ACMG
American College of Medical Genetics and Genomics
Translating Genes Into Health®

ACT Sheet

Newborn Screening ACT Sheet

[Elevated C14:1 +/- other long-chain Acylcarnitines]

Very Long-Chain Acyl-CoA Dehydrogenase (VLCAD) Deficiency

Differential Diagnosis: None.

Condition Description: VLCAD deficiency is a fatty acid oxidation (FAO) disorder that disrupts fatty acid breakdown at the level of long-chain fatty acids. It is associated with elevated long-chain acylcarnitines, predominantly C14:1 acylcarnitine, and with decreased energy production from fats, particularly during periods of prolonged fasting or increased energy demands (fever, stress) when energy production relies increasingly on fat metabolism. Although presentation in the newborn period is rare, it can present acutely with severe cardiomyopathy.

You Should Take the Following IMMEDIATE Actions:

- Inform family of the newborn screening result.
- Ascertain clinical status (poor feeding, vomiting, lethargy).
- Consult with pediatric metabolic specialist the same day.
- Evaluate the newborn (poor feeding, lethargy, hypotonia, hepatomegaly, arrhythmias, evidence of cardiac decompensation). If any of these findings are present or if the infant is ill, transport to a hospital for further treatment in consultation with the metabolic specialist. If the newborn becomes even mildly ill (poor feeding, vomiting, lethargy), immediate treatment with IV glucose is indicated. Initiate confirmatory diagnostic testing and management, as recommended by the specialist.
- Provide family with basic information about VLCAD deficiency and its management, including information about the avoidance of fasting for the newborn.
- Report final diagnostic outcome to newborn screening program.

Diagnostic Evaluation: **Plasma acylcarnitines:** C14:1 acylcarnitine (and, to a lesser extent other long-chain acylcarnitines) are typically, but not consistently, elevated in VLCAD deficiency. **Molecular genetic testing and/or functional studies including enzyme testing** may be required to confirm the diagnosis. If clinically indicated, consider an immediate echocardiagram.

Clinical Considerations: VLCAD deficiency can present acutely in the neonate and is associated with high mortality rates unless treated promptly. Findings of severe VLCAD deficiency in infancy include hepatomegaly, cardiomyopathy and arrhythmias, lethargy, and hypoketotic hypoglycemia. Most newborns are asymptomatic and milder forms exist usually limited to exercise intolerance with intermittent rhabdomyolysis. Treatment should be initiated under the guidance of a specialist and includes the avoidance of fasting and supplementation with medium-chain triglycerides.

Local Referral Site:

UAB Department of Genetics
VHL108B 1670 University Blvd
Birmingham, AL 35233
Phone: 205-996-6983
Fax: 205-975-6389

Alabama Newborn Screening Program
1-866-928-6755

Additional Information:

Emergency Protocols (New England Consortium of Metabolic Programs)
https://www.newenglandconsortium.org/vlcadd

Medline Plus
https://medlineplus.gov/genetics/condition/very-long-chain-acyl-coa-dehydrogenase-deficiency/

Condition Information for Families-HRSA Newborn Screening Clearinghouse
https://newbornscreening.hrsa.gov/conditions/very-long-chain-acyl-coa-dehydrogenase-deficiency