SEIZURES IN CHILDREN

Outline

- Definition/ Introduction
- Aetiology
- Classification
- Clinical features
- Investigations
- Treatment
- Differential diagnosis
- Febrile seizures
- Neonatal seizures

SEIZURES IN CHILDREN

Definition

- Epileptic seizure: paroxysmal **involuntary** disturbance of the brain function.

- Clinical features include an impairment (or loss) of consciousness, abnormal motor activity, behavioural abnormalities, sensory disturbance or autonomic dysfunction.

SEIZURES IN CHILDREN

- Seizure may result from enhanced:
  - neuronal discharge of a given focus.
  - transmission of normal/abnormal discharge.
- Convulsion: an epileptic seizure characterised by motor activity.
- Epilepsy: two or more recurrent unprovoked seizures.

SEIZURES IN CHILDREN

- Epilepsy syndrome: a clinical entity of relatively consistent clinical features.
- The features are:
  - seizure type(s),
  - aetiology,
  - EEG features,
  - neurologic status,
  - prognosis, and/or,
  - response to specific antiepileptic drugs.

Aetiology of Seizures:

1. Metabolic disorders
   - Hyperglycaemia
   - Hyponatraemia
   - Hypoglycaemia
   - Hypernatraemia
   - Hypomagnesaemia
   - Hypocalcemia.

Aetiology of Seizures:

2. Infections
   - Meningitis
   - Encephalitis
   - Abscess
   - Septicaemia
   - Parasitic infestations like Malaria.

Aetiology of Seizures

3. Tumours / intracranial SOL
   - Malignancies: Primary/ secondary
   - Cystic lesions e.g. Hydatid cyst, cysticercosis
   - Others e.g. Foreign Bodies, inflammatory lesions, effusions

Aetiology of Seizures

4. *Inherited conditions*
   - Storage diseases
   - Metabolic diseases e.g. porphyrias
   - Deficiency e.g. pyridoxine dependency
   - Neurocutaneous disorders e.g. Tuberous sclerosis, neurofibromatosis etc.

Aetiology of Seizures

5. *Systemic disorders*
   - Vasculitis
   - Encephalopathy of hypertension
   - Renal failure
   - Hepatic failure
6. *Drugs*
   - Lead
   - Addictive drug withdrawal
   - Alcohol withdrawal.

Aetiology of Seizures

7. Toxins
   - organophosphates,
   - carbamates.

8. Trauma to the head
   - concussion,
   - contusion.

Aetiology of Seizures

9. Disorders of neurodevelopment
   - Neuronal/ neuroblast migration disorders
   - Dysplasias
   - Dysgenesis

10. Idiopathic.

SEIZURE CLASSIFICATION.

1. **Partial seizure (focal or localised)**

   (A) *Simple Partial seizures*

   - With motor signs.
   - With somatosensory or special sensory systems.
   - With autonomic symptoms or signs.
   - With psychic symptoms.

SEIZURE CLASSIFICATION.

1. **Partial seizure (focal or localised)**

   (B) *Complex partial seizures*

   - Simple partial at onset followed by impairment of consciousness
   - With impairment of consciousness at onset

SEIZURE CLASSIFICATION.

1. **Partial seizure (focal or localised)**

   (C) *Partial seizure evolving to secondarily generalised seizures*

   - Simple partial seizures evolving to generalised seizure
   - Complex partial seizures evolving to generalised seizures
   - Simple partial seizures evolving to complex partial then to generalised seizures.

SEIZURE CLASSIFICATION.

11. Generalised

- Absence seizures
- Tonic clonic (grand mal epilepsy)
- Tonic
- Clonic
- Akinetic/ atonic
- Myoclonic

Seizures: Clinical Features

- Depend on:
  - the type of seizure manifested,
  - the aetiology or
  - the epileptic syndrome among others.
- It may be generalised or localised (focal/ partial).
- Associated with variable level of consciousness.
- Characterised based on the classification of the *International League Against Epilepsy.*

Clinical features

1. *Partial Seizures*

A. Simple partial seizures

- Consciousness retained through the episode.
- Manifestation may be motor, sensory or autonomic.
- Depends on the part of the brain primarily affected.
- Precentral gyrus focus presents motor activity.
- Sensory features - Postcentral gyrus activity.
- Autonomic presentation e.g. nausea, palpitations in temporal and frontal lobes focus.

Clinical features

1. *Partial Seizures*

B. Complex partial seizures

- Associated impairment of consciousness.
- Impaired consciousness either at onset or secondary.
- Aura present (often not recognised).

Clinical features

1. *Partial Seizures*

C. Partial seizure secondarily generalised.

- Initial simple partial seizure spreads to other parts.
- Complex partial seizures evolving to generalised seizures.
- Simple partial evolves to complex partial then generalised.

Clinical features

2. Generalised seizures

A. Absence seizure

- Brief episodes of sudden interruption of ongoing activity, blank stare, altered tone
- associated loss of consciousness over this period
- minimal or no motor manifestation
- no memory of the event
- easily provoked by hyperventilation

Clinical features

2. Generalised seizures

B. Tonic clonic seizure

- Is associated with convulsion involving various muscle groups
- Generalised seizures have bilaterally synchronous onset and generalised EEG features commonly.

C. Tonic

- Sudden sustained muscle contraction.

Clinical features

2. Generalised seizures

D. Clonic.

- Repeated muscle jerk like activity

E. Akinetic/ atonic.

- Sudden loss of muscle tone.
- Presents like faint attack/syncope

F. Myoclonic

-Isolated muscle group jerk like epsodes.

Investigations

Are many and will be influenced by the differential diagnosis:

- Random blood sugar
- Haemogram
- Blood slide for Malaria parasites
- Blood biochemistry
- Liver function tests

Investigations

- Cerebrospinal fluid assay
- Chemical analysis for poisoning
- Skull x-ray
- EEG
- CT scan / MRI scan.

TREATMENT

- Depends on the suspected cause.
- Treat the primary cause.
- Anti-epileptic drugs to stop the seizure.
- Long-term anti seizure drugs.

Differential Diagnosis

- Syncope / faint attack.
- Psychogenic pseudoseizures.
- Transient ischaemic attack.
- Tics.
- Breath holding attacks.
- Tetany/ tetanus/ Muscular spasms.
- Movement disorders.
- Total global amnesia

Differential Diagnosis

- Abdominal colic.
- Narcolepsy/ cataplexy.
- Sleep disorders.
- Paroxysmal torticollis.
- Startle disease (hyperexplexia).
- Daydreaming.
- Benign paroxysmal vertigo.
- Migraine.

FEBRILE SEIZURES

- Age of occurrence is 6 month to 6 years.
- Always associated with fever.
- Diagnosis of exclusion.
- Occurs in boys more commonly than girls.
- Familial association seen (Chr 19 and 8)
- Usually generalised tonic clonic but can take any form.
- Chances of recurrence are higher in those whose onset was at infancy.

Febrile Seizures

- Epilepsy may develop in later life.
- Status epilepticus can occur.
- Complicated febrile seizures:
  - are prolonged,
  - focal or
  - several episodes within the same illness
- Exclude CNS infections like meningitis.

Febrile Seizures

- Investigations are variable.
- EEG not routine test; usually it is normal.
- Treat the cause; control fever; and the convulsion.
- Long term prophylaxis with Phenobarbital useful.
- Prophylaxis is not mandatory (the American Academy of Paediatrics - 2001)

NEONATAL SEIZURES

- GTC seizures tend not to occur during the first month of life – incomplete arborization of axons and dendritic processes, incomplete myelination.
- At least 5 seizure types seen in neonates
  - Focal seizures
  - Tonic
  - Clonic – focal/multifocal
  - Myoclonic
  - Subtle seizures eg chewing motions, nystagmus, apnoea, peddling movts, etc

NEONATAL SEIZURES

- **CAUSES**
  - **H**ypoxic Ischaemic encephalopathy (Birth asphyxia)
  - **H**ypoglycaemia SGA, IDM
  - **H**ypocalcaemia LBWs, IDM
  - **H**yponatremia / Hypernatremia
  - **H**ypomagnesaemia

NEONATAL SEIZURES

- **I**ntracranial hemorrhage – upto 15% of cases
- **I**nfection
- **I**nborn error of metabolism
- **I**diopathic (no cause found 10% of cases)
- **D**rug withdrawal
- **D**evelopmental defects
- **D**eficiencies eg pyridoxine
- Benign familial neonatal seizures
- Trauma

NEONATAL SEIZURES

- Certain syndromes have seizures as part of the syndrome description eg Aicardi, incontinentia pigmenti, tuberous sclerosis
- Unintentional injection of a local anaesthetic into a fetus during labour

Investigations

- Blood Glucose
- Calcium :Low Ca seen in birth trauma, CNS insult in the perinatal period, Maternal DM, Prematurity, Di George syndrome, high PO4 feedings
- Magnesium
- UECs
- LP
- Cranial US
- CT Scan #Metabolic work up #EEG

Neonatal seizures management

- ABCs to ensure adequate ventilation and perfusion
- Hypoglycaemia (Dextrose 10 %)
- Hypocalcaemia (Cal gluconate 10 %)
- Hypomagnesaemia (Ms So4)
- Antibiotics (If there is infection)
- Correct electrolyte abnormalities
- Anticonvulsants (PB, Phenytoin, Na Valproate)
- Trial of pyridoxine for refractory seizures

QUESTIONS?