Phenytoin

Phenytoin is an antiepileptic medication used to treat generalized tonic-clonic (grand mal) seizures and during status epilepticus. This drug works by blocking sodium channel activation in neuronal membranes, leading to an inhibition of glutamate release and resultingly, enhanced GABA release. Phenytoin is categorized as and also has use as a Class IB antiarrhythmic medication. There are numerous side effects related to phenytoin use. It is known to be teratogenic, and can cause fetal hydantoin syndrome. It induces cytochrome p450, and decreases folate levels, leading to megaloblastic anemia. Phenytoin can prompt drug-induced lupus, which is an autoimmune disorder that can sometimes arise from a drug reaction. Neurological symptoms can present in various forms, depending on acute and chronic usage of this medication, and hirsutism is often seen in women who use phenytoin long term. Gingival hyperplasia may also be seen.



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Indications

Status Epilepticus
Statue-Caesar
This is used as a medication for status epilepticus and is considered a 2nd line agent, used when benzodiazepines fail.

Tonic-Clonic Seizures
Tonic-clown Caesar
Phenytoin is indicated for treating generalized tonic-clonic (grand mal) seizures, and is considered a 1st line agent.

Mechanism of Action

Blocks Na+ Channel Activation
Block-guy Blocking Salt-shaker Channel
Phenytoin acts to block Na⁺ channel activation on the neuronal cell membrane. More specifially, it increases sodium channel inactivation, decreasing the flux of sodium ions across the neuronal membrane. This limits the spread of seizure activity and reducing seizure propagation. It tends to stabilize the threshold against hyperexcitability caused by excessive stimulation or environmental changes.

Inhibition of Glutamate Release
Inhibiting-chains on Glue-tomatoes
As a consequence of blocking Na⁺ channel activation, phenytoin inhibits glutamate release from excitatory presynaptic neurons and enhances GABA release.

Class IB Antiarrhythmic
(1) Wand B-Bee Ant-tie-arrhythmia-drummer
Phenytoin, though an anticonvulsant, is also a class IB antiarrhythmic medication.

Side Effects

Teratogenic
Tarantula-gem
Phenytoin is known to be a teratogen and causes fetal hydantoin syndrome, which is characterized by intrauterine growth restriction, microcephaly, craniofacial deformities and developmental delay.

Macrocytic Megaloblastic Anemia
Macaroni Megablast Anemone
Phenytoin decreases folate levels, leading to a macrocytic megaloblastic anemia.

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Induce Cytochrome P450

Side-toe-chrome Pea-450-rocket

Phenytoin is an inducer of the P450 enzyme responsible for the hepatic degradation of various drugs.

Drug-induced Lupus

Loopy Pill-butterfly

A side effect tied to phenytoin use is drug-induced lupus. This is an autoimmune disease which can be caused by chronic use of certain drugs, including phenytoin. Patients characteristically display anti-histone antibodies.

Neuropathy

Wavy Neuron-guy

Chronic use can lead to peripheral neuropathy, while ataxia and diplopia can be seen with acute use of phenytoin.

Hirsutism

Bearded-lady

Hirsutism, which is excessive hair growth in women, is seen with long term use of phenytoin.

Gingival Hyperplasia

Gums and Teeth Wind-up Toy

Gingival hyperplasia, or gingival overgrowth, is a side effect plaguing up to 50% of patients taking phenytoin for epilepsy.

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