Clinical characteristics of Hypertensive Encephalopathy in pediatric patients

Purpose: Hypertensive encephalopathy in a rare, but important disease in children. The aim of this study was to verifying the clinical characteristics of hypertensive encephalopathy according to underlying etiologies in children.

Method: We retrospectively analyzed 23 patients diagnosed with hypertensive encephalopathy, from 2000 to 2015 in Department of Pediatrics, Chonbuk National University Children’s Hospital. Eight cases were excluded due to no incomplete data or indefinite neurologic symptoms. Finally, 15 patients were enrolled to this study; we make a comparative study about clinical features and brain MRI findings between renal origin hypertension group and non-renal origin hypertension group.

Results: Average age was 12.1 ± 4.5 yrs, Among underlying disease, we divided two group renal origin: renal artery stenosis (4 patients), APSGN (2 patients), lupus nephritis (1 case), and acute renal failure (1 case) and non-renal group: essential hypertension (5 patients), pheochromocytoma (1 case), and hypothyroidism (1 case). and mean systolic blood pressure was higher on renal group as 172.5±36.9 mmHg than 137.1±11.1 mmHg in non-renal group (P<0.05), Seizure was the most common neurologic symptom (66.6%), and this is more remarkable on renal group than non-renal group (P>0.05). Typical finding of hypertensive encephalopathy: high signal intensity on the parieto-occipital area on T2WI and Flair images in brain MRI was more common on renal group (87.5%) than non-renal group (14.3%, P<0.05),

Conclusion: We concluded that renal group had more severe hypertension and also highly associated parieto-occipital lesion on brain MRI than non-renal etiologies in children.

Keyword : Hypertensive encephalopathy, renal disease, MRI finding

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ICNC-0893  Spontaneous Haemorrhagic Stroke and cerebral arteriovenous malformations and aneurysms in children

Introduction

There are few data about spontaneous haemorrhagic stroke in children in Europe. This retrospective study analyses the clinical presentation, relative frequency of various types of haemorrhage, prevalence of vascular abnormalities and outcome in paediatric haemorrhagic stroke spanning a 10 year period from 2005-2015 in a teaching hospital serving a defined population.

Method

Medical records were reviewed for key words: intracranial or subarachnoid haemorrhage, arteriovenous malformation (AVM) and aneurysm. Patients were included if they had been diagnosed under the age of 21 with haemorrhage or a predisposing vascular abnormality with or without haemorrhage, excluding trauma within 48 hours. Modified Rankin scale was assessed at last follow-up.

Results

There were 91 patients, 61 (54.9%) boys, median age 13.1 (range 0 to 21) years. 54% of patients were diagnosed with intracerebral and 10% with subarachnoid haemorrhage. Of those that bled, the commonest cause of haemorrhage was AVM (50%) followed by arterial aneurysm (14.3) and cavernoma (10%). For the whole group, diagnosis was AVM (45.1%), aneurysm (7.7%), cavernoma (18.7%), tumours (1.1%) and bleeding diathesis (6.6%). Of the survivors, there was no recurrence of intracranial haemorrhage over a median follow-up of 1.4 (range 0-10) years. Rankin was 0 in 48%, 1-2 in 36%, 3-5 in 11% and 6 (death) in 3 (3%; at 1 day, 4 months and 5 years post presentation).

Conclusion

Haemorrhagic stroke was commoner in boys. The most common cause was AVM, with relatively few aneurysms. Mortality and recurrence rate for this hospitalised population were low but there was significant morbidity.

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Stroke in Nigerian children: risk factors and short-term outcomes

Introduction: Childhood stroke adversely affects cognition, functional independence, educational opportunities and the overall quality of life. There are limited reports on the pattern of stroke in African children. Objectives: To determine the pattern, risk factors and short-term outcomes in a cohort of Nigerian children with stroke. Methods: Consecutive new cases of stroke seen in a paediatric neurology clinic over a period of 6 years were evaluated clinically and by neuroimaging studies. All were followed up for a minimum period of 12 months. Results: There were a total of 56 new cases of paediatric stroke; 51 (91%) ischaemic and 5 (9%) haemorrhagic. Age at first stroke ranged from 1 week to 15 years, median 7.25 years. Risk factors identified for stroke were sickle cell disease (SCD) (69.6%), adverse intrauterine/perinatal events (14.3%), meningitis (5.4%), cerebral aneurysms (5.4%), congenital heart disease (CHD) (3.6%) and Moyamoya disease (1.8%). At discharge, only 45 (80.4%) were ambulant. By the end of the first year, 22 (39.3%) children had suffered a recurrence and 17 (30.3%) children had dropped out of school on account of severe motor disability and learning difficulties. Stroke due to SCD was associated with an increased risk of recurrence (p=0.016) and an increased risk of dropping out of school (p<0.001). Conclusion: Two of every three strokes in Nigerian children are due to SCD, with attendant high risk of recurrence, severe motor disability and high school drop-out rates. Institution of primary stroke prevention measures in SCD will significantly reduce the burden of childhood stroke in Nigeria.

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ICNC-0883 Additional corticosteroid treatment improves outcome in pediatric stroke due to focal arteriopathy

Background: Focal cerebral arteriopathy (FCA) accounts for up to 35% of arterial ischemic stroke (AIS) in children, and is the most important predictor of stroke recurrence. The study objective was to compare outcomes for children with FCA treated with combined corticosteroid antithrombotic treatment (CAT) to those receiving antithrombotic treatment (AT) alone. Methods: This multicenter retrospective Swiss/Australian cohort study analyzed consecutive children, aged 1 month-18 years, presenting with first AIS due to a FCA, from 1999-2014. Children with CAT were compared to those treated with AT. Primary outcome was the neurological deficit at 6 months post AIS, as measured by the Pediatric Stroke Outcome Measure (PSOM). Secondary outcomes included resolution of stenosis and stroke recurrence. Results: 73 patients (51% males) were identified, 21 (29%) of whom received CAT. Mean (SD) age at stroke for the entire group was 7.9 years (4.7). Median (IQR) pedNIHSS was 3 (2.0-8.0) in the CAT-group and 5 (3.0-9.0) in the AT-group (p=0.098). Median (IQR) PSOM 6 months post AIS was 0.5 (0-1.5) in the CAT-group, compared to 1.0 (0.5-2.0) in the AT-group (p=0.035). Complete resolution of stenosis at last MRI was noted in 17 (81%) in the CAT-group compared to 24 (59%) in the AT-group (p=0.197). Stroke recurrence occurred in one patient in each group. Conclusion: Corticosteroid treatment appears to provide additional benefit over antithrombotic treatment for improved neurological outcome in childhood AIS due to FCA. Larger prospective studies are warranted to further investigate these differences and understand mechanisms by which steroids modify outcome.

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ICNC-0897  Kinesthetic deficits after perinatal stroke: a KINARM robot study

Background: Perinatal stroke is the leading cause of hemiparetic cerebral palsy. Sensory dysfunction is common and an understudied contributor to disability. The prevalence and severity of kinesthesia (movement sense) deficits are unstudied. Robotic technology can measure such sensorimotor functions in adult stroke but has not been applied to children. We hypothesized that kinesthetic dysfunction occurs in children with perinatal stroke and correlate with stroke type and disability.

Methods: Children 6-19 years with MRI-confirmed, unilateral perinatal stroke (arterial or venous) and symptomatic upper limb disability were recruited from the Perinatal Stroke Project. Healthy controls underwent the same evaluations. Robotic assessment of upper extremity kinesthesia was performed using an exoskeleton device (KINARM). Four parameters were measured with and without vision including initial direction error (IDE, primary outcome), response latency (RL), peak speed ratio (PSR), and path length ratio (PLR). Clinical measures of sensorimotor function (assisting hand assessment (AHA), stereognosis, graphesthesia) were scored.

Results: Forty-three stroke participants (23 arterial, 20 venous, median age 12 years) were compared to 106 controls. Many stroke cases had impaired kinesthesia. IDE was larger in arterial (44.9±13.4⁰) and venous (33.0±11.7⁰) cases compared to controls (19.3±6.8⁰, p<0.001) without vision. Secondary outcomes of RL, PSR, and PLR were also impaired in stroke subjects. Robotic measures correlated with functional disability (AHA, r=-0.48, p<0.05). We saw similar impairments when subjects used vision.

Conclusions: Robotic assessment of kinesthesia is feasible in children with perinatal stroke. Impairment is greatest in arterial lesions and clinically relevant. Limited correction with vision suggests cortical network dysfunction.
ICNC-0909 Identifying research priorities for childhood arterial ischaemic stroke by Delphi consensus process

Background: There is a paucity of data from randomised controlled treatment trials to inform best practice in childhood arterial ischaemic stroke (AIS). The purpose of the study was to identify and plan a secondary prevention AIS trial through use of a West Delphi consensus process.

Methods: The Delphi panel consisted of Australian, New Zealand and European paediatric neurologists with a research or clinical interest in childhood stroke. Three rounds were conducted using a REDCap web based application; the first consisted of open ended questions, the second evaluated agreement for the most important trial, and the third reached final consensus and asked questions about study feasibility and design.

Results: 47 of 70 neurologists responded to the first round of open questions and 8 areas of research for important and feasible trials were identified. The second round asked 43 respondents to rank the three highest rated trials: Aspirin versus aspirin and steroids in focal arteriopathy (trial 1 n=31), (ii) heparin versus aspirin (trial 2 n=6) and (iii) heparin versus aspirin versus modern anticoagulation (trial 3 n=6). The third survey reached consensus among 43 respondents that trial 1 was most important and allowed agreement to be reached about inclusion and exclusion criteria, clinical and neuroimaging data elements and steroid treatment protocols.

Conclusion: The Delphi Consensus Process is an efficient method of identifying and planning paediatric stroke trials. Funding proposals are now being prepared for an international multicentre trial comparing aspirin and steroids to aspirin alone.

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ICNC-0903  Neonatal inflammatory signatures distinguish specific perinatal stroke syndromes

Neonatal inflammatory signatures distinguish specific perinatal stroke syndromes.

Introduction: Perinatal stroke causes lifelong disability. Imaging-defined diseases include neonatal arterial ischemic stroke (NAIS), arterial presumed perinatal ischemic stroke (APPIS), and fetal periventricular venous infarction (PVI). Pathophysiology is poorly understood though placental inflammation is suspected in NAIS. We hypothesized that abnormal neonatal inflammatory signatures are recognizable in NAIS but not PVI or controls.

Methods: MRI-defined cases of NAIS, APPIS, and PVI were identified within a population-based research cohort. Neonatal blood spots were obtained for all index cases. The next 3 chronological healthy cases served as controls. Using bioplex technology, a panel of 65 cytokines was quantified with quality assurance performed. Fisher linear discriminant analysis and classification trees explored cytokine patterns across groups to define sensitivity, specificity, positive and negative predictive values (PPV, NPV).

Results: A total of 188 subjects were analyzed (27 NAIS, 6 APPIS, 11 PVI, 132 controls). Cytokines were quantifiable with internal quality control measures including standards testing, decay analysis, and positive controls satisfied. Linear discriminant analysis accurately defined disease classification. PVI and control samples were comparable. NAIS identification was highly accurate: sensitivity 77%, specificity 97%, PPV 83%, NPV 96%. APPIS patterns were distinct from NAIS with similar accuracy (sensitivity 86%, specificity 99%). Classification tree analysis generated similar diagnostic accuracy. Fifteen cytokines demonstrated the most discriminatory power.

Conclusions: Unique inflammatory biomarker signatures are associated with arterial (but not venous) perinatal stroke syndromes. These findings further support an acquired pathophysiology and suggest the possibility of identifying at-risk pregnancies in order to develop prevention strategies.

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