Chapter 12

NEONATAL SEIZURES

A seizure in the neonatal period is an emergency. These can occur due to neurological problems like asphyxia, birth injuries or meningitis or due to metabolic problems like hypoglycemia, hypocalcemia and hypo or hypernatremia. Neonatal seizures should be differentiated from spasms of neonatal tetanus.

Learning objectives:
The participants after completing this module should be able to:
1. Identify neonatal seizures
2. Enumerate causes of neonatal seizures
3. Manage neonatal seizures

Common types of Neonatal seizures

1. Generalized or Focal, Tonic or Clonic
   - Repetitive jerking movements of limbs or face
   - Continuous extension or flexion of arms and legs

2. Subtle convulsions
   - Repetitive blinking, eye deviation, or staring
   - Repetitive movements of mouth or tongue
   - Purposeless movement of the limbs, as if bicycling or swimming

Features of spasms due to tetanus

- Involuntary contraction of muscles
- Fists often persistently and tightly clenched
- Trismus, Opisthotonus
- Triggered by touch, light, or sound
- Baby is conscious throughout, often crying with pain

Neonatal seizures may sometimes be confused with Jitteriness which has following features:
- Can be provoked by stimulation, and aborted by gentle restraint
- Are not accompanied by autonomic changes (tachycardia, increased B.P. etc.) or abnormal eye movements
Diagnostic approach:

A detailed history should be taken and examination should be done after initial acute management of the seizure to determine underlying cause.

Treatment

1. First step is resuscitate if needed: Place in the neutral environment and ensure a patent airway, effective breathing and adequate circulation (TABC). Oxygen should be started if required and IV access should be secured and blood samples drawn for complete blood count, blood sugar, serum calcium and electrolytes.

2. Second step: Obtain blood sugar by Dextrostix: If less than 45mg/dl, correct hypoglycemia by a bolus of 4-5 ml/kg 10% dextrose followed by a maintenance infusion of 6-8 mg/kg/min.

3. Third step: Anti convulsant drugs (ACD)

ACD should be given if seizures persist even after correction of hypoglycemia.

Pharmacotherapy for neonatal seizures

1. Phenobarbitone: Drug of choice.

   Initial Dose: is 20 mg/kg IV slowly over 20 minutes

   Repeat dose: If seizures persist after completion of this loading dose repeat dose of phenobarbitone 10 mg/kg may be used every 20-30 min till a total dose of 40 mg/kg has been given.

   *Be careful, and watch for potential respiratory depression with higher doses of phenobarbitone.*

   Maintenance dose: 3-4 mg/kg/day in 1-2 divided dose, started 12 hrs after the loading dose.

2. Phenytoin

   Indication: If maximal dose of phenobarbitone (40 mg/kg) fails to resolve seizures.

   Dose is 20 mg/kg IV over 20 – 30 minutes.

   Caution: It should only be mixed with Saline and not with dextrose as it precipitates in Dextrose.

   Repeat dose of 10 mg/kg may be tried in refractory seizures. The maintenance dose is 5-8 mg/kg/d in 2 divided doses. Oral administration has very erratic absorption so it
should be avoided. Only IV route is preferred and should be discontinued before discharge.

| If total Serum calcium is low (<7mg%), administer IV 10% Calcium gluconate, 2 ml/kg diluted with equal volume of distilled water slowly under cardiac monitoring preferably by an infusion pump. Withhold infusion if HR<100/min. |

**When to discontinue ACD**  
Try to discontinue all medications at discharge if neurological examination is normal. There is no need to taper the ACD.

| **Caution**  
Do not use Diazepam or Midazolam for control of convulsions in neonates |

| Continue supportive care and treat underlying cause e.g. Meningitis |
Flow diagram for management of neonate with seizures

1. Identify and characterize the seizure
2. Secure airway and optimize breathing, circulation and temperature
3. Start O₂ if seizures continue
4. Secure IV access and take samples for baseline investigations including sugar, hematocrit, sepsis screen and calcium, magnesium, electrolytes where feasible
5. If blood sugar < 45 mg/dl, give 5 ml/kg 10% dextrose
6. If seizures continue
7. IV phenobarbione 20 mg/kg over 20 min
   - If no control
   - Rpt phenobarbione 10 mg/kg till a total of 40 mg/kg
8. If seizures continue
9. Give phenytoin 20 mg/kg over 20 min
10. After control of seizures initiate maintenance doses.
11. If seizures are uncontrolled, refer to a higher centre for further management.
VIDEO ON NEONATAL SEIZURES

The facilitator will now show a video on neonatal seizures.
EVALUATION

1. fourteen days old infant weighing 3 kg brought to the SCNU with generalized tonic seizures with refusal to feeds with multiple pustules. What is the probable cause of convulsions and first step in management?

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2. Baby’s blood sugar is 20 mg/dl by dextrose. How will you manage?

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3. Baby continues to have seizures even after correcting hypoglycemia. What anticonvulsant would you use, in what dose and by which route?

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