

# Service evaluation of EEG monitoring on neonatal ICU when hypoxic brain injury suspected & Audit of latency to EEG application

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## Introduction

- Diagnosis of neonatal hypoxic brain injury includes EEG (NICE 347). Therapeutic hypothermia is indicated in neonates with hypoxic brain injury as soon as possible after diagnosis, usually within 6 hours of birth (NICE 347).
- Therefore, EEG within 6 hours of birth helps to make the decision on whether therapeutic hypothermia should be initiated.
- In addition to NICE guidance, UCLH uses local guidelines: 'Nicolet EEG and video telemetry [...] should remain in situ until therapeutic hypothermia (if commenced) has completed and baby is re-warmed, or until baby has no clinical or EEG signs'.
- The 24-hours EEG service on neonatal ICU at UCLH is led by SM and supported by trained nursing staff. EEG set-up includes: F4, F3, T4, C4, Cz, C3, T3, O2, O1, ECG and a respiratory monitor.
- Neonatal ICU provides medical care to babies born at UCLH, as well as those born at nearby local hospitals who require intensive care.



## Aims

- To examine the use of EEG and therapeutic hypothermia on neonatal ICU when hypoxic brain injury suspected.
- To audit latency of EEG application against the NICE guidance (EEG most useful if applied within 6 hours of birth).

## Methods

- GK identified 86 babies born Jan 2012 – June 2014 with suspected hypoxic brain injury. KW reviewed their EEG and medical records; their gestational age at birth (day 0) was 35+5-41+6 weeks.

## Results: EEG and hypothermia

### EEG

- All 86 babies had EEG monitoring (range 33-187 hrs)

### Therapeutic hypothermia

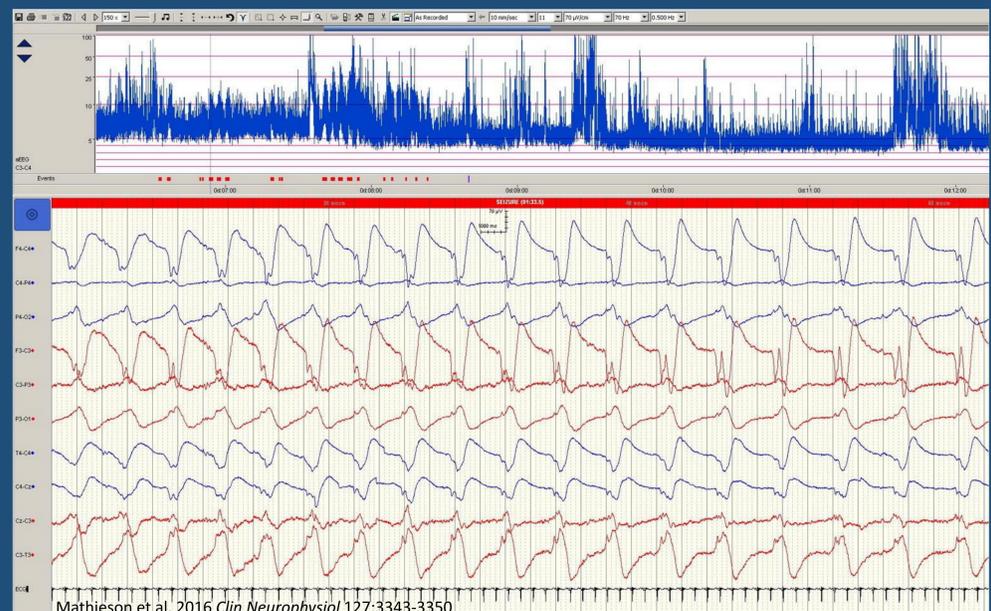
- 77/86 cooled (median 89 hrs of EEG)
- 9/86 not cooled (median 55 hrs of EEG)
  - 4 not cooled because brain injury mild / not indicated
  - 5 only developed signs of having received an insult (e.g. seizures, apnoeas) between day 1 and day 5

## Results: Seizures

- 27/86 had electrographic seizures +/- clinical signs
- In a further 7/86 babies, seizures suspected clinically; EEG ruled out electrographic correlates

### Additional EEG

- 7/86 had EEG reapplied day 7 - 14 for suspected seizures



## Results: Audit of latency to EEG application

- N=81 (babies with evidence of hypoxic injury at birth; 5 babies excluded who developed signs day 1 or later)
  - Latency to EEG application range 1-26 hrs; median 7 hrs; **41% <6 hrs**
- In a subset of 23/81 babies **born at UCLH** with evidence of hypoxic injury at birth
  - Latency range 1-5.5 hrs; median 3 hrs; **100% <6 hrs**

## Discussion

- The EEG service within neonatal ICU at UCLH is valuable. EEG is used routinely to monitor brain function immediately after injury, during hypothermia and during re-warming.
- When babies born at UCLH, 100% compliance with NICE guidance. When babies born at local hospitals and transferred to UCLH are included in the sample, compliance drops to 41% but the median latency to EEG application is only 7 hours (1 hour later than the maximum recommended).

### Audit recommendations and action plan

- This audit will be extended to assess compliance against the local guideline that EEG continues until re-warming of the baby has been completed.
- The full results will be presented at the Women's Health Governance Meeting and the local Neonatal ICU Audit Meeting in February 2017 where a decision will be made whether to close the audit loop.