Chapter– 5.1 EPILEPSY

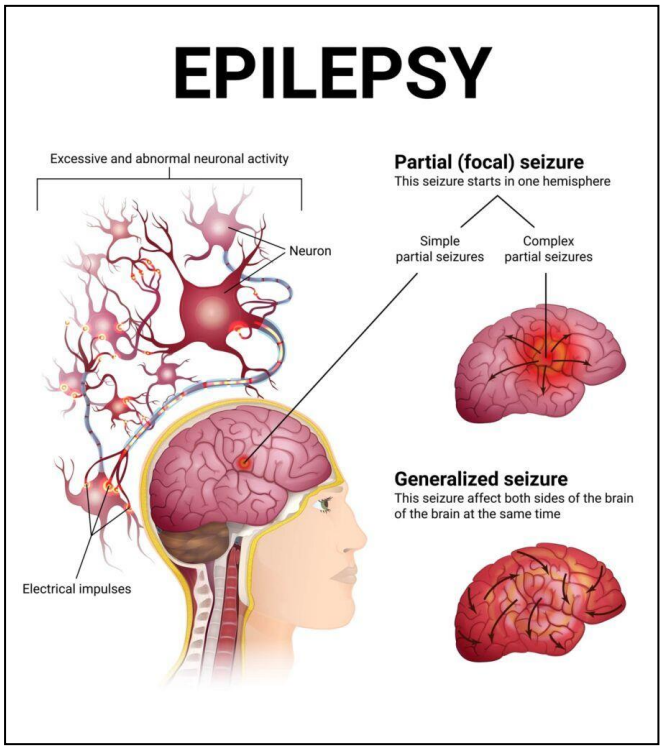
Topic: Epilepsy

5.1 Introduction

Epilepsy is a neurological disorder characterized by recurrent, unprovoked seizures due to abnormal electrical activity in the brain.

Etiopathogenesis: The etiology of epilepsy is diverse and may involve genetic, structural, metabolic, infectious, or unknown factors. Common causes and risk factors include:

1. **Genetic predisposition:** Inherited genetic mutations or familial history of epilepsy.
2. **Structural brain abnormalities:** Such as tumors, strokes, traumatic brain injury, or congenital malformations.
3. **Metabolic disturbances:** Such as electrolyte imbalances, hypoglycemia, or metabolic disorders.
4. **Central nervous system infections:** Such as meningitis, encephalitis, or neurocysticercosis.
5. **Perinatal insults:** Such as birth trauma, hypoxia, or neonatal seizures.



5.2 Types

Common types include:

1. **Focal seizures (partial seizures):** Arise from a specific region of the brain and may remain localized (simple focal seizures) or spread to involve both hemispheres (complex focal seizures).
2. **Generalized seizures:** Involve widespread areas of the brain from the onset and may manifest as tonic-clonic seizures (formerly known as grand mal seizures), absence seizures (formerly known as petit mal seizures), myoclonic seizures, or atonic seizures

5.3 Symptoms

depending on the type and severity of seizures but may include:

- Loss of consciousness
- Altered awareness or behavior Staring.
- Jerking movements of the arms and legs.
- Stiffening of the body.
- Breathing problems or breathing stops.
- Loss of bowel or bladder control.
- Sensory disturbances (such as tingling sensations or hallucinations)
- Motor symptoms (such as repetitive movements or muscle stiffness)
- Autonomic symptoms (such as sweating, flushing, or changes in heart rate or breathing)

5.4 Diagnostic Test

Diagnosis of epilepsy involves a comprehensive evaluation, including:

- Detailed history of seizure episodes, associated symptoms, and potential triggers.
- Neurological examination to assess reflexes, motor function, sensation, and coordination.
- EEG, recording of brain wave activity to detect abnormal electrical patterns associated with seizures.
- MRI or CT scans to identify structural abnormalities or lesions in the brain.
- Blood tests, to evaluate for metabolic or infectious causes of seizures.

5.5 Management

The management of epilepsy involves:

A. Pharmacological Management: Pharmacological treatment of epilepsy aims to reduce the frequency and severity of seizures while minimizing side effects. Commonly prescribed antiepileptic drugs (AEDs) include:

1. **Antiepileptic Drugs (AEDs): e.g.** Carbamazepine, phenytoin, valproic acid, lamotrigine, levetiracetam, topiramate, gabapentin, pregabalin, ethosuximide, phenobarbital, lacosamide, brivaracetam, perampanel.
    - **Mechanism:** AEDs work through various mechanisms to stabilize neuronal membranes, modulate ion channels, or enhance inhibitory neurotransmission, ultimately reducing excessive neuronal excitability.
2. **Anticonvulsant Mood Stabilizers: e.g.** Carbamazepine, valproic acid.
    - **Mechanism:** These medications not only have antiepileptic properties but are also effective mood stabilizers. They help stabilize mood fluctuations and prevent manic or depressive episodes in patients with comorbid epilepsy and bipolar disorder.
3. **Adjunctive Therapies: e.g.** Cannabidiol (CBD), ketogenic diet, vagus nerve stimulation (VNS)
    - **Mechanism:** These adjunctive therapies may be used in combination with AEDs to improve seizure control in patients with refractory epilepsy or as alternative treatment options in specific cases.

B. Non-Pharmacological Management: Non-pharmacological interventions for epilepsy may include:

- **Ketogenic diet:** High-fat, low-carbohydrate diet that may help control seizures, particularly in children with refractory epilepsy.
- **Vagus nerve stimulation (VNS):** Surgical implantation of a device that delivers electrical impulses to the vagus nerve to reduce seizure frequency.
- **Responsive neurostimulation (RNS):** Implantation of a device that detects abnormal brain activity and delivers targeted electrical stimulation to interrupt seizure onset.

5.6 Complications

Complications of epilepsy may include:

- Prolonged or recurrent seizures lasting more than five minutes or occurring in rapid succession, requiring immediate medical intervention.
- Seizures can lead to falls, burns, drowning, or other injuries, especially if they occur unexpectedly or during activities such as driving or swimming.
- Prolonged or frequent seizures may impair cognitive function, memory, and learning abilities, particularly in children.
- Epilepsy can impact mental health, self-esteem, social relationships, and quality of life, leading to anxiety, depression, or social stigma.