

Abstract

Perinatal asphyxia is a major cause of infant mortality in the developing world with 280,000 deaths per year in sub-Saharan Africa alone. Brain injuries resulting from asphyxia can have detrimental effects on brain function, which can negatively impact quality of life in those who survive. Since clinical manifestations are often subtle and the therapeutic window is narrow, investigating effective diagnostics in low-resource hospitals is imperative. We used affordable cranial ultrasonography (cUS) and electroencephalography (EEG) to assess how structural abnormalities and impairments in auditory processing are related to neurodevelopmental outcome in East African newborns. Healthy infants (N=15) and infants diagnosed with asphyxia (N=17) were recruited from urban hospitals in Rwanda and Kenya. Structural images of the brain were obtained by cUS through the anterior fontanel. EEG was recorded at rest and during three auditory stimulation tasks. We expect negative health outcomes to be correlated with enlarged lateral ventricle size, thalamus echodensity and the neural strength reflected in the EEG data. We will compare the prognostic value of these measures, after completing “offline” analyses, with clinical assessment of raw data. This study forms a solid foundation for further work in identifying early clinical markers of brain injury and establishing protocols that are viable in the developing world.