Paediatric Clinical Guidelines: Status Epilepticus

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To be reviewed: Autumn 2010

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STATUS EPILEPTICUS

University College Hospital
Paediatric Clinical Guidelines

Diagnosis

- 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 \textsuperscript{1}.

- However, it is usual practice to start anti-convulsive treatment when the episode has lasted 5 or more minutes \textsuperscript{1,3}.

Management

- Anti-convulsive treatment should be started according to the Advanced Paediatric Life Support (APLS) algorithm below \textsuperscript{1}.

- If the patient is febrile, the temperature should be controlled with immediate antipyretics and cooling measures \textsuperscript{1}.

- If transfer to a PICU is required, CATS should be called on 0800 085 0003. CATS Clinical Guidelines 2004 outline the patient management needed prior to transportation (available in the CATS folder in A&E resus and on the ward) \textsuperscript{2}.
APLS Status Epilepticus algorithm

Airway
Highflow O2
Check Glucose

Yes

Vascular access?

No

Lorazepam
100 micrograms/kg PO/IO

10 minutes

Yes

Midazolam (buccal) see below
(1st line unless previous allergy)

No

Diazepam (rectal) see below

Vascular access?

Lorazepam
100 micrograms/kg PO/IO

10 minutes

Yes

Phenytoin 18mg/kg IV/IO over 20 minutes
If patient is already taking phenytoin give phenobarbital 20mg/kg IV/IO over 10 minutes

No

RSI with thiopentone 4mg/kg IV/IO

**Buccal midazolam doses**
- **Neonate** 300 micrograms/kg as a single dose
- **Child 1-6 months** 300 micrograms/kg (max 2.5mg), repeated once if necessary
- **Child 6 months–1 year** 2.5mg, repeated once if necessary
- **Child 1-5 years** 5mg, repeated once if necessary
- **Child 5-10 years** 7.5mg, repeated once if necessary
- **Child 10-18 years** 10mg, repeated once if necessary

**Diazepam rectal doses**
- **Neonate** 1.25-2.5mg repeated after 5 minutes if necessary
- **Child 1 month–2 years** 5mg repeated after 5 minutes if necessary
- **Child 2–12 years** 5-10mg repeated after 5 minutes if necessary
- **Child 12–18 years** 10mg repeated after 5 minutes if necessary

- Ensure that the **correct doses of drugs** are given. If required, the approximate weight of children age 1 – 10 years can be calculated using the APLS formula: Approximate weight (kg) = 2 x [age (years) + 4].
• If no vascular access is available, **buccal midazolam** 0.5mg/kg should be given *unless there has been a previous documented allergy*. Rectal diazepam is the second choice agent.
• Involve **Senior Paediatric help** early from the SpR +/- Consultant.
• The **on call anaesthetist** (bleep 4600) must be called at the latest when starting phenytoin or phenobarbitone infusions.$^{1,3}$

**Management of Status Epilepticus**

**Summary of APLS, CATS and North Central London Epilepsy Network for Children & Young People Guidelines**

**Primary assessment and resuscitation**

**Airway**
• Ensure a **patent airway**.$^1$
• Put the child in the **recovery position**.$^1$
• If the airway is not patent, use an **airway manoeuvre** or **airway adjunct**.$^1$
• **Airway compromise is an indication for intubation**.$^2$

**Breathing**
• **Assess breathing** – signs of respiratory distress, respiratory rate, oxygen saturations, clinical examination of the chest.$^1$
• Give **high flow oxygen** via a non-rebreath face mask to all children.$^1$
• **Hypoventilation** should be supported with oxygen via a bag-valve-mask device and intubation considered. This is not unusually encountered in infants (as abdominal muscle breathers).$^1$

**Circulation**
• **Assess circulation** – pulse rate, blood pressure, capillary refill time, cardiovascular examination.$^1$
• **Hypertension** indicates a possible cause for the convulsion, or more likely is a result of it.$^1$
• **Malignant hypertension** may require treatment (APLS Section 12.7).$^1$
• **Intravenous, or intraosseous, access must be established**.$^1$
• **Blood tests**: glucose BM testing, FBC, U+E, calcium, magnesium, serum glucose, blood gas and blood cultures for suspected meningitis.$^{1,2}$
• **Hypoglycaemia?** Give 5 ml/kg of 10% dextrose. If hypoglycaemia is a new condition, take bloods before giving dextrose according to the hypoglycaemia protocol.$^1$
• **Signs of shock?** Give 20 ml/kg rapid bolus of crystalloid.$^1$
• **Suspected meningitis?** Give ceftriaxone 80 mg/kg od. Give IV aciclovir in suspected encephalitis.$^1$
• **Signs of raised intracranial pressure?** Consider mannitol 0.25 g/kg.$^2$
Disability
- **Assess conscious level (AVPU), pupil size and reaction, and posture** – decorticate or decerebrate posturing in a previously normal child should suggest raised intracranial pressure \(^1\).
- Look for **signs of meningitis** including neck stiffness and a full fontanelle.

Exposure
- **Temperature** – a fever suggests febrile convulsion, meningoencephalitis or poisoning \(^1\).
- Look for a **petechial or purpuric rash** \(^1\).
- Look for **signs of trauma**.

Secondary assessment

Emergency treatment of the convulsion
- After ABC resuscitation and exclusion or treatment of hypoglycaemia, the priority is to **stop the convulsion** according to the APLS algorithm \(^1\).

History taking
- Important points in the history are \(^1\):
  - Duration of fitting
  - Treatment given
  - History of epilepsy
  - Current febrile illness
  - Recent trauma
  - Poison ingestion
  - Last meal
  - Known illnesses.

Ongoing management
- If transfer to PICU is required, call CATS on **0800 085 0003** \(^2\).
- Reassess ABC \(^1\).
- Monitor for respiratory depression post benzodiazepines \(^1,3,4\).
- Regular neuro obs and monitor glucose \(^4\).
- Restrict fluids to 60% of maintenance and monitor urine output \(^1\).
- Insert NG tube to aspirate stomach contents \(^1\).
- Lumbar puncture should never be performed in a child with reduced level of consciousness \(^3\). Consider CT head scan.
- Identify and treat underlying causes, including metabolic disturbances and poisoning \(^1\).

Most common underlying causes \(^3\)
- Febrile convulsion
- Known epilepsy +/- acute illness
- Metabolic / hypoglycaemia / poisoning
- Meningitis / encephalitis
- Trauma (including NAI)
- Hypoxia

Complications of status epilepticus \(^1\)
- Airway obstruction
- Cardiac arrhythmias
- Aspiration - Pulmonary oedema
- Hypoxia - Hyperthermia
- Hypertension - Disseminated intravascular coagulation (DIC)
- Respiratory depression secondary to excess benzodiazepines.

CATS Clinical Guideline

Status Epilepticus

1. Assessment
   • Aetiology
     - Febrile convulsion
     - Known epileptic + acute illness
     - Meningoencephalitis
     - Metabolic/electrolyte abnormality (glucose?)
     - Trauma (including NAI)
   • Duration of fitting
   • Morphology of fit
   • Treatment given

2. Initial management
2.1 Ensure patent airway
2.2 Give 100% oxygen via rebreathing mask
2.3 Check glucose before giving anticonvulsants. Check urea, electrolytes, calcium and magnesium.
2.4 Stop seizures using the APLS protocol shown below. Give enough time for drugs to work to avoid respiratory depression from benzodiazepine overdose.
2.5 Maintain normothermia. Treat fever with paracetamol and cooling. Ibuprofen may be useful.
2.6 Cefotaxime, acyclovir and erythromycin are recommended if aetiology is uncertain (i.e. meningoencephalitis is a possibility) and acyclovir should always be used for focal fits of unknown cause. **N.B. Ceftriaxone is recommended for suspected meningitis at UCH.**
2.7 Consider mannitol 0.25g/kg if signs of raised intracranial pressure.
2.8 Lumbar puncture should never be performed in a child with a reduced level of consciousness.

3. Indications for intubation
3.1 Child in convulsive status epilepticus 20 minutes after commencement of iv phenytoin/iv phenobarbitone
3.2 Airway compromised at any time

4. Management of the child requiring intubation
4.1 Prepare infusions of morphine and midazolam

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4.2 Rapid sequence induction with thiopentone and suxamethonium
4.3 Place NGT if not already in situ
4.4 Initiate infusions of morphine and midazolam once ETT in situ
4.5 If seizures continue consider thiopentone infusion (discuss with CATS consultant on call)
4.6 Give iv fluids at 60% maintenance

5. Transport considerations
5.1 Ventilate to normocarbia
5.2 Infusion or bolus drugs for breakthrough seizures en route (benzodiazepines, thiopentone)
5.3 Monitor glucose.
5.4 Consider mannitol if signs of raised ICP
5.5 Paralysis only if necessary to ventilate or protect airway
5.6 Take CT scans if these have been done.

References

   Advanced Life Support Group (ALSG), Blackwell Publishing.

2. Childrens Acute Transport Service (CATS) Clinical Guidelines 2004
