Medium/Short Chain L-3-hydroxyacyl-CoA Dehydrogenase
M/SCHAD Deficiency

Medium/short chain L-3-hydroxyacyl-CoA dehydrogenase deficiency, also known as M/SCHAD deficiency, is a type of genetic condition categorized as a fatty acid oxidation disorder (also known as a FAOD). The body usually gets its energy by breaking down, or burning, fats and sugars. People with FAODs cannot properly break down certain types of fats. This prevents the body from creating needed energy during times of stress, illness, fasting, and exercise, which can lead to medical symptoms. In M/SCHAD deficiency, too much insulin goes into the blood, which causes low blood sugar levels. M/SCHAD deficiency is also part of a group of genetic conditions called familial hyperinsulinism (also known as congenital hyperinsulinism/CHI or persistent hyperinsulinemic hypoglycemia of infancy/PHHI).

Genetics

People usually have two copies of the HADHSC gene (sometimes called the HADH gene), one inherited from each parent. M/SCHAD deficiency occurs when there are changes in both copies of the HADHSC gene (autosomal recessive inheritance). Someone who has a change in only one copy of the HADHSC gene is called a carrier, and they usually do not have any medical symptoms. If both parents are carriers, there is a 1 in 4 chance with each pregnancy that their child will have M/SCHAD deficiency. Both males and females can have M/SCHAD deficiency.

Frequency

M/SCHAD deficiency is very rare, and the exact frequency is unknown.

Signs and Symptoms

M/SCHAD deficiency can cause a range of signs and symptoms. Whether your child was diagnosed via newborn screening may also affect when, if, and how these symptoms present. Always check with your doctor if your child is doing something out of “their” normal, as every child may present with symptoms a little differently. Signs and symptoms may include:

- Extreme sleepiness (lethargy)
- Irritability
- Poor appetite
- Mood changes

Without treatment, people with M/SCHAD deficiency can have additional signs and symptoms including:

- Low blood sugar (hypoglycemia)
- Fever
- Diarrhea
- Vomiting
- Coma and seizures
- Breathing problems

- Swelling in the brain
- Enlarged heart (cardiomyopathy)
- Abnormal heart rhythm (arrhythmia)
- Liver problems
- Muscle problems

Diagnosis

Most cases of M/SCHAD deficiency are identified by routine newborn screening. If newborn screening is suggestive of M/SCHAD deficiency, additional tests may be performed including:

- Measuring biochemical markers in the blood or urine
- Measuring M/SCHAD protein activity from skin cell samples (cultured fibroblasts)
- Performing a genetic test to look for changes in the HADHSC gene

If there is a known family history of M/SCHAD deficiency, or if parents know they are known carriers, prenatal testing can be performed on amniotic fluid (the fluid surrounding a baby) or chorionic villi (a specific part of the placenta).

Treatment and Management

Before beginning any treatment or therapy, please consult with your physician.

Treatment and management of M/SCHAD deficiency includes:

- Regular eating schedules to prevent low blood sugar (hypoglycemia)
- Medication called diazoxide to reduce insulin levels in the blood
- Intravenous (IV) sugar-containing fluids called D10 during metabolic crisis

Parents should call their health care provider immediately if babies show symptoms like excessive sleepiness, vomiting, diarrhea, a fever, poor appetite, or an infection. Medical treatment should be sought immediately if there is loss of consciousness or severe confusion (decompensation), as these are signs of dangerously low blood sugar.

Patients should discuss the appropriate preparation for anesthesia with their metabolic team.

All patients should have an emergency protocol letter, written and signed by their doctor, that details their prescribed treatment during crisis and in emergency room settings, to manage severe episodes.

Clinical Trials

The availability of active clinical trials for M/SCHAD deficiency can change over time. For more specific details on clinical trials visit www.mitoaction.org/clinicaltrials or www.clincialtrials.gov

Resources

- The National Institutes of Health: 3-alpha hydroxyacyl-CoA dehydrogenase deficiency - About the Disease
- The INFORM Network: M/SCHAD Deficiency | Fatty Acid Oxidation Disorders Diagnosis
- Baby's First Test: Conditions Medium/Short-Chain L-3 Hydroxyacyl-CoA Dehydrogenase Deficiency

Connecting with others who are impacted by a rare disease allows for important information to be shared about day-to day life, prevents isolation, and gives hope. Please contact MitoAction for FAOD peer support opportunities at 888-MITO-411 or email mito411@mitoaction.org