

Drugs for Epilepsy

I. OVERVIEW

Epilepsy, a chronic disease, occurs in approximately 1% of the population. Antiepileptic (AEDs) are effective, at least to some degree, for about 80% of these patients. Life-long treatment may be necessary.

Approximately 10% of the population will have at least one seizure in their lifetime.

Globally, epilepsy is the third most common neurologic disorder after cerebrovascular and Alzheimer's disease.

Epilepsy is not a single entity but an assortment of different seizure types and syndromes. Characterized by abnormal electrical activity may originate from sudden, excessive, and synchronous discharge of cerebral neurons.

Classification of Focal seizures

Seizure type	Cause	Symptoms	consciousness or awareness lost	Age affected
Simple partial	a group of hyperactive neurons exhibiting abnormal electrical activity and are confined to a single locus in the brain	The patient exhibits abnormal activity of a single limb or muscle but patient does not lose consciousness or awareness	NO	May occur at any age
Complex partial	These seizures exhibit complex sensory Hallucinations and mental distortion	Motor dysfunction may involve chewing movements, diarrhea, and/or urination	Consciousness is altered	Complex partial seizures may occur at any age

B. Generalized

Generalized seizures may begin locally and then progress to include abnormal electrical discharges throughout both hemispheres of the brain. Primary generalized seizures may be convulsive or non-convulsive, and the patient usually has an immediate loss of consciousness.

Seizure type	Cause	Symptoms	consciousness or awareness lost	Age affected
Tonic-clonic	The seizure may be followed by a period of confusion and exhaustion due to the depletion of glucose and energy stores.	These seizures result in loss of consciousness, followed by tonic (continuous contraction) and clonic (rapid contraction and relaxation) phases.	Yes	
Myoclonic:	They generally occur after waking, may recur for several minutes.,	These seizures consist of short episodes of limb muscle contractions	Yes	Occur at any age but usually begin around puberty or early adulthood
Clonic		These seizures consist of short episodes of muscle contractions that may closely resemble myoclonic seizures	Impaired or altered	begin around puberty or early adulthood
Tonic		These seizures involve increased tone in the extension muscles less than 60 seconds long for	Yes	
Atonic: ..	They generally occur after waking, may recur for	These seizures are characterized by a sudden loss of muscle tone	Yes	

	several minutes.,			
--	----------------------	--	--	--

Mechanism of action of Antiepilepsy medications

Drugs reduce seizures through such mechanisms as :

A-Blocking voltage-gated channels (Na⁺ or Ca²⁺),

B- Enhancing inhibitory γ -aminobutyric acid (GABA)-ergic impulses

C- Interfering with excitatory glutamate transmission.

Some antiepilepsy medications appear to have multiple targets within the CNS, whereas the mechanism of action for some agents is poorly defined.

ANTIEPILEPSY MEDICATIONS

Classification based on mechanism of action & type of neurotransmitter involved

1- GABA neurons

- ❖ Benzodiazepines
- ❖ Phenobarbital and primidone
- ❖ Tiagabine

2- Drugs Modifying Na⁺ channel activation

- ❖ Carbamazepine
- ❖ Phenytoin
- ❖ Fosphenytoin [FOS-phen-i-toin]
- ❖ Lamotrigine

3- Drugs Modifying Ca⁺⁺ channel activation

- ❖ Ethosuximide
- ❖ Pregabalin

4- Drugs with mixed action

- ❖ Valproic acid and divalproex
- ❖ Gabapentin
- ❖ Topiramate
- ❖ Felbamate