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## Seizure Severity is Correlated With Severity of Hypoxic Ischemic Injury in Abusive Head Trauma

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### **Abstract**

**Objective:** to characterize hypoxic ischemic injury (HII) and seizures in abusive head trauma (AHT). **Methods:** We performed a retrospective study over 4 years of 58 children with moderate or severe traumatic brain injury (TBI) due to AHT. Continuous electroencephalograms (cEEGs) and magnetic resonance images (MRIs) were scored. **Results:** Electrographic seizures (51.2%) and HII (77.4%) were common in our cohort. Younger age was associated with electrographic seizures (no seizures: median age 13.5 months, IQR 5-25 months vs seizures: 4.5 months IQR 3-9.5,  $p=0.001$ ). Severity of HII was also associated with seizures (no seizures: median HII score 1.0 IQR 0-3 vs seizures: 4.5 IQR 3-8,  $p=0.01$ ), but traumatic injury severity was not associated with seizures (no seizures: mean injury score  $3.78 \pm 1.68$  vs seizures:  $3.83 \pm 0.95$ ,  $p=0.89$ ). There was a significant correlation between HII severity and seizure burden when controlling for patient age ( $r_s=0.61$ ,  $p<0.001$ ). The ratio of restricted diffusion volume to total brain volume (RD ratio) was smaller on MRIs done early (median RD ratio 0.03, IQR 0-0.23 in MRIs done within 2 days vs median RD ratio 0.13, IQR 0.01-0.43 in MRIs done after 2 days,  $p=0.03$ ).

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