Norfolk and Norwich University Hospitals NHS Foundation Trust

James Paget University Hospitals NHS Foundation Trust

The Queen Elizabeth Hospital King's Lynn NHS Foundation Trust

Joint Trust Guidelines for the Management of Generalised Convulsive Status Epilepticus in Children

A clinical guideline recommended for use

In:	Paediatric Wards, Emergency Department (ED), Theatres, Intensive Care Unit
By:	Paediatric, ED, Anaesthetics staff
For:	Patients with continuous seizures or intermittent seizures with no recovery of conscious level
Division responsible for document:	Women and Children's Services
Key words:	Status Epilepticus, Children, Lorazepam, Midazolam
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If Yes – does the strategy/policy deviate from the recommendations of NICE? If so, why?	No

This guideline has been approved by the Trust's Clinical Guidelines Assessment Panel as an aid to the diagnosis and management of relevant patients and clinical circumstances. Not every patient or situation fits neatly into a standard guideline scenario and the guideline must be interpreted and applied in practice in the light of prevailing clinical circumstances, the diagnostic and treatment options available and the professional judgement, knowledge and expertise of relevant clinicians. It is advised that the rationale for any departure from relevant guidance should be documented in the patient's case notes.

The Trust's guidelines are made publicly available as part of the collective endeavour to continuously improve the quality of healthcare through sharing medical experience and knowledge. The Trust accepts no responsibility for any misunderstanding or misapplication of this document.

Version and Document Control:

Joint Trust Guidelines for the Management of Generalised Convulsive Status Epilepticus in Children

Version Number	Date of Update	Change Description	Author
1.1	27/05/2020	Became a joint guideline for 3 trusts	Dr M Win, Dr B Mukhtyar, Dr R Arora, Dr D Easby
1.2	09/02/2022	Reviewed, no changes	Dr M Win, Dr B Mukhtyar, Dr R Arora, Dr D Easby

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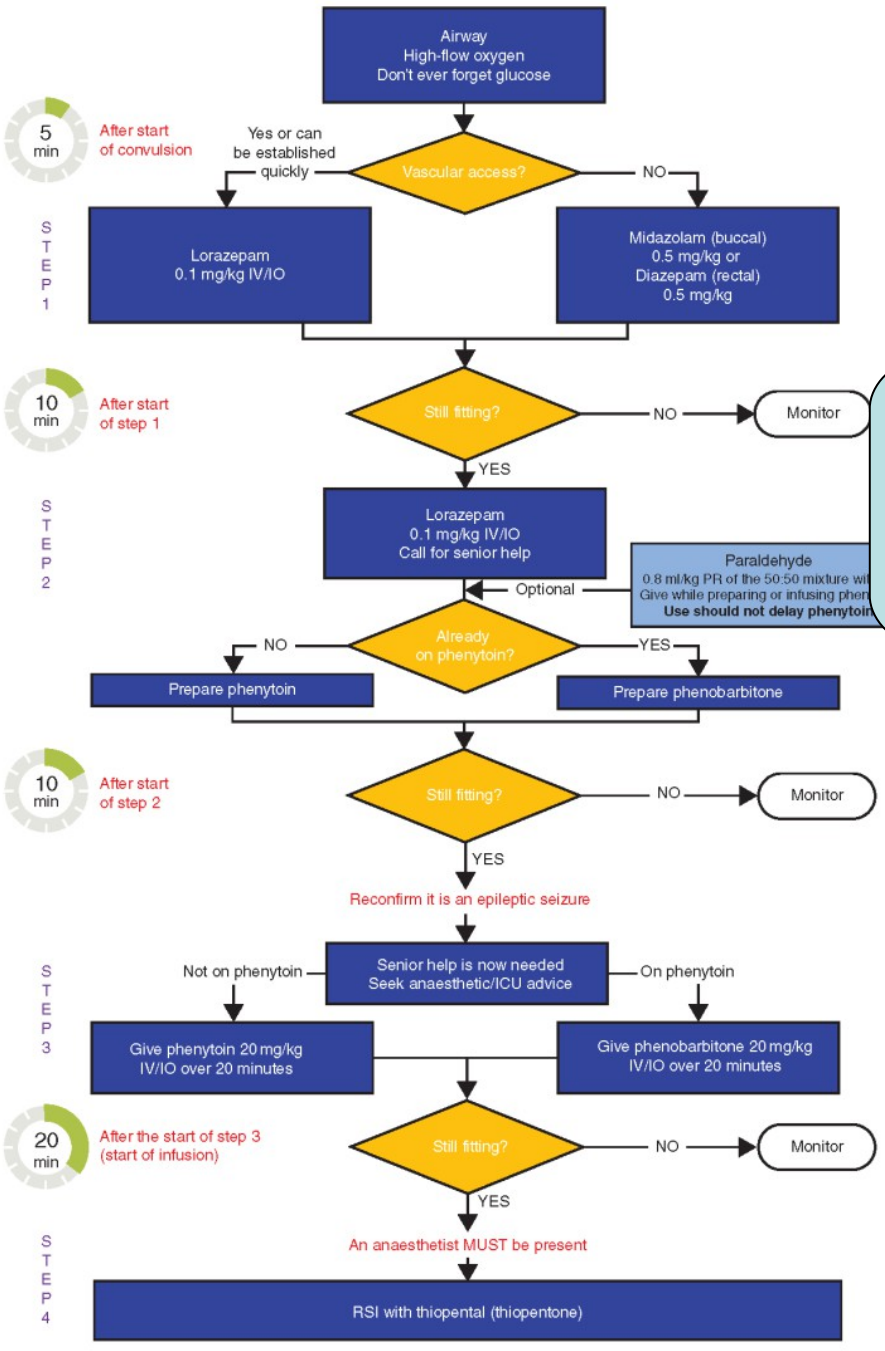
Quick reference guideline (as per APLS 2017)



IV Midazolam 0.05-0.2mg/kg
Dilute 1:1 saline
1yr – 10kg = 0.5-2mg
2yr – 12kg = 0.6-2.4mg
3yr – 14kg = 0.7-2.8mg
4 yr – 16kg = 0.8-3.2mg
5 yr – 18kg = 0.9-3.6mg

>12yr = 15mg

Figure 9.1 Status epilepticus algorithm. [ICU, intensive care unit; RSI, rapid sequence induction]

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Taken from Advance Paediatric Life Support (APLS) manual
https://www.alsg.org/en/files/APLS/APLS_6e_Manual_updates.pdf

N.B: IV Phenytoin should be given at 20 mg/kg, over 20 min, rate not exceeding more than 1 mg/kg/min, maximum rate 50 mg/minute.

Children (over 1 month and up to the age of 16 years)

1. Assessment

- Aetiology:
    - Febrile convulsion
    - Known epileptic + acute illness
    - Meningoencephalitis (see Meningitis guideline if suspected)
    - Metabolic/electrolyte abnormality (glucose, calcium, sodium)
    - Drug, intoxication, poisoning
    - Stroke / bleed
    - Trauma (including Non-Accidental Injury)
    - Secondary to raised intracranial pressure i.e., blocked VP shunt, space-occupying lesion.
- Duration of fitting.
- Nature of fit (generalised or focal).
- Treatment given.

2. Initial management

- Ensure patent airway.
- Give 100% oxygen.
- In addition to blood glucose, it is helpful to take blood samples for electrolytes including sodium, calcium and magnesium and blood cultures (if the child is febrile).
- If blood sugar < 3 mmol, then appropriate ‘ hypoglycaemia screen’ blood tests should be done immediately followed by treating with IV bolus of 2-5 mL/kg 10% glucose. This should be followed by an ongoing infusion with fluids containing glucose solution (10% in infants).
- Stop seizures using the Advance Paediatric Life Support (APLS) (2017) protocol shown above. **Give enough time for drugs to work to avoid respiratory depression from benzodiazepine overdose. DO NOT GIVE MORE THAN 2 DOSES OF BENZODIAZEPINES. ALWAYS CHECK IF ANY DOSES WERE GIVEN PREHOSPITAL.**
- If shocked give 10mL/kg bolus of 0.9% Sodium Chloride and re-assess. Treat causes of shock.
- Consider taking early urine sample for toxicology.
- Maintain normothermia. Treat fever with paracetamol +/- ibuprofen and cooling.
- Ceftriaxone (cefotaxime for age <1 year), acyclovir and clarithromycin are recommended if aetiology is uncertain (i.e., meningo-encephalitis is a possibility) and acyclovir should be used for focal fits of unknown cause.

- If signs of raised intracranial pressure (bradycardia, hypertension, pupillary signs), then consider Mannitol 0.25g/kg and/or 3mL/kg 3% or 2.7% NaCl 3 mL/kg over 10-20 minutes should be given ideally through a central line (aim Na 145 mmol/l). This should be discussed with Children's Acute Transport Service (CATS)/neurosurgery.
- ***Avoid Lumbar puncture in a child with a reduced level of consciousness.***
- Consider CT scan +/- contrast if seizures atypical, focal or aetiology uncertain.
- Treat any underlying causes identified (e.g., poisoning, sepsis, metabolic disturbance).

3. Indications for intubation

- Child in refractory convulsive status epilepticus after completion of IV phenytoin/ IV phenobarbitone.
- Airway compromised at any time.
- Hypoxia.
- Glasgow coma score remains <8.
- To establish neuroprotection (CO2 control) in a child requiring a CT scan and pending results.

4. Management of the child requiring intubation

- Rapid sequence induction with thiopentone and suxamethonium (if no hyperkalemia, myopathy or kidney injury).
- Insert Nasogastric tube (NGT) or Orogastric tube (OGT) if not already in situ. Place on free drainage.
- Initiate infusions of morphine and midazolam once Endotracheal tube (ETT) in situ (use CATS drugs calculator).
- N.B. Midazolam IVI is useful as an anticonvulsant.
- If seizures continue consider further administration of thiopentone in discussion with Paediatric Consultant Anaesthetist and Paediatric Consultant.
- In collaboration with on call Paediatric Consultant - IV Levetiracetam 10mg/kg, max dose 2.5g may be considered.
- CATs can be contacted for advice about ongoing management where seizures not stopping following intubation.
- Administer IV fluids at 60% maintenance, monitor urine output.

5. Transport considerations

Not all children who require intubation (particularly those intubated for temporary respiratory depression after benzodiazepines) will require transfer to a Paediatric Intensive Care Unit (PICU). Child should be discussed between Paediatric Consultant, Paediatric Anaesthetist and where relevant Adult Critical Care Consultant to decide if they can safely remain at NNUH to be woken up after a short period of stabilisation/monitoring in A&E/Critical Care Centre (CCC)/Theatres.

Those who require transfer to PICU should be referred to CATS.

Whilst awaiting CATS retrieval:

- Ventilate to normocarbia (neuroprotection strategies).
- Infusion or bolus drugs for breakthrough seizures (benzodiazepines, thiopentone).
- Monitor glucose.
- Maintain normothermia.
- Consider mannitol or 3% NaCl if signs of raised intracranial pressure (ICP) (bradycardia, hypertension, pupil changes) and discuss with CATS/Neurosurgery.
- Consider paralysis to assist ventilation and prevent accidental extubation during transport.
- Send copies of any CT scans/X-rays to receiving centre.

Rationale for the recommendations

- For the purposes of this guideline the definition of status epilepticus is: a seizure, or series of seizures during which consciousness is not regained, that lasts for at least 5 minutes (**5**).

Clinical audit standards

Standards to be audited every 3 years:

- Was a blood sugar measurement done at the commencement of the Status Epilepticus protocol in the hospital? Expected standard 100%.
- No more than 2 doses of Benzodiazepines in appropriate doses administered. Expected standard 100%.

Audit results to be submitted to Women and Children's Division Governance meeting for review.

Summary of development and consultation process undertaken before registration and dissemination

The guideline was drafted by the authors listed, who are agreed on the final content During its development it was circulated for comment to: Dr Mary-Anne Morris (Chief of Services, Paediatrics, NNUH), Dr S Nirmal (Consultant Paediatrician with expertise in Epilepsy/Neurology, JPH), Consultant Paediatricians, ED consultants and Paediatric Anaesthetists at NNUH.

Distribution list/dissemination method

To be placed on the Trust Intranet.

References/ source documents

1. Berg A.; Berkovik, Brodie MJ. Revised terminology and concepts for organisation of seizures and epilepsies: 2005-2009 ILAE commission and classification. *Epilepsia 2010;51:676-685.*

2. Advanced Paediatric Life Support (APLS), Resuscitation Council, UK Sixth Edition 2016.

3. Advanced Life Support Group (ALSG), Blackwell Publishing. Advanced Paediatric Life Support (APLS) Sixth edition Manual update January 2017.

4. Childrens Acute Transport Service (CATS) Clinical Guidelines 2004; http://www.cats.nhs.uk/downloads/CATS_status_epilepticus.pdf

5. NICE guideline CG137: National Clinical Guideline Centre; 'Epilepsies'; The diagnosis and management of epilepsies in adults and children in primary and secondary care.