

Suggested Follow-up for Elevated C5OH: 3-OH Isovaleryl Carnitine/2-Methyl-3-OH Butyryl Carnitine

Possible Causes: Elevated C5OH is the primary marker for three defects of leucine (LEU) catabolism. These are **3-methylcrotonyl co-A carboxylase deficiency (3-MCC)**, **3-methylglutaconyl co-A hydratase deficiency (3-MGH)**, and **3-methyl 3-OH glutaryl co-A lyase deficiency (HMGL)**. It is also elevated in **betaketothiolase deficiency (SKAT)**, a disorder of isoleucine (ILE) metabolism and of ketolysis and **2-methyl 3-OH butyryl co-A dehydrogenase deficiency (2-M 3-HBD)**, a disorder of isoleucine (ILE) metabolism.

Next Steps if Abnormal: **Potential medical emergency.** See infant as soon as possible to ascertain health status. Consult pediatric metabolic specialist and initiate diagnostic evaluation and treatment as recommended. Common diagnostic studies include plasma total and free carnitines, plasma acylcarnitines and urine organic acids. In addition, repeat acyl carnitine profile on filter paper and send to the DHEC laboratory.

Neonatal Presentation: These enzyme deficiencies have various and different presentations, but all can have metabolic compromise. Infants are at risk for metabolic decompensation/crisis including hypoglycemia, hyperammonemia, and ketosis or hypoketosis.

Emergency Treatment: Treatment of metabolic crisis includes provision of sufficient calories (concentrated dextrose infusion with appropriate electrolytes) to correct catabolic state and biochemical abnormalities if needed.

Standard Treatment: 3-MCC—Avoid fasting. Moderate protein and LEU restriction. Glycine (GLY) and carnitine supplementation.

3-MGH—Avoid fasting. Moderate protein and LEU restriction. Carnitine supplementation.

HMGL—Avoid fasting. Protein restricted diet and use of metabolic formula without LEU. Carnitine supplementation. Fat controlled diet when older.

SKAT—Avoid fasting. Protein restricted/fat controlled diet. Carnitine supplementation. May require long term bicarbonate.

2-M 3-HBD—Avoid fasting. Moderate protein and ILE restriction.

Advice for Family: Provide basic information about organic acid disorders. The handout, *When Baby Needs a Second Test for an Organic Acid Disorder (Elevated C5OH)*, may be used for this purpose. Stress the importance of seeking immediate medical attention if the infant shows any signs of illness.

NOTE: In some newborns, the elevated C5OH is reflective of maternal 3-MCC.

Internet Resources:

<http://oregon.gov/DHS/ph/nbs/expand.shtml>

http://web1.tch.harvard.edu/newenglandconsortium/scientists_physicians2.html

<http://ghr.nlm.nih.gov/condition=3methylcrotonylcoenzymeacarboxylasedeficiency>

<http://ghr.nlm.nih.gov/condition=3hydroxy3methylglutarylcoenzymealysedeficiency>

<http://ghr.nlm.nih.gov/condition=betaketothiolasedeficiency>