Dr KY Yam*		
12:05 – 12:45	**FREE PAPER VI** Chairpersons: *Dr Danny Chan, Dr KY Yam*		
12:45 – 13:00	Group Photo for All		
13:00 – 14:00	Lunch Buffet – Alibi on 5/F		
14:00 – 14:35	**KEYNOTE LECTURE X** **Lumbosacral Lipoma Surgery: Association with a Considerable Complication Rate** ***Prof Kyu-chang Wang*** Chairpersons: *Dr Dawson Fong, Dr YT Kan*		
14:35 – 15:10	**KEYNOTE LECTURE XI** **Paediatric Hydrocephalus and Its Management** ***Prof Tadanori Tomita*** Chairpersons: *Dr Wilson Ho, Dr Joseph Lam*		
15:10 – 15:45	**KEYNOTE LECTURE XII** **Arachnoid Cyst: My Prejudice of Conservative Management** ***Prof Kyu-chang Wang*** Chairpersons: *Dr TC Tan, Dr WK Wong*		
15:45 – 16:10	Tea Break		
16:10 – 16:50	**FREE PAPER VII** Chairpersons: *Dr YC Po, Dr Derek Wong*		
16:50 – 17:00	Concluding Remarks		

FP 1.1

Spontaneous Intracerebral Haemorrhage in a Paediatric Population in a Regional Hospital in Hong Kong: a 10-Year Review

Allan NL Chan, Jennie SY Yeung, PY Chung
Department of Neurosurgery, Princess Margaret Hospital, Hong Kong SAR

Objective: To review the incidence, aetiology, surgical management and outcome of spontaneous intracerebral haemorrhage (ICH) in a paediatric population.
Methods: Records of all patients aged <18 years admitted to Princess Margaret Hospital, Hong Kong, for spontaneous ICH from July 2008 to June 2018 were reviewed. Detailed information was retrieved from the Hospital Authority Clinical Management System.
Results: Thirty-one patients with spontaneous ICH were included in this review. Arteriovenous malformation was the most common cause of spontaneous ICH, found in 13 (42%) patients. Other common causes of spontaneous ICH were haematological disorder in four (13%) patients and cavernoma in three (10%) patients. Twenty-one (68%) patients underwent surgery. At the time of review, seven (23%) patients had passed away and most surviving patients had achieved favourable outcome.
Conclusion: Arteriovenous malformation is the most common underlying cause of spontaneous ICH in paediatric populations. With timely treatment, most patients can achieve favourable outcome.

FP 1.2

Ruptured Arteriovenous Malformations in a Paediatric Population

KY Tam, Kevin Lim, George KC Wong
Division of Neurosurgery, Prince of Wales Hospital, New Territories East Cluster, Hong Kong SAR

Objective: To evaluate the management of ruptured arteriovenous malformations (AVM) in a paediatric population.
Methods: A retrospective review was performed. Patients with AVM and at least 2 years of radiological follow-up were included in analysis. Demographic, clinical, and angioarchitectural data from 1999 onwards were obtained from the Clinical Data Analysis and Reporting System and paper records.
Results: A total of 33 patients were identified. The median age at presentation was 11.2 years, with a slight male predominance. The most common presenting symptom was headache (60.6%), followed by motor deficits (24.2%) and seizure (6.1%). The median radiological follow-up was 89 (range, 24-229) months. The AVMs were lobar in 57.6%, infratentorial in 27.3%, and within the basal ganglia in 9.1%. In all, 30.3% underwent emergency haematoma evacuation and AVM excision because of neurological deterioration in the acute phase. For patients without neurological deterioration, 21.2% underwent interval excision and 45.5% underwent stereotactic radiosurgery. There were no Clavien-Dindo complications greater than grade II in the surgery group. Those who underwent stereotactic radiosurgery had a significantly higher Spetzler-Martin grade; AVM obliteration was achieved in 81.1% of these patients, without any post-radiosurgery haemorrhages. There was one mortality and one patient who became severely disabled; the remaining patients had a Glasgow Outcome Scale score of 5.
Conclusion: An optimal outcome can be achieved in paediatric patients with ruptured AVMs. Stereotactic radiosurgery is safe and effective when surgical excision entails a high risk of neurological deficits.

Stereotactic Radiosurgery/Radiotherapy for Brain Arteriovenous Malformation in Paediatric Patients: a Single-centre 19-Year Review

FP 1.3

KT Yeung, B Luk, KY Yam
Department of Neurosurgery, Tuen Mun Hospital, Hong Kong SAR

Objective: To study the outcomes of paediatric patients with brain arteriovenous malformation (AVM) treated with stereotactic radiosurgery (SRS) or stereotactic radiotherapy (SRT).
Methods: This was a 20-year retrospective review of the outcomes of paediatric patients with AVM treated with SRS or SRT at Tuen Mun Hospital, Hong Kong, from 1997 to 2016.
Results: A total of 16 patients (6 male, 10 female) were identified. Mean age of the patients was 12.67 (range, 7-17) years. Three patients presented with seizure, one presented with focal neurological deficit, and 12 presented with haemorrhage. Two patients had Spetzler-Martin (SM) grade 2, 10 patients had SM grade 3, and four patients had SM grade 4. All patients had AVM in an eloquent brain area. Mean nidus volume was 6.86 (range, 0.3-38.7) mL. Four patients had embolisation before radiation. Two patients had surgical excision before radiation and one patient had surgical excision and embolisation before radiation. Twelve patients received SRS and four patients received SRT. For SRS, mean nidus volume was 3.61 (range, 0.3-11.15) mL. Mean radiation dose given was 18.36 (range, 16-22) Gy. Obliteration was achieved in 11 out of 12 patients who received SRS. Mean duration from treatment to documented obliteration was 42.64 (range, 18-95) months. Mean follow-up period was 179.1 (range, 36-247) months. For SRT, mean nidus volume was 26.35 (range, 13.4-39.3) mL. All patients received 4 Gy in 11 sessions. Mean follow-up period was 35 (range, 17-48) months. No patient had post-radiation haemorrhage. No patient had radionecrosis. Fifteen patients had modified Rankin Scale score 0 to 2, one patient had modified Rankin Scale score 3.
Conclusion: Both SRS and SRT are safe and effective treatment modalities for paediatric AVM.

Infant Hypoxic-ischaemic Encephalopathy: Do We Need a New Animal Model?

FP 1.4

H Lyu, Hadi Askari, DM Sun, W Young, W Cheng, CC Wang, Stephanie Ng, WS Poon
Division of Neurosurgery, Department of Surgery, Prince of Wales Hospital, Hong Kong SAR
WM Keck Center for Collaborative Neuroscience, Rutgers, The State University of New Jersey, New Jersey, United States
Department of Obstetrics and Gynaecology, Prince of Wales Hospital, Hong Kong SAR

Background: Hypoxic ischaemic encephalopathy (HIE) occurs when an infant's brain does not receive adequate oxygen and blood supply, resulting in ischaemic and hypoxic damage. The currently used animal model of HIE was first established by Rice et al in 1981,[1] and has been used extensively to explore the mechanisms of brain damage resulting from HIE and to test the effectiveness of potential therapeutic interventions. This HIE rat model involves the permanent occlusion of one common carotid artery followed by hypoxia (8% oxygen). This study aimed to define and validate a modified HIE model which mimics human neonatal HIE more closely.
Methods: In the proposed rat model, both common carotid arteries were occluded. After occlusion, rats were placed in a hypoxic chamber, breathing 8% oxygen for 60 minutes. After this, the ligatures occluding both common carotid arteries were released, mimicking reperfusion injury. This proposed HIE rat model was compared with the Vannucci HIE rat model for validation.
Results: In total, 60 neonatal rats were randomised to receive unilateral permanent or bilateral temporary common carotid artery occlusion. In the unilateral permanent occlusion group, surgical mortality was 20%; in the bilateral temporary occlusion group, surgical mortality was 20% to 100%.
Conclusion: Bilateral temporary common carotid artery occlusion for 60 minutes results in a moderately brain damaged model, which is preferable for future therapeutic trials.

Reference

1. Rice JE 3rd, Vannucci RC, Brierley JB. The influence of immaturity on hypoxic-ischemic brain damage in the rat. Ann Neurol 1981;9:131-41.

FP 2.1

Multidisciplinary Group-based Treatment for Paediatric Central Nervous System Tumour at The University of Hong Kong–Shenzhen Hospital

X Ye[1], Wilson WS Ho[1,2], J Chen[3], Z Zhang[1], Z Xu[4]
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[4] Department of Oncology, University of Hong Kong–Shenzhen Hospital, China

Objective: Although management of various diseases includes a multimodal approach of surgery, radiation therapy, and chemotherapy, there is often no broad involvement of doctors from different fields. A central nervous system (CNS) tumour warrants a referral to a neurosurgeon for biopsy, and gross total resection where possible. Radiation therapy and chemotherapy are used as adjunct measures based on the histology of the tumour. We aimed to assess the effectiveness of a multidisciplinary group–based treatment, to improve the survival rate of paediatric CNS tumour.
Methods: This was a 5-year retrospective review of our multidisciplinary treatment for paediatric CNS tumour at The University of Hong Kong–Shenzhen Hospital, China, from 2013 to 2018. Eligible participants were children aged 0 to 14 years who attended the hospital and were given a multimodal therapy following a primary diagnosis of CNS tumour. Interventions included surgery, chemotherapy, and radiation therapy. The survival rate of children was evaluated.
Results: There were 43 cases of paediatric CNS tumours, including 22 (49%) medulloblastomas, eight (18%) embryonal tumours, four (9%) ependymomas, and nine (20%) gliomas. Medulloblastomas showed the most favourable outcomes, whereas patients with embryonal tumours had the worst prognoses. Embryonal tumours included four atypical teratoid/rhabdoid tumours, three embryonal tumours with multi-layered rosettes, and one CNS embryonal tumour not otherwise specified (previously called CNS primitive neuroectodermal tumour).
Conclusion: Multidisciplinary group–based treatment leads to favourable outcomes for paediatric primary malignant CNS tumours, especially for medulloblastoma.

FP 2.2

Outcomes in Paediatric Patients Receiving Neurosurgical Intervention for Central Nervous System Infections: a Case Series

Victor KH Hui, Emily KY Chan, Danny TM Chan, XL Zhu
Division of the Neurosurgery, Department of Surgery, Prince of Wales Hospital, Hong Kong SAR

Introduction: Central nervous system (CNS) infection in paediatric patients remains a significant cause of mortality and morbidities. In paediatric patients with severe CNS infection, neurosurgical intervention is often employed for indications including the monitoring and relief of refractory raised intracranial pressure. The aim of this case series was to evaluate outcomes of paediatric patients who received neurosurgical intervention for presumed or confirmed CNS infection.
Methods: We retrospectively reviewed all consecutive paediatric patients who underwent neurosurgical intervention, including external ventricular drain, with or without decompressive craniectomy, due to presumed or confirmed CNS infection within a 5-year period from 1 September 2013 to 30 August 2018 in a single university-affiliated centre. Patient age, preoperative Glasgow Coma Scale score, preoperative intracranial pressures, nature of neurosurgical intervention, and diagnosis on discharge were investigated. The primary outcome was the degree of disability on discharge, as assessed by the modified Rankin scale (mRS).
Results: Eight patients (2 male, 6 female), aged 3 to 13 years, were included in this case series. In five patients, treatment resulted in good recovery (mRS score 0 or 1), one patient, treatment resulted in severe disability (mRS score 5), and the two remaining patients succumbed despite treatment (mRS score 6).
Conclusion: The results show that neurosurgical intervention for CNS infection in paediatric patients has variable outcomes, which is inconsistent with the current available evidence.

Patterns of Paediatric Head Injury

FP 2.3

SK Chan, ST Wong, KY Yam
Department of Neurosurgery, Tuen Mun Hospital, Hong Kong SAR

Objective: To review the pattern of head injury among paediatric population in a single tertiary centre.
Methods: We performed a retrospective review with data retrieved from Clinical Data Analysis and Reporting System. Details of patients aged <16 years who were admitted to the Neurosurgical Department of Tuen Mun Hospital, Hong Kong, from July 2013 to June 2018 for head injury were reviewed. Patient demographics, mechanisms of injury, initial Glasgow Coma Scale, presenting signs and symptoms, radiological findings, and outcomes were studied.
Results: A total of 512 children were analysed. In all, 347 (67.8%) were male and the median age was 3 years. In all, 47.9% of patients were aged <2 years. Falls were the commonest cause of head injury, in 87.5% of patients, followed by traffic accident (5.9%). Of all patients, 25 (5%) had significant intracranial injuries, 13 (52%) of which were epidural haematoma. Traffic injuries were associated with neurosurgical interventions and mortality (odds ratio=2.18, 95% confidence interval=1.224-2.987).
Conclusion: Nearly half of the paediatric head injuries were in patients aged <2 years. Traffic injuries were associated with poor outcome.

Endoscopic Deep Brain Stimulation Insertion for Anterior Thalamus: a Case Report

FP 3.1

David YC Chan, Danny TM Chan, XL Zhu, WS Poon
Division of Neurosurgery, Department of Surgery, Prince of Wales Hospital, Hong Kong SAR

Deep brain stimulation (DBS) for treatment of refractory epilepsy is a demanding procedure, especially in children. The most catastrophic complications of this procedure include thalamic haemorrhage or intraventricular haemorrhage. This report describes a case using an operative technique for anterior thalamus DBS with direct endoscopic visualisation and guidance. Using endoscopic visualisation, the DBS lead was applied to the anterior thalamus without injury to the thalamostriatal veins. Operating time was similar to that for DBS without endoscopic visualisation and guidance, and the procedure was uncomplicated. Postoperatively, the patient's symptoms improved and seizures were less frequent. Endoscopic lead insertion for anterior thalamus DBS is a safe and practical alternative to DBS without endoscopic guidance.

FP 3.2

Quantitative Imaging Data for Evaluating Patients with Glioblastoma Multiforme

Sarah SN Lau, Calvin HK Mak, FC Cheung, HM Chiu
Department of Neurosurgery, Queen Elizabeth Hospital, Hong Kong SAR

Objective: To analyse quantitative imaging data from patients with glioblastoma multiforme, in order to investigate factors affecting outcome.
Methods: For patients who underwent glioblastoma resection surgery in our centre from 2013 to 2018, preoperative stereotactic magnetic resonance imaging DICOM image data were extracted from our computer systems. These images were analysed using 3D Slicer 4.8.1 software and cross-checked by two neurosurgeons. Imaging data were analysed and comparisons made for tumour genotype, 3- and 6-month progression-free survival, and 6- and 12-month overall survival.
Results: Data were collected for 42 patients (24 male, 18 female). Median age of the patients was 60.4 (range, 10-78) years. Median overall survival was 17.25 (range, 1.9-91) months. Median progression-free survival was 7.65 (range, 1-36.8) months. Twenty-one patients had methyltransferase methylation, 12 had wild-type isocitrate dehydrogenase 1 gene. Median tumour volume was 39.76 (range 2.91-120.54) mL. Median T1 contrast-enhancing volume was 17.56 (range 1.80-57.84) mL. Median cystic tumour volume was 17.59 (range, 3.78-114.66) mL. Isocitrate dehydrogenase 1 mutation was a significant predictor of 6-month overall survival. Methyltransferase methylation, T1 contrast-enhancing, and tumour cystic volume did not significantly influence progression-free survival or overall survival. Total tumour volume was a significant predictor of 12-month overall survival.
Conclusion: Quantitative imaging data is a promising parameter that can give insight into the prognosis of patients diagnosed with glioblastoma.

FP 3.3

Lovastatin Enhances Cytotoxicity of Temozolomide via Impairing Autophagic Flux in Glioblastoma Cells

Z Zhu, P Zhang, N Li, Karrie MY Kiang, Stephen Y Cheng, Gilberto KK Leung
Division of Neurosurgery, Department of Surgery, Queen Mary Hospital, Hong Kong SAR

Objective: To investigate the cytotoxicity and mechanism of combining lovastatin with temozolomide in glioblastoma multiforme cells.
Methods: Colony forming cell and MTT assays were used to measure cell viability of U87 and U251 glioblastoma cells. Autophagy level was measured by immunoblotting of LC3II and SQSTM1/p62. U87 cells stably expressed mRFP-EGFP-LC3 and autophagy inhibitors bafilomycin A1 were used to dissect the autophagic flux. Flow cytometry for annexin V/propidium iodide and western blot were used to measure apoptosis level.
Results: Colony forming cell and MTT assays showed that combining with lovastatin significantly enhanced the cytotoxicity of temozolomide in both temozolomide-sensitive and -resistant glioblastoma cells. Lovastatin-enhanced temozolomide induced apoptosis in glioblastoma cells. Flow cytometric analysis and western blot showed that co-treatment significantly increased the percentage of apoptotic cells and protein level of cleaved caspase-3 and poly (ADP-ribose) polymerase. Lovastatin inhibited the autophagosome–lysosome fusion. Western blot analysis showed that co-treatment increased the levels of LC3II and SQSTM1/p62. U87 cells with stable mRFP-EGFP-LC3 expression further supported the finding that co-treatment blocked the autolysosome fusion. In addition, lovastatin had a synergistic effect with bafilomycin A1 on blocking autolysosome formation. Lovastatin impaired autophagic flux by inducing initiation and by inhibiting autophagosome–lysosome fusion. Lovastatin might induce autophagy via inhibiting p-Akt/mTOR pathway. The role of lovastatin in blocking autolysosome maturation might be associated with suppressing LAMP2 and dynein, two important mediators for autophagosome trafficking and maturation.
Conclusion: Lovastatin enhanced temozolomide cytotoxicity in glioblastoma cells by impairing autophagic flux. Combining lovastatin with temozolomide may be an effective treatment strategy for patients with glioblastoma.

Spina Bifida Surgery—Long-term Case Series Review for Safety and Outcome with Selected Case Sharing

FP 4.1

Emily KY Chan, XL Zhu, WS Poon
Division of Neurosurgery, Department of Surgery, Prince of Wales Hospital, Hong Kong SAR

Spina bifida is a spectrum of diseases with a wide range of presentations and clinical symptoms. As knowledge of spina bifida grows, a higher index of suspicion among clinical staff leads to earlier recognition of patients with occult spina bifida. Currently, more than 80% of patients with spina bifida are diagnosed before age 6 months. Our centre offers prophylactic untethering surgery as an option for patients diagnosed with spina bifida with low lying cord or with suspicious features on ultrasonogram or magnetic resonance imaging of the spine.

Records were retrieved for more than 200 patients who were followed up in the Combined Spina Bifida Clinic, Prince of Wales Hospital, Hong Kong, in the past 20 years. Patients with conus at normal level were excluded. Patients who received surgeries from other centres or those with incomplete records were excluded. We stratified patients who received prophylactic untethering surgery by reason for surgery. All patients included in the analysis were followed up for at least 1 year after surgery. Demographic data, characteristic of the disease, operative details and other parameters were recorded. Patients who received prophylactic surgery based on radiological findings were compared with historical patients who received surgeries only when symptoms appeared.

Surgical Outcome of Tethered Cord Syndrome in Paediatric Patients—a 10-Year Single-centre Review

FP 4.2

Remy SL Hung, NF Kwok, HM Chiu
Department of Neurosurgery, Queen Elizabeth Hospital, Hong Kong SAR

Objective: To investigate the surgical outcome of tethered cord syndrome (TCS) in paediatric patients.
Methods: This was a retrospective review of the surgical outcome of all paediatric patients with TCS who underwent untethering surgery in Queen Elizabeth Hospital, Hong Kong, from 2008 to 2018.
Results: In total, 39 patients were included. Median age at the time of operation was 23 (range, 1-204) months. Mean follow-up period was 43 (range, 2-119) months. Twelve patients had symptomatic TCS; the other 27 were asymptomatic. Aetiologies for primary cord tethering included 19 patients who had lipomyelomeningocele, two who had filar lipoma, 11 who had fatty filum, two who had dermal sinus tract, and one who had myelomeningocele. In four patients, TCS was recurrent. For the 12 symptomatic cases, improvement in symptoms was seen in three cases; symptoms remained stable in the remaining nine patients. Three asymptomatic patients developed symptoms after surgery; the other 24 remained stable. Among patients operated on within this period, two patients eventually required reoperation for retethering. There were no cases of postoperative cerebrospinal fluid leakage.
Conclusion: Surgical untethering is a safe and effective method of treatment for children with TCS to prevent neurological deterioration.

Radical Excision Technique for Spinal Cord Lipomas

FP 4.3

ST Wong, KY Yam, Dawson Fong
Department of Neurosurgery, Tuen Mun Hospital, Hong Kong SAR

Objective: Management of spinal cord lipomas—conservative, partial excision, or radical excision—has been intensively investigated. Partial excision of spinal cord lipomas is ineffective in preventing the occurrence of neurological deficits. Radical excision has been demonstrated to have very favourable outcome in a large case series. We aimed to evaluate whether the favourable outcome was reproducible in our institute.
Methods: We reviewed patients who underwent radial excision technique between November 2013 and June 2018.
Results: In total, 13 patients (8 female, 5 male) were included. Median age was 13 months (range, 5 months to 34 years). Subtypes of spinal cord lipomas included dorsal in two patients, transitional in eight, terminal in one, and chaotic in two cases. Preoperatively, neurological deficits were present in three patients. The mean postoperative follow-up was 27 (range, 4-61) months. Reoperation was performed in one patient for imaging deterioration. No patients developed new neurological deficits. Neurological deficits improved in two thirds of the patients.
Conclusions: Radial excision of spinal cord lipomas is safe and can relieve the tethering effect.

Outcomes of Neurosurgical Interventions for Paediatric Intractable Epilepsy

FP 4.4

Z He, ST Wong, KY Yam, Dawson Fong
Department of Neurosurgery, Tuen Mun Hospital, Hong Kong SAR

Objective: We aimed to review the surgical outcomes of different types of neurosurgical interventions, including excision, disconnection, or stimulation surgeries for intractable epilepsy in paediatric patients in Tuen Mun Hospital from 2000 to 2018.
Methods: This was a retrospective study. Records of patients with intractable epilepsy were retrieved from the operation database of the neurosurgical department using the diagnostic coding of intractable epilepsy, with operation date between October 2000 and July 2018. The principal procedures included lobectomy, excision of cerebral lesion, corpus callosotomy, and implantation of a peripheral stimulator. Cases were excluded if there were insufficient follow-up details. The primary outcome was seizure control after the first principal operation, measured by the Engel outcome classification. Other outcome measures included surgical complications, the use of anticonvulsants, and further epilepsy surgeries.
Results: In total, 48 patients were included in the study. Of these, 62.5% patients had focal seizures, 23.0% patients had complex partial seizures, and 14.5% patients had generalised seizures. Of the 48 patients, 16 were treated with excision of cerebral lesions, nine were treated with lobectomy, nine were treated with selective amygdalohippocampectomy, nine underwent corpus callosotomy, four received implantation of a peripheral stimulator, and one underwent hemispherectomy. At the final follow-up, 76% hippocampectomy patients, 83% lobectomy patients, and 67% patients with excision of cerebral lesions had Engel I outcome. Four patients received more than one epilepsy surgery because of unsatisfactory seizure control. One patient with acute subdural haemorrhage after the operation required clot evacuation.
Conclusion: The outcomes of our series were in concordance with the good outcomes in international studies.

Efficacy and Treatment Outcomes of Cervical Corpectomy and Anterior Spinal Fusion for Cervical Stenosis

FP 4.5

CY Mok, David YC Chan, WK Mak, WS Poon
Division of Neurosurgery, Department of Surgery, Prince of Wales Hospital, Hong Kong SAR

Background: Currently there is no standard treatment for long-segment cervical stenosis, such as the presence of ossified posterior longitudinal ligament. Corpectomy is a demanding procedure with technical nuance and pitfalls especially in the ageing population. One of the most catastrophic complications of this procedure includes respiratory failure and tetraplegia.
Methods: We reviewed all patients treated by anterior spinal fusion in Prince of Wales Hospital from January 2013 to June 2018. Treatment efficacy for neurological improvements was analysed. Complications including dysphagia, hoarseness, reoperation rates, neurological deficits, and death were recorded.
Results: In total, 103 patients (22 female, 81 male) with mean age 56 (range, 16-86) years underwent anterior spinal fusion. Mean duration of anterior spinal fusion surgery was 3 hours 44 minutes. After surgery, 85 (83%) patients showed neurological improvement. A total of 85 (83%) patients showed osseous fusion on imaging. For complications, 11 (11%) patients developed short-term dysphagia, three (3%) developed neurological deficit with no tetraplegia, and two (2%) had intra-operative cerebrospinal fluid leak due to dural tear. One (1%) patient developed transient hoarseness. One (1%) patient required reoperation for epidural abscess with subsequent good outcome. There was no postoperative cerebrospinal fluid leak. There was no mortality.
Conclusion: Anterior spinal fusion is a safe and effective treatment for cervical stenosis.

Application of Skull Base Techniques to Paediatric Neurosurgery

FP 5.1

Kevin KF Cheng, Wilson WS Ho, Gilberto KK Leung, WM Lui
Division of Neurosurgery, Department of Surgery, Queen Mary Hospital, Hong Kong SAR

Objective: To analyse the pathology and surgical outcomes of skull base approaches in a paediatric population.
Methods: This was a retrospective case review in Queen Mary Hospital, Hong Kong, and The University of Hong Kong–Shenzhen Hospital, China, during 2017 to 2018. Charts of paediatric patients who underwent skull base procedures for various pathologies including vascular or brain tumour were included. A review of the literature was performed to compare any differences or difficulties encountered when operating on a developing rather than a developed skull.
Results: A total of four paediatric patients (aged <10 years) received skull base surgeries during that period. Two of them had tumours near the medial cerebellopontine angle and those patients had a lateral skull base approach for tumour excision. The other two had dural arteriovenous fistula located in the medial pre-pontine and upper cervicomedullary region; those patients had lateral skull base and far lateral approach for clipping of the fistula, respectively. None of the patients had permanent added neurological deficit nor cerebrospinal leakage. All patients were discharged home within 1 week of surgery with good functional outcome. It is also evident that for at least 10 years after birth, the skull base of a child is incompletely developed. It is unsurprising then that adult surgical approaches to the cranial base require modification when implemented in a child. These modifications are dependent on the anatomic maturity of the individual patient.
Conclusion: Skull base surgery has a role in paediatric practice. Although such surgery is high risk, the outcomes were good in our patients without added neurological deficit. Understanding of the growth of the paediatric skull base would make the implementation of adult skull base approach safer.

Surgical and Visual Outcomes of Anterior Cranial Fossa Juxtasellar Meningioma: a Review

FP 5.2

PT Yuen, Joyce SW Chow, YW Wong, HM Chiu
Department of Neurosurgery, Queen Elizabeth Hospital, Hong Kong SAR

Objective: Anterior skull base meningioma over the juxtasellar region frequently affects the optic pathway. We aimed to review the surgical and visual outcomes of patients with these tumours.
Methods: We conducted a single-centre retrospective review of patients with juxtasellar meningioma, treated at our centre from 2013 to 2018. Visual outcome was assessed by ophthalmological exam in terms of visual acuity. Extent of resection, residual tumour, and disease recurrence were determined by preoperative and postoperative imaging and operative records. We also investigated the visual outcomes of clinoidectomy, optic canal decompression, and optic nerve sheath opening.
Results: In total, 45 patients were included; 35 of them presented with decreased vision. In all, 24 (68.6%) patients showed improved vision after surgery, six (17.1%) showed static vision, and five (14.3%) showed decreased vision. In all, 15 patients received clinoidectomy, optic canal decompression, or opening of optic nerve sheath, 12 (80%) of them showed improved vision, two (13.3%) showed static vision and one (6.7%) showed decreased vision. Gross total resection was achieved in 16 (35.6%) patients, near total in 11 (24.4%), and subtotal in 18 (40%) patients. Residual tumour or disease recurrence was seen in 26 (57.8%) patients.
Conclusion: Most patients with anterior cranial fossa juxtasellar meningioma who underwent surgery in our centre had either improved or static vision.

Acupuncture to Manage Facial Nerve Palsy after Acoustic Neuroma Treatment

FP 5.3

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Vestibular schwannomas are normally managed by surgery, radiosurgery or observation. Owing to their close proximity to the facial and the vestibulocochlear nerves, subsequent facial nerve palsy and hearing loss are common sequelae after management of vestibular schwannoma. Management options for facial nerve palsy are limited, and can cause physical and social disabilities. We aimed to compare the severity of facial nerve palsy before and after acupuncture.

Patients who had facial nerve palsy after acoustic neuroma treatment at our centre from January 2007 to December 2016 were included. Patients received steroids, no treatment, or acupuncture. Outcome measures included recovery from surgical complications and resumption of premorbid cranial nerve functions. We used the House-Brackmann classification to evaluate improvements in facial nerve palsy. In total, 100 patients underwent acoustic neuroma treatment had subsequent facial nerve palsy. Of them, 26 patients were given acupuncture after treatment.

FP 5.4

Perioperative Management of Aspirin in Patients Who Received Burr Holes for Chronic Subdural Haematoma

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Objective: To investigate the appropriate time for aspirin resumption after burr hole surgery for patients with chronic subdural haematoma (CSDH), and to examine the effect of preoperative platelet transfusion.
Methods: This was a 2-year retrospective study of 79 patients taking aspirin at the time of CSDH diagnosis. Patients on concomitant antiplatelet or anticoagulant therapy were excluded. Data analysed included indication of aspirin, time of operation, use of preoperative platelet transfusion, time of aspirin resumption, vascular events (VEs), and recurrence. The VEs included acute coronary syndrome and stroke. Recurrence was defined as increase in thickness of CSDH on postoperative computed tomography. Outcome was measured by Glasgow Outcome Scale (GOS) at 3 and 12 months after surgery. Good outcome was defined as GOS ≥4.
Results: Aspirin was withheld upon diagnosis in all patients. Mean diagnosis-to-operation time was 2.4 days. In all, 60% of VEs occurred more than 2 weeks after surgery. Mortality or drop in GOS was reported in 80% of patients with VEs, which was significantly higher than in patients without VEs (11%, P<0.0001). Aspirin resumption within 2 weeks was associated with higher rate of recurrence (50% vs 8%, P=0.0896). Platelet transfusion was given in 58% of patients. Platelet transfusion was not associated with good outcome (P=0.25) or VEs (P=0.19).
Conclusion: When indicated, neurosurgeons should consider aspirin resumption 2 weeks after burr hole surgery. The benefits of preoperative platelet transfusion remain uncertain.

FP 6.1

Outcomes of Frameless Stereotactic Radiosurgery on Patients with Brain Metastasis

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Objectives: To investigate the effectiveness of frameless stereotactic radiosurgery on patients with brain metastasis, and to identify factors affecting outcomes after stereotactic radiosurgery.
Methods: Patient data were collected for all patients who underwent frameless stereotactic radiosurgery from 2015 to 2017 at Queen Elizabeth Hospital, Hong Kong. Factors including origin of tumour, presence of multiple brain metastases, and status of chemotherapy were studied. Primary outcomes were local recurrence/progression, 6-month survival, and overall brain metastasis progression. Secondary outcomes included changes in recursive partitioning analysis class, the basic score for brain metastases, and Graded Prognostic Assessment before and 6 months after stereotactic radiosurgery.
Results: A total of 38 patients were included. Local control rate was 68.2% and mean time to local recurrence was 8.9 months. Absence of chemotherapy was associated with poor 6-month survival. Presence of multiple brain metastases was associated with brain metastasis progression.
Conclusion: Stereotactic radiosurgery is effective in controlling local tumour growth. Poor prognostic factors include absence of chemotherapy and presence of multiple brain metastases.

Postoperative Survival and Functional Status of Brain Metastasis from Lung Cancer

FP 6.2

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Objective: To review the postoperative survival and functional status of patients who received surgical excision of brain metastasis and to investigate if patient selection criteria for surgical excision could be further expanded.
Methods: This was a retrospective study of patients who had brain metastasis from lung cancer resected from 2014 to 2017 in the New Territories West Cluster of hospitals, Hong Kong. Patient demographics, presenting symptoms, preoperative condition, and preoperative imaging results were retrieved from electronic patient records. Outcomes measured included symptom-free period, radiological progression-free survival, survival with Karnofsky Performance Scale score >70, and overall survival. Subgroup analysis was performed for age-group, tumour size, and number of metastases.
Results: A total of 71 patients were identified that matched the selection criteria within the study period; median age of the patients was 61 (range, 40-79) years. In terms of overall survival and survival with Karnofsky Performance Scale score >70, there was no statistical difference between patients aged <65 years and those aged >65 years or between patients with one brain metastasis or those with two brain metastases.
Conclusion: Brain metastasis excision is safe and feasible in patients aged ≥65 years and in those with two brain metastases.

Microsurgical Management of Cerebral Arteriovenous Malformations

FP 6.3

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Objective: To investigate the microsurgical management of cerebral arteriovenous malformations (AVMs) and its efficacy, as well as the significance of intra-operative angiography.
Methods: A retrospective analysis was conducted for 24 cases (13 male, 11 female) of cerebral AVMs in our hospital from March 2014 to September 2018. The mean age of the patients was 28.4 (range, 4.6-71) years. Four patients had a history of cerebral haemorrhage, and 12 had acute cerebral haemorrhage. Of the 12 patients with acute cerebral haemorrhage, nine underwent computed tomography angiography, and six underwent digital subtraction angiography before operation.
Results: All patients underwent microsurgical treatment, including eight cases of emergency surgery and 16 cases of elective surgery. Intra-operative angiography was performed in seven patients undergoing elective surgery, and residual lesions were found in two patients; thus, resections were completed for all patients. Of 14 patients who received postoperative digital subtraction angiography, suspicious residual lesions were found in two emergency operation cases. Nineteen patients were followed up for a mean of 10 (range, 2-48) months. Follow-up Glasgow Outcome Scale scores showed good recovery in 15 cases and moderate disability in four cases. No cases of severe disability, vegetative survival, or death were recorded.
Conclusion: Microsurgical treatment of cerebral AVMs is safe and effective. Intra-operative angiography is helpful to detect residual lesions. For large cerebral AVMs, the combination of intra-operative embolisation with surgical resection will be an effective strategy.

Clinical Presentation and Endovascular Treatment of Spontaneous Internal Carotid Artery Dissection

FP 6.4

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Objective: In the past, spontaneous internal carotid artery dissection was considered uncommon. Since the introduction of mechanical thrombectomy, spontaneous internal carotid artery dissection has been increasingly recognised as an important cause of acute ischaemic stroke. This study aimed to investigate the clinical presentation and endovascular treatment options for patients with acute ischaemic stroke.
Methods: A retrospective review of the database of a single centre was performed from 2013 to 2018. Patients were included if they had diagnosis of spontaneous internal carotid artery dissection confirmed with either magnetic resonance angiography or digital subtraction angiography.
Results: A total of 15 patients with spontaneous internal carotid artery dissection were included. Of these, eight were asymptomatic; four presented with visual disturbance, neck pain, or unilateral headache; and three presented with acute ischaemic stroke. Endovascular treatment with stenting (n=3) or mechanical thrombectomy and stenting (n=3) was performed in six patients.
Conclusion: Endovascular treatment is an effective treatment option for stroke caused by spontaneous internal carotid artery dissection.

Outcomes of High-flow Cerebral Vascular Bypass Operations: a Single-centre Retrospective Review

FP 7.1

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Although the advent of pipeline flow diverters in the recent decade has largely replaced the need for bypass operations in aneurysm treatment, where aneurysms are not amenable to endovascular treatments, cerebral vascular bypasses remain to be the ultimate solution. The procedure is also a strategy in treatment of moyamoya disease, pseudoaneurysms, skull base tumours which encase great vessels and in stroke prevention. Unfavourable outcomes of high-flow bypass have been reported, which include haemorrhagic transformation, perioperative ischaemia and graft occlusion. Nevertheless, high-flow bypass provides a better approximate of physiological condition than low-flow bypass and would be the preferred option where higher flow is preferred and scalp arteries are unavailable.

The outcome of high-flow bypass shows great variation and graft patency is the single most important indicator for operation success. Much of the current literature on high-flow bypass procedures reports on Western populations. The resemblance and hence representativeness, in terms of disease characteristics and treatment response, between this locality and the western populations are unproven. For instance, a large majority of pseudoaneurysms eventually indicating high-flow bypass operations arise as complications of radiation therapies for previous head and neck tumours, including the regionally endemic nasopharyngeal carcinoma.

To provide more accurate data on disease characteristics and treatment responses in an Asian population, we reviewed the outcomes of high-flow bypass operations performed over a 15-year period in a regional hospital in Hong Kong.

Data on high-flow bypass performed between 2002 to 2017 at Queen Mary Hospital were retrieved from our database. Procedure indications, graft type, co-morbidities, and radiological (ie, graft patency) and clinical outcomes, including ischaemic events, were collected and analysed.

PHASES Risk Prediction Score: Local Application and Interpretation

FP 7.2

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Objective: The PHASES risk prediction score is a method of calculating the absolute 5-year risk of intracranial aneurysm rupture. Japanese and Finnish populations have higher risk of rupture. We aimed to investigate the rupture risk in an Asian population.
Methods: All computed tomography cerebral angiograms performed at our institution from November 2016 to June 2018 were reviewed. Those showing ruptured aneurysms or incidental findings were included for further evaluation. Patient data, including age, medical history, smoking status, aneurysm size, and aneurysm location were collected and the PHASES score calculated for each patient. Treatment-related complications and clinical outcomes for these patients were also assessed.
Results: A total of 255 aneurysms were analysed. In all, 160 were incidental findings and 95 were ruptured aneurysms. The mean PHASES score was 4 (range, 1-14). For ruptured aneurysms, more than half (54%) had PHASES score of 5 to 6; more than 80% of ruptured aneurysms were <7 mm. The treatment-related complication rate was around 4% to 5%, which is comparable to the international standard.
Conclusion: The PHASES score is around 5 to 6 for more than half of the ruptured aneurysms in our centre. Although the 5-year accumulative rupture rate for these patients were around 1.3% to 1.7%, we may consider offering treatment for those patients with PHASES score of ≥5.

Bonnet Bypass: Report of Four Patients

FP 7.3

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Objective: We report four cases of high-flow bonnet vascular bypass to replace internal carotid arteries. Indications, operative technique, and results for the bonnet bypasses surgery are described.
Methods: We performed bonnet bypass operations in four patients: one with advanced nasopharyngeal carcinoma and carotid blowout, one paediatric patient with large head and neck tumour, and two patients with recurrence of nasopharyngeal carcinoma. Bonnet bypass surgery was necessary in all four patients because local advanced disease made ipsilateral vascular bypass impossible.
Results: All four patients had uneventful perioperative courses without any ischaemic events. All four patients later received a second-stage operation to remove the tumours and the affected internal carotid arteries.
Conclusion: Bonnet bypass is a safe and effective neurosurgical technique for replacing diseased internal carotid arteries in patients with advance head and neck tumour.

FP 7.4

Antiplatelet Therapy Duration Effect on Risk of Late Ischaemic Complications in Patients with Intracranial Aneurysm Treated by Flow Diverters

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Objective: Flow diverters (FDs) have been increasingly employed to treat intracranial aneurysms. However, the effect of antiplatelet therapy after surgery on the occurrence of delayed complications remains poorly understood. We examined whether an association exists between antiplatelet therapy characteristics and occurrence of delayed complications in FD-treated aneurysm patients.

Methods: Patients with intracranial aneurysm treated by FD at Queen Mary Hospital, Hong Kong, from September 2008 to March 2018 were identified from a prospectively maintained database. Retrospective review was performed to evaluate demographic factors, clinical characteristics, surgical outcomes, and adverse events during follow-up. Primary outcomes consisted of FD-associated ischaemic complications (in-stent thrombosis, thromboembolic events and cerebral infarcts). Secondary outcomes consisted of haemorrhagic complications (subarachnoid and intracerebral haemorrhage). Fisher's exact tests were used to determine significant associations between antiplatelet therapy dosage/duration and complication occurrence.

Results: The cohort consisted of 126 patients (31 male, 95 female) with a mean age at operation of 56.5 years and follow-up duration of 57.9 months. Pipeline embolisation device was the FD of choice in 84.1% (n=106) of cases. The ischaemic complication rate was 4.0% (n=5); three of those cases occurred >6 months after surgery. The haemorrhagic complication rate was 4.8% (n=6); four of those cases occurred >6 months after surgery. Statistical analyses showed that stopping antiplatelet therapy at ≤1 year after surgery, compared with >1 year after surgery, did not significantly alter risk of delayed ischaemic (P=0.368) or haemorrhagic complications (P=1).

Conclusion: Our results suggest that duration of antiplatelet therapy does not affect the risk of delayed ischaemic complications in intracranial aneurysm patients treated by FD.

Paediatric Traumatic Brain Injury: a Two-year Descriptive Study

P 1.1

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Objective: To describe the epidemiological and clinical characteristics of paediatric patients with traumatic brain injury (TBI) in a hospital setting.
Methods: Patients <18 years admitted through the resuscitation room of Prince of Wales Hospital, Hong Kong, between 2014 and 2015 with admission Abbreviated Injury Scale head and neck score ≥2 were included. Demographics, cause of injury, medical history, clinical evaluations, and details of cranial surgery were collected through the computerised medical system. Survival rates and Glasgow Outcome Scale scores were assessed at 30 days after TBI.
Results: Of 750 paediatric patients with TBI, 69 (9.2%) patients with a mean age of 7.8 ± 6.0 years were included. Infants, toddlers and preschoolers (age ≤5 years) accounted for 40.6% of the patients, followed by teenagers (age 12-17 years; 33.3%). In all, 94.2% of patients had a good medical history. The TBIs were most often caused by low-level falls (52.5%), bicycle-related injuries (24.6%), and pedestrian injuries (13.0%). Mild TBI (Glasgow Coma Scale [GCS] score 13-15) accounted for 91.3% of the patients with one moderate TBI (GCS score 9-12) and five severe TBIs (GCS score 3-8). Eight (11.6%) patients underwent cranial surgery (burr hole for intracranial pressure monitoring, craniotomy, or craniectomy). Eight patients subsequently developed epidural haematoma; five patients with severe TBI and three with mild TBI. Four of them were admitted for bicycle-related injuries, two for pedestrian injuries, and two for low-level falls. Seven of them achieved a good recovery (defined by Glasgow Outcome Scale); the other with severe disability was transferred for decompression and developed post-TBI epilepsy after cranial surgery. Thirty-day mortality was zero; 67 (97.1%) patients achieved good recovery and two (2.9%) were severely disabled.
Conclusions: In paediatric patients with TBI, mild TBI is most common, with low-level falls as the main injury mechanism. The majority of paediatric patients with TBI who underwent cranial surgery achieve good recovery. This suggests the importance of a management protocol including liberal interval computed tomography and timely surgery.

Phosphoserine Phosphatase is Upregulated in Glioma and Predicts Poor Survival of Glioma Patients

P 1.2

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Objective: To investigate the role of serine synthesis pathway in glioma.
Methods: Public dataset analysis (GEPIA and cBioPortal), quantitative real-time polymerase chain reaction, immunohistochemistry, and western blot.
Results: The public database GEPIA showed that mRNA levels of three important enzymes: phosphoglycerate dehydrogenase, phosphoserine aminotransferase 1 and phosphoserine phosphatase were all upregulated in glioma. Among these enzymes, phosphoserine phosphatase showed a grade-dependent increase in glioma tissues and predicted poor overall and disease-free survival of patients with glioma. The cBioPortal database showed that phosphoserine phosphatase bore the highest amplification percentage (6%), compared with the other two enzymes (both <1%), in 794 glioma tissues. These data suggest that phosphoserine phosphatase is a promising biomarker for glioma. We further verified these results with clinical specimens collected from our hospital by quantitative real-time polymerase chain reaction, immunohistochemistry, and western blot.
Conclusion: Phosphoserine phosphatase is upregulated in glioma in a grade-dependent manner and predicts poor survival of patients with glioma.

P 1.3

Vitamin D3 Promotes Neurological Recovery via Enhancing Haematoma Resolution after Intracerebral Haemorrhage in Mice

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Objective: To investigate the protective role of vitamin D3 on neurological outcome and haematoma resolution in a mouse model of collagenase-induced intracerebral haemorrhage (ICH).
Methods: Experimental intracerebral haemorrhage model was induced with type IV collagenase in C57/6N mice. In the treatment group, vitamin D3 was administrated by oral gavage 2 hours after ICH and daily until day 7. Coconut oil was given as vehicle in the control group. Forelimb-use asymmetry (cylinder) test and accelerated rotarod test were performed for functional assessment. Magnetic resonance imaging was employed for haematoma lesion measurement. Western blot was used for quantitative analysis of CD206 and CD36.
Results: Vitamin D3 significantly increased coordinated ability and relative average scores of spontaneous contralateral forelimb use (impaired) compared with the control group. The haematoma lesions of vitamin D3 group were significantly smaller than those of the control group. In addition, western blot analysis results indicated that CD206, peroxisome proliferator-activated receptor gamma, and CD36 were significantly increased in perihaematomal brain tissue of the treatment group compared with that of the control group.
Conclusion: Vitamin D3 supplement improves neurological outcomes after ICH and reduced haematoma volume possibly via CD36-dependent manner.

P 1.4

Targeting Protein Tyrosine Phosphatase-σ Induces Functional Recovery by Enhancing Perilesional Axon Regeneration and Attenuating Ipsilesional Corticospinal Tract Degeneration after Intracerebral Haemorrhagic Stroke in Mice

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Objective: To investigate the effects of treatment with intracellular sigma peptide (ISP) targeting protein tyrosine phosphatase-σ (PTPσ) on behavioural and morphological outcomes after experimental intracerebral haemorrhage (ICH) in mice.
Methods: An experimental ICH model in male mice was induced by intrastriatal injection of collagenase IV. The functional neurological recovery was evaluated weekly until 8 weeks after ICH using the rotarod test and cylinder test following daily subcutaneous injection of ISP (10 μM) for 8 weeks. Perilesional axonal regeneration and morphological changes of the corticospinal tract were assessed by histological staining, light and electron microscopy, three-dimensional histological methods, and immune blot.
Results: Functional recovery, increased perilesional axonal sprouting, and recovery of injured ipsilesional corticospinal tract were observed in ICH mice after ISP treatment.
Conclusion: These results suggest that modulation of PTPσ by ISP represents a potential therapeutic strategy for haemorrhagic stroke.

Third Ventricular Tumour with Obstructive Hydrocephalus: a Case Report

P 1.5

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Third ventricle is an uncommon site for brain tumours. Non-specific symptoms preceding typical presentation for lesions in this deep part of the brain include obstructive hydrocephalus and dorsal midbrain syndrome. Different surgical approaches have been described. A 13-year-old girl presented with paroxysmal facial numbness for a few years. Initial physical examinations were unrevealing. Investigations including blood tests were unremarkable and non-conclusive. The patient then developed headache and was noted to have increased head size. Magnetic resonance imaging of the brain revealed a heterogeneous lesion in the third ventricle arising from the left thalamus with obstructive hydrocephalus. Endoscopic third ventriculostomy was performed to relieve the obstructive hydrocephalus. Biopsy results revealed features suggesting pilocytic astrocytoma. Excision of the tumour was performed via an interhemispheric approach. Final pathology results confirmed diffuse astrocytoma. The patient recovered gradually. Third ventricular tumours are an uncommon entity. The choice of surgical approach depends on the location of the tumour. Final histology affects management of the disease.

Single-stage Posterior Decompression and Occipitocervical Fusion Treatment for Basilar Invagination, Chiari I Malformation, and Atlantoaxial Subluxation: a Case Report

P 1.6

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We report on the surgical outcome of a patient with basilar invagination, Chiari I malformation, and atlantoaxial subluxation. The patient was treated with single-stage posterior decompression and occipitocervical fusion. The surgical outcome of the patient was evaluated clinically by the Japanese Orthopedic Association and Nurick scales clinically, and radiologically by computed tomography scans. Single-stage posterior decompression and occipitocervical fusion is a possible surgical treatment for basilar invagination with Chiari I malformation and atlantoaxial subluxation.

Achondroplasia Causing Craniocervical Stenosis: a Case Report

P 1.7

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Achondroplasia is an autosomal dominant genetic disorder causing abnormality in bone and cartilage formation. Most patients acquire the disorder through de novo mutation during the early stages of development. We herein describe an infant with achondroplasia causing craniocervical stenosis and central apnoea. We illustrate the surgical intervention and the subsequent progress. The infant was delivered at full term. Shortly after birth, the patient had short limbs, frontal bossing, mid-face hypoplasia, depressed nasal bridge, and bilateral rhizomelic shortening. He was confirmed by genetic testing to have achondroplasia. He had recurrent bronchiolitis since age 5 months, eventually requiring non-invasive positive pressure ventilation (NPPV) support at age 8 months. Sleep study revealed the patient to have hypoventilation with significant desaturation, particularly during rapid eye movement sleep with a few central apnoea events. The conclusion was that respiratory dysfunction had been caused by both restrictive lung disease and central apnoea. Magnetic resonance imaging (MRI) showed significant crowding at the foramen magnum. The patient was put on home nocturnal NPPV at age 9 months. Posterior fossa decompression and C1 laminectomy was performed at age 11 months. After the operation, the child was weaned off from the NPPV machine by age 18 months without desaturations overnight. Respiratory failure in patients with achondroplasia could be caused by restrictive lung disease or central apnoea due to craniocervical stenosis. Elective screening MRI should be performed when patients show signs of respiratory failure.

Crouzon Syndrome Infant Born with Patent Sutures—No Need for Surgical Intervention?

P 1.8

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Crouzon syndrome is a congenital disorder causing craniofacial abnormality due to premature fusion of multiple cranial and skull base sutures. Infants diagnosed with fusion of cranial sutures undergo a series of neurosurgical and craniofacial interventions throughout their lifetime until fully mature. However, it is unclear if infants born with patent sutures must also be followed up. We herein present the evolution of symptoms of Crouzon syndrome in an infant and the surgical interventions. The infant was born full term, with dysmorphism, mild bilateral proptosis, down slanting of the eyes, hypertelorism, and a flat nasal bridge. Clinically, the patient's fontanelle was normal in tension. Skull X-ray and computed tomography scan showed that all sutures were patent. Worsening of feeding with noisy breathing war noted during feeding at age 1 month, with worsening of proptosis. Later, the patient developed upper airway obstruction with recurrent desaturation spells. The patient received tracheostomy at age 2 months. At age 4 months, the patient developed a bulging fontanelle and hydrocephalus. Computed tomography brain still showed patent sutures. Magnetic resonance imaging confirmed tonsillar herniation and moderate hydrocephalus. At age 7 months, the patient received posterior cranial vault osteotomy for distraction osteogenesis and suboccipital decompression. The patient subsequently made progress in development. Crouzon syndrome is a disease with evolving symptoms. All affected individuals should be followed up for any signs of progression.

Recurrent Chronic Subdural Haematoma as an Alternative Indication for Fenestration of Arachnoid Cyst without Mass Effect: a Case Report

P 1.9

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In the management of the arachnoid cysts in the patients, it is often taken into consideration whether the cyst causes any mass effect or influence on overall brain development. Older patients who have already completed normal development are usually treated surgically. However, it is unclear whether these cysts must to be managed surgically in paediatric patients. We report the case of a teenage girl with recurrent chronic subdural haematoma related to an arachnoid cyst. The patient presented at age 9 years with a minor head injury sustained while playing on the trampoline. Magnetic resonance imaging scan, performed at another centre 2 weeks after the head injury, showed a small left temporal base arachnoid cyst without mass effect. The patient developed recurrent headaches 3 months later and was admitted to our centre for further investigation. On admission, computed tomography of the brain showed chronic subdural haematoma on the ipsilateral side with mass effect. Burr hole drainage was performed, and the patient was discharged home free of headache. The headache recurred 4 months later, associated with vomiting. Magnetic resonance imaging showed recurrent subdural haematoma of different ages of haemosiderin deposition and prominent vasculature adjacent to the left temporal arachnoid cyst. Craniotomy for cyst fenestration was performed. There was no recurrence at 1 year after surgery. Recurrent chronic subdural haematoma associated with arachnoid cyst is another indication for fenestration surgery, even without mass effect.

Two Siblings with Congenital Myelomeningocele: a Case Report

P 1.10

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Congenital myelomeningocele refers to the protrusion of the meninges and cerebral spinal fluid through a defect in the skull. It is considered a more obvious abnormality in the spectrum of neural tube defects and may be associated with other major congenital structural defects. We describe here two siblings who had congenital myelomeningocele. The elder sister was born in 2014 and the younger brother was born in 2018. They were both diagnosed of the condition by antenatal morphology scans at around 20 weeks of gestation. Elective repair operations were performed during their neonatal period. The elder sister developed an arachnoid cyst at the posterior fossa with mass effect requiring operative fenestration at age 16 months. She was also found to have severe myopia and has received laser surgery at age 3 years. Otherwise, the siblings developed normally. No other structural abnormalities were detected and no family history of such conditions was reported. An underlying genetic disorder was suspected and therefore investigated.

P 1.11

Transsphenoidal Surgery for Functional Pituitary Adenoma: a 16-Year Retrospective Review

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Objective: To investigate the management of the transsphenoidal surgery for functional pituitary adenoma.
Methods: This was a 16-year single-centre retrospective review of the management and recurrence of functional pituitary adenoma in the Department of Neurosurgery, Pamela Youde Nethersole Eastern Hospital, Hong Kong, from 2002 to 2017. The results of the transsphenoidal surgery were reviewed in terms of hormonal remission, need of further treatment, and complications.
Results: There were 50 cases of transsphenoidal surgery for functional pituitary adenoma, mainly Cushing's disease and acromegaly. In all, 38 of these cases resulted in hormonal remission. The most common postoperative complication was hypopituitarism, which is transient in most patients. Only four patients were reported as having diabetes insipidus. Cerebrospinal fluid leakage requiring procedures, such as lumbar drain or operation for repair, presented in four patients.
Conclusion: Transsphenoidal surgery is a safe and effective treatment for Cushing's disease and acromegaly in view of hormonal remission and complications.

P 1.12

Clinical Outcome of Major Vessels Occlusion Receiving Recombinant Tissue Plasminogen Activator Prior to Intra-arterial Thrombectomy in an Asian Population—Experience of a Regional Neurosurgical Unit

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This study aimed to investigate the clinical outcomes of patients with major vessel occlusion receiving recombinant intravenous tissue-type plasminogen activator prior to intra-arterial thrombectomy in an Asian population. This was a 10-year retrospective review of clinical outcome all patients receiving intra-arterial thrombectomy in a regional neurosurgical unit in Asia. In total, 101 patients received intra-arterial thrombectomy within the study period. Of these, 61 underwent surgery for anterior circulation obstruction with the middle cerebral artery occluded. Clinical outcomes of these 61 patients were evaluated.

Mimicking Multiple Sclerosis: Ghost Tumour That Comes and Goes in Different Parts of the Brain without Any Treatment

P 1.13

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Lesions that disappear spontaneously without treatment then reappear at different locations in the central nervous system (CNS) at different time points in imaging are one of the classical radiological features of multiple sclerosis. On the other hand, lymphomas involving the CNS are known to be steroid sensitive. They can disappear completely after steroid treatment and thus are sometimes referred as ghost tumours. Despite this name, lymphomas in the CNS resolving spontaneously without treatment is unheard of in the literature. We report a case of intracranial lesions that disappeared spontaneously without treatment then reappeared at different locations. The lesions were histologically confirmed to be diffuse large B cell lymphoma. Diagnostic difficulties can be encountered when facing lesions that appear and resolve spontaneously. Surgical biopsy remains an important tool to establish the diagnosis.

Challenges in Determining Optic Nerve Compression by Pituitary Adenoma: a Case Report

P 1.14

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Pituitary adenoma is one of the commonest intracranial tumours. Radiological investigation such as magnetic resonance imaging delineating the extent of compression onto the optic nerve by the pituitary adenoma is an important factor for determining the need for surgical decompression. We report a case of pituitary adenoma with optic nerve compression evident clinically and by optical coherence tomography but without definite radiological evidence. Examination by experienced clinicians or radiologists is important in determining the presence of optic nerve compression by pituitary adenomas. Despite expertise from radiology colleagues, subtle compression may not be apparent radiologically.

Endoscopic Third Ventriculostomy for Refractory Low-pressure Hydrocephalus: Case Reports and Literature Review

P 1.15

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Objective: Low-pressure hydrocephalus remains a poorly understood neurosurgical entity which poses significant challenge in our daily practice. Prolonged external ventricular drainage at sub-zero pressures is reported to reverse ventriculomegaly before the cerebrospinal fluid shunting procedure. However, prolonged sub-zero drainage is not always feasible and persistent ventricular dilatation can occur after cerebrospinal fluid shunting. Some studies have suggested alternative or additional treatments, including endoscopic third ventriculostomy (ETV).
Methods: We report two patients with persistent ventriculomegaly after low-pressure shunt insertion. We performed ETV on both patients with clinical and serial computed tomography monitoring. We also conducted a literature search and analysed appropriate case studies and case series.
Results: Clinical and radiological improvements were observed in both cases. Current evidence in the literature suggests that ETV is a good alternative or additional treatment.
Conclusion: In patients with refractory low-pressure hydrocephalus, ETV is a suitable alternative or additional treatment.

Revascularisation Effect on Neurocognition in Patients with Moyamoya Disease

P 1.16

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Objective: To analyse the effect of revascularisation surgery on neurocognition in patients with moyamoya disease.
Methods: All patients who underwent revascularisation surgery in our centre from 2012 to 2015 were included. Neurocognitive assessments were performed before operation, and at 1 month and 6 months after surgery. Results were analysed for statistical significance.
Results: In total, 13 patients were included (4 male, 9 female), with mean age 36.8 (range, 23-49) years. Of these, 11 patients underwent two-stage (bilateral) surgery; the other two had left-sided surgery only. Three patients had first-stage surgery before assessment (2 on right side, 1 on left side). In total 24 bypass surgeries were performed. Neurocognitive assessments at 1 month after surgery showed no significant improvement. At 6 months after surgery, improvement in memory was observed as demonstrated by Chinese auditory verbal learning test. In addition, executive functions, especially non-verbal fluency, showed significant improvement.
Conclusion: Revascularisation surgery is an effective treatment for improving neurocognition in patients with moyamoya disease.

Laminectomy for Overshunting-associated Myelopathy: a Case Report

P 1.17

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We present a case of overshunting-associated myelopathy (OSAM) with cervical stenosis treated with cervical laminectomy. The patient was a 39-year-old man with history of hydrocephalus with ventriculoperitoneal shunt. The patient presented to our hospital with gait disturbance and finger numbness. Magnetic resonance imaging showed evidence of OSAM and cervical stenosis. The clinical symptoms were compared before and after cervical laminectomy. After laminectomy, the patient's gait problem and finger numbness improved. Cervical laminectomy may help relieve gait problem and finger numbness in OSAM with cervical stenosis.

Transcranial Light-emitting Diode Therapy for Experimental Traumatic Brain Injury

P 1.18

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Objective: To evaluate the effects of light-emitting diode (LED) treatment on functional improvement in an experimental traumatic brain injury (TBI) rat model.
Methods: Mild-to-moderate TBI was induced in rats with an electromagnetically controlled cortical impact device. Light-emitting diode radiation (wavelength: 630 nm, power: 2W, with proton vibration alignment) for 15 minutes was given to these animals on the same day after surgery for 7 consecutive days (Group A, n=10). A normal commercial light-emitting diode was used as positive control (Group B, n=10). No light was given as negative control (Group C, n=10). Neurological functions were evaluated with Water Maze, Rotorod, and Gait Analysis. Animals were sacrificed on day 3 or day 14 for microscopic examinations including neuron death (cresyl violet), inflammation (marker: glial fibrillary acidic protein [GFAP] and ionised calcium-binding adapter molecule 1 [Iba1]) and cell proliferation (marker: proliferating cell nuclear antigen [PCNA]).
Results: The rats in group A showed significantly greater improvement in neurological functional recovery than groups B and C. Early astrocytosis (GFAP) and microgliosis (Iba1) were triggered by the presence of fewer GFAP-positive cells and fewer Iba1-positive cells on day 3 in group A. On day 3 and day 14, there was significantly ($P<0.05$) lower neuronal death in group A than in groups B and C in both the hippocampus and the penumbra region, as determined by Cresyl violet staining. In the penumbra region, more cell proliferation was detected by PCNA antibody staining on both day 3 and day 14 in group A.
Conclusion: Transcranial light-emitting diode therapy improves functional recovery after experimental TBI through suppression of inflammation, increase in cell proliferation, and reduction in neuronal death.

Epidemiology, Natural History, and Outcomes of Moyamoya Disease in Children: a Cluster-wide Retrospective Cohort Study

P 2.1

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Introduction: Moyamoya disease (MMD) is a cerebrovascular condition with progressive stenosis of internal carotid arteries which predisposes affected patients to stroke. Paediatric presentation is not uncommon, and it is the most common paediatric cerebrovascular disease in Hong Kong. The classic presentation in paediatric population is recurrent transient ischaemic attacks. Long-term outcomes are affected by myriad factors. In this study, we examine the epidemiologic features and natural history of patients with MMD, as well as to identify the factors affecting surgical outcomes of these patients in a cluster-wide study in Hong Kong.
Methods: We retrospectively analysed patients diagnosed with MMD from January 1998 to January 2018 in the New Territories West Cluster in Hong Kong. Clinical, radiological, and surgical data were collected. Outcomes were analysed.
Results: A total of 11 paediatric patients diagnosed with MMD from radiographic means over a 20-year period were identified in this study. These patients were predominantly female (72.7%), all were ischaemic in nature, two were affected unilaterally, and nine were affected bilaterally. Transient ischaemic attacks, partial seizures, and complete paresis occurred in 36.3%, 36.3%, and 27.4% of the patients, respectively. In all, 63.6% of the patients were symptom free at 30 days and 90.9% were symptom free at 5 years. There were no surgical complications from this group of patients; however, one patient passed away unrelated to surgical intervention for MMD. Patient age at presentation (categorised as age 0-4 years, 5-9 years, or 10-18 years) was statistically associated with symptoms at 30 days ($P<0.05$) but not at 5 years. No other factors were found to be statistically associated with symptoms at 30 days.
Conclusion: This retrospective cohort study examines paediatric patients with MMD revealing pertinent information on the epidemiology, natural history and the outcomes of disease in our cluster. Our study demonstrates that age at presentation may play a role in predicting early recovery after surgery for MMD in the paediatric population.

Endovascular Mechanical Thrombectomy: 10-Year Experience in Queen Mary Hospital

P 2.2

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Objective: Several practice-changing randomised controlled trials were published endovascular mechanical thrombectomy in 2015, leading to more standardised criteria and new thrombectomy devices. We aimed to provide an overview of mechanical thrombectomy for acute ischaemic stroke, and to analyse the differences between those performed before and after 2015.
Methods: We conducted a retrospective study by collecting the clinical data of mechanical thrombectomy performed in Queen Mary Hospital, Hong Kong, from November 2005 to June 2018. We compared the demographics and outcomes between those performed before and after 2015. Primary outcome was good functional outcome, defined as modified Rankin Scale score 0-2 at 3 months after surgery. Secondary outcomes were reperfusion rate, haemorrhagic transformation rate, and 6-month mortality.
Results: In total, 97 patients (62 male, 35 female) were included. Overall, the rate of attaining good functional outcome was 39.2%, with approximately 25% 6-month mortality and 10% significant haemorrhagic transformation. The two groups before and after 2015 were comparable in demographics. The after 2015 group had higher reperfusion rate (88.7% vs 65.4%; $P=0.038$) and lower haemorrhagic transformation rate (2.8% vs 30.8%; $P<0.001$), despite no significant difference of functional outcomes and mortality.
Conclusion: Endovascular mechanical thrombectomy for acute ischaemic stroke has been successfully implemented in our centre, with improving surgical outcomes commensurate with international standards.

Open Excision of a Mid-forehead Sinus Pericranii in a Paediatric Patient: a Case Report

P 2.3

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Sinus pericranii is a rare venous anomaly abnormally connecting the intracranial dural sinuses with the epicranial veins. This case illustrates this clinicoradiological entity, defines the role of angiography in its preoperative assessment, and suggests a diagnostic-therapeutic flow chart for management purposes. A boy presented to our hospital with a mid-forehead that had been slightly bulging since early childhood, hindering his normal psychosocial development and causing discomfort when performing the Valsalva manoeuvre. He underwent brain magnetic resonance imaging with venography, computed tomography scan, and digital subtraction angiography. The vein was categorised as accessory type, because it drained only a minority of the intracranial venous outflow. After reviewing the digital subtraction angiography result, sinus pericranii was classified as the accessory type rather than the dominant type. Treatment options included conservative, open surgical ligature, or endovascular (transvenous or percutaneous) embolisation. Open surgical ligature was performed successfully by bicoronal incision, careful dissection was performed, and minimal blood loss was achieved. The boy was discharged home the next day and long-term follow-up showed no recurrence with excellent cosmetic results and patient satisfaction. Histology of the specimen was reviewed. Because of its rarity, the exact nature and management of sinus pericranii are debated, and agreement on guidelines or recommendations for management and therapeutic choices is still lacking. Neuroimaging plays a critical role in the diagnosis of this uncommon condition. Digital subtraction angiography is pivotal for the categorisation of sinus pericranii as dominant or accessory, which in turn informs management choices. Only accessory sinus pericranii is amenable to treatment.

Contralateral Interhemispheric Transfalcine Approach to Parieto-occipital Brain Lesions: a Case Series

P 2.4

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Background: Numerous surgical approaches to the peri-atrium region of the lateral ventricle have been described, from the classical posterior interhemispheric transprecuneus approach originally described by Yaşargil, to later more novel transtemporal and posterior transcallosal approaches. Nonetheless, ipsilateral approaches to the parieto-occipital region of the brain are often associated with neurological deficits owing to surrounding eloquent areas and also limited by narrow working angle. The contralateral interhemispheric transfalcine transprecuneus approach has recently been reported internationally.
Objective: To review cases of the contralateral interhemispheric transfalcine approach for biopsy or resection of parieto-occipital brain lesions in a single centre in Asia.
Methods: All patients with parieto-occipital brain lesions who underwent biopsy or resection at Queen Elizabeth Hospital, Hong Kong, were reviewed retrospectively.
Results: Three patients were included in the study: one with right peri-atrial low-grade glioma, one with left peri-atrial high-grade tumour, and one with right occipital arteriovenous malformation.
Conclusion: The contralateral interhemispheric transfalcine approach is a safe and viable approach to the parieto-occipital region, which may otherwise be associated with postoperative neurological deficits.

P 2.5

Complete Removal of Thalamic Arteriovenous Malformation Achieved by a Combined Embolisation and Surgical Approach: a Case Report

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Arteriovenous malformation (AVM) is a disastrous congenital vascular abnormality with potential complications such as intracranial haemorrhage and epilepsy. Herein, we report a case in which brain AVM was treated by a combination of embolisation with precipitating hydrophobic injectable liquid (PHIL) and surgical excision. The management of deep-seated AVM; surgical strategy, including different approaches and their risks; and the difference between the PHIL and conventional embolic agent Onyx are discussed. The ruptured right AVM with a flow-related aneurysm and a nidal aneurysm were supplied by the distal right posterior cerebral artery and drained by the vein of Galen. Embolisation of the AVM was performed, and partial obliteration of the medial part of AVM was achieved with PHIL. Haemorrhage from the remaining AVM nidus developed subsequently and occipital transtentorial surgical excision was performed. Previously embolised AVM arterial feeder, nidus, and intranidal aneurysm with PHIL showed good obliteration intra-operatively. Follow-up digital subtraction angiography 6 weeks after surgery showed no residual AVM. Although a challenging technique, surgical extirpation provides a definitive opportunity to minimise the risk of subsequent haemorrhage resulting in morbidity and mortality. As a new-generation embolic agent, PHIL has advantages of ease of use, faster plug formation, and fewer artefacts on follow-up imaging scans. Thus, PHIL is an effective alternative embolic material.

P 2.6

Identification of Cranial Nerves before Skin Incision: a Case Series on Correlation between Intra-operative Finding and High-resolution Diffusion Tensor Imaging on Cranial Nerves

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Objective: Nerve injury is a devastating complication following intracranial surgery, with a great impact on the patient's quality of life. In addition to intra-operative monitoring, high-resolution diffusion tensor imaging can identify the course of nerves. We aimed to evaluate the correlation between preoperative high-resolution diffusion tensor imaging and intra-operative finding.
Methods: All patients receiving operations with preoperative high-resolution diffusion tensor imaging at the Department of Neurosurgery of Queen Elizabeth Hospital, Hong Kong, from March to October 2018 were reviewed. The course of nerves was reconstructed by navigation software. The correlation between the imaging finding and intra-operative finding was evaluated.
Results: In total, 10 patients were included. The correlation between high-resolution diffusion tensor imaging and intra-operative finding was excellent.
Conclusion: High-resolution diffusion tensor imaging can identify the course of nerves before skin incision. Thus, it is a useful tool for operative planning to avoid injury.

P 2.7

Association of Antithrombotic Agents with Risk of Haemorrhage and Thromboembolism after Surgical Evacuation of Chronic Subdural Haemorrhage

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Objective: To evaluate the relationship of postoperative complications with antithrombotic use in patients undergoing surgical drainage of chronic subdural haemorrhage.
Methods: This was a 5-year retrospective cohort study (2013-2017) of 297 patients who underwent surgical drainage of chronic subdural haemorrhage at Pamela Youde Nethersole Eastern Hospital, Hong Kong. Collected data included type and indication of antithrombotics, withhold and resumption timing of antithrombotics, and frequency and timing of postoperative complications. Postoperative complications include major haemorrhage, minor haemorrhage, and thromboembolic events. Association of antithrombotic use and postoperative complications were studied using Chi squared analysis. Association of antithrombotic use and timing of postoperative complications were studied using Kaplan-Meier curve and log rank test.
Results: Among the study population, 26 (8.8%) patients experienced major haemorrhage, 27 (9.1%) experienced minor haemorrhage, and six (2%) experienced thromboembolisms. Patients with preoperative antithrombotics did not have a higher or earlier haemorrhagic risk or thromboembolic risk than those without. Resumption of antithrombotics after surgery did not affect the frequency and timing of haemorrhage or thromboembolism.
Conclusion: Preoperative antithrombotic use and postoperative antithrombotic resumption did not lead to a significant difference in haemorrhagic and thromboembolic risk.

P 2.8

Flowchart of Clinical Features, Imaging and Management of Spontaneous Intracranial Hypotension: a Case Report

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Spontaneous intracranial hypotension represents a distinct cause of subdural haemorrhage, the management for which has profound differences compared to traumatic subdural haematoma. We aimed to highlight the classical features, pathophysiology, and management principles of this condition. We report a patient with spontaneous intracranial hypotension who presented with atraumatic bilateral subdural haemorrhage and classic symptoms including orthostatic headache. Based on the clinical evidence, we present a flowchart depicting the pathophysiology, clinical features, imaging findings, and management. The patient's symptoms included orthostatic headache and those of meningeal irritation. Confirmation of diagnosis required magnetic resonance imaging (MRI) brain contrast scan and MR myelogram. For our patient, there was diffuse pachymeningeal thickening on MRI of the brain, and typical features on MR myelogram. An epidural blood patch at the lumbar level using autologous blood produced dramatic clinical improvement in our patient. Surgical drainage of the subdural haematoma was unnecessary. Diagnosis of spontaneous intracranial hypotension requires a high index of suspicion and careful investigation. It is imperative for neurosurgeons to recognise this condition and its pathophysiology, in order to provide the best care and obviate any unnecessary surgical drainage.

Osimertinib with Ventriculoperitoneal Shunt for Hydrocephalus Caused by Brain Metastases from Lung Cancer: a Case Report

P 2.9

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Lung cancer is the commonest cause of brain metastases. Despite recent chemotherapeutic advances, brain metastasis with hydrocephalus remains a severe condition. Herein, we present a treatment strategy for hydrocephalus caused by brain metastases from epidermal growth factor receptor (EGFR)-positive lung cancer, using ventriculoperitoneal shunt and osimertinib. We also review the literature on the mechanisms and efficacy of these treatments. Our patient had remarkable clinical and radiological improvement within 1 week of treatment by osimertinib and ventriculoperitoneal shunt. Ventriculoperitoneal shunt has been shown to improve symptoms and control intracranial pressure in patients with brain metastases. Osimertinib is a third-generation tyrosine kinase inhibitor that targets specific mutations (L858R and T790M) of the EGFR gene with better penetration of the blood brain barrier. For selected patients with hydrocephalus caused by brain metastases from EGFR-positive lung cancer, the combination of osimertinib and ventriculoperitoneal shunt can effectively alleviate symptoms and may prolong progression-free survival.

Subgaleal Collection in a 34-Year-old Autistic Man with Osteogenesis Imperfecta: a Case Report

P 2.10

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A 34-year-old man with a background of autism and osteogenesis imperfecta (OI) type 1b underwent burr hole drainage due to acute on chronic subdural haemorrhage with midline shift. A scalp swelling soon developed postoperatively over 2 to 3 months, expanded to such a size that required aspiration. Postoperative magnetic resonance imaging revealed a chronic/subacute subgaleal collection at vertex, which was T1 and fluid-attenuated inversion recovery hyperintense, measuring 11.3 × 5.8 × 3.4 cm (transverse × anteroposterior × craniocaudal). The massive subgaleal collection appeared after burr hole drainage. The patient was under round-the-clock care, caregivers reported no injuries, and no skull fractures were detected. The patient had a history of attention-seeking behaviour, including hitting his head against the wall; this was likely the cause of the subdural haemorrhage, but unlikely to account for the scalp swelling. In OI, a combination of vascular, blood cell-related, and coagulation factor deficiency can increase bleeding risk. Also, OI is a collagenous disease that may cause scalp layers to loosen, leading to little or no tamponade effect when there is minor bleeding. Scalp haemostasis therefore is important during neurosurgery for patients with OI. Creping the head after operation may also be considered to further reduce the risk of developing haematoma.

Posterior Fossa Decompression with Duraplasty and Tonsillectomy in Chiari Malformation: a Single-centre Experience

P 2.11

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Introduction: Chiari malformation is a neurological malformation described as downward displacement of tonsils through the foramen magnum. Chiari malformation can also be associated with syringomyelia and scoliosis. Left untreated, Chiari malformation can result in marked cerebellar dysfunction and limb weakness. Some studies have shown better clinical outcomes with duraplasty and tonsillectomy. We review our experience of posterior fossa decompression with duraplasty and tonsillectomy treatment for Chiari malformation in this surgical approach.
Methods: Clinical records of patients with Chiari malformation treated in Prince of Wales Hospital, Hong Kong, in the past 20 years were reviewed. The primary outcome was the improvement in symptoms. The secondary outcomes were radiological improvement of the syrinx, tonsillar descent, and scoliosis.
Results: In total, 25 patients were included. Mean follow-up was 11.0 years. Of 22 patients who underwent posterior fossa decompression, 19 (76%) also received duroplasty and tonsillectomy for decompression, 15 (68%) were symptomatic (motor weakness, or cranial nerve deficit, or sensory symptoms) before the operation, and seven (31.8%) were asymptomatic. Twenty (80%) of all patients had syrinx and 11 (44%) of them also had scoliosis. For patients presenting with syrinx on magnetic resonance imaging scan, 17 (85%) improved after operation, whereas three (15%) remained static. Among the symptomatic patients, nine (60%) reported symptom improvement after decompression surgery. Scoliosis remained severe in five (45%) patients, requiring correctional surgery. The overall complication rate was low.
Conclusion: Posterior fossa decompression with duraplasty and tonsillectomy is a safe and efficient operation for Chiari malformation. It may help to improve the syrinx progression and halt the deterioration of scoliosis.

Pure Spinal Epidural Cavernous Haemangioma: a Case Report and Literature Review

P 2.12

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Pure spinal epidural cavernous haemangioma (PSECH) is an uncommon spinal pathology. We report a case of PSECH and review the clinical presentations, radiological findings, and managements of PSECHs. Thoracic PSECHs commonly present with myelopathy and lumbar PSECHs commonly present with radiculopathy. Radiological features of PSECHs can vary, the most common magnetic resonance imaging finding is T1 isointense and T2 hyperintense lesion. Surgical resection is the recommended treatment. In case of subtotal excision, radiotherapy has been suggested by some literature to control tumour growth. Pure spinal epidural cavernous haemangioma is a rare spinal lesion with variable clinical presentation and radiological finding. It is most common in female patients with a predilection in the thoracic spine. No adjuvant therapy is needed for lesion without vertebral destruction after gross total excision.

Endoscopic Management of a Ruptured Symptomatic Arachnoid Cyst: a Case Report

P 2.13

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Arachnoid cyst is usually managed conservatively, unless complicated with bleeding or rupture. We report the management strategy of a complicated arachnoid cyst. A 16-year-old boy presented to our hospital with chronic subdural haemorrhage. The patient was found to have a ruptured left temporal fossa arachnoid cyst. Burr hole drainage was performed. After drainage, the patient presented with recurrent headache, dizziness, and tinnitus. Computed tomography scan showed persistent subdural effusion. Therefore, endoscopic assisted fenestration for ruptured arachnoid cysts was performed to relieve mass effect. Intra-operatively the arachnoid cyst was fenestrated into the basal cistern. Postoperatively, the patient developed transient third nerve palsy, which resolved completely on follow-up. After fenestration, the patient's symptoms gradually improved, and headaches reduce in frequency. Endoscopic-assisted fenestration for ruptured arachnoid cyst allows satisfactory surgical outcome.

Sodium Valproate and Hyperammonaemia: a Single-centre Experience

P 2.14

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Objectives: Sodium valproate is a widely used medication for control and prevention of seizures in a wide range of disorders including epilepsy, brain tumours, and haemorrhagic stroke. Although relatively safe, monitoring of liver function is necessary, and serious adverse effects include valproate-induced hyperammonaemia with encephalopathy. This study aimed to investigate the risk factors for derangement of liver function and hyperammonaemia.
Methods: A total of 176 patients receiving sodium valproate for longer than 1 week were recruited into the study. Dosage, serum valproate levels, liver function, and duration were recorded. Other factors recorded include indication, hepatitis status, and other antiepileptic medications, if any. Results were analysed and stratified according to time.
Results: Sodium valproate use of ≥1 month was associated with an increase in serum ammonia levels. A linear relationship between serum valproate levels and serum ammonia levels was found.
Conclusion: Serum valproate levels and duration are positively correlated with ammonia levels.

Immunoglobulin G4 Disease Mimicking of Chronic Subdural Haematoma: a Case Report

P 2.15

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We report a case of immunoglobulin G4 (IgG4)–related disease mimicking chronic subdural haematoma. An 86-year-old Chinese man presented with sequential visual loss of fluctuating severity. His medical history included asthma, hypertension, and myeloperoxidase-antineutrophil cytoplasmic antibodies–associated crescentic glomerulonephritis. Cerebrospinal fluid showed lymphocytic pleocytosis. Computed tomography and magnetic resonance imaging of the brain revealed features of left chronic subdural haematoma. Temporal artery biopsy and burr hole for dural biopsy revealed features of hypertrophic pachymeningitis with raised IgG4 cells. Serum IgG4 level was elevated. The patient was treated with a course of steroids, which improved the patient's symptoms. Hypertrophic pachymeningitis related to IgG4 disease is a diagnostic challenge requiring both clinical and pathological evidence.

Targeting Proteoglycan Receptor Protein Tyrosine Phosphatase σ Promotes Regeneration of Sensory Axons after Spinal Cord Dorsal Root Injury

P 2.16

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Objective: Traumatic injury to the spinal dorsal root usually always results in permanent sensory deficits. The inhibitory barriers at the dorsal root entry zone (DREZ) could prevent both axonal entry and regeneration in the spinal cord. Chondroitin sulfate proteoglycans (CSPGs) are dominant suppressors in the DREZ and exert inhibition via neuronal receptors including protein tyrosine phosphatase σ (PTPσ). Intracellular sigma peptide (ISP) is a small peptide mimetic of the PTPσ wedge region; it could target PTPσ to relieve inhibition of CSPG. We aimed to verify that ISP promotes morphological and functional recovery after dorsal root injury.
Methods: Adult female Sprague Dawley rats were subjected to unilateral cervical 5 to thoracic 1 dorsal root crush, and ISP or vehicle was administrated daily by subcutaneous injection near the injury site.
Results: Sensory axon regeneration into spinal cord was significantly higher in animals in the ISP group than in those in the vehicle group, without abnormal regrowth on intact sides. Also, ISP promoted primary sensory fibre regeneration across the DREZ delineated by laminin at 4 weeks after injury. We found that BDA-labelled axons were found more frequently in the DREZ in animals in the ISP group. For function recovery testing, animals in the ISP group showed significant recovery of function in the peripheral afferent stimulation, in sensory-motor behavioural tests, and in the electrophysiology test.
Conclusion: Our results show that systemic ISP administration improves morphology and function test results after dorsal root injury.

Facial Nerve Schwannoma along the Course of the Nerve: Case Series and Literature Review

P 2.17

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Facial nerve schwannoma is rare, but is the most common benign facial nerve tumour. The clinical features depend on the segment from which the tumour arises whereas common investigations include imaging and biopsy. The management strategies remain controversial but the top concern is to preserve the facial nerve function and stereotactic radiosurgery is an emerging treatment modality. We report three cases of facial nerve schwannoma in different segments of the facial nerve and review the related literature.

Facial nerve schwannoma should be considered as a differential diagnosis in patients with cerebellopontine angle, temporal and parotid lesions, so that appropriate preoperative planning and counselling can be given.

Early Educational/Occupational Outcome and Post-concussion Symptoms in Adolescents after Mild Traumatic Brain Injury

P 2.18

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Objective: To better understand the impact of mild traumatic brain injury (mTBI) on adolescent patients' early educational/occupational outcome and post-concussion symptoms.
Methods: Patients with mTBI (Glasgow Coma Scale 13-15) aged 16 to 65 years admitted to the neurosurgical ward of the Prince of Wales Hospital from 2011 to 2016 were recruited in this prospective observational cohort study. Patients were divided into two groups: adolescents (16-21 years) and adults (22-65 years). Patients were followed up by telephone interview 2 weeks after discharge to assess whether they had returned to school or work, their educational or occupational performance, and the presence of somatic post-concussion symptoms (headache, vomit, dizziness).
Results: There were 617 (67.6%) out of 913 mTBI patients who had 2-week follow-up, 57 (9.2%) of whom were adolescents. Adolescents who reported post-concussion symptoms were older than those who did not (mean age, 19.9 ± 1.5 years vs 18.6 ± 1.5 years, P=0.002). Of the 617 patients, 508 (82.3%) adults and 54 (8.8%) adolescents were engaged in education/employment and reported their 2-week educational/employment status. Compared with adults, adolescents had a significantly higher ratio of returning to school/work (odds ratio [OR]=2.0, P=0.018) and lower ratio of impaired educational/occupational performance (OR=2.2, P=0.006). Within the adolescent group, students were more likely to return to school than workers to return to work (OR=3.2, P=0.0495). Adolescents with impaired educational/occupational performance were more likely to report post-concussion symptoms (OR=3.2, P=0.044) and headache (OR=4.5, P=0.030) in particular.
Conclusion: Adolescents have better educational/occupational outcome than do adults at 2 weeks after discharge. Both groups have comparable incidences of post-concussion symptoms.

Solitary Plasmacytoma of Frontal Bone: a Case Report

P 2.19

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Solitary plasmacytoma of bone is a malignant proliferation of monoclonal plasma cells localised in the bone in the absence of other features of multiple myelomas. Common sites of involvement include the vertebrae, pelvis, and ribs. The objective of this case report is to discuss management of this rare tumour in the frontal bone. A 35-year-old woman with history of systemic sclerosis and paraproteinaemia presented with a right forehead painless hard swelling. Examination showed a hard mass with some soft component. Computed tomography brain revealed an expansile intradiploic hyperdense mass suspected to be an intraosseous meningioma. Craniectomy for tumour excision was done and the bony defect was repaired with cranioplasty with a three-dimensional mould. Final pathology confirmed plasmacytoma. The skull is an atypical site of solitary plasmacytoma of bone. This case emphasises the need for considering plasmacytoma in the differential diagnosis of a lytic skull lesion.

Effectiveness of Nursing Grand Rounds on Professional Knowledge and Competency Development in Neurosurgical Department

N 1

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Objective: The neurosurgical department at Princess Margaret Hospital, Hong Kong, introduced nursing grand rounds (NGRs) in 2011 to improve nursing development. We aimed to evaluate the effectiveness of these NGRs.
Methods: A cross-sectional study with staff evaluation form on NGRs was designed. Convenience sampling was performed of full-time registered nurses (n=32) in the neurosurgical department during the period of 15 October 2017 to 3 November 2017. There were total 13 questions: 10 questions requiring responses on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree) and three questions requiring opened-ended responses.
Results: The response rate was 100%. The satisfactory mean score was 3.89 with the highest mean score 4 on the sharing on the discussion on disease/procedure and the lowest score of 3.47 on the duration and frequencies of the nursing grand round. The interest and concern on the disease topics are update care plan, the hospital issue, the special situation encountered, and the clinical procedure. The sharing platform provided a discussion period on the topics concerned. Staying overtime for NGRs and difficulty to find suitable timeslot due to uncontrollable ward situation for NGRs are the barriers commented.
Conclusion: The results revealed that there are still obstacles in promoting NGRs in the neurosurgical department, including time limitations and unavoidable interruptions. The results were used to form recommendations and an improvement plan was implemented. Implementing regular timeslots and time alertness minimised overtime. It has also been suggested that enhancing patrols by patient care assistants might reduce interruptions during NGRs. Periodic review is recommended to remove barriers to NGRs and improve the satisfaction of nursing staff on NGRs.

Pilot Study of Neuro-modified Early Warning Score—Early Detection of Deteriorating Neurosurgical Patients

N 2

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Objectives: To investigate the effectiveness of neuro-modified early warning score (neuro-MEWS) in detecting neurological and medical deteriorations.
Methods: A retrospective study of all neurosurgical patients transferred from both adult male (E8) and female (G8) neurosurgical wards to the higher dependency ward (HDU) in Queen Elizabeth Hospital (QEH), Hong Kong, due to change in condition from April to June 2018. Their cause of transfer and the relationship of neuro-MEWS were analysed. The study excluded patients transferred to the HDU for postoperative care of elective operation.
Results: A total of 667 patients (366 male, 301 female) were admitted to QEH neurological department from April to June 2018. Among them, 21 patients (13 male, 8 female) were transferred from the general ward to the HDU owing to conditional change. In all, 17 (81%) patients transferred to the HDU owing to a decrease in Glasgow Coma Scale score, 14 (82.4%) of whom had undergone end of treatment; two (9.5%) were transferred to the HDU owing to increase in neuro-MEWS score; and another two (9.5%) were transferred to the HDU for other reasons, including unsteady gait for emergency operation or respiratory failure for HDU care.
Conclusions: In all, 9.5% extra cases were able to be screened out. The neuro-MEWS can effectively supplement the Glasgow Coma Scale score for early identification of deterioration in neurosurgical patients.

N 3

End-tidal Carbon Dioxide Monitoring after Tracheostomy Tube Replacement or Suspected Tube Dislodgement in the General Neurosurgical Unit in a Regional Hospital in Hong Kong

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Objectives: To promote awareness among nurses of end-tidal carbon dioxide ($EtCO_2$) monitoring for neurosurgical patients with tracheostomy tube replacement or suspected tube dislodgement.
Methods: First, a presentation on tracheostomy tube replacement and capnography monitoring was prepared and included in the neurosurgical nursing orientation programme. Second, all nurses attended a live demonstration and performed a return demonstration of $EtCO_2$ monitoring techniques. Third, a single-page quick reference guide and a teaching video on $EtCO_2$ monitoring were added to the electronic nurse training platform for quick reference and easy retrieval. Finally, a standardised label was created to ensure clear concise documentation of patient respiratory status including $EtCO_2$ after changing of tracheostomy tube.
Results: All nurses were trained in early October 2018. Use of the label and $EtCO_2$ monitoring started in mid-October 2018. The programme raised nursing staff awareness of monitoring neurosurgical patients with a tracheostomy tube. At the time of writing, an evaluation on this programme was scheduled by end of 2018.
Conclusion: $EtCO_2$ monitoring is recommended after tracheostomy tube replacement or whenever suspected dislodgement to ensure safety.

N 4

Doctors' and Nurses' Perceptions on the Use of Richmond Agitation-sedation Scale for Sedation Management in a Neurosurgical Intensive Care Unit

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Objective: Using a validated sedation assessment scale for sedation monitoring and drug titration to achieve a predefined sedation score target enhances communication and unifies sedation practices among members of the healthcare team, facilitates control over sedation administration, and improves patient outcomes. In December 2017, the neurosurgical intensive care unit (ICU) of Queen Mary Hospital, Hong Kong, adopted the Richmond Agitation-Sedation Scale (RASS) with prescription of target RASS score for sedation management. This study investigated doctors' and nurses' perceptions of this practice in the neurosurgical ICU, to reveal whether the practice is successful, and to identify any barriers impairing compliance.
Methods: A questionnaire adopted from a previous Belgian study was distributed to the doctors and nurses in the neurosurgical ICU in September 2018 using convenience sampling. It included 17 items in the form of a 6-point Likert scale to assess the common perceptions on the effects and uses of sedation scales.
Results: The questionnaire was distributed to target participants and they were instructed to return it once completed. At the time of writing, some responses have not been received. The final results are pending.
Conclusion: Compliance with a practice is highly related to the perceptions of the healthcare professionals. By investigating the doctors' and nurses' perceptions on the use of RASS for sedation management, its compliance can be predicted and future improvements can be suggested.

Intra-operative Neurophysiological Monitoring in Paediatric Neurosurgery

N 5

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Introduction: Intra-operative neurophysiological monitoring (IONM) enables continuous monitoring of the functional integrity of neural pathways. Like adults, children are also at risk for neurological injury during a variety of surgical procedures. However, some neurophysiological techniques commonly used in adults may need technical adjustments for use in children with immature nervous systems.
Objective: We aimed to compare the different neurophysiological techniques between adult and paediatric patients, and to examine special problems of application of IONM to paediatric neurosurgical cases and the technical preparation required.
Methods: Our department has performed paediatric surgery requiring IONM since 2013. There are special problems of application of IONM to paediatric patients and are therefore carefully reviewed with literature and peer support. Apart from the common factors affecting the data collection as discussed; a case is shared in detail to illustrate the challenging of monitoring a paediatric case.
Results: A paediatric case requiring IONM was discussed to explore the different neurophysiological techniques between adults and paediatrics. The technical preparation and adjustments were examined. The special problems of application IONM to this case were also reviewed.
Conclusion: Intra-operative neurophysiological monitoring is the gold standard for ensuring patient safety while undergoing neurosurgical operations. Yet, there are still factors and technical difficulties, which make it challenging to perform IONM in paediatric cases. Technical advancements are therefore required to allow monitoring techniques to develop and improve, such that we can strive for better patient outcomes in the near future.

Intra-operative Bulbocavernosus Reflex Monitoring in Tethered Cord Surgery for Paediatric Patients: a Pilot Study

N 6

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Objective: To evaluate the sensitivity and specificity of intra-operative bulbocavernosus reflex (BCR) testing during untethering surgery in paediatric patients to predict postoperative bladder function.
Methods: From 2009 to 2018, intra-operative BCR monitoring was applied in 33 patients (17 male, 16 female, mean age 5.04 ± 13 years [range, 5 months to 15 years]) by electrical stimulation (20-40 mA, single or train-of-four pulses, interstimulus interval 2 ms) to the dorsal penile/clitoral nerve and recorded from bilateral external anal sphincters. Anaesthesia was maintained by propofol and remi-fentanyl or sevoflurane/desflurane, and remi-fentanyl, without neuromuscular blockade. We observed the association between preoperative bladder function and BCR baseline establishment, as well as intra-operative BCR integrity and postoperative bladder function.
Results: The BCR monitoring was successful in 26 patients, and failed in seven cases. Reproducible BCR waveforms were recorded in 25 (96%) patients, and a significant decrease in BCR amplitude was observed in one patient. Overall, there were true-positive results in two, true-negative in 25, and false-positive in six cases. No false-negative results were found. The sensitivity and specificity of BCR monitoring used to predict postoperative bladder function were 100% and 80.65%, respectively, and the negative predictive value was 100%.
Conclusion: The BCR monitoring during untethering surgery in paediatric patients is a feasible method to predict postoperative bladder function.

Specific and Structured Rehabilitation Programme: Neurosurgery Disease-based Integrated Rehabilitation Programme (Posterior Fossa)

N 7

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Objective: To start a clinical pathway with planned rehabilitation in order to facilitate communication and to promote early rehabilitation.
Methods: In 2017, the 'Disease-based integrated rehabilitation programme (posterior fossa)' was endorsed by the Queen Elizabeth Hospital, Hong Kong. It aimed to use a streamlined workflow, to provide a well-structured comprehensive rehabilitation tailored to operated patients with posterior fossa lesions. Multidisciplinary inputs from neurosurgeons, physiotherapists, occupational therapists, speech therapists, and nurses, were obtained. Specific needs for adult patients at different disease stages were assembled in a record form. These include acute phase (preoperative period), acute phase (intubation period), subacute phase (early postoperative period, post-extubation), and rehabilitation phase (late postoperative period). The form serves an early alert and also provides better communication about the rehabilitation progress across disciplines.
Results: From April 2017 to March 2018, a total of 45 patients (19 male, 26 female) were recruited (age range, 17-80 years). Of these patients, 34 underwent elective surgery. Under this programme, 76.5% of the patients received rehabilitation assessment or intervention as early as in the preoperative phase, compared with 63.2% of patients who received rehabilitation 6 months before the programme. The current workflow of the programme will be revisited to facilitate an early initiation of rehabilitation.
Conclusion: In the future, applying the programme to the rehabilitation setting or extending the programme to the rehabilitation phase to promote a continuation of care should be investigated. A rehabilitation programme series should also be considered for patients with different neurosurgical diseases.

Audit on "Care of Patient with Subdural Drain" in Neurosurgical Centres

N 8

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Objective: To evaluate the standard of nursing practice in the selected areas and identify area for improvement on the respective nursing practice.
Methods: The audit was based on the "Standards for Specialty Nursing Services—Neurosurgical Care" Standard No. 9: "Care of Patient with Subdural Drain". A set of audit checklists approved by the Neurosurgical Specialty Core Group was used in this exercise. Seven neurosurgical centres of Hong Kong Hospital Authority hospitals were recruited, including Kwong Wah Hospital, Princess Margaret Hospital, Prince of Wales Hospital, Pamela Youde Nethersole Eastern Hospital, Queen Elizabeth Hospital, Queen Mary Hospital, and Tuen Mun Hospital in the period of 1 March 2018 to 31 August 2018. Nurses were assessed on caring of patients with subdural drain according to the audit checklist and marking criteria.
Results: A total of 66 samples were obtained from the seven hospitals. Overall compliance rate was 99.57%. (range, 97.86%-100%). Five hospitals achieved a 100% compliance rate. The overall compliance rate is similar to the audit result in 2011, with one additional hospital achieving a 100% compliance rate. For the standard criteria, the mean compliance rate was 99.55% (range, 85.71%-100%). For the critical items, the compliance rate was 100%.
Conclusion: The audit allows monitoring of the competency nursing staff and consolidation of standards of nursing practice. Ongoing assessment and monitoring are essential to maintain the competencies on "Care of Patient with Subdural Drain" among nursing staff.

AUTHOR INDEX

Acknowledgements

The Organising Committee would like to extend their gratitude to the following sponsors (in alphabetical order) for their continuing support:

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