Pediatrics

Convulsive Disorders in Childhood

Definition

- **Convulsion**
  - A sudden, violent, irregular movement of a limb or of the body
  - Caused by involuntary contraction of muscles and associated especially with brain disorders such as
    - Epilepsy,
    - Presence of certain toxins
    - Other agents in the blood
    - Fever in children.
- **Status Epilepticus**
  - Any seizure lasting for more than 30 minutes
  - Intermittent seizures, without regaining full consciousness in between for more than 30 minutes
- **Refractory Status Epilepticus**
  - Seizure lasting for more than 60 minutes
  - Seizure that doesn't respond to adequate Benzodiazepine or second line antiepileptic dosage

Childhood Seizures

- Childhood seizures represent paroxysmal abnormal, excessive discharges originating from cortical neurons resulting in alteration of function or behavior
- General clinical manifestations are:
  - Tonic clonic movement
  - Staring/ drop attacks
  - Behavioral changes
  - Autonomic disturbances (urinary and bowel incontinence)
- **Etiologies**
  - **Neonates, Infants, Toddlers**
    - Perinatal brain injury
    - Intracranial tumor
    - Congenital neurological malformation
    - Metabolic derangement
  - **Elder children**
    - Central nervous system infection,
    - Genetic epilepsies
    - Neurodegenerative neurocutaneous disorders
- **Classifications**
  - **Partial/ Focal Seizures**
    - Simple Partial Seizure
    - Complex Partial Seizure
  - **Generalized Seizures**
    - Absence Seizure
    - Mixed Generalized Seizures
  - **Specialized Epileptic Syndrome**
    - Infantile Spasm
    - Idiopathic Epilepsy
    - Juvenile Myoclonic Epilepsy
    - Febrile Seizures
    - Neonatal Seizures

Types of Seizure	Clinical Manifestations	Treatment
Simple Partial Seizure (Gran Mal)	• Starts from hand or face - head and eyes deviate away/opposite from seizure focus • No loss of consciousness. Patient is aware of the spasm and verbalizes • Seizure last 10-20 seconds • Can change into generalized complex seizure(Jacksonian march)	• Phenytoin • Carbamazepine • Oxcarazipine • Lamotrigine • Leviteracetam • Gabapentin

Complex Partial Seizure (Temporal Lobe Seizure)	• Aura present
	  o Emotion, abdomen, head or vague feeling in throat
	• Automatism present
	  o Lip smacking, drooling, chewing running about, pulling clothes or bed sheets often in fearful fashion
	• Consciousness impaired.
	  o May lose bladder or anal control
	• Post ictal state
	  o drowsiness or sleep may last 30mins-2hrs
	• Amnesia or no recall of episode.
	  o Can mimic other seizures	

Simple Absence Seizure (Petit Mal) • Common in girls. (4-12yrs) • Starts after 3-5yr • Tends to disappear by adolescence. (95% remission)	• Flickering , blinking or staring.(blank facial expression) • No loss of body tone, but head may droop • No aura, no post ictal state • Episode lasts about 30 seconds and can occur many times a day • No recall. Goes back to normal activity it was doing • Can be provoked by hyperventilation • 40% could have a single episode of generalized seizure **** EEG shows 'typical' 3per second spike-and-wave discharge **Atypical or complex absence seizures** may have myoclonus of face and/or limbs with loss of body tone.	• Ethosuximide – effective first line medication • Valproate – second alternative • Lamotrigine – for 2nd line treatment

Types of Seizure	Clinical Manifestations	Treatment
Mixed Generalized Seizures (Lennox Gastaut Syndrome) • Onset 6months- 2-4 yrs. • May have associations with family history of seizures, HIE, infantile spasms, febrile fits.	• Frequent seizures, sometimes intractable, tonic-clonic convulsions or drop attacks. • Frequently associated with developmental delay, mental retardation, behavioral abnormalities. • UMN and extrapyramidal signs and/or microcephaly may be seen	• Monotherapy is not very successful. May require combination therapy. • Response and outcome of treatment is variable. • Requires lifelong medication
Infantile Spasm/ Salaam Spasm/ West Syndrome • Onset usually first year of life. (4-8mths) **Types** • **Symptomatic type: (80-90%)** o Pre-intra-post natal abnormal factors present. May be associated with genetic, metabolic, neuro-cutaneous syndromes. o **Prognosis:** poor • **Cryptogenic type: (10-20%)** o Uneventful birth history and normal developmental milestones before the onset. o Usually neurologic examination, CT, MRI and scans of head are normal. o **Prognosis:** good	• Brief symmetrical contractions of neck, trunk and extremities o Flexor, extensor and mixed spasms • Occurs in clusters or volleys of spasm may last for minutes • Spasms may occur during awake and sleep period • May preceed with a cry Investigations • EEG: characteristic pattern of " hypsarrhythmia" o A chaotic pattern of high-voltage asynchronous slow wave activity. • Direct or indirect witnessing (Video tape) • Supportive: CSF and blood chemistry, metabolic screening, MRI. CT. Brain scan.	• ACTH – first line • ACTH + Vigabatrin – second line

Types of Seizure	Clinical Manifestations	Treatment
Benign Childhood Epilepsy/ Early Childhood Epilepsy • Onset 3-13 yrs. usually near normal before onset of seizures. • May have history of febrile seizure. • May have history of epilepsy in family(genetic) • Intelligence and neurologic examination normal in most children.	• Seizures may occur during sleep. Nocturnal bedwetting may occur in previously dry child. • May occur during wake hours. • Tonic-clonic seizure patterns and may be seizure free for weeks to months. • May be associated with drooling, dysarthria, and perioral anesthesia or speech arrest. (temporary) Investigations • EEG. Diagnostic Fast spike-wave complexes in mid-temporal tracings (Temporal lobe area). o 2-3 spike-waves against a normal background. • Direct or indirect visualization.	• May not require treatment for initial episode or if non-frequent. Spontaneous remission may occur. • Carbamazepine, valproate commonly used.
Neonatal Seizures • Neonates are more at risk of developing seizures because this group is particularly prone to structural, metabolic, toxic, infection and trauma.	• Classification: They differ in presentation and may not always have convulsions. (tonic-clonic movements): o Focal seizure: Twitching of a muscle group. o Multifocal: many muscle groups involved. o Tonic seizures: rigid posturing o Myoclonic seizures o Subtle seizures: change in color, nystagmus, cycling movements.	• Diazepam, phenytoin but aimed at the cause. • Feeding also important in metabolic causes

Febrile Seizure

Definition

- Convulsion occurring in association with fever in children between 3 months to 6 years of age
- In whom there is no evidence of
  - Intracranial pathology
  - Metabolic derangement

Risk Factors to Develop Epilepsy

- Abnormal neurologic and developmental status (before or after fits).
- Family history of seizures
- Abnormal and persistent EEG findings after complex febrile convulsions.

Types of Febrile Seizures

Simple Febrile Seizures	Complex Febrile Seizure
• Last less than 5minutes. • Not more than one episode. • No focal features during or after episode. • Absence of metabolic disarray, or CNS infection. • EEG, neuroimaging normal	• May be multiple and prolonged. • May have focal features during or after episode. • Absence of metabolic disarray, or CNS infection. • EEG neuroimaging may not be normal

Management

- **Hospitalization only for**
  - Exclude intracranial pathology especially infection
  - Fear of recurrent fits
  - To investigate and treat the cause of fever apart from meningitis/ encephalitis
  - Allay parental anxiety especially when they live away from hospital
- **Investigations**
  - **Lumbar puncture**
    - **Must be done in**
      - Any signs of intracranial infection
      - Prior antibiotic therapy
      - Persistent lethargy/ not fully interactive after 6 hours post-ictal
    - **Strongly recommended in**
      - Age <12 months old
      - First complex seizure
      - District hospital without pediatrician
      - Parents have difficulty to send back to hospital if deterioration happens at home
- Control the convulsion
  - Rectal Diazepam 0.5mg/kg
- Control hyperthermia
  - Tepid sponging
  - Paracetamol suppository

General Measures in Children with Epilepsy

1. Don't panic. Keep calm and note the time of onset of the fit
2. Loosen child clothing especially around the neck
3. Place the child in left lateral position with head lower than the body
4. Wipe any vomitus or secretion from the mouth
5. Don't insert any object in the mouth even if the teeth is clenched
6. Don't give any fluid or drugs orally
7. Stay near the child until the convulsion is over and comfort the child as he is recovering