

Neonatal Seizures

REPUBLIC OF KENYA



MINISTRY OF HEALTH



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KENYA
PAEDIATRIC
ASSOCIATION

KEMRI | Wellcome Trust



Keprecon
Kenya Paediatric Research Consortium

Objectives

- Review the properties of commonly available anticonvulsants; Phenobarbitone, Levetiracetam & Phenytoin
- Illustrate the need for appropriate supportive care during a convulsion

Introduction

- About 4 out of 10 neonates with seizures progress to status epilepticus.
- Timely and correct treatment of seizure is desired
- Higher seizure burden is associated with worse outcome.
- Seizures become more difficult to treat the longer they last.
- Only half of neonates treated with current single anticonvulsant drugs respond to treatment while another 10-20% respond with multiple drugs.

Causes of Neonatal Seizures

Hypoxic ischemic encephalopathy

Commonest cause in above 1500grams

Intraventricular Hemorrhage

Commonest cause below 1500gms

Stroke

Arterial or venous

Acute Metabolic disorders

Hypoglycemia, hypocalcemia, hypomagnesemia

CNS Infections

Meningitis, encephalitis, intrauterine infections

Congenital Brain Malformations

Lissencephaly, holoproncephaly

Definitions

Clonic Seizures

- Rhythmic jerking, consciousness usually preserved. Focal, multifocal or generalised. Often correlate with a structural lesion.

Tonic Seizures

- Extension of upper and lower limbs accompanied by pronation of arms and clenching fists. Often less than a minute and seen most commonly in the first 24 hrs of life following an hypoxic event

Definitions

Subtle seizures (motor automatism & autonomic signs)

- Motor automatisms (such as chewing, swallowing, sucking, repetitive tongue movements, “cycling”, “boxing”, “pedaling”, “swimming” Eyelid fluttering, eye deviation, fixed open stare, chewing, sucking, tongue thrusting,)
- Autonomic signs (changes in heart rate or breathing pattern, flushing, salivation, pupil dilatation, tachycardia, BP instability and apnoea)

Principles of Managing Seizures

- Resuscitation and supportive measures
- Assessment and treatment of the underlying cause
- Anticonvulsant drugs
- Wean of anticonvulsant drugs
- Follow-up and rehabilitation

Managing the risks of seizures and their treatment

Airway

- Positioning
- Suction
- Support after seizure

Breathing

- Start on Oxygen
- Check after seizure

Circulation

- Temperature gradient?
- Severe Pallor?

Disability

- What drugs have been used?
- Glucose?
- Calcium
- Need of phenobarbitone



*The commonly used drugs cause respiratory depression
Anticipate – be prepared to intervene*

Phenobarbitone

- First line treatment for neonatal seizures
- It is cheaper and easily available than phenytoin
- Time period of phenobarbital distribution is estimated 30-minute
- Additional seizure drug doses should not be given sooner than 60 minutes from administration of the IM injection to allow for evaluation of the full medication effect prior to administering further doses.
- Phenobarbitone is easier to administer with one daily dose being adequate after attainment of therapeutic level.

Phenobarbitone – side effects

- Respiratory depression
- CNS depression
- In overdose or rapid iv infusion – coma and hypotension.

Monitor respirations, pulse and blood pressure

PS: In the absence of clinical seizures, neonates with hypoxic - ischemic encephalopathy need not to be given prophylactic treatment with phenobarbital

Phenytoin

- Phenytoin and phenobarbitone are equally effective in neonatal seizures
- Has unpredictable pharmacokinetics and narrow therapeutic index. The level between efficacy and toxicity is very narrow and thus requires very close blood level monitoring
- Has more severe side effects; cardiac arrhythmia requires cardiac monitoring during administration, extravasation

Phenytoin

- Not ideal medication for maintenance on discharge; Has erratic oral absorption and variable metabolism with age of the young infants
- Phenytoin only provide 10-15% of increase in seizure control when given following phenobarbitone failure

Levetiracetam

- Inhibits burst firing without affecting normal neuronal excitability
- May selectively prevent hypersynchronization of epileptiform burst firing and propagation of seizure activity.
- Rapidly and completely absorbed even after oral administration (peaks 1-1.5hrs, duration 12hrs)
- Side effects;
 - Neuropsychiatric symptoms, weakness, drowsiness, dyskinesia, fatigue.
 - Stevens-johnson syndrome, toxic epidermal necrolysis.
- Dilution: Dilute 30mg/kg in 10 mL of 0.9% NaCl, D5W, or RL.
- Infuse over 15 min

Managing Seizures

Seizure drugs may cause respiratory depression. Be prepared!



Any clinically apparent seizure >3minutes
OR brief serial seizures

A.B.C.D Consider
glucose and calcium

Phenobarbitone IM 20mg/kg.

Reassess after 1hr

If no obvious
underlying cause -
pyridoxine treatment
may be considered.
before more
antiseizure drugs

Seizure stopped/decreased significantly

No

Yes

Repeat phenobarbitone 10mg/kg after
1 hour if needed. Max total
phenobarbitone 40mg/kg

IM/PO Phenobarb 5mg/kg 24hrly after
at least 12hrs of the loading

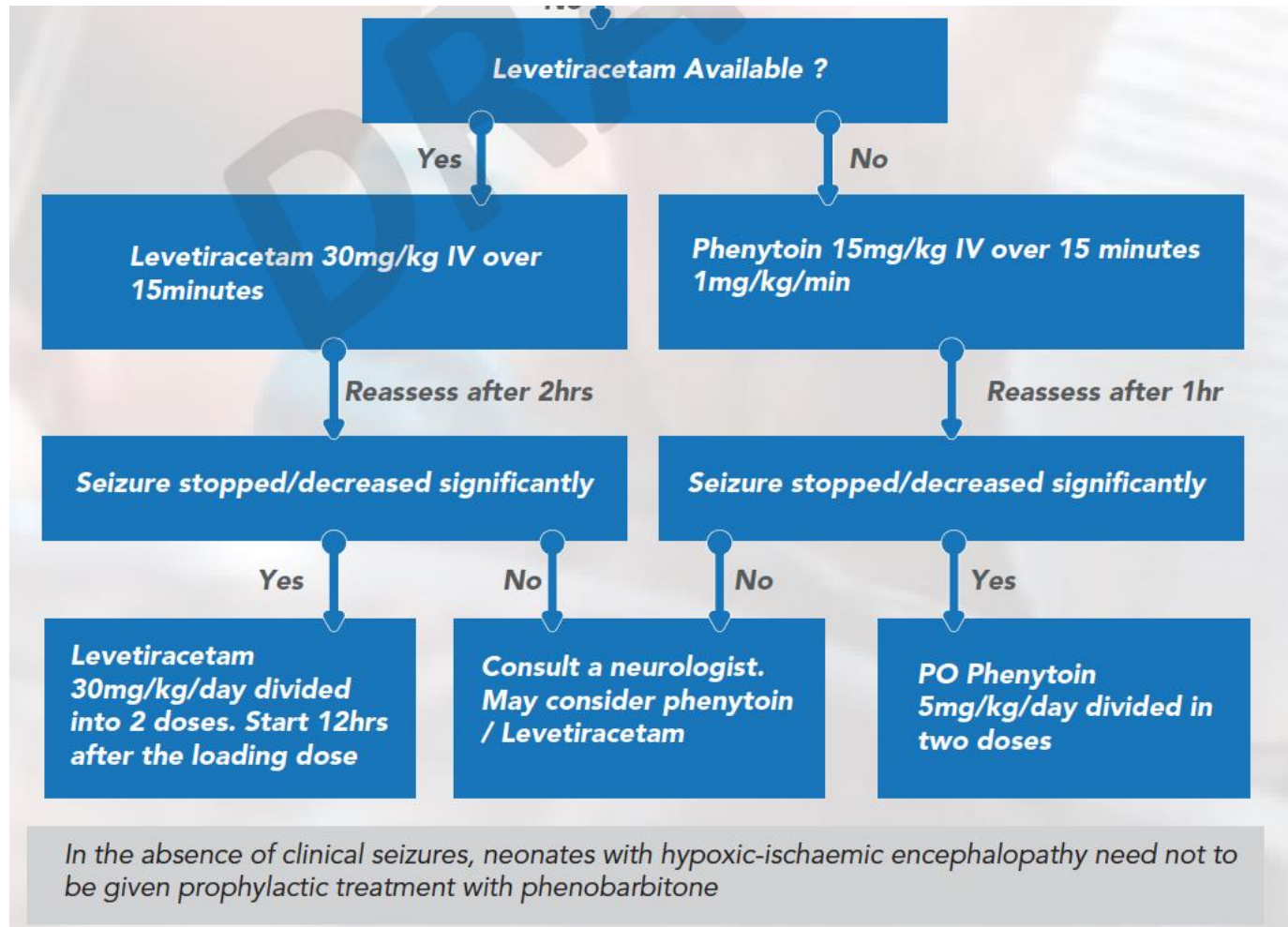
Reassess after 1hr

Yes

Seizure stopped/decreased
significantly

No

Managing Seizures – if no response to phenobarbitone



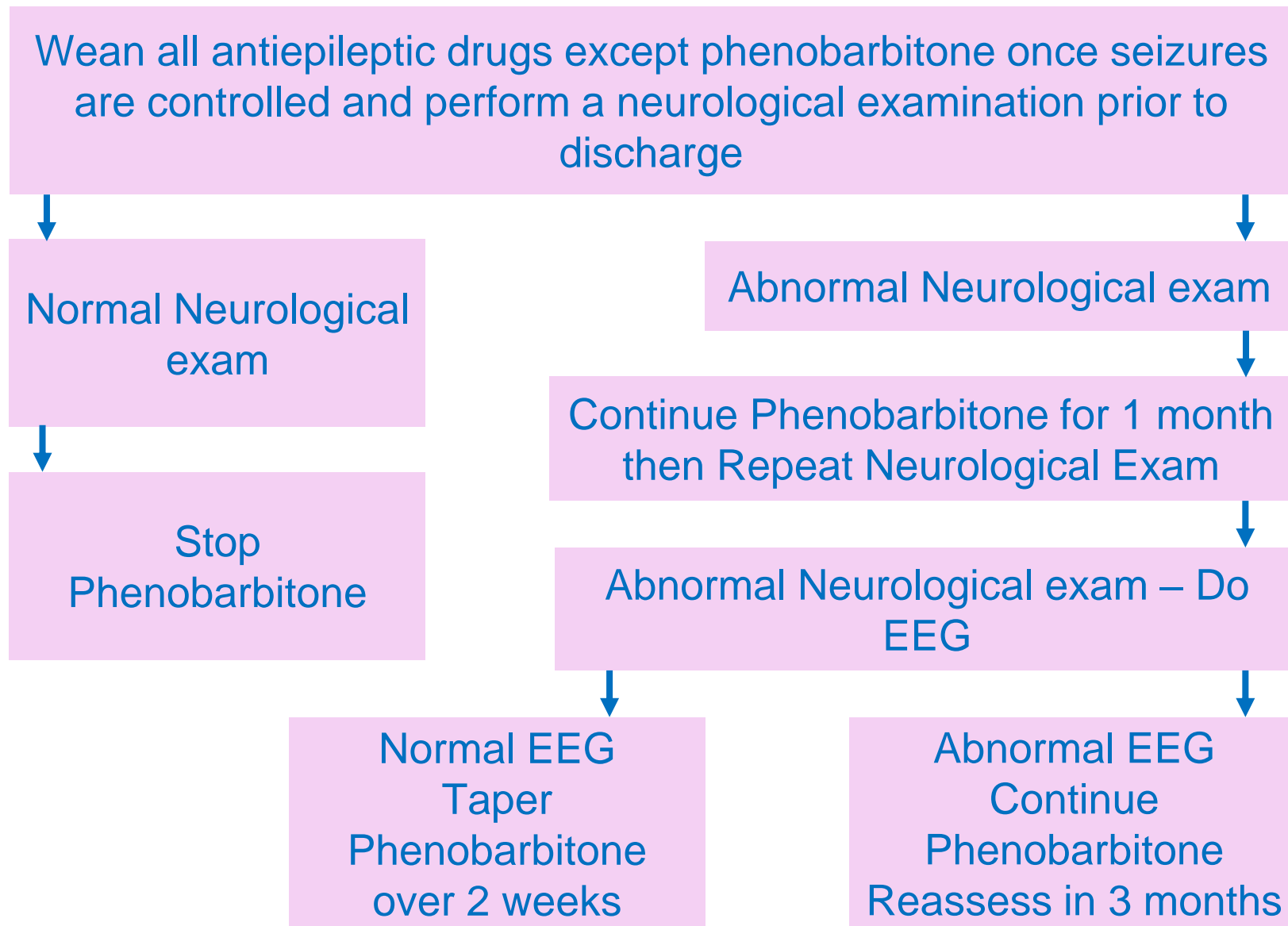
When to stop anticonvulsants

- Stop anticonvulsants if neonate has/is;
 - Normal neurological examination
 - Normal electroencephalography
 - Seizure-free for >72 hours
- Restart the drug(s) in case of recurrence of seizures
- In neonates in whom seizure control is achieved with a single anticonvulsant drug; discontinue drug abruptly without any tapering of the doses.

When to stop anticonvulsants

- In neonates requiring more than one anticonvulsant drug for seizure control;
 - Stop drugs one by one, with phenobarbital being the last drug to be withdrawn.
- Neonates with abnormal neurological examination;
 - Continue phenobarbitone for ONE months then review

Weaning Off Anticonvulsants



Questions

Summary

1. Neonatal seizures are symptoms of underlying CNS/systemic condition – assess the patient! – remember hypoglycaemia
2. Phenobarbitone is first line treatment and levetiracetam second line.
3. Stop anticonvulsant if neonate seizure free for 72hrs