LRI Children's Hospital

Management of Status Epilepticus

Staff relevant to:	Medical staff caring for Children within UHL Children's Hospital presenting with status epilepticus
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1. Introduction and Who Guideline applies to

This guideline is intended for children presenting with Status epilepticus and are >1 month of age and < 16 years old. This guideline is based on APLS and NICE guidelines.

A) Definition:

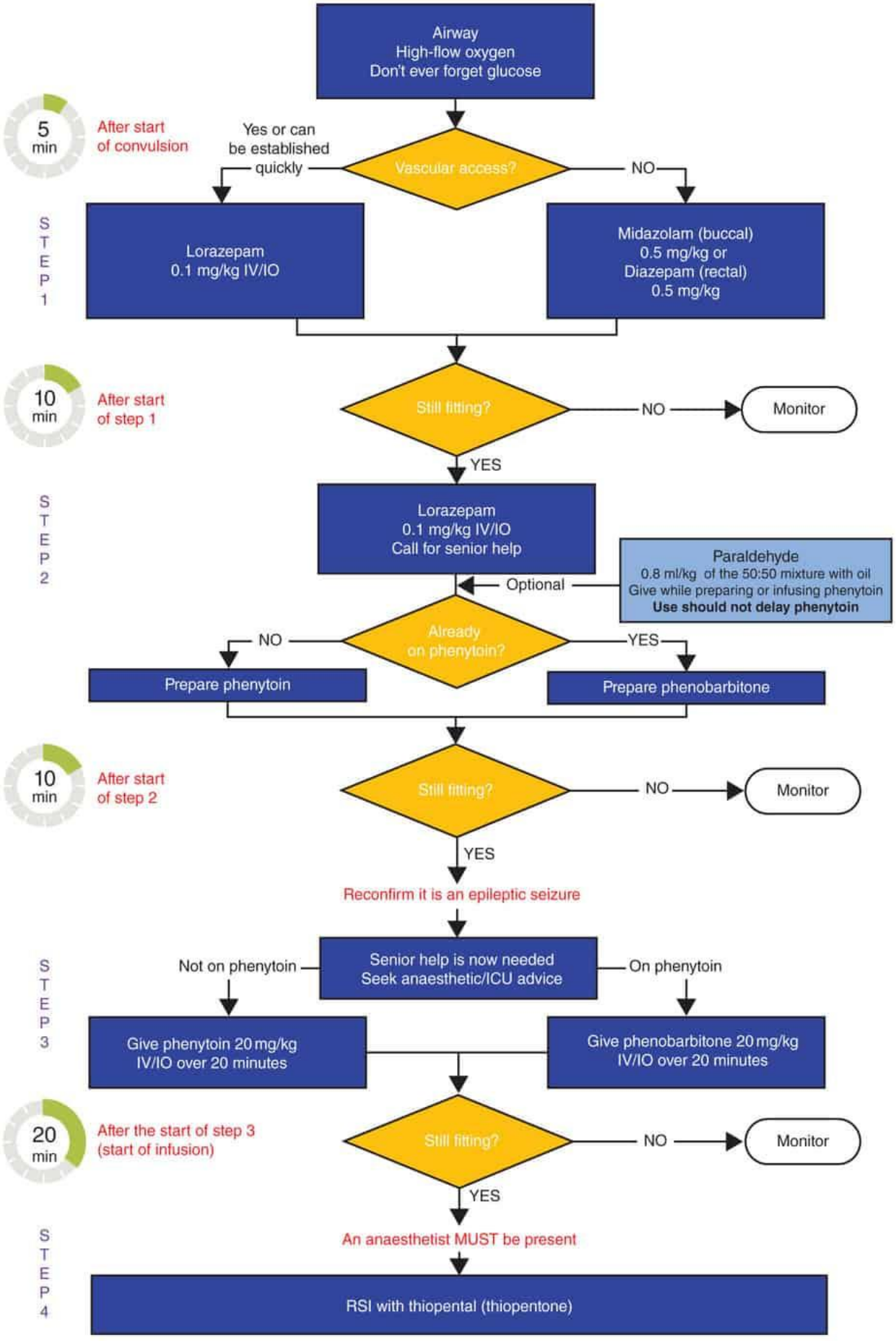
Generalised convulsive status epilepticus is defined as a generalized convulsion lasting 30 minutes or longer or when successive convulsions occur so frequently over a 30-minute period that the patient does not recover consciousness between them.(1)

- Cerebral damage is more likely if seizure is prolonged.

Related Documents.

UHL Basic Life Support C2/2016
UHL Blood glucose monitoring in children C37/2005
UHL Venous access policy B13/2010
UHL Intravenous Medication & fluids policy B25/2010
UHL Children's ED Status Epilepticus in Children C33/2016

Algorithm: Management of Status Epilepticus in Children >1 months of age



2. Primary Assessment:

The main aim of Primary assessment is to minimise systemic complications and identifying treatable causes. Primary assessment to be performed in conjunction with Status Epilepticus algorithm (above).

Airway:

-Ensure patent airway
-Put the child in recovery position
-Consider airway support adjuncts when airway is compromised

Breathing:

-Assess breathing- sign of respiratory distress, respiratory rate, and oxygen saturation
-Give high flow oxygen via non-rebreathe mask
-Monitor Oxygen saturation

Circulation:

-Assess circulation- capillary refill time, heart rate (presence of bradycardia suggests Raised Intracranial pressure), blood pressure (significant hypertension >97th centile indicates possible aetiology)
-Intravenous or Intraosseous access must be established

Table 1: **Blood tests**

Suspecting Meningitis/encephalitis	**Known Epileptic and no signs of meningitis/encephalitis**	**Considering inborn errors of metabolism**
Please refer to UHL Meningitis/Encephalitis guidelines	Blood Glucose, FBC, U+E, calcium, magnesium, blood gas. Consider Anti-convulsants drug levels	Blood Glucose, FBC, U+E, calcium, magnesium, blood gas, blood c/s Consider Plasma Ammonia, Lactate, Serum amino acid, Urine amino and organic acids

-Hypoglycaemia- Give 5 ml/kg of 10% dextrose. (See UHL Hypoglycemia guidelines for children)
-Signs of shock- Give 20 ml/kg rapid bolus of crystalloid.
-Suspected meningitis- Give ceftriaxone 80 mg/kg OD. (See UHL Meningitis guideline for children).
-Give IV aciclovir in suspected encephalitis. (See UHL Encephalitis guidelines for children).
-Signs of raised intracranial pressure. Give mannitol0.5 to 1 g/kg (2.5 to 5 ml/kg of 20% solution) as IV infusion over 20-30 minutes OR 5 ml/kg of 3% Hypertonic saline.
- Lumbar puncture should never be performed in a child with reduced level of consciousness

Disability:

- Assess conscious level (AVPU), pupil size and reaction, and posture
- Pupillary size and reaction (very small pupils suggest opiate poisoning, dilated pupils seen in, atropine, amphetamine, tricyclic antidepressant poisoning)
-decorticate or decerebrate posturing should suggest raised intracranial pressure
- Focal neurological signs

Exposure:

-Temperature – fever suggests febrile convulsion, meningo-encephalitis or poisoning.
-Look for a petechial or purpuric rash.
-Look for signs of trauma.

2.1 Secondary assessment:

History:

- Try to obtain and document an eye witness account of episode if possible.
- Important points in History;
    - Duration of seizure
    - Treatment given
    - History of epilepsy
    - History of temp, recent trauma, poison ingestion
    - Changes in medication, compliance if known epileptic

Investigations:

- Bed side Glucose monitoring in all children
- Bloods:
    - FBC, U&E, LFT, CRP, Blood Gas, Blood Culture.
    - Consider Plasma Ammonia, Lactate, Serum amino acid, Urine amino and organic acids to rule out inborn errors of metabolism.
    - Anticonvulsant levels if a known epileptic on anticonvulsants.
    - Save serum.
    - Consider Toxicology screen depending of clinical presentation and history.
- Imaging:
    - CT scan of brain if suspect NAI or Space occupying lesion or raised intracranial pressure or prolonged focal seizure. (MRI may be needed later to evaluate other neurodevelopmental causes of Epilepsy)
- ECG:
    - All children presenting with prolonged seizures should have an ECG performed to rule out long QT syndrome

2.2 Most common underlying causes:

- Febrile convulsion
- Known epilepsy +/- acute illness
- Metabolic/hypoglycaemia/poisoning
- Meningitis/encephalitis
- Trauma (including NAI)
- Hypoxia

2.3 Complications of Status Epilepticus:

- Airway obstruction
- Cardiac arrhythmias
- Aspiration
- Pulmonary oedema
- Hypoxia
- Hyperthermia
- Hypertension
- Disseminated intravascular coagulation
- Respiratory depression secondary to benzodiazepines

2.4 Specific treatment:

- See flow chart for management of status epilepticus
- Consider IV antibiotics (as per meningitis protocol) /acIclovir after prolonged febrile convulsion without a clear focus of infection[(2).]

2.5 At Discharge:

- Information to be provided to parents: about epilepsy, safety issues, about use of rescue medications-buccal midazolam / PR Diazepam, follow up arrangements and future investigations: EEG, brain imaging
- BLS training for parents and carers.
- Consider parental training for buccal midazolam/PR diazepam prior to discharge[(3)]
- Review of episode & Follow up by paediatrician to be arranged prior to discharge.

2.6 Drugs:

1) Midazolam- buccal

-Only licensed oromucosal midazolam for the treatment of prolonged, acute, convulsive seizures in infants, children and adolescents (from 3 months to <18 yrs of age).

-Administer from pre-filled oral syringe and administer to buccal area thought to be more effective than rectal diazepam [4,5,6]. Both cause similar degree of respiratory depression.

-NB Buccal midazolam should not be used in infants < 3 months of age – use rectal diazepam for this group.

Buccolam unit dose preparation:

Age range	*Dose*	*Label colour*
3-6 months	*2.5 mg*	*Yellow*
>6 month to <1 year	*2.5 mg*	*Yellow*
1 year to <5 years	*5 mg*	*Blue*
5 years to < 10 years	*7.5 mg*	*Purple*
10 years to <18 years	*10 mg*	*Orange*

2) Lorazepam- IV/IO

-The ampoule is 4 milligram /ml.
-Dilute 1:1 with NaCl= 2 milligram/ml
-Dose 0.1 milligram/kg

Weight	Dose	Volume
10	1.0 mg	0.5 ml
12	1.2 mg	0.6 ml
14	1.4 mg	0.7 ml
16	1.6 mg	0.8 ml
18	1.8 mg	0.9 ml
20	2.0 mg	1.0 ml
30	3.0 mg	1.5 ml
40	4.0 mg	2.0 ml

3) Rectal Diazepam (Dose based on age)

Neonates 1.25 - 2.5mg
1month - 2 years 5mg
2-12 years 5 - 10mg
12-18 years 10mg

4) Rectal Paraldehyde

Presented as an unlicensed premixed 50% Paraldehyde/50% Olive Oil Solution
Dose: OF PREMIXED 50% SOLUTION
Neonate: 0.8ml/kg (max 1ml)
1-3 months 1ml
3-6 months 2ml
6-12 months 3ml
1-2 years 4ml
2-5 years 6-8ml
5-12 years 10-12ml
12-18 years 10-20ml

5) Intravenous Phenytoin

- Refer to CH IV monograph for information on dose and administration as without suitable precautions there are significant risks associated with the use of this drug [7]

- Prescribing - Confirm the following is correct
  - Drug availability
  - ECG monitoring available and being used
  - Correct patient weight
  - Previous dosing of phenytoin (may need dose reduction if already on phenytoin)

    - Legible prescription
    - Suitable ongoing dosing (e.g. further part loading doses or a maintenance dose)
- Administration – Ensure the independent checks are undertaken
    - Can be given undiluted – if dilution necessary for smaller doses then only dilute with sodium chloride 0.9% - note the concentration produced on the chart to confirm the correct rate
    - Use an 0.22 micron in-line filter on a dedicated line
    - Seek a plan to assess efficacy/side effects of doses

3. Education and Training

Ensure healthcare professionals managing children with Status epilepticus are APLS trained and is up to date.

4. Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
1) Manage all children who are fitting on arrival as per APLS algorithm (exceptions: children with known history of seizures and a written management plan)	Audit	Consultant Paediatric Neurologist	2 Yearly	Local clinical practice group
2) Take a careful eyewitness history to ascertain possible cause and document in the patient's clinical record	Audit	Consultant Paediatric Neurologist	2 Yearly	Local clinical practice group
3) Check blood glucose of actively fitting children and document in the patient's clinical record	Audit	Consultant Paediatric Neurologist	2 Yearly	Local clinical practice group

5. Supporting References

1. Advanced Paediatric Life Support (APLS)
Advanced Life Support Group (ALSG), Blackwell Publishing.

2. R F M Chin, B G R Neville and R C Scott Meningitis is a common cause of convulsive status epilepticus with fever. Archives of Disease in Childhood 2005; 90:66-69.

3. The epilepsies: the diagnosis and management of epilepsies in children in primary and secondary care. The NICE Clinical guideline CG137. April 2018.

4. McIntyre J, et al. Safety and Efficacy of Buccal Midazolam Versus Rectal Diazepam for Emergency Treatment of Seizures in Children: A randomised controlled trial. Lancet 2005; 366(9481): 205 - 210

5. Mpimbaza A,et al. Comparison of Buccal Midazolam with Rectal Diazepam in the Treatment of Prolonged Seizures in Ugandan Children: A randomized Clinical Trials. Paediatrics 2008; 121 (1): e58 - e64

6. McMullan J, et al. Midazolam Versus Diazepam for the Treatment of Status Epilepticus in Children and Young Adults: A Meta-analysis. Acad Emerg Med 2010; 17 (6): 575 – 582

http://www.alsg.org/en/files/APLS/APLS_6e_Manual_updates.pdf

6. Key Words

Status epilepticus, Convulsive status epilepticus

CONTACT AND REVIEW DETAILS	
Guideline Lead (Name and Title) M Iqbal Consultant Paediatric Neurologist	**Executive Lead** Ruth Radcliffe
Details of Changes made during review: **Added scope** **Updated management algorithm** **2. - Added - aim of primary assessment** **- Added table 1. Blood tests** **- Amended treatment -** Signs of raised intracranial pressure from consider mannitol 0.25g/kg to ***- Give mannitol0.5 to 1 g/kg (2.5 to 5 ml/kg of 20% solution) as IV infusion over 20-30 minutes OR 5 ml/kg of 3% Hypertonic saline*** **- Added advice re- lumbar puncture** **2.6 - added- 4) Rectal Paraldehyde** **- 5) I.V Phenytoin** **2.1 added title secondary assessment** **Added under investigations - consider toxicology** **Terminology change from** vasovagal syncope/collapse or breath holding/reflex anoxic seizures **to *prolonged seizures*** **Added common underlying causes and complications** **Added BLS training at discharge**	