

**Supplementary/Appendix:****Appendix 1: Patient at risk of seizures categories (EEG monitoring pathway)**

Strong recommendations:

- I) patients with persistently altered mental status after seizures,
- II) patients with acute supratentorial brain injury with altered mental state,
- III) PICU patients without primary brain injury and fluctuating or unexplained alteration in mental status.

Weak recommendations

- IV) patients at risk of seizures that are under pharmacological paralysis and
- V) paroxysmal events suspected by PICU personnel to be seizures.

**Specifically, at CHQ:**

PICU patients that are comatose or intubated and ventilated and cannot be safely lightened for clinical assessment or infants aged less than 2 years where one of the following risk factors is present:

1. suspicion of non-convulsive seizures among encephalopathic patients (with or without concomitant muscle relaxation):
2. Recent clinical seizure or SE with delayed return to baseline conscious state (>60 min after seizure medication); earlier if clinical evidence of continued seizures or clinical concerns
3. Encephalopathy with suspicion of electrographic seizures – especially autoimmune encephalitis
4. Recent stroke (ischemic, haemorrhagic, sinovenous thrombosis = CSVT) with clinical seizures
5. Recent stroke (ischemic, haemorrhagic, sinovenous thrombosis) in children < 5 years of age with or without clinical seizures
6. Known Epilepsy diagnosis and high risk of subclinical seizures
7. Structural brain abnormality with high risk of subclinical seizures
8. ECMO with suspicion of seizures or brain injury
9. Recent cardiac procedure with suspicion of seizures in infants < 2 years of age
10. Suspected electrographic seizures in patients with unexplained altered mental status
11. Intracranial haemorrhage including TBI, SAH, ICH
12. Acute brain injury and prolonged use of muscle relaxants (e.g. drowning, neonatal HIE, recent cardiac arrest)
13. neonatal HIE patients in PICU for other reasons within 5 days of their acute insult
14. Acute supratentorial brain injury with altered mental state (moderate/severe TBI (accidental or NAI), CNS infections, recent neurosurgical procedures, brain tumours, HIE, sepsis associated encephalopathy)

**Appendix 2: Data collection parameters and source**

Table 3. Variables and definitions

Variable	Definition	Data collection
QEEG		
Seizure (no clinical) certain	≥ 3 QEEG trends indicative of seizure, no observed clinical manifestations	QEEG comment
Seizure (clinical) certain	≥ 3 QEEG trends indicative of seizure, observed clinical manifestations	QEEG comment
Status epilepticus (no clinical) certain	≥ 3 QEEG trends indicative of seizure, lasting > 10 min OR multiple seizures occur per hour making up more than 10 min, no observed clinical manifestations	QEEG comment
Status epilepticus (clinical) certain	≥ 3 QEEG trends indicative of seizure, lasting > 10 min OR multiple seizures occur per hour making up more than 10 min, observed clinical manifestations	QEEG comment
QEEG screened hourly	Bedside clinician has assessed QEEG 1-hour epoch	QEEG comment
Time to seizure recognition QEEG	Date/time stamp of seizure certain comment on QEEG	QEEG comment
Seizure event verified by neurologist	Date/time stamp of seizure confirmed comment on QEEG	QEEG comment
Event confirmed “not seizure” by neurologist	Date/time stamp of Event confirmed “not seizure” comment on QEEG	QEEG comment
EEG		
EEG duration	EEG start and stop date/time	EEG annotation
Seizures present (yes/no)	Clinical or subclinical seizures present on cEEG expert review	EEG annotation
Seizures clinical (yes/no)	Clinical manifestations present on video or annotations	EEG annotation
Seizure duration	Seizure onset and offset	EEG annotation
Seizure duration category	< 1 min 1-5 min > 5 min	EEG annotation
Spatial extension of seizure	focal (≤ 4 unilateral electrodes involved) hemispheric (unilateral but > 4 electrodes involved) generalized/bilateral (bilateral, > 4 electrodes involved)	EEG annotation
Electrographic status epilepticus	a single seizure lasting > 10min or recurrent seizures totalling > 10 min in any 1-h period (hourly seizure burden > 10%)	EEG annotation
Status epilepticus clinical (yes/no)	Clinical manifestations present on video or annotations	EEG annotation
EEG background category	normal or sedated sleep slow and disorganized discontinuous or burst suppression attenuated and featureless	EEG annotation

Time to seizure recognition cEEG	Date/time stamp of seizure annotation on cEEG	EEG annotation
Spike amplitude	average amplitude during electrographic seizures as $\leq 50 \mu\text{V}$ or $> 50\mu\text{V}$ .	EEG annotation
Patient characteristics		
Gender	Male, female	EEG request form
Age	Years, months, days	EEG request form
Primary diagnosis or indication for cEEG	Refractory status epilepticus Encephalopathy with suspicion of electrographic seizures Recent stroke (ischemic, haemorrhagic, sinovenous thrombosis) Epilepsy (history of seizures) Structural brain malformation ECMO and suspicion of brain injury Cardiac procedure and suspicion of brain injury Traumatic brain injury (TBI) Non-accidental injury (NAI) CNS infection (meningitis/encephalitis) Recent neurosurgical procedure (postoperative craniotomy) Brain tumour Hypoxic-ischemic encephalopathy (HIE) Sepsis associated encephalopathy	EEG request form
Primary discharge category/factor for risk of seizures	systemic disease, acute seizures, acute brain injury	Electronic medical record
Time to seizure recognition chart	Date/time stamp of chart entry referencing seizure recognition and/or management	Electronic medical record
Hospital length of stay (LOS)	Date/time of hospital admission and discharge	Electronic medical record
PICU LOS	Date/time of PICU admission and discharge	Electronic medical record
Adverse events	Pressure areas related to EEG electrode placement	Electronic medical record

EEG: electroencephalogram; cEEG: continuously monitored electroencephalogram; QEEG: quantitative electroencephalogram; ECMO: extracorporeal membrane oxygenation; CNS: central nervous system; PICU: paediatric intensive care unit; LOS: length of stay