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Poster presentation

Non-invasive intracranial pressure monitoring in African children with infectious encephalopathies: preliminary results

Samson Gwer*[1], Richard Idro[1,2], Michael Kazungu[1], Edwin Chengo[1], Mwanamvua Boga[1], Eric Ohuma[1], Kathryn Maitland[1,3], Tony Birch[4], Robert Marchbanks[4], Fenella Kirkham[5,6] and Charles Newton[1,6]

Address: [1]Centre for Geographic Medicine Research, Kenya Medical Research Institute, Kilifi, Kenya, [2]Department of Paediatrics and Child Health, Mulago Hospital/Makerere University Medical School, Kampala, Uganda, [3]Department of Paediatrics, Imperial College, London, UK, [4]Neurological Physics Group, Department of Medical Physics, Southampton University Hospitals NHS Trust, Southampton, UK, [5]Clinical Neurosciences, Southampton University, Southampton, UK and [6]Neurosciences Unit, Child Health Institute, University of London, London, UK

Email: Samson Gwer* - sgwer@kilifi.kemri-welcome.org

* Corresponding author

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Background

Infectious encephalopathies due to cerebral malaria (CM), Acute Bacterial Meningitis (ABM) and Viral Encephalitis are an important cause of pediatric morbidity in sub-Saharan Africa. Raised intracranial pressure (ICP) occurs in all of these encephalopathies and is associated with an increased risk of death and neurological sequelae. Non-invasive tools for measuring ICP allow for serial and yet safe monitoring and enable early recognition of raised ICP. Such observations could also provide further insight into the pathophysiology of these diseases.

Methods

Children presenting with coma at the Kilifi District Hospital were recruited for non-invasive ICP monitoring using the Tympanic Membrane Displacement Analyser (TMD) and for measurements of right middle cerebral artery blood flow using the Trans-cranial Doppler machine (TCD). Measurements were taken at 0, 4 and 24 hours and thereafter, every 24 hours for a maximum of 72 hours or until the patients regained full consciousness. Measurements were also taken at lumbar puncture (LP), when LP manometry was also performed. Neurological sequelae were assessed for at discharge.

Results

Twenty-two children (15 male) with a median age of 45 (range 12 – 144) months were monitored. Fifteen had CM, 5 ABM and 2 sepsis; *Staphylococcus aureus* and *Salmonella typhi*. Five children died and five had gross neurological sequelae at discharge. The median admission TMD peak to peak (P-P) intra-aural pressure measurements in children who died was 276 (range 241–518)nl compared to 121(58–410)nl in those who survived($p = 0.05$; Mann-Whitney test). A P-P admission reading ≥300 nl was significantly associated with death or neurological sequelae (relative risk 2.5, 95% C.I. 1.2–5.4, $p = 0.04$). A positive correlation was observed between P-P readings and TCD pulsatility indices ($r = 0.423$). Baseline pressure waves were not analysed since most children had abnormal tympanometry.

Conclusion

The TMD appears to be of value in determining prognosis. It may also be useful in monitoring intracranial pressure but more observations are needed to confirm this.