

What is Long-Chain 3-Hydroxyacyl-CoA Dehydrogenase Deficiency?

Long-chain 3-hydroxyacyl-coA dehydrogenase (LCHAD) deficiency is an inherited disease characterized by lethargy, weakness, vomiting, and low blood sugar. It can quickly progress to liver problems, seizures, coma, and death if untreated.¹ LCHAD deficiency involves abnormalities in an enzyme involved in the breakdown of long-chain fatty acids that are used for energy in cells. Symptoms associated with LCHAD deficiency are due to low levels of energy and the toxic build-up of fatty acids in cells, especially in the liver and brain.²

What are the symptoms of LCHAD Deficiency and what treatment is available?

Onset of LCHAD deficiency usually occurs before two years of age and is often triggered by fasting or illness. Less often, an individual is found to be affected only after a family member is diagnosed. Symptoms are episodic and may include¹:

- Lethargy (lack of energy)
- Vomiting
- Hypoglycemia (low blood sugar)
- Hypotonia (low muscle tone)

If untreated, symptoms may worsen and can include breathing problems, swelling of the brain, seizures, coma, and possible death. Long-term effects of repeated episodes may include^{1,2}:

- Poor weight gain
- Learning and developmental delays, possible mental retardation
- Enlarged liver or liver disease
- Early-onset cardiomyopathy (thickened heart muscle)
- Vision loss
- Muscle pain and weakness
- Peripheral neuropathy (pain and/or numbness in the hands and feet)
- Anemia

There is no cure for LCHAD deficiency. Treatment includes avoidance of fasting, dietary modifications, and possible nutritional supplements. When properly treated, some affected individuals live healthy lives with typical growth and development, while others may continue to have episodes of hypoglycemia that affect the brain, muscle, liver, heart, and eyes.¹

LCHAD deficiency is included on all newborn screening panels in the United States.⁴

How is LCHAD deficiency inherited?

LCHAD deficiency is an autosomal recessive disease caused by mutations in the *HADHA* gene.² An individual who inherits one *HADHA* gene mutation is a “carrier.” An individual who inherits two copies of a *HADHA* mutation, one from each parent, is expected to be affected with LCHAD deficiency.

If both members of a couple are carriers of an *HADHA* gene mutation, the risk for an affected child is 25% in each pregnancy; therefore, it is especially important that the reproductive partner of a carrier be offered testing. Female carriers with an affected fetus may be at increased risk for a specific pregnancy complication called HELLP syndrome.⁴



Who is at risk for LCHAD deficiency? LCHAD deficiency can occur in individuals of any ethnic background. The incidence in the United States is approximately 1 in 75,000, with a calculated carrier frequency of 1 in 138.⁵ In Europe, the incidence is approximately 1 in 100,000.⁶

Having a relative who is a carrier or who is affected can increase an individual's risk to be a carrier. Consultation with a genetics health professional may be helpful in determining carrier risk and appropriate testing.

What does a positive test result mean?

If a gene mutation is identified, an individual should speak to a physician or genetics health professional about the implications of the result and appropriate testing for the reproductive partner and at-risk family members.

What does a negative test result mean?

A negative result reduces, but does not eliminate, the possibility that an individual carries a gene mutation. The likelihood of being a carrier is also influenced by family history, medical symptoms, and other relevant test results.

Where can I get more information?

- Screening, Technology and Research in Genetics: <http://www.newbornscreening.info/>
- Fatty Acid Oxidation Disorder Family Support Group (FOD): www.fodsupport.org
- Genetic and Rare Disease Information Center: http://rarediseases.info.nih.gov/GARD/Condition/6867/LCHAD_deficiency.aspx

References

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