

Newborn Screening ACT Sheet

[Elevated C4 Acylcarnitine] Short-Chain Acyl-CoA Dehydrogenase (SCAD) Deficiency

Differential Diagnosis: Short-chain acyl CoA dehydrogenase (SCAD) deficiency; Isobutyryl-CoA dehydrogenase (IBDH) deficiency (also known as isobutyrylglycinuria (IBG)); ethylmalonic encephalopathy (EE).

Condition Description: SCAD deficiency disrupts fatty acid oxidation at the level of short chain fatty acids, leading to elevated C4 acylcarnitine (as butyrylcarnitine). IBDH is a disorder of valine metabolism leading to elevated C4 acylcarnitine (as isobutyrylcarnitine). Both conditions have limited, if any, clinical significance. EE is a disorder caused by variants in a gene coding for a mitochondrial enzyme. In EE, potentially toxic metabolites accumulate preventing the mitochondria from producing energy.

You Should Take the Following Actions:

- Inform family of the newborn screening result.
 - Ascertain clinical status (typically asymptomatic; rarely lethargy, hypotonia, vomiting).
 - Consult with pediatric metabolic specialist.
 - Evaluate newborn for signs of hypoglycemia, lethargy, or metabolic acidosis. 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, as recommended by the specialist.
 - Provide the family with basic information about these conditions and their management.
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- Report final diagnostic outcome to newborn screening program.

Diagnostic Evaluation: Plasma acylcarnitines: C4 is elevated in both SCAD and IBDH deficiencies. C4 (+/- C5) is elevated in EE. **Urine organic acids** demonstrate elevated ethylmalonic acid in SCAD and isobutyrylglycine in IBDH deficiency. EE is associated with elevated ethylmalonic acid and mild elevations of glycine conjugates. **Molecular genetic testing** may be required to differentiate these disorders.

Clinical Considerations: SCAD deficiency and IBDH deficiencies are typically benign. EE can present in infancy with developmental delay, diarrhea and petechiae.

Additional Information:

[How to Communicate Newborn Screening Results](#)

[Emergency Protocols \(New England Consortium of Metabolic Programs\)](#)

[Gene Reviews \(SCAD | EE\)](#)

[Medline Plus \(SCAD | EE | IBDH\)](#)

[Condition Information for Families- HRSA Newborn Screening Clearinghouse \(SCAD | EE | IBDH\)](#)

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

[Find a Genetics Clinic Directory](#)

[Genetic Testing Registry](#)

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 Newborn Disorders and Parents & Families sections)
ri.medicalhomeportal.org/newborn/short-chain-acyl-coa-dehydrogenase-deficiency

Parent/Family Support

FOD Family Support Group – fodsupport.org/
United Mitochondrial Disease Foundation – www.umdf.org
Organic Acidemia Association – www.oaanews.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/scadd

Gene Reviews

- www.ncbi.nlm.nih.gov/books/NBK63582/
- www.ncbi.nlm.nih.gov/books/NBK453432/

Medline Plus

- medlineplus.gov/genetics/condition/short-chain-acyl-coa-dehydrogenase-deficiency/
- medlineplus.gov/genetics/condition/ethylmalonic-encephalopathy/
- medlineplus.gov/genetics/condition/isobutyryl-coa-dehydrogenase-deficiency/

Condition Information for Families-HRSA Newborn Screening Clearinghouse

- newbornscreening.hrsa.gov/conditions/short-chain-acyl-coa-dehydrogenase-deficiency
- newbornscreening.hrsa.gov/conditions/ethylmalonic-encephalopathy
- newbornscreening.hrsa.gov/conditions/isobutyryl-coa-dehydrogenase-deficiency

Referral (local, state, regional and national)

Find a Genetics Clinic Directory
clinics.acmg.net

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