Chapter- 4 DRUG ACTING ON CENTRAL NERVOUS SYSTEM

4.6 ANTI-CONVULSANTS/ANTI-EPILEPTIC DRUGS

Anticonvulsants (antiepileptics or AEDs) agents used to manage epilepsy, is a group of neurological disorders characterized by Loss or disturbance or consciousness,characteristic body movements (usually but not always), autonomic hyperactivity.

Epilepsy is classified into following classes:

- Focal epilepsy
- Grandmal epilepsy
- Petitmal epilepsy
- Myclonic epilepsy
- Temporal epilepsy

MECHANISM OF ACTIONS:

Glutamate is the excitatory neurotransmitter and alpha-amino butyric acid (GABA) is the inhibitory neurotransmitter in the C.N.S most of the antiepileptic drugs act by inhibiting GABA transaminases and excessive release of the excitatory neurotransmitter, glutamate.

CLASSIFICATION

1. **Hydrations:** Ex: Phenytoin
2. **Barbiturates:** Ex: Phenobarbitone, Primidone
3. **Iminostilbenes:** Ex: Carbamazepine
4. **Succinimides:** Ex: Ethosuximides
5. **Aliphatic carboxylic acids:** Ex: Sodium Valporate
6. **Benzodiazepines:** Ex: Clonazepam, Diazepam
7. **Newer antiepileptic:** Ex: Gabapentin
8. **Miscellaneous:** Ex: Trimethadione, Acetazolamide

1. PHENYTOIN

Phenytoin is a hydantoin derivative. Phenytoin has good anticonvulsant activity and useful in generalized and partial seizers.

MECANISM OF ACTION:

It acts by blocking sodium channels in the neuron of the brain.

PHARMACOKINETIC:

It is well absorbed after oral administration. The onset of action is slow, but duration of action is long. It'smetabolized in liver and metabolite are almost completely excreted in urine within 40 hrs.

ADVERESE EFFECTS:

Giddiness, tremors, headache, insomnia, nausea, vomiting, anoxia, skin rashes. On long term use swelling of gums, bleeding, gingivitis. When used in pregnancy it causes cleft palate, hair lips and microcephaly in the foetus.

USES:

In grand mal epilepsy, psychomotor epilepsy.

2. CARBAMAZEPINE

Carbamazepine has been used as AEDs since 1965, and is most effective against partial seizures. Carbamazepine has a good anticonvulsant activity and are of the most commonly used and more effective intemporal lobe epilepsy and grandmal epilepsy.

MECHANISM OF ACTION:

Two basic mechanisms of action have been proposed:

1) enhancement of sodium channel inactivation by reducing high-frequency repetitive firing of action potentials,

2) action on synaptic transmission.

PHARMACOKINETIC:

It is slowly absorbed on oral administration. But overall bioavailability is 90%.

ADVERSE EFFECTS:

Like nausea vomiting giddiness, skin rashes, blurred vision.

USES:

Temporal lobe epilepsy, grandmal epilepsy, chronic neuropathic pain and in bipolar mood disorder.

3. SODIUM VALPORATE

forms are medications primarily used to treat epilepsy and bipolar disorder. It is highly effective in petitmal epilepsy.

MECHANISM OF ACTION:

Valproic acid exhibits its pharmacologic effects in a couple of ways, such as

1. by acting on GABA (γ aminobutyric acid) levels in the CNS, blocking voltage-gated ion channels.
2. inhibiting histone deacetylase.

It acts by inhibition of gamma amino butyrate transaminases and potentiate the post synaptic GABA activity.

PHARMACOKINETIC:

It is completely absorbed after oral administration and metabolized in liver.

ADVERSE EFFECTS:

It can cause nausea, vomiting, hepatic damage, sedation, ataxia and allergic reaction.

USES:

In petitmal epilepsy.