

A National Review of Amplitude Integrated Electroencephalography (aEEG)

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Dear Sir,

The use of amplitude integrated encephalography (aEEG) has become well integrated into routine care in the neonatal intensive care unit (NICU), to monitor brain function where encephalopathy or seizures are suspected.¹ Early aEEG abnormalities and their rate of resolution have clinical and prognostic significance in severely ill newborns with altered levels of consciousness.²

The most common use of aEEG is in infants with neonatal encephalopathy undergoing therapeutic hypothermia (TH). While TH is performed in tertiary centres, local and regional centres play an important role in the diagnosis and initial management of these infants. The Therapeutic Hypothermia Working Group National Report from 2018 reported that 28/69 (40%) of infants requiring Therapeutic Hypothermia were outborn in local or regional units requiring transfer.³ The report also highlighted that early and accurate aEEG interpretation is important in the care of these infants with many seizures being sub-clinical or electrographic without clinical correlation.

We performed a national audit on aEEG in neonatal services in Ireland, surveying 18 neonatal units that are divided into Level 1 (Local), Level 2 (Regional) and Level 3 (Tertiary). One unit was excluded from our study as it provides a continuous EEG monitoring service on a 24-hour basis as part of the Neonatal Brain Research Group.

Our findings showed that while no Level 1 unit had aEEG, it is widely available in Level 2 and Level 3 units [3/4 (75%) and 3/3 (100%)] respectively. With regards to electrode availability, 1/6 (16%) of centres had hydrogel electrodes. This represents a substandard level of care, given that hydrogel electrodes are the standard of care for preterm infants. The responsibility of electrode placement and aEEG set-up lay mostly with nursing staff (3/5 [60%]), with some inter-hospital variability. Interpretation was largely the responsibility of the doctor (4/5 [80%]).

With regards to education, bedside teaching was the baseline standard of education provided by all units, with one unit relying on teaching from the manufacturing company supplying its equipment. Additional education was provided by two level 3 facilities, in the form of didactic lectures and small group tutorials. Of note, one Level 2 unit reported that while they possessed the equipment, the technology was not generally utilised in SCBU for encephalopathic infants due to a lack of staff education.

This study group has previously shown that trainee paediatric doctors in Ireland have poor baseline knowledge of aEEG set-up, use and interpretation, with improvement noted following a structured education programme. Subsequent to this, and in conjunction with the Royal College

of Physicians in Ireland (RCPI) and the Therapeutic Hypothermia Working Group, an online module titled 'aEEG in the NICU' will be launched in 2020. This will allow for a standardisation of aEEG education for neonatal staff nationally.

Accurate use of aEEG is important in the diagnosis and management of neurologically compromised infants. Having highlighted its widespread use in units throughout Ireland, we hope the development of a standardised online education programme will help to educate and empower the neonatal workforce to provide the optimal standard of neurocritical care to newborns nationally.

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