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

ACT Sheet

Newborn Screening ACTSheet
[Increased C16 and/or C18:1 Acylcarnitine]
Carnitine Palmitoyltransferase II (CPT II) Deficiency and Carnitine Acylcarnitine Translocase (CACT) Deficiency

Differential Diagnosis: Carnitine palmitoyltransferase II (CPT II) deficiency; carnitine acylcarnitine translocase (CACT) deficiency.

Condition Description: Carnitine palmitoyltransferase II (CPT II) deficiency and carnitine acylcarnitine translocase (CACT) deficiency result from defects in the transport of long-chain acylcarnitines into the mitochondria for fatty acid oxidation. As a result, the energy needs derived from fatty acids during fasting or periods of increased demand (e.g., fever, stress) cannot be met. In addition, the neonatal form of CPT II deficiency is associated with multiple congenital anomalies and other organ system involvement, including heart and liver.

You Should Take the Following IMMEDIATE Actions:

- Inform family of newborn screening result.
- Ascertain clinical status (poor feeding, vomiting, lethargy); elicit history of sudden unexpected death in a sibling.
- Consult with pediatric metabolic specialist the same day.
- Evaluate the newborn for signs of acute illness such as hypoglycemia, hepatic dysfunction, cardiac insufficiency, or seizures. If any of these findings are present or if the newborn is ill, transport to a hospital for further treatment in consultation with a metabolic specialist.
- Initiate confirmatory/diagnostic testing and management
- Provide the family with basic information about CPT II and/or CACT including possible early signs and symptoms.
- Report final diagnostic outcome to newborn screening program.

Diagnostic Evaluation: **Plasma acylcarnitines:** C16 and/or C18:1 are elevated in both CPT II and CACT deficiencies. **Molecular genetic testing** is required to distinguish between the two conditions.

Clinical Considerations: In the neonatal form of CPT II deficiency, the neonate is profoundly ill with marked hypoglycemia, metabolic acidosis, cardiac arrhythmias, cardiomyopathy, liver disease, and facial dysmorphism with renal and brain anomalies. These infants rarely survive. Patients with the more common, later-onset muscular form of CPT II deficiency present in adolescence or adulthood with muscle weakness, exercise intolerance, and rhabdomyolysis. CACT deficiency presents similarly to the neonatal form of CPT II deficiency.

Additional Information:

How to Communicate Newborn Screening Results
Emergency Protocols (New England Consortium of Metabolic Programs)
Gene Reviews
Medline Plus (CPT II | CACT)
Condition Information for Families-HRSA Newborn Screening Clearinghouse
ClinGen Actionability Report

Referral (local, state, regional, and national:

Find a Genetics Clinic Directory
Genetic Testing Registry

State and Other Resources

State Newborn Screening Program

Newborn Genetic Screening, New Mexico Department of Health
877-890-4692, www.nmhealth.org/about/phd/fhb/cms/nbgs/

Genetics/Metabolic Consultants

Michael Marble, MD
University of New Mexico Metabolic Clinic
505-272-6631, hsc.unm.edu/directory/marble-michael.html

Information for Clinicians and Families

New Mexico Medical Home Portal (see Newborn Disorders and Parents & Families sections)
nm.medicalhomeportal.org/newborn/carnitine-acylcarnitine-translocase-deficiency

Parent/Family Support

FOD Family Support Group
fodsupport.org/

National Resources (with web addresses)

Additional Information

How to Communicate Newborn Screening Results
www.hrsa.gov/sites/default/files/hrsa/advisory-committees/heritable-disorders/Resources/achdnc-communication-guide-newborn.pdf

Emergency Protocols (New England Consortium of Metabolic Programs)
www.newenglandconsortium.org/cpt-ii-deficiency

Gene Reviews
www.ncbi.nlm.nih.gov/books/NBK1253/

Medline Plus

CPT II - https://medlineplus.gov/genetics/condition/carnitine-palmitoyltransferase-ii-deficiency/
CACT - https://medlineplus.gov/genetics/condition/carnitine-acylcarnitine-translocase-deficiency/

Condition Information for Families-HRSA Newborn Screening Clearinghouse
newbornscreening.hrsa.gov/conditions/carnitine-palmitoyltransferase-ii-deficiency

ClinGen Actionability Report
actionability.clinicalgenome.org/ac/Pediatric/ui/stg2SummaryRpt?doc=AC1022

Referral (local, state, regional and national)

Find a Genetics Clinic Directory
clinics.acmg.net

Genetic Testing Registry
www.ncbi.nlm.nih.gov/gtr/