

# 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.

**You Should Take the Following *IMMEDIATE* Actions:**

- Contact family to inform them of the newborn screening result and ascertain clinical status (poor feeding, vomiting, lethargy).
- Consult with pediatric metabolic specialist.
- 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.
- Educate family about signs and symptoms of hypoglycemia and metabolic acidosis.
- 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.

(Click on underlined items below to take you to the website. Complete URLs are listed in the Appendix)

**Additional Information:**

**Referral** (local, state, regional and national):

Emergency Treatment Protocol

Search for Metabolic Specialist

STAR-G/HRSA

Testing

LCHAD

Clinical

TFP

Genetics Home Reference

LCHAD

TFP

**Disclaimer:** These standards and guidelines are designed primarily as an educational resource for physicians to help them provide quality medical services. Adherence to these standards and guidelines does not necessarily ensure a successful medical outcome. These standards and guidelines should not be considered inclusive of all proper procedures and tests or exclusive of other procedures and tests that are reasonably directed to obtaining the same results. In determining the propriety of any specific procedure or test, the healthcare provider should apply his or her own professional judgment to the specific clinical circumstances presented by the individual patient or specimen. It may be prudent, however, to document in the patient's record the rationale for any significant deviation from these standards and guidelines.

## APPENDIX: Resources with Full URL Addresses

### ***Additional Information:***

**Emergency Treatment Protocol** <http://www.childrenshospital.org/newenglandconsortium/NBS/LCHADD.html>

#### **STAR-G/HRSA**

**LCHAD** <http://www.newbornscreening.info/Parents/fattyaciddisorders/LCHADD.html>

**TFP** <http://www.newbornscreening.info/Parents/fattyaciddisorders/TFP.html>

#### **Genetics Home Reference**

**LCHAD** <http://ghr.nlm.nih.gov/condition=longchain3hydroxyacylcoenzymeadehydrogenasedeficiency>

**TFP** <http://ghr.nlm.nih.gov/condition=mitochondrialtrifunctionalproteindeficiency>

### ***Referral (local, state, regional and national):***

**Search for Metabolic Specialist** <http://www.simd.org/Membership/publicListNames.asp?mode=geo>

**Testing** <http://biochemgen.ucsd.edu/UCSDW3BG/Labchoose.asp>

#### **Clinical**

<http://www.genetests.org/servlet/access?id=8888891&key=RRqZcXXEUiAx9&fcn=y&fw=zLsf&filename=/clinicsearch/searchclinic.html>

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