National Policy ☐ National Procedure ☐ National Protocol ☐ National Guideline ☐ National Clinical Guideline ☒

**HSE National Clinical Guideline for:**
**Status Epilepticus: Management in children/adolescents from 1 month to 18 years.**

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| **Topic:** |
| **Status Epilepticus: Management in children/adolescents from 1 month to 18 years.** |
| **National Group:** |
| National Clinical Programme for Paediatrics and Neonatology |
| **Short summary:** |
| The aim of this guideline is to provide an evidence-based approach in the assessment and management of children/adolescents from 1 month to 18 years presenting with status epilepticus. |
| **Description:** |
| Status epilepticus is a medical emergency requiring rapid diagnosis and management. Status epilepticus is the most common paediatric neurological emergency, with significant morbidity and mortality. Management includes prompt administration of appropriately selected anti-seizure medications, identification, and management of any seizure precipitant(s), as well as identification and management of associated systemic complications. Non-adherence to status epilepticus guidelines can affect patient outcomes negatively. This guideline does not apply to the management of infants less than one month with status epilepticus or children with epilepsy and increased seizures from baseline. |

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# HSE NATIONAL CLINICAL GUIDELINE

## TITLE:

# Status Epilepticus: Management in children/adolescents from 1 month to 18 years.

The Department of Neurology and Clinical Neurophysiology @ CHI
National Clinical Programme for Paediatrics and Neonatology
Clinical Design and Innovation
Health Service Executive



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# Contents

## Aim:

The aim of this document is to provide a guideline for the assessment and management of children presenting with status epilepticus.

## Definition of Terms:

| | |
|---|---|
| APLS | Acute paediatric life support |
| GTC | Generalised tonic-clonic |
| IV | Intravenous |
| RCT | Randomised-control trials |

## Target Patient Population

This guideline is aimed for use in children/adolescents aged 1 month to 18 years with status epilepticus in the hospital setting. This guideline does not apply to the management of infants less than one month with status epilepticus or children with epilepsy and increased seizures from baseline.

## Target users

This guide is directed towards healthcare professionals involved in the care of children with status epilepticus in the hospital setting.

## Assessment

Status epilepticus is a medical emergency requiring rapid diagnosis and management. Status epilepticus is the most common paediatric neurological emergency, with significant morbidity and mortality. (1) Management includes prompt administration of appropriately selected anti-seizure medications, identification, and management of any seizure precipitant(s), as well as identification and management of associated systemic complications Non-adherence to status epilepticus guidelines can affect patient outcomes negatively. (2)

Updated APLS guidelines and RCTs are reflected in this updated guideline. The Royal College of Paediatrics and Child Health and the British Paediatric Neurology Association endorse the APLS programme. (3)(4)

Status epilepticus is defined as (5)

1. Prolonged seizure activity (> 5 minutes for generalised tonic-clonic seizure [GTC])
2. Recurrent seizures without recovery of consciousness

Try to establish quickly

- A brief history of description and length of the seizure
- Exact time at onset of seizure, if known
- What drugs have been given so far, including doses, routes and times
- Any temperature or illness before presentation
- Any relevant medical history
- What anti-seizure medications do they usually take, if any
- Does the child have an individual emergency care plan? Then follow that plan rather than this guideline.

## Initial Management

1. Stabilise the patient as per APLS guidelines: Access and manage **A**irway, **B**reathing, and **C**irculation (ABC). (4)
2. Time seizure from the onset
3. Monitor vital signs including temperature
4. Assess oxygenation with continuous Spo2 monitoring, and give oxygen to maintain Spo2 >94%.
5. Check blood glucose- finger prick

   If low blood sugar is < 2.6mmol/L, administer glucose 10% 3ml/kg and re-check sugar in 10 minutes
6. Consider IV access

   Obtaining IV access should <u>not</u> delay starting the treatment algorithm.
7. If obtaining IV access, then take blood for

   • Glucose, urea and electrolytes, calcium, magnesium, blood gas, full blood count, blood cultures

   • Anti-seizure medication levels, toxicology screen (as appropriate)

# Management

## Step One

### Benzodiazepines

- Benzodiazepines should be administered if GTC seizure is ongoing for 5 minutes from onset.
- Check if parents/school/ambulance have administered benzodiazepines pre-hospital.
- **Only 2 doses** of benzodiazepines should be administered in total. This includes doses administered before hospital arrival (home/school/ambulance).
- Obtaining IV access, should not delay treatment. Buccal midazolam is as efficacious as IV lorazepam. (6–8)

#### *Buccal Midazolam (Buccolam®)*

Dose is weight dependent (0.3mg/kg) or use dose bands below

| | |
|---|---|
| *1-3 months:* | 0.3mg/kg (Maximum dose: 2.5mg) |
| *3 - 11 months:* | 2.5mg |
| *1 - 4 years:* | 5mg |
| *5 - 9 years:* | 7.5mg |
| *10 - 17 years:* | 10mg |

#### *IV Lorazepam (Ativan®)*

*IV bolus:* 0.1mg/kg (Maximum dose: 4mg)

Dilute with an equal volume of 0.9% sodium chloride and give as a slow push.

#### *Rectal Diazepam*

*Dose:* 0.5mg/kg (Maximum: 20mg) or use dose band below

| | |
|---|---|
| *1 month - 1 year:* | 5mg |
| *2 - 11 years:* | 5-10mg |
| *12 - 17 years* | 10-20mg |

***Stop and re-evaluate: does the seizure continue five minutes after the first dose of Benzodiazepine. If YES, then continue immediately to the next step.***

## Step Two

### Benzodiazepines

- A second dose may be administered if the seizure is ongoing 5 minutes after the first dose of Benzodiazepine.
- **Only 2 doses** of benzodiazepines should be administered, this includes doses given at home/school/ambulance etc.
- The risk of respiratory depression increases if more than two doses of benzodiazepines are administered. (9)
- The dose of benzodiazepine as per **Step One**
- Continue to access and manage ABC. (4)
- Anticipate and start preparing step three Levetiracetam (Keppra®).
- Contact the paediatric consultant or emergency department Consultant on call

***Stop and re-evaluate. Does the seizure continue five minutes after the second dose of Benzodiazepine? If YES, then continue immediately to the next step.***

## Step Three

Levetiracetam should be administered if seizure continues after 15 minutes from the onset and 2 doses of benzodiazepines have been administered.

### *Levetiracetam (Keppra®)*

- *IV loading dose:* 40mg/kg (Maximum dose: 3g)
- Dilute to 50mg/1mL and infusion can be delivered over 5 minutes in status epilepticus.
- Evidence for the dose and use of Levetiracetam as second-line was demonstrated in two RCT in paediatric population. (10,11)
- A loading dose can be prescribed even if the child/teenager is on regular Levetiracetam (Keppra®**)**
- Continue to access and manage ABC. (4)
- Start preparing third-line treatment.

***Stop and re-evaluate. Does the seizure continue at the end of infusion? If YES, then continue immediately to the next step.***

## Step Four

*Phenytoin Sodium*

- *Intravenous loading dose:* 20mg/kg (Maximum dose:2g)
- ***Administer in accordance with local drug administration policy in use***
- Needs large IV cannula due to extravasation risk and continuous cardiac monitoring
- Evidence for the dose and use of Phenytoin as third-line was demonstrated in two RCT in paediatric population. (10–12)
- Continue to monitor ABC. (4)
- Start preparing fourth-line treatment.
- Contact the intensive care unit/anaesthetic on-call.
- Contact the IPATs team to discuss transfer to PICU in CHI.

***Stop and re-evaluate. Does the seizure continue after the end of infusion? If YES, then continue immediately to the next step.***

## Step Five

*Phenobarbitone*

- *Loading dose:* 20mg/kg (Maximum dose: 1g)
- ***Administer in accordance with local drug administration policy in use***
- A meta-analysis demonstrated a 73.4% mean efficacy in status epilepticus. (13) Dosing as used in RCT. (14)
- Continue to monitor ABC. (4)
- Intensive care unit/anaesthetics should be present and preparing for induction and intubation.
- Update IPATS regarding transfer to PICU in CHI.

***Stop and re-evaluate. Does the seizure continue at the end of infusion? If YES, then continue immediately to the next step.***

## Step Six

- PICU management.
- This will be outlined in a separate PICU protocol.

Other options that can be used after discussion with Consultant Neurologists are the following and maybe be used at different steps.

*Lacosamide*

- *Loading dose:* 10mg/kg
- ***Administer in accordance with local drug administration policy in use***
- Success in 45-78% of patients with status epilepticus, though small numbers (15)
- Oral and IV doses are the same[5]. Therefore, Lacosamide is an option if difficulty to obtaining IV access

*Sodium Valproate*

- *Loading dose: 20mg/kg IV dose (Maximum dose 3g) as per RCT. (12)(14)*
- ***Administer in accordance with local drug administration policy***
- Avoid if hepatic dysfunction, metabolic disease, <2 years old with unknown aetiology, pancreatitis, or thrombocytopenia, pregnancy**.**

## Management after seizures terminate

1. Stabilise the patient as per APLS guidelines (4)
2. Monitor vitals including neuro-observations
3. Take a detailed history and examination
4. Evaluate and treat possible causes of status epilepticus
    - ✓ Know epileptic
    - ✓ Infection/meningoencephalitis
    - ✓ Febrile seizure
    - ✓ Metabolic/electrolyte derangements
    - ✓ Raised intracranial pressure
    - ✓ Stroke/bleed
    - ✓ Drugs/Poisoning
5. Neuroimaging maybe considered
6. Consider the need for maintenance anti-seizure medication

[5] Different solutions but same dosing

## Companion documents

- Link to references
- Link to Literature Search Strategy

## Links to useful websites:

- https://www.rch.org.au/clinicalguide/guideline_index/Afebrile_seizures/
- https://www.nice.org.uk/guidance/ng217
- https://ep.bmj.com/content/edpract/108/1/43.full.pdf

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# Appendices

## Status Epilepticus Flow Chart