

Propionic Acidemia (PA) – Organic Acid Disorder

What are organic acid disorders?

Organic acid disorders (also sometimes called organic acidemias) are a class of inherited metabolic disorders that occur when the body cannot break certain components of proteins (for example, branched-chain amino acids) and other substances. This leads to an accumulation of harmful substances in the blood and urine, which can cause serious health problems.

What is Propionic Acidemia?

People with Propionic Acidemia (PA) have an enzyme called “propionyl CoA carboxylase” (PCC) that is either missing or not working properly. This leads to elevated levels of propionic acid, glycine, and other substances in their blood.

What is its incidence?

Propionic acidemia is a rare disease that affects about 1 in every 100,000 babies born in Ontario.

What causes the disease?

Mutations in the gene for propionyl CoA carboxylase results in enzyme that is not working well or is deficient.

What are the clinical features of the disease?

Although babies with propionic acidemia are normal at birth, without treatment they may have an episode of metabolic crisis with encephalopathy, which can progress to coma and death. The first episode usually occurs within the first few days of life and can be triggered by events such as an illness or a fever. Other symptoms include lethargy, failure to thrive, vomiting, hypotonia, seizures, and stroke. Increased amounts of

ammonia and acidic substances may be found in the blood (hyperammonemia and acidemia). In the long term, the child may have poor balance and coordination, poor growth, and mental retardation even if they are treated. The presentation of PA is variable and there may be individuals with the disorder who are mildly affected or are asymptomatic, but may still be at risk for an acute metabolic crisis.

How is the diagnosis confirmed?

The diagnosis of PA is confirmed by looking for specific substances in the blood and urine. A specific urine organic acid profile, and specific acylcarnitine and amino acid profiles in the blood are helpful in confirming the diagnosis. Enzyme studies and mutation analysis of the gene for propionyl CoA carboxylase may also assist in confirming the diagnosis. Diagnostic testing is arranged by specialists at your regional treatment centre.

What is the treatment of the disease?

The mainstay of treatment is to prevent fasting, especially when the child is ill. In an acute symptomatic episode, IV glucose and fluids can be given, along with other medications that can help the body to get rid of harmful substances and to decrease the level of acid in the blood. A low protein diet is often recommended in children with PA. A special medical formula may also be suggested. Supplementation with carnitine, biotin, and antibiotics may also be considered. This can prevent metabolic crises and their sequelae. Treatment is coordinated by specialists at your regional treatment centre.

What is the outcome of treatment?

If treatment is able to prevent episodes of metabolic crisis, children with propionic acidemia have a good prognosis. However, response to treatment and therefore the outcome is variable.

Can a family have more than one child with PA?

PA is inherited as an autosomal recessive disorder. The parents of a child who has PA 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. Prenatal testing for PA can be done as early as 10-12 weeks of pregnancy. Genetic counselling to discuss the benefits of prenatal testing options in more detail is recommended.

Unaffected siblings of a child with PA have a 2/3 chance of being carriers. Carriers are healthy and do not have symptoms of PA.

Resources

<http://www.newbornscreening.info/Parents/organicacid disorders/PA.html>

<http://www.oa news.org/>

<http://www.pafoundation.com/>

<http://www.geneclinics.org/>

Propionic Acidemia info sheet