TEXAS Health and Human Services | Texas Department of State Health Services

Newborn Screening ACT Sheet

Elevated C5-OH Acylcarnitine

Organic Acidemias

Differential Diagnosis

3-methylcrotonyl-CoA carboxylase (3MCC) deficiency (infant or mother); 3-hydroxy-3methylglutaryl (HMG)-CoA lyase deficiency; β-ketothiolase deficiency (BKT); multiple carboxylase deficiency (MCD), including biotinidase deficiency and holocarboxylase deficiency, 2-methyl-3-hydroxybutyric acidemia (2M3HBA), 3-methylglutaconic aciduria (3MGA).

Condition Description

Each of the disorders is caused by a deficiency of the relevant enzyme. In most of the disorders, the substrate, for which the enzyme is named, and potentially toxic metabolites accumulate.

Conditions associated with this analyte have been identified by the Society of Inherited Metabolic Disorders (SIMD) as critical and require immediate action.

Medical Emergency: Take the Following IMMEDIATE Actions

- **Contact family to inform them of the newborn screening result and ascertain clinical status (poor feeding, vomiting, and lethargy);**
- **Immediate telephone consultation with pediatric metabolic specialist (See attached list);**
- **Evaluate the newborn (hypoglycemia, ketonuria, metabolic acidosis);**
- **If any of these parameters are abnormal or the infant is ill, initiate emergency treatment as indicated by metabolic specialist and transport IMMEDIATELY to tertiary center with metabolic specialist;**
- **Initiate timely confirmatory/diagnostic testing as recommended by specialist;**
- **Initial testing: urine organic acids, urine acylglycine, and plasma acylcarnitine analysis on infant and mother;**
- **Repeat newborn screen if second screen has not been done;**
- **Educate family about signs, symptoms, and need for urgent treatment of metabolic acidosis (poor feeding, vomiting, lethargy); and**
- **Report findings to newborn screening program.**

Diagnostic Evaluation

Confirmatory tests include urine organic acids, urine acylglycine, and plasma acylcarnitine on infant and mother. The organic acids analysis on infant and mother should clarify the differential except for holocarboxylase synthetase deficiency. **Biotinidase assay is performed on all newborn screens.**

Clinical Considerations

The neonate is usually asymptomatic in 3MCC deficiency. However, episodic hypoglycemia, lethargy, hypotonia, and mild developmental delay can occur at any time from the neonatal period through childhood for any of these disorders. There is beneficial treatment that is specific to each condition.

Additional Information

American College of Medical Genetics and Genomics – Organic Acidemias ACT Sheet
U.S. National Library of Medicine, Medline Plus – 3-methylcrotonyl-CoA carboxylase deficiency
U.S. National Library of Medicine, Medline Plus – Beta-ketothiolase deficiency
U.S. National Library of Medicine, Medline Plus – 3-hydroxy-3-methylglutaryl-CoA lyase deficiency
U.S. National Library of Medicine, Medline Plus – Barth syndrome
STAR G FELSI – Beta-ketothiolase deficiency
STAR G FELSI – 3-hydroxy-3-methylglutaryl-CoA lyase deficiency
STAR G FELSI – 3-methylcrotonyl-CoA carboxylase deficiency

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