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This clinical guideline was produced by NECTAR hosted by Newcastle Upon Tyne Hospital Trust. To be used by clinicians in the emergency care of acutely/critically ill children. This guideline represents the views of NECTAR and was produced after careful consideration of available evidence in conjunction with clinical expertise and experience. The guideline does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient.

Post-intubation management of patients with

Convulsive Status Epilepticus

Background

Convulsive Status Epilepticus(CSE) is one of the commonest causes of admission to PICUs in the UK. Longer seizures are more difficult to treat. Status epilepticus is life-threatening and may cause serious neurological sequelae (neuronal death), especially if seizures last > 30 minutes. Refractory status occurs in up to 30% patients and is associated with high morbidity and mortality.

The treatment pathway includes intubation and ventilation for several reasons (see below). Retrospective studies[1,2,] show that 2/3 of cases are extubated and discharged from PICU within 24 hours. It has also been shown that post-extubation, care can be provided in a ward setting once stable[3]. Local extubation would also minimise risks of transfer, prolonged ventilation; and the impact of displacement and hospitalisation on the family. Recently published multi-centre audit of data from 10 Paediatric Critical Care Transport teams in UK showed 35% successful extubation and <5% reintubation in the DGH.[4] And regions with high successful extubation rates had established guidelines. A small review of 22 cases in our region found that 16 patients (73%) were successfully extubated at the referring acute hospital.

Local critical care management of these patients may be required for a number of reasons:

1. Airway control – secretions, patency, decreased level of consciousness
2. To terminate prolonged seizure activity - as per APLS protocol, with use of anaesthetic medications as an anticonvulsant agent.
3. Respiratory failure – possible aspiration
4. Respiratory depression – medication induced, e.g. benzodiazepines
5. To facilitate CT imaging – focal seizures, clinically raised ICP
6. Stabilisation prior to PICU transfer.

Management of status epilepticus - summary

- APLS guidance[5]
- Termination of seizures – in addition to APLS algorithm
    a. Consider giving patient's usual anti-convulsant medications IV if appropriate
    b. Contact Paediatric Neurology for advice if appropriate
- RSI anaesthesia
- Assess the need for CT head
- Consider using short-acting agents for ongoing sedation from the outset e.g. 1% Propofol 2-5mg/kg/hr.
- Manage clinical signs of raised ICP with osmotherapy
- Contact NECTAR for further advice

Indications for CT scan

Some, but not all children with CSE require an urgent CT brain scan. A CT scan may be needed in the following circumstances:

1. Any child with CSE when aetiology is unknown
2. Focal neurological signs including focal seizure
3. Asymmetric or unreactive pupils
4. Clinical suspicion of raised intracranial pressure
5. Reduced conscious level one hour post seizure
6. History of trauma
7. VP/VA shunt in situ
8. Suspicion of abusive head trauma

These indications will trigger separate management interventions in case of underlying pathology.

It is nationally accepted practice for an appropriately selected group of patients with CSE to be managed in the acute hospitals. Careful patient selection and shared decision making involving the local Paediatrician, Critical Care Consultant and the NECTAR Consultant would be required prior the patient being extubated locally.

Post-ictal period

- Most children have some degree of respiratory depression and mixed acidosis with raised lactate and raised PCO_2.
- In the early post ictal phase it may be sufficient to support ventilation with a bag and mask with the child in the recovery position or by insertion of an airway adjunct.
- A large bore NGT may be considered to reduce the risk of aspiration.
- The infusion of anti-convulsant initially commenced to terminate seizures must be completed even after intubation and ventilation.

Criteria for trial of local extubation

Local paediatrician and local critical care consultant may jointly evaluate below criteria and do a sedation hold. Please involve NECTAR in discussions with a conference call about any clinical issues or local logistical/patient safety issues that may significantly affect this process.

- Intubated for
    - airway control with no abnormal/difficult airway
    - hypoventilation
    - febrile convulsion
    - usual/typical seizures

- Requiring minimal ventilatory support and low FiO_2 with normal CXR
- Haemodynamically stable and not requiring vasoactive medications
- No concerns about ongoing seizures
- Not known to have complex/refractory epilepsy
- No concerns about traumatic brain injury
- No signs of raised ICP/meningo-encephalitis/focal neurology/ abnormal posturing and normal CT head when indicated
- No abnormal blood results to explain the seizure (glucose, blood gas, electrolytes)
- No severe neuro-disability causing chronic respiratory/airway issues

NECTAR will activate team if

- Above criteria not met
- Child is not awake enough to extubate within 2 hours
- Child has further clinical seizure activity.

Modifications to pathway for 24hr units in NENC

Patients being managed with status epilepticus in these units, in addition require a seamless transfer to an inpatient Paediatric unit following extubation.

If the clinical criteria are met by patients presenting to the 24hr paediatric unit (QE or NSECH hospital) then it would be appropriate to follow local extubation pathway. The conference call will be used for collaborative decision making. The NECTAR team will aim to mobilise whilst the process of exubation has been commenced locally. The team will assist and facilitate the transfer of the child to an inpatient paediatric bed.

Both teams will work together to ensure that the patient is referred and accepted by the Paediatric team in a timely manner. In rare situations, the NECTAR team may need to divert to a more critically unwell patient in the NENC region. In exceptional situations, a clear alternative plan should be jointly agreed by senior decision makers.

Post extubation care

Local paediatric and critical care teams to determine optimal pathways and environment for safe and consistent management of the child post extubation.

References

1. Davison KE, Cooper S. Management of children intubated for status epilepticus: current practice in West Yorkshire. Arch Dis Child. 2012 Sep;97(9):855. doi: 10.1136/archdischild-2012-302116. Epub 2012 Jun 9. PMID: 22685056.
2. McViety J, Jackman L, Barber R*, et al*. Seizing the opportunity to extubate locally? Archives of Disease in Childhood 2012;97:A145-A146.
3. Behjati S, Jamieson K, Montgomery M, et al. Do paediatric high dependency units in district general hospitals improve patient care? A local review of children presenting with seizures. *Archives of Disease in Childhood* . 2012;97:582.
4. Philip Knight et al Can critical care transport be safely reduced in children intubated during emergency management of status epilepticus in the United Kingdom: a national audit with case–control analysis *Archives of Disease in Childhood* 2024;109:476-481
5. ALSG (Advanced Life Support Group). Available at: https://www.alsg.org

Status Epilepticus in NENC Acute Hospital

Child with CSE intubated for
- airway control
- hypoventilation
- febrile convulsion
- usual/typical seizures

↓

1% Propofol 2-5mg/kg/hr for sedation
(CVS stable patient only)

↓

Are the following statements all **true**

- Minimal ventilatory support, low FiO_2 with normal CXR
- Haemodynamically stable and not requiring vasoactive medications
- No concerns about ongoing seizures
- No signs of raised ICP/meningo-encephalitis/focal neurology/posturing and normal CT head if indicated
- Not known to have complex/refractory epilepsy
- No severe neuro-disability causing chronic respiratory/airway issues
- No concerns about traumatic brain injury
- No abnormal blood results (glucose, blood gas, , electrolytes)

Yes ↙

Stop sedation and attempt extubation

↙ ↘

Local processes for close monitoring until GCS normalising

Child not awake enough to extubate < 2 hours **OR**

further seizure activity **OR** other clinical concern

↑

No ↘

Start morphine and midazolam infusions

Stop Propofol

Call NECTAR