TEXAS Health and Human Services | Texas Department of State Health Services

Newborn Screening ACT Sheet

# Elevated C16-OH +/- C18:1-OH and Other Long Chain Acylcarnitines

Long-chain 3-Hydroxyacyl-CoA Dehydrogenase Deficiency (LCHAD)

## Differential Diagnosis

Long-chain 3-hydroxyacyl-CoA dehydrogenase (LCHAD) deficiency; Trifunctional protein (TFP) deficiency.

## Condition Description

LCHAD and TFP deficiencies are fatty acid oxidation (FAO) disorders. FAO occurs during prolonged fasting and/or periods of increased energy demands (fever, stress) after glycogen stores become depleted and energy production relies increasingly on fat metabolism. Fatty acids and potentially toxic derivatives accumulate in FAO disorders, which are caused by deficiency in one of the enzymes involved in FAO.

**Conditions associated with this analyte have been identified by the Society of Inherited Metabolic Disorders (SIMD) as critical and require immediate action.**

## Take the Following IMMEDIATE Actions

- **Contact family to inform them of the newborn screening result and ascertain clinical status (poor feeding, vomiting, and lethargy);**
- **Consult with pediatric metabolic specialist (See attached list.);**
- **Evaluate infant (hepatomegaly, cardiac insufficiency; history of sudden unexpected death in a sibling; maternal liver disease during pregnancy; hypoglycemia);**
- **If signs are present or infant is ill, initiate emergency treatment in consultation with metabolic specialist;**
- ***Initial testing: plasma acylcarnitine profile and urine organic acids;***
- **Repeat newborn screen if the second screen has not been done;**
- **Educate family about signs and symptoms of hypoglycemia and metabolic acidosis; and**
- **Report findings to newborn screening program.**

## Confirmation of Diagnosis

Hypoglycemia, elevated liver transaminases, bilirubin, lactate, ammonia, and creatine phosphokinase (CPK) are suggestive of LCHAD and TFP deficiencies. Plasma acylcarnitine and urine organic acid analysis are first-line tests to determine if the appropriate LCHAD/TFP profiles are present. Differentiation between both disorders requires further biochemical and molecular genetic testing in cultured fibroblasts derived from a skin biopsy.

## Clinical Considerations

LCHAD and TFP deficiencies typically present acutely and are associated with high mortality unless treated promptly; milder variants exist. Hallmark features include hepatomegaly, cardiomyopathy, lethargy, hypoketotic hypoglycemia, elevated liver transaminases, lactic acidosis, and failure to thrive.
Acylcarnitines may normalize on the second screen on affected babies, therefore an infant with an out of range first newborn screen and normal second newborn screen will still need a metabolic evaluation.

## Additional Information

New England Consortium of Metabolic Programs – LCHAD Emergency Treatment Protocol
STAR G FELSI - LCHAD
STAR G FELSI – TFP
U.S. National Library of Medicine, Medline Plus – LCHAD
U.S. National Library of Medicine, Medline Plus – TFP


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