

Introduction:

Convulsive Status Epilepticus (CSE) is one of the most common paediatric neurological emergencies with an incidence of 17–23 episodes per 100,000 children per year

The classic definition described CSE as “a single clinical seizure lasting at least 30 min or repeated seizures over a period of more than 30 min without recovery of consciousness”. This definition and the treatment guidelines have been subsequently revised due to advances in the understanding of CSE over the past decades. CSE is a dynamic state, and increased pharmacoresistance may at least partly be related to rapid internalization of GABAA receptors with ongoing seizure activity leading to progressive impairment of GABA-mediated inhibition.

In 2015, the International League Against Epilepsy (ILAE) described an operational definition that proposed that treatment of CSE may ideally be initiated at around 5 min because at this time point successive failure of the mechanisms responsible for seizure termination and initiation of hyperexcitability mechanisms may become more prominent, leading to prolonged seizures

Early initial benzodiazepine application of the recommended dose with quick escalation to second-line non-benzodiazepine anti-seizure medication using a time-line based algorithm is recommended.

Management:

Initial Stabilization Phase:

This phase focusses on stabilizing the patient by ensuring and supporting adequate circulation, airway, and breathing. Assessment and supplementation of the patient's oxygenation and blood glucose is recommended. IV access as soon as possible is crucial.

Protect Airway – Give High Flow O₂ Face Mask

Continuous Cardiac Monitoring

Check Blood Glucose – Give 2mls/kg 10% Glucose if <4.0mmol/L

First Line Therapy:

Benzodiazepines remain the first line treatment for paediatric patients presenting with CSE.

The route of administration is less important than the timely administration of this line of therapy as the efficacy of benzodiazepines decreases over time during CSE.

Give Lorazepam 0.1mg/kg by IV/IO access if available. For patients without parenteral access give Buccal Midazolam 0.3mg/kg.

Timely administration of first line benzodiazepine therapy is a crucial step in the management of CSE. Patients who receive first-line BZD later than 10 min are at greater risk for death, more likely to require continuous infusion, and have longer CSE duration compared with those who receive first-line BZD within 10 min of SE onset.

Second Line Therapy:

Levetiracetam (Keppra) 40mg/kg IV over 5 minutes (MAX 2.5g)

Dilute the required dose of Levetiracetam to a concentration of 50mg/mL and administer over 5 minutes into a peripheral IV cannula. Compatible infusion fluids: Sodium Chloride 0.9% w/v or Glucose 5% w/v

Ref: Alderhey Children's Hospital Liverpool. Guidelines on the Use of Intravenous Levetiracetam. 04/06/2020 - guidance attached)

Third Line Therapy:

Phenytoin 20mg/kg IV over 20 minutes (MAX 2g)

A 0.2micron filter must be used when giving Phenytoin. Filters included in Status Bag. Phenytoin may be given in an initial dose of 20 mg/kg IV at a rate of 1 mg/kg per minute (maximum rate 50 mg/min). Compatible with Sodium Chloride 0.9%. (Incompatible with Glucose solutions)

(ref: www.uptodate.com accessed 28/10/2020)

(As per Crumlin guidelines. Caution - note maximum concentration guidance in CHI prescribing guidelines.)

Fourth Line Therapy:

Lacosamide (Vimpat) IV over 15 minutes

Intravenous: using Vimpat (lacosamide) 10mg/ml solution for infusion.

Compatible infusion fluids: 100mls Sodium Chloride 0.9% w/v or Glucose 5% w/v

Method of Administration: IV infusion over 15-60 minutes. If given peripherally use a large vein and monitor injection site closely.

Or if already on regular Lacosamide:

Valproate 20mg/kg

Valproate is given in a loading dose of 20 to 40 mg/kg IV (diluted 1:1 with normal saline or 5% dextrose in water)

Contraindications for Valproate - <2 years old or concern for metabolic disorder

If <2 years **and** on regular Lacosamide; use **Phenobarbital IV 20mg/kg**.

Phenobarbital IV 20mg/kg. Max rate: 1mg/kg/min Intravenous: Using Phenobarbital Sodium 60mg/ml or Phenobarbital Sodium 200mg/ml Compatible infusion fluids: Sodium Chloride 0.9% w/v or Glucose 5% w/v, Maximum concentration 20mg/ml Method of Administration: Slow IV injection at maximum rate of 1mg/kg/minute OR IV infusion over at least 20 minutes.

Fifth Line Therapy:

Patients with refractory Status Epilepticus may require rapid sequence intubation. This should be anticipated early and the ICU Anaesthetist should be notified (ext 62251) when a patient presents in CSE.

Consider also the need for:

CT Brain

Antibiotics (Ceftriaxone +/- Aciclovir)

Transfer: Paediatric patients who are intubated will likely require transfer to the Paediatric ICU in Temple Street. To arrange transfer contact the Irish Paediatric Transport Service (IPATS) on 1800 222 378

Known Seizure Patients:

In CUH the paediatric neurology team have complex epileptic children who regularly attend the ED. The paediatric neurology team have created bespoke treatment plans for them. These files are securely protected but can be accessed by:

1. Log onto a networked computer using your / or a CNM2's login details
2. Go to CUH File Shares on desktop>paedstatus folder
3. Print off the relevant plan.
4. Please log off again as your individual access is tracked/recorded

References:

- 1.) Alderhey Children's hospital Liverpool. *Guidelines on the Use of Intravenous Levetiracetam. 04/06/2020*
- 2.) https://www.uptodate.com/contents/management-of-convulsive-status-epilepticus-in-children?search=status%20epilepticus%20in%20children&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1
- 3.) Shann.F Drug Doses ICU, Royal Childrens Hospital Victoria. 16th ed, 2014