

# SEIZURES

Seizures occur in 1-3% of term newborn infants and in a greater proportion of preterm infants. They can be subtle, clonic, myoclonic or tonic

## RECOGNITION AND ASSESSMENT

### Physical signs

- In addition to obvious convulsive movements, look for:
  - apnoea
  - eye fluttering and deviation
  - staring
  - sucking, chewing, tongue thrusting
  - changes in blood pressure and heart rate
  - limb cycling/peddalling
- Perform a detailed examination and neurological assessment

***Infants who have been given paralysing drugs may display only autonomic features, such as changes in blood pressure and heart rate, with or without changes in oxygen saturation***

### Differential diagnosis

- Jitteriness – tremulous, jerky, stimulus-provoked and ceasing with passive flexion
- Benign sleep myoclonus – focal or generalised, occurring only during sleep; EEG normal; resolves by 2 months of age

### Investigations

#### **First line**

- Pulse oximetry
- Blood gas analysis
- FBC, coagulation
- Plasma glucose
- LFT
- CRP
- Serum electrolytes, including  $\text{Ca}^{++}$  and  $\text{Mg}^{++}$ ,  $\text{PO}_4$
- Infection screen, including CSF
- Metabolic screen (plasma ammonia, lactate and amino acids, urine amino and organic acids)
- Cranial USS – if inconclusive or suggestive of haemorrhage, request further imaging

#### **Second line**

If seizures persist or difficult to control and first line investigations normal

- EEG
- MR scan (investigation of choice); CT head if MR scan unavailable or haemorrhage suspected
- Drug screen - maternal consent necessary
- If other signs:
  - congenital infection screen (TORCH)
  - VLCFAs, biotinidase levels
  - Wood's light
- Ophthalmology review

## TREATMENT

- Ensure ABC satisfactory

### Causes

- Treat any underlying cause (e.g. hypoxia, hypoglycaemia, electrolyte abnormalities, infection)
- hypoglycaemia: give glucose 10% 5 mL/kg IV bolus, followed by maintenance infusion
- hypocalcaemia (total Ca <1.7 mmol/L or ionised Ca <0.64 mmol/L): give calcium gluconate 10% 2 mL/kg IV over 5-10 min with ECG monitoring (beware of tissue damage if extravasation: ensure cannula is working well)
- hypomagnesaemia (<0.68 mmol/L): give magnesium sulphate 50% 0.2 mL/kg IM (also use for refractory hypocalcaemic fit)

### **Prolonged fits**

If fits continue for >3 min, recur more than 3 times/hr or are associated with hypoxia:

- Give phenobarbital 20 mg/kg by IV bolus over 20 min
- if no response, give further 10 mg/kg by IV bolus up to twice
- If response good, consider maintenance phenobarbital 4 mg/kg/day 24 hr after loading dose
- if loading dose in excess of 20 mg/kg required, defer maintenance dose for 3-4 days

If no response to phenobarbital after 40 mg/kg:

- Give phenytoin 20 mg/kg by IV infusion over at least 20 min (maximum 1 mg/kg/min) with ECG monitoring
- Give maintenance phenytoin 2 mg/kg by IV infusion every 8 hr

If no response to either phenobarbital or phenytoin:

- Give clonazepam 100 microgram/kg by IV bolus over 5-10 min, once every 24 hr for 2-3 days
- if treatment necessary for more than a few days, eventual withdrawal of clonazepam must be gradual over 3-6 weeks, tapering dosage to avoid risk of withdrawal seizures

If no response to any of above:

- Consider thiopental

### ***Breakthrough fits***

If occasional breakthrough fits occur during maintenance treatment using any of the above agents:

- Consider paraldehyde 0.4 mL/kg PR mixed with equal volume of sodium chloride 0.9%/olive oil, or midazolam (see **Neonatal Formulary**)

### ***Intractable fits***

For intractable fits with no apparent cause:

- Pyridoxine 100 mg IV over at least 5 min, but beware of neurological and respiratory depression following use in true pyridoxine-dependent seizures
- Lidocaine 4 mg/kg (0.4 mL/kg of 1% adrenaline-free lidocaine) over 1 hr IV (see **Neonatal Formulary**)

## **SUBSEQUENT MANAGEMENT**

- Once free of seizures for 5 days, if no need for continued maintenance, stop anticonvulsants
- withdraw most recently added drug first
- except for clonazepam, dosage need not be tapered

### ***Recurrence***

- Consider continued maintenance treatment with phenobarbital if seizures recur during or after withdrawal in infants with following conditions:
  - underlying CNS malformation
  - following severe HIE
  - meningitis
  - initial difficulty controlling fits
  - persisting clinical or EEG abnormalities

## **DISCHARGE POLICY**

- Arrange hearing test
- Outpatient follow-up at 6 weeks
- Long term follow-up for developmental assessment and monitoring of head growth
- No contraindication to vaccinations unless fits secondary to a progressive neurological disorder
- Arrange MR brain scan if not already done, and no cause identified on initial investigations