**The tympanic membrane displacement analyser for monitoring intracranial pressure in children.**

**Abstract:**

Raised intracranial pressure (ICP) is a potentially treatable cause of morbidity and mortality but tools for monitoring are invasive. We sought to investigate the utility of the tympanic membrane displacement (TMD) analyser for non-invasive measurement of ICP in children. We made TMD observations on normal and acutely comatose children presenting to Kilifi District Hospital (KDH) at the rural coast of Kenya and on children on follow-up for idiopathic intracranial hypertension at Evelina Children's Hospital (ECH), in London, UK. We recruited 63 patients (median age 3.3 (inter-quartile range (IQR) 2.0-4.3) years) at KDH and 14 children (median age 10 (IQR 5-11) years) at ECH. We observed significantly higher (more negative) TMD measurements in KDH children presenting with coma compared to normal children seen at the hospital's outpatient department, in both semi-recumbent [mean -61.3 (95 % confidence interval (95 % CI) -93.5 to 29.1) nl versus mean -7.1 (95 % CI -54.0 to 68.3) nl, respectively; $P = 0.03$] and recumbent postures [mean -61.4 (95 % CI -93.4 to -29.3) nl, $n = 59$) versus mean -25.9 (95 % CI -71.4 to 123.2) nl, respectively; $P = 0.03$]. We also observed higher TMD measurements in ECH children with raised ICP measurements, as indicated by lumbar puncture manometry, compared to those with normal ICP, in both semi-recumbent [mean -259.3 (95 % CI -363.8 to -154.8) nl versus mean 26.7 (95 % CI -52.3 to 105.7) nl, respectively; $P < 0.01$] and recumbent postures [mean -137.5 (95 % CI -260.6 to -14.4) nl versus mean 96.6 (95 % CI 6.5 to 186.6) nl, respectively; $P < 0.01$]. The TMD analyser has a potential utility in monitoring ICP in a variety of clinical circumstances