

antifungal agents to reduce treatment-associated morbidity and mortality in children with ALL is probably warranted during induction therapy.

## 120 Neuroimages and the Predictors for Neurological Sequelae of Enterovirus Encephalomyelitis

流行性腸病毒腦脊髓炎神經影像及神經系統後遺症預測因子

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**Background:** Since 1998 in Taiwan, enterovirus (EV) 71 epidemics have caused encephalomyelitis and placed a significant burden on parents and physicians.

**Methods:** In this study, we presented clinical manifestations, magnetic resonance (MR) imaging findings and neurological sequelae on epidemic EV-infected patients with neurological encephalomyelitis.

**Results:** Of the 46 patients, 14 presented with neurological sequelae; of them, 3 suffered from complications of mental regression. Predictors of unfavorable neurological sequelae were myoclonic jerks (>4 times/night) and pleocytosis (167/uL) of the cerebrospinal fluid (CSF). Results from viral culture and MR imaging indicated that positive identification of EV71 infection was associated significantly with lesions on MR imaging.

**Conclusions:** Our results show that hand-foot-mouth disease carries a higher risk of neurological involvement and that frequent myoclonic jerks and pleocytosis of the CSF are risk factors for subsequent neurological sequelae. Positive identification of EV71 might be useful as a predictor of lesions in MR imaging.

## 121 Epidemiology and Clinical Manifestations of Pediatric Cerebrovascular Diseases in Northern Regional Teaching Hospital: 5 Years Experience

一北部教學醫院五年內兒童腦血管疾病經驗分享

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**Background:** Childhood cerebrovascular diseases (CVDs) are uncommon. The incidence is about 2.52/100,000 person below 14 years of age. However, the serious complications after CVDs will affect the quality of life. To help early diagnosis, we intend to investigate the epidemiology and clinical manifestations of pediatric CVDs.

**Methods:** Retrospective chart review of child cerebrovascular

disease according the ICD-9 CM in Shuang Ho Hospital was done from July 2008 to December 2103. The age was under the age of 18 treated for cerebrovascular disease. We excluded ICH after head trauma, brain tumor, other non- cerebrovascular malformation such as encephalomalacic cysts.

**Results:** Mean age was 9.04 years old (range: 0-17 years old) and male-to-female ratio was 1.33:1. Main clinical manifestations in ischemia group include seizures (63.6%, 7/11), loss of consciousness (45.4%,5/11), headaches (27.2%,3/11), and focal neurological deficits (18.1%,2/11) while in the hemorrhage group include vomiting (55.6%,5/9), headaches (44.4%,4/9), focal neurological deficits (44.4%,4/9) and seizures (33.3%, 3/9). The most common etiologies in ischemia group was idiopathic (45.4%,5/11) and Moyamoya disease (18.1%:2/11), encephalitis related (18.1%:2/11), thromboembolism (18.1%:2/11) while in the hemorrhage group was: arteriovenous malformations (55.6%; 5/9), cavernomas (22.2%; 2/9), IVH (11.1%; 1/9), and the cause remained unknown in 11.1% (1/9).

**Conclusions:** The epidemiology and risk factors for pediatric cerebrovascular diseases are different from that of the adults. In our experience, the most common etiologies in ischemia group was idiopathic and arteriovenous malformations in the hemorrhage group. Main clinical manifestations in ischemia group are seizures and loss of consciousness while vomiting, headaches, focal neurological deficits in the hemorrhage group. The clinical manifestations above-mentioned are important to alert the pediatrician to intensive following up the clinical course.

## 122 Whether the Spetzler-Martin Grading Scale (SMGS) is Adequate to Children with Intracranial Arteriovenous Malformations (ICAVM)?

患有顱內動靜脈異常的兒童是否適用 Spetzler-Martin Grading Scale?

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**Background:** Intracranial arteriovenous malformation (ICAVM) is a rare and life threatening disease. Clinical presentations of pediatric ICAVMs are variable and unpredictable. The Spetzler-Martin grading scale (SMGS) is a commonly used system for predicting prognoses and guiding therapeutic protocols. However, the application of this system to children is controversial. The purposes of this study were to retrospectively analyze clinical presentations of children with ICAVM and to investigate the relationship between the SMGS and the prognoses of children with ICAVM.

**Methods:** Based on the International Classification of Diseases, 9th revision, Clinical Modification (ICD-9-CM) code 747.81, we retrospectively reviewed 8 children with ICAVMs admitted to a medical center from 1991 to 2012. The primary selection criterion was the diagnosis of the ICAVM, which was not irrelevant to traumatic injury or known coagulopathy. Patients' outcomes were determined based on evaluation records of admission, discharge, and clinic visit 6 months after the ICAVM episode. For purposes of data analysis, outcomes were divided into "1=death", "2=persistent vegetative state", "3=severe disability", "4=moderate disability", and "5=low disability". The relationship between the GOS and SMGS was analyzed using a scatter plot and Spearman's correlation coefficient.

**Results:** A total of 8 patients with at least follow-up 6 months consisted of 4 males (50.0%) and 4 females (50.0%). Their ages ranged from 7 to 15 years, and the mean age was 12.63 years. Common sites of ICAVM nidus included basal ganglia (n=3, 37.5%), and frontal-temporal region (25.0%). 62.5% of patients experienced bleeding on the right side of the brain. 62.5% of patients complained of headache. 62.5% of patients showed loss of consciousness. 37.5% of patients showed generalized seizures. The SMGS were Grade I in 1 patient (12.5%), Grade II in 2 patients (25.0%), Grade III in 2 patients (25.0%), and Grade IV in 3 patients (37.5%). The clinical outcomes for the overall series were 87.5% excellent or good (GOS Score equal or above 4) and only one case dead. The correlation between SMGS and GOS, analyzed by Spearman's correlation coefficient, was insignificant. Treatment, either by SRS or surgery, was irrelevant to the prognosis of patient with ICAVM.

**Conclusions:** ICAVM is a life-threatening disease in children. Headache is a warning sign in this disease. Clinical presentations, including altered level of consciousness and generalized seizures may suggest active bleeding. The use of this system in children with ICAVM should consider patients' age for their good healing ability and neuroplasticity. Treatment, either by surgery or SRS, may be irrelevant to patients' prognoses in this study.

## 123 Prognostic Value of Cerebrospinal Fluid Cytokine Changes in Childhood Encephalitis

腦脊髓液中細胞激素之變化在兒童腦炎的預後價值

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**Background:** Encephalitis is an inflammation of the central nervous system which involves the brain. Without evidence of culture proved pathogen, the mechanism of encephalitis remains unclear. Hypercytokines in the brain, with subsequent brain edema and degenerative changes in the neural cell that may lead to poor prognosis. In the study, we aimed to evaluate the differences of cerebrospinal fluid (CSF) cytokine changes in patients with encephalitis in different outcomes.

**Methods:** Total 73 CSF samplings taken from 69 patients with encephalitis were enrolled. Cytokines were analyzed using the Bio-Plex Cytokine Assay System (Bio-Rad Laboratories, Inc. San Diego, CA, USA). Interleukin (IL)-6, IL-8, IL-10, IL-17, monocyte chemoattractant protein-1 (MCP-1), interferon-gamma (IFN-gamma), regulated upon activation normal T cell expressed and presumably secreted (RANTES) and tumor necrosis factor-alpha (TNF-alpha) were measured. Outcome for participants is defined as poor if children die or have persistent motor functional disability for daily living skills with moderate, severe, or profound learning difficulties. The good outcome group consists of those children with normal intellect, those with mild general or specific learning difficulties, or those with mild physical disability with no significant functional daily living skill impairment. The Mann-Whitney U test was used to compare the age distribution of study-outcome groups. Fisher's exact test was used to compare the observed and expected frequencies of individual parameters in the outcome groups.

**Results:** Outcomes were poor in 10 patients with severe sequels or death. IL-17, IL-8, IFN-gamma and TNF-alpha were close related to the prognosis regardless of pathogens (P<0.05). After adjust of pathogen factors, IL-8 level play a key role as a prognostic factor of central nervous system infection (P<0.001).

**Conclusions:** IL-8 is a pro-inflammatory cytokine which correlated with blood brain barrier function. Increased IL-8 levels in the CSF significantly correlated well with the severity of brain damage caused by encephalitis. It may be useful as a potential biological indicator for neurological prognosis following encephalitis in children.

## 124 Reduction of Carbamazepine-related Allergic Skin Rash through Screening of HLA Genotyping

檢測人類白血球抗原以降低抗癲癇藥物引起之過敏性皮膚紅疹

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**Background:** In terms of anti-epileptic-drugs (AEDs), Steven-Johnson-syndrome (SJS) and toxic-epidermal-necrolysis (TEN), are the most serious though uncommon side effect, while bother most practitioners and patients. In