Carnitine Uptake Deficiency (CUD) - Fatty Acid Oxidation Disorder

What is a Fatty Acid Oxidation Disorder?

FAODs occur when fats (fatty acids) cannot be broken down in the body. Fats are an important source of energy for the body, especially during periods of fasting. Fatty acids are transported into cells and then taken into the mitochondria to be broken down.

What is Carnitine Uptake Deficiency?

The carnitine transporter is a protein responsible for transporting carnitine into cells where it is required for importing fatty acids into the mitochondrion. Individuals who are missing this transporter have low carnitine and a reduced ability to breakdown fatty acids.

What is its incidence?

CUD is identified in ~ 1 in 60,000 babies born in BC.

What causes the disease?

Mutations in the SLC22A5 gene cause CUD due to a defect in transport of carnitine from the intestine and losses of carnitine through the kidney.

What are the clinical features of the disease?

Most babies with CUD are indistinguishable from healthy babies for the first few weeks of life. Without treatment however, low carnitine levels disrupt fatty acid breakdown leading to episodes of low blood sugar, lethargy, poor feeding and liver problems. These episode are often preceded by an infection such as a cold or flu. Older children can develop muscle pain and problems with heart function, even leading to heart failure.

In some cases, low carnitine discovered on an infant's newborn screen is a result ofthe mother having undiagnosed CUD. As part of the follow-up testing a blood sample from mom will also be requested.

How is the diagnosis confirmed?

The diagnosis of CUD is confirmed by testing creatine levels in urine and plasma along with genetic testing of the SLC22A5 gene. As noted, a blood sample from mom will also be tested to rule out maternal CUD. Diagnostic testing is arranged by specialists at BC Children's Hospital.

What is the treatment of the disease?

The mainstay of treatment is to provide dietary supplementation with carnitine and avoid fasting. Treatment is coordinated by specialists at BC Children's Hospital.

What is the outcome of treatment?

If treatment is started early, children with CUD have a good prognosis and many avoid any serious health consequences.

Can a family have more than one child with CUD?

CUD is inherited as an autosomal recessive disorder. The parents of a child who has CUD are assumed to be carriers for the disorder and have a 1 in 4 (25%) chance, in each pregnancy, of having another child with the disorder. Unaffected siblings of a child with CUD have a 2/3 chance of being carriers. Carriers are healthy and do not have symptoms of the disorder.

Resources

https://rarediseases.org/rare-diseases/systemic-primary-carnitine-deficiency