Wilson's Disease Symptoms

Wilson disease is an autosomal recessive disorder due to a mutation in the ATP7B gene on chromosome 13, causing a failure to incorporate copper into ceruloplasmin and impaired copper excretion into bile. This disease is characterized by marked accumulation of copper in tissues and organs to toxic levels, including the liver, brain and eye. Normally, copper is absorbed in the small intestine and transported to the liver where it is incorporated into enzymes and bound to apoceruloplasmin to form ceruloplasmin. Ceruloplasmin can be secreted into the blood while excess copper is transported into bile to be excreted. A mutation in the ATP7B gene leads to a decrease in copper transport into bile, impairs its incorporation to ceruloplasmin and also decreases ceruloplasmin secretion into the blood causing accumulation of copper in the liver and decreased ceruloplasmin levels. The excess copper in the liver causes toxic injury via the production of reactive oxygen species and non ceruloplasmin bound copper enters the systemic circulation and can cause hemolysis of red blood cells and pathologic changes in the brain, cornea, kidneys, and joints. Penicillamine is a copper chelator that can be used in the treatment of Wilson disease.

PLAY PICMONIC

Cirrhosis
C-roses-on-liver
Mutation of the ATP7B gene leads to toxic accumulation of copper in the liver, which produces reactive oxygen species leading to liver damage. Chronic inflammation of the liver can result in cirrhosis.

Hepatocellular Carcinoma
Liver Car-gnome
Toxic accumulation of copper in the liver produces reactive oxygen species leading to liver damage. Chronic inflammation of the liver can predispose individuals to develop hepatocellular carcinoma.

Basal Ganglia Degeneration
Bass Guitar
In the brain, the toxic injury primarily affects the basal ganglia, especially the putamen. Involvement of the brain can cause neuropsychiatric manifestations including a Parkinson disease like syndrome.

Dementia
Demented-D-man
Toxic accumulation of copper in the brain can lead to early onset dementia in patients with Wilson disease.

Dyskinesia
Disc-kite
Dyskinesia is a movement disorder characterized by the presence of involuntary movements and diminished voluntary movements and is a common neuropsychiatric manifestation of Wilson disease.

Asterixis
Asterisk
Asterixis refers to a jerking tremor of the hand that is apparent when the wrist is extended, commonly called a flapping tremor. It can be a sign of hepatic encephalopathy and a feature of Wilsons disease.

Kayser-Fleischer Rings
Kaiser Fish Ring
Almost all patients with neurologic involvement develop characteristic eye lesions in the cornea called Kayser-Fleischer rings which are brownish green deposits of copper in Descemet membrane of the cornea.

Slit Lamp Exam
Lamp
Kayser Fleischer rings can be detected by slit lamp examination, which consists of a high intensity light source focused to shine a thin sheet of light into the eye.

Hemolytic Anemia

Hemolysing-RBCs from Anemone

Production of reactive oxygen species of excess copper in the blood can lead to hemolytic anemia.