

## Guidelines For Management of Neonatal Seizures

### Introduction

Most frequent major manifestation of neonatal neurological disorders.

- Usually related to significant illness which sometimes requires specific treatment. Many feel that seizures per se can cause brain injury.
- Repeated seizures lead to hypoventilation and apnoea causing increased CO<sub>2</sub> and decreased O<sub>2</sub> with ischaemic brain injury. Raised CO<sub>2</sub> levels result in raised arterial blood pressure causing abrupt increases in cerebral blood flow predisposing to IVH and haemorrhagic infarction.

### Causes

- HYPOXIC ISCHAEMIC ENCEPHALOPATHY
- CEREBRAL INFARCTION
- TRAUMA
- INFECTION
  - Early:* Group B Strep and E Coli
  - Late:* Toxoplasmosis, Herpes Simplex, Coxsackie B, Rubella, CMV
- DRUG WITHDRAWAL
  - First 3 days to a week. Methadone/Heroin, Sedatives – Hypnotics, Alcohol
- INTRACRANIAL HAEMORRHAGE
  - Usually associated with trauma or ischaemia or both.
  - Intraventricular haemorrhage* Day 1-3. Generalised tonic.
  - Primary subarachnoid* Full term baby, Day2.
  - Subdural* Associated with trauma. Focal seizures
- METABOLIC
  - Hypoglycaemia* Seizures, jitteriness, stupor, hypotonia, apnoea. SGA infants, infants of diabetic mothers
  - Hypocalcaemia* Hyperactive tendon reflexes and clonus  
Jitteriness. Focal seizures, clinically and on EEG
  - Hypo and Hypernatraemia*
  - Hypomagnesaemia +/- Hypocalcaemia*
  - Inborn Errors of metabolism*  
Pyridoxine deficiency. Diagnosis by giving IV pyridoxine and cessation of seizures both clinically and on EEG. BEWARE: In deficiency IV pyridoxine can result in a flat EEG and a completely flaccid, paralysed apnoeic baby and cardiorespiratory collapse.
- DEVELOPMENTAL DEFECTS
- FAMILIAL Seizures occur between 2<sup>nd</sup> – 3<sup>rd</sup> postnatal day. Have 10 –20 seizures a day. Self limiting, resolve by 1-6months of age.
- FIFTH DAY FITS
  - Full term healthy infants. 90% 4<sup>th</sup> to 6<sup>th</sup> day of life. Majority last < 24hours and cease within 15days

Management of neonatal seizures

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## Investigations

Full history and examination

Maternal history – IDDM. Perinatal history – Foetal distress

Blood tests:

Blood Glucose, FBC (PCV), U&E (Ca<sup>2+</sup>, PO<sub>4</sub>, Mg)

Septic Screen – LP

Imaging

CT/MRI/Cranial Ultrasound

EEG

Inconsistent relationship between seizures and EEG changes

Useful: Interictal Period – For prognosis

Difficult to control seizures

Subtle phenomena ? Seizures

Paralysed infant

## Anticonvulsants

**When to treat?**

Seizures persist for longer than 3 minutes

Frequent seizures >3 per hour

Seizures disrupting vital functions

**Which anticonvulsant to use?**

*Phenobarbitone*

Ventilated: 20mg/Kg over 10mins IV Loading dose  
then 5mg/Kg every 5mins (Total 40mg/Kg)

Non ventilated: 2 doses of 10mg/kg up to 12hours apart.

*Phenytoin*

20mg/Kg Loading Dose or 2 separate doses of 10mg/Kg with an interval of more than 20 minutes between them. *This avoids very high blood levels and hence disturbance in cardiac function*

Monitor cardiac rate and rhythm. Give directly into IV line as insoluble in aqueous solution and precipitates in standard IV solutions.

*Clonazepam*

Loading dose of 100-200mcg/kg then 10-40mcg/kg/hr

Causes bronchorrhoea. Monitor airway carefully

Be prepared to intubate if secretions become overwhelming

**Diazepam**

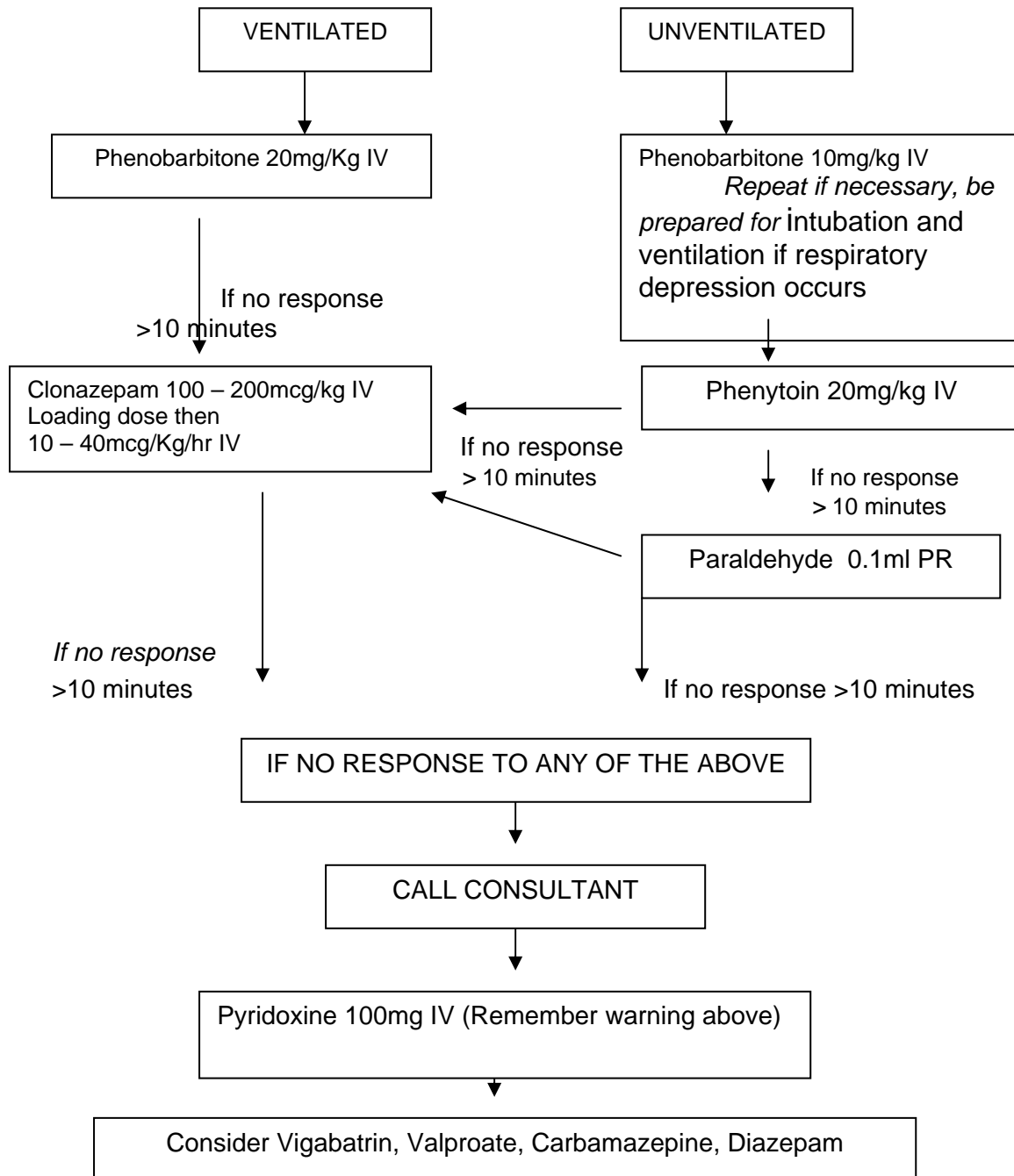
***Rarely used. Never been shown to be more effective than phenobarbitone***

Ineffective maintenance drug as rapidly cleared from brain

If used with barbiturates can cause severe circulatory collapse and respiratory failure.

**Management**

- A). Remember ABC!! Ensure adequate ventilation and perfusion.  
Have equipment for intubation and ventilation available
- B). Identify any treatable causes, especially hypoglycaemia  
2mls/Kg 10% Dextrose
- C). Anticonvulsants:



## *REFERENCES*

NETS Neonatal Handbook: Seizures

Neonatology on the Web: CSMC NICU Teaching Files: Neonatal Seizures, Division of Neonatology, Cedars-Sinai Medical Centre, Los Angeles, California.

Elizabeth Ward Royal London Hospital Neonatal SHO Handbook