Wilson?s Disease

Wilson’s Disease, also known as hepatolenticular degeneration, is an inherited metabolic disease that impacts the liver’s ability to excrete copper (1). More specifically, it is a mutation of gene ATP7B, found on chromosome 13, that results in a progressive accumulation of copper in the liver, central nervous system (often the basal ganglia), kidneys and eyes, resulting in a multisystemic condition (2, 4, 8, 9). Wilson’s disease occurs in about 1 in 30-40,000 people and tends to effect men and women equally (9). The disease is transmitted as a single autosomal recessive gene, therefore, if each parent of a child carries the gene, there is a 25% chance that the child will have the disease (1). Unfortunately genetic testing is not feasible due to the approximate 300 identified mutations of this gene (4). However, genetic counseling may be appropriate for those with known family members who have the disease (9).

The accumulation of copper in the body’s tissues can lead to hepatic, neurologic and psychiatric symptoms of varying degrees (8). In about 40-50% of patients, hepatic dysfunction is the initial symptom and in about 40-60% of patients, neurological dysfunction is the initial symptom (4). Some individuals may experience only hepatic symptoms, others may experience primarily neurologic symptoms, and some may experience both. In general, neurologic symptoms appear to be predominant in men while hepatic symptoms are often predominant in women (3). Symptom onset typically occurs between the ages of 5 to 35, with hepatic symptoms most likely occurring in childhood (2). Hepatic symptoms include swelling of the liver, fluid build up in legs or abdomen, fatigue, jaundice and bruising easily, among others (9). Kayser-Fleischer rings, rusty colored rings around the cornea that result from copper build up in the eyes, are the most common symptom of Wilson’s Disease (4, 9). Neurologic symptoms include a resting tremor (most frequent symptom), dysarthria, abnormal gait, dystonia, rigidity, bradykinesia, postural instabilty and impaired coordination (1, 2, 4). Sensory functioning is typically intact (1). The cerebellum, thalamus, subcortical white matter and the basal ganglia are all areas that appear to be implicated in the disease (2).

Psychiatric symptoms can also occur in individuals with Wilson’s Disease including changes in personality, behavior, mood (apathy, depression) and cognitive functioning. Cognitive findings were first documented by S. A. Kinnier Wilson in his more than 200 page thesis in 1912 (2, 4). Eight out of 12 patients he studied experienced impairment in the areas of motor, memory, frontal executive functioning and visuospatial processing (7). Recent studies show similar findings with impairment in attention, processing speed, executive functioning and memory (encoding) (2, 7, 8). It is estimated that about 25% of patients experience some form of cognitive decline; these patients with neurologic symptoms perform worse on neuropsychological measures than patients with hepatic symptoms who perform more similar to controls (2). However, formal test findings show that the cognitive impairment is often mild, with neurologic patient scores typically falling within one standard deviation of the control group or asymptomatic patient group (8).

The treatment of Wilson’s disease is a lifelong process. Pharmacological interventions include the combination of pencillamine, trientine, and zinc. These medications are palliative only; they work to reduce the amount of copper in the body and then maintain appropriate levels (4, 5). In many cases, individuals experience some relief in their symptoms after initiating treatment, including improved motor and cognitive fucntioning (2, 4, 5). However, pharmacological treatment is not an end all be all approach to treatment and symptoms may persist, including cognitive abnormalities (2). The only resolutive approach to Wilson’s Disease is a liver transplant (5). Liver transplants are often a treatment option in severe hepatic cases but are controversial in neurological patients with stable liver functioning (5). Liver transplants often reverse several features of the disease and eliminate the need for lifelong treatment (5).

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