**Clinical Guideline**

**Status Epilepticus in Children**

**Additional Steps:**
1. Check blood glucose.
   If < 3mmol/L give 2mL/kg 10% glucose IV. Commence infusion. Monitor blood glucose.
2. History and clinical examination
3. Measure temperature
   If ≥ 37.5°C give rectal paracetamol
4. Consider antibiotics/aciclovir IV/IO

**IMMEDIATE IV/IO ACCESS**

- **Lorazepam 0.1 mg/kg IV/IO**
  (Maximum 4mg) over 60 seconds
  OR (if Lorazepam not available)
  **Diazepam 0.3mg/kg IV/IO**
  (Maximum 10mg) over 2-4 minutes

  10 minutes

- **Lorazepam 0.1mg/kg IV/IO**
  (maximum 4mg)
  OR
  **Diazepam 0.3mg/kg IV/IO**
  (maximum 10mg)

  10 minutes

  **Note:** *Do not give more than 2 doses of benzodiazepines. (Including pre hospital dose)*

- **IV/IO access**

**NO IV/IO ACCESS YET**

- **Midazolam 0.5mg/kg BUCCAL**
  (maximum 10mg)
  OR
  **Diazepam 0.5mg/kg PR**
  (maximum 20mg)

  10 minutes

- **IV / IO ACCESS?**

  **NO**

  2nd dose of Midazolam / Diazepam as above

  10 minutes

- **Phenytoin sodium 20mg/kg**
  (maximum 1g) IV/IO over 20 minutes (see separate guideline)
  (monitor ECG & BP)
  OR (If already on Phenytoin)
  **Phenobarbital sodium 20mg/kg**
  (maximum 1g) IV/IO over 10 minutes

- **Consider paraldehyde once phenytoin or phenobarbital commenced**
  (Consultant decision)
  **Paraldehyde PR 0.8mL/kg of ready mixed paraldehyde and olive oil enema**
  (maximum dose 20mL)

- **AND**
  **CALL ANAESTHETIST**

- **Seizure continues at end of phenytoin / phenobarbital infusion?**
  **YES?**

  **Rapid sequence induction with Thiopental sodium 4mg/kg IV/IO**
Status Epilepticus

Definition
A continuous abnormal paroxysmal discharge of neurones. It can be a single continuous seizure, or a series of seizures between which the patient does not regain consciousness, lasting for more than 30 minutes.

Types of status epilepticus:
1. Convulsive (most common) which can be:
   a) Tonic clonic
   b) Clonic
   c) Generalised focal.
2. Non convulsive, which can be:
   a) Absence
   b) Complex partial.

Common causes in children include:
Febrile status epilepticus
Sudden reduction in anticonvulsant medication
Acute cerebral trauma
Idiopathic epilepsy
Bacterial meningitis
Encephalopathy (including Reye’s syndrome)
Poisoning

Investigations
First line include:
- Glucose
- Calcium
- Phosphate
- Magnesium
- Full blood count
- Urea and electrolytes
- Blood gas
- Blood culture (if pyrexial)
- Blood drug concentrations (if on anticonvulsants)

Second line include: (Discuss with registrar)
- Toxicology
- Ammonia
- Liver function test
- Urine analysis
- Metabolic screening
- Clotting screen
- Chest radiograph
- CT scan

Convulsive status epilepticus can be fatal due to:
- Obstruction of airway
- Aspiration of vomit
- Side effects of medicines
- Underlying disease process
Management:
See flow chart on page 1. See Appendix 1 for information about midazolam buccal solution.

Monitor: ECG, blood pressure, pulse oximetry and temperature. There are no essential bloods to perform except a blood glucose measurement. In febrile seizures, bloods should be performed as needed to elucidate the source of the temperature, if there is clinical uncertainty. In afebrile seizures the yield of abnormal results when other electrolytes are tested is very low, unless there is specific reason to suspect a problem (e.g. recent gastroenteritis as a cause of sodium imbalance). Note that vitamin D deficiency is very common in British Asian and Afro-Caribbean children and therefore calcium, magnesium and phosphate should be checked in children from these populations presenting with a first afebrile seizure.

References:
Advanced Paediatric Life Support, The Practical Approach, Fifth edition
Northwest & North Wales Paediatric Critical Care Network; Guidelines for management of generalised convulsive status epilepticus in children

Related Documents:

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<thead>
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<tbody>
<tr>
<td>1. All patients receive anticonvulsants as per guideline</td>
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<td>2. All patients have a blood glucose measured on admission</td>
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Appendix 1: Midazolam Buccal Solution.

Midazolam solution is available in two concentrations: 10mg/2mL and 10mg/mL. It is important that the correct dose, volume and concentration of midazolam is prescribed and administered. Most children were previously treated with midazolam using the Epistatus® brand 10mg/mL.

Wirral Hospital and Wirral CCG now advise the use of licensed buccal midazolam solutions where possible. Midazolam (Buccolam®) 10mg/2mL solution is not licensed in children under 3 months. In such cases supplies of midazolam solution should be sourced from the hospital pharmacy department. In all other cases midazolam (Buccolam®) solution for on-going management of children should be prescribed via the GP.

Midazolam (Buccolam®) is licensed for the treatment of prolonged, acute, convulsive seizures in infants, toddlers, children and adolescents (from 3 months to < 18 years). Use of Buccolam® in adults is off label. Midazolam is a short acting benzodiazepine that offers an alternative to rectal diazepam.

**Availability:** Midazolam (Buccolam®) oromucosal solution, as hydrochloride 5mg/mL. 0.5mL (2.5mg) pre-filled syringe. 1mL (5mg) pre-filled syringe. 1.5mL (7.5mg) pre-filled syringe. 2mL (10mg) pre-filled syringe.

**Dosage and administration:**

The dose of midazolam buccal solution depends on weight and age. Usual doses are:

- **Child under 3 months** dose based on weight (300microgram per kilogram)
- **Child 3 months to 1 year** 2.5mg (0.5mL)
- **Child 1 to 5 years** 5mg (1mL)
- **Child 5 to 10 years** 7.5mg (1.5mL)
- **Child over 10 years and adults** 10mg (2mL)

**For adults,** a second dose may be given 10 minutes later if no response is apparent and the patient is breathing normally. If the patients’ breathing becomes shallow, call an ambulance and do not administer a second dose. **If a response is not seen after a further 5 minutes, call for assistance.**

For children, do NOT give a second dose unless this has been previously agreed with the consultant and parent/carer. If the child’s breathing becomes shallow, call an ambulance and do not administer a second dose. If the child re-fits an ambulance should be called. Ambulance staff may repeat the dose if deemed appropriate.

**What to do if a seizure starts again**

The official guidance states that no more doses should be given in the next 6 hours for children weighing 40kg or less or 12 hours for bigger children and adults (midazolam half-life shorter in young children). Local opinion is that if the seizures stop but the patient experiences further seizures within the following 24 hours requiring drug intervention an ambulance should be called. The maximum recommended dose in 24 hours is 20mg.

Further information about use of midazolam buccal solution is available from:

Jenny Stewart, Paediatric Epilepsy Specialist Nurse, extension 2187 or jennifer.stewart5@nhs.net

Neil Caldwell, Consultant Pharmacist Children’s Services, extension 8052 or neil.caldwell@nhs.net or

Medicines Information Department, extension 5126 or wih-tr.PharmacyMI@nhs.net