

ACT Sheet

Newborn Screening ACT Sheet

[Elevated C8 with Lesser Elevations of C6

and C10 Acylcarnitine]

Medium-Chain Acyl-CoA Dehydrogenase (MCAD) Deficiency

Differential Diagnosis: Glutaric acidemia type II.

Condition Description: MCAD deficiency is a fatty acid oxidation (FAO) disorder, disrupting fatty acid breakdown at the level of medium-chain fats and is associated with characteristic elevations of medium-chain acylcarnitines. Fatty acid oxidation occurs mainly during prolonged fasting and/or periods of increased energy demands (fever, stress), when energy production relies increasingly on fat metabolism. In an FAO disorder, fatty acids and potentially toxic derivatives accumulate because of a deficiency in one of the mitochondrial FAO enzymes. Presentation in the neonatal period can occur with decreased caloric intake often related to breast feeding with insufficient milk production and/or prolonged fasting.

You Should Take the Following <u>IMMEDIATE</u> 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 (hypoglycemia, poor feeding, lethargy, hypotonia). If any of these signs are present or if the newborn 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 or 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 MCAD and its management, including information about the avoidance of fasting in the newborn.
- Report final diagnostic outcome to newborn screening program.

Diagnostic Evaluation: <u>Plasma acylcarnitines</u>: Medium-chain acylcarnitines are characteristically elevated in MCAD deficiency. <u>Urine organic acids</u> may show a pattern of elevated medium-chain dicarboxylic acids and glycine conjugates (e.g. hexanoylglycine). <u>Molecular genetic testing</u> may be required to confirm the diagnosis.

Clinical Considerations: MCAD deficiency is usually asymptomatic in the newborn although it can present acutely with severe hypoglycemia, metabolic acidosis, especially when breast milk production is insufficient. Illnesses causing vomiting, poor oral intake, and prolonged fasting can cause lethargy and hypoketotic hypoglycemia with high mortality rates unless treated promptly. Untreated MCAD deficiency is a significant cause of sudden death. **Additional Information:**

How to Communicate Newborn Screening Results Emergency Protocols (New England Consortium of Metabolic Programs) Gene Reviews Medline Plus 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

This practice resource is designed primarily as an educational resource for medical geneticists and other clinicians to help them provide quality medical services. Adherence to this practice resource is completely voluntary and does not necessarily assure a successful medical outcome. This practice resource 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 clinician should apply his or her own professional judgment to the specific clinical circumstances presented by the individual patient or specimen. Clinicians are encouraged to document the reasons for the use of a particular procedure or test, whether or not it is in conformance with this practice resource. Clinicians also are advised to take notice of the date this practice resource was adopted, and to consider other medical and scientific information that becomes available after that date. It also would be prudent to consider whether intellectual property interests may restrict the performance of certain tests and other procedures.

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State and Other Resources

State Newborn Screening Program

Newborn Screening, State of Rhode Island Department of Health 401-921-7619, health.ri.gov/newbornscreening/

Genetics/Metabolic Consultants

Division of Genetics, Lifespan Physician's Group, Hasbro Children's Hospital 401-444-4000, www.lifespan.org/centers-services/childrens-neurodevelopment-center/genetics-and-dysmorphology

Information for Clinicians and Families

Rhode Island Medical Home Portal (see also the Parents & Families section) ri.medicalhomeportal.org/newborn/mcadd

Parent/Family Support

Fatty Oxidation Disorders (FOD) Family Support Group www.fodsupport.org/

Minutes Matter minutesmatter-mcadd.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/achdnccommunication-guide-newborn.pdf

Emergency Protocols (New England Consortium of Metabolic Programs) www.newenglandconsortium.org/mcadd

Gene Reviews www.ncbi.nlm.nih.gov/books/NBK1424/

Medline Plus

medlineplus.gov/genetics/condition/medium-chain-acyl-coa-dehydrogenase-deficiency/

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

ClinGen Actionability Report actionability.clinicalgenome.org/ac/Pediatric/ui/stg2SummaryRpt?doc=AC1016

Referral (local, state, regional and national)

Find a Genetics Clinic Directory clinics.acmg.net

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

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