

Anti Epileptic Drugs

Four MOA

• Normally Glutamate and Aspartate (major excitatory neurotransmitter of brain) act on NMDA or AMPA receptors to cause excitation.

1. Prolongation of Na^+ Channel Inactivation

Mnemonic: Pehlay Car Vale London To Zao

Pehlay $\rightarrow$ Phenytoin

Car $\rightarrow$ Carbamazepine

Vale $\rightarrow$ Valproate

London $\rightarrow$ Lamotrigine

To $\rightarrow$ Topiramate

Zao $\rightarrow$ Zonisamide

2. Facilitation of GABA mediated Cl^- Channel Opening

Ben Ten Gwen On TV / Ben Gwen TV

Ben $\rightarrow$ Benzodiazepene $\rightarrow$ (GABA facilitatory)

$\rightarrow$ Barbiturate $\rightarrow$ (GABA facilitatory + GABA mimetic)

Ten $\rightarrow$ Tiagabine $\rightarrow$ ($\downarrow$ reuptake of GABA into neuron)

Gwen $\rightarrow$ Gabapentin

T $\rightarrow$ T

V $\rightarrow$ Valproate, Vigabatrin $\rightarrow$ ($\downarrow$ degradation of GABA)

3. Decrease in Excitatory Neurotransmission

• Felbamate

4. Inhibition of T Type Ca^{+2} Channels^(Transient)

• Ethosuximide

• Valproate

• Zonisamide

* Phenytoin

- No CNS depression

Adverse Effect

- Rapid IV Injection → Cardiovascular Collapse, Arrhythmia, CNS Depression

- Cerebellovestibular Effects → Nystagmus, Vertigo, Diplopia, Ataxia

- Behavioral effects → Hyper activity, Confusion, Dullness, Drowsiness, Hallucination

- Gingival hyperplasia

- GIT → Nausea, Vomiting, epigastric pain, anorexia

- Endocrine → Hyperglycemia, glycosuria } due to ↓ insulin Release

- P → Reduce ADH Secretion

- Osteomalacia

- Hypoprothrombinemia and hemorrhage in newborns of mother receiving phenytoin

↳ Tx by Vit K

- Megaloblastic Anemia

- Hypersensitivity Reactions → Rashes, SJS, SLE etc

- Blood Dyscrasias → Neutropenia, Leukopenia, Thrombocytopenia, Agranulocytosis

- Hirsutism

- Lymphadenopathy

- Fetal malformations (Fetal Hydantoin Syndrome)

- Reduced libido and impotence

Phenytoin Adverse Effects

Mnemonic: ~~Phenytoin~~

Phenytoin

P → P-450 interactions

H → Hirsutism

E → Enlarged Gums (Gingival Hyperplasia)

N → Nystagmus

Y → Yellow-browning of skin

T → Teratogenicity

O → Osteomalacia

I → Interference with B12 metabolism (hence anemia)

N → Neuropathies

↓ Vertigo
Ataxia
Headache

• contraindicated in pregnancy

* Carbamazepine

Adverse effects

- mostly similar to Phenytoin except Gingival Hyperplasia
Reduction in insulin Release
- Additionally there may be Cholestatic Jaundice
water Retention

* Valproate

- broad Spectrum Antiepileptic (acts by 3 mechanisms)

Adverse effects

- GIT → Nausea, vomiting, abdominal pain, diarrhea
- CNS → Sedation, Ataxia, Tremors
- Hepatic Toxicity → occasional but may be fatal
- Acute pancreatitis; hyperammonemia
- Alopecia
- Increased appetite, weight gain
- Teratogenicity

Mnemonic: VALPROATE

V → Vomiting

A → Anorexia

L → Liver: Fulminant hepatitis

P → Pancreatitis

R → Rash

O → Orofacial and Digital Abnormalities
(Neural Tube defect due to Teratogenicity)

A → Ataxia

T → Tremor

E → Elevation of Liver enzymes

Therapeutic Uses

* Phenytoin

- Tonic Clonic or partial epilepsy
- Arrhythmia : Ventricular or Digitalis induced
- Neuralgias
- Paroxysmal Nightmares

* Carbamazepine

- All but absent seizures
- Neuralgias
- Lightning tabetic pain
- Bipolar affective Disorder

FIRST LINE DRUGS (DDC)

* Partial Seizure → Carbamazepine
Phenytoin
Valproic Acid

* Tonic Clonic Seizures → Carbamazepine
Phenytoin
Valproic Acid

* Myoclonic Seizure → Valproic Acid
Clonazepam

* Absence Seizures → Valproic Acid
Ethosuximide

* Infantile Spasm → ACTH or Corticosteroids
Vigabatrin also effective

* Lennox Gastaut Syndrome → Lamotrigine

* Seizure of eclampsia → Magnesium Sulfate

* Isoniazid induced Seizure → Pyridoxine

~~DOE~~ DRUG USES

(TARA)

- ✦ Fosphenytoin preferred to phenytoin in status epilepticus
- ✦ Carbamazepine → DOC in Generalized Tonic Clonic Seizures
Partial Seizures
Trigeminal Neuralgias
- ✦ Ethosuximide → Tx of Absent Seizures
- ✦ Phenobarbitone → effective in Generalized Tonic Clonic Seizures
Partial Seizures
Prophylactic Tx of Febrile Convulsions
Status epilepticus not controlled by Diazepam & Phenytoin
- ✦ Diazepam → Emergency Tx of Status epilepticus
Tetanus
Eclamptic Convulsions
Febrile Convulsions
Drug Induced Convulsions
→ Administered Rectally in children during emergency
- ✦ Lorazepam → preferred in status epilepticus

⋆ Generalized Tonic Clonic → Carbamazepine
(Grand mal epilepsy) Lamotrigine
Valproic Acid (Sodium Valproate)

⋆ Partial Seizures → Carbamazepine
Lamotrigine
Valproic Acid

⋆ Absence Seizures → Ethosuximide
(Petit mal epilepsy) Valproic Acid

⋆ Myoclonic Acid → Valproic Acid

⋆ Status Epilepticus → Lorazepam
Diazepam
Fosphenytoin
Phenytoin
Phenobarbitone