FACT SHEET
Healthcare Provider

Beta-Ketothiolase Deficiency (Mitochondrial Acetoacetyl CoA Thiolase Deficiency) (BKT)

Description:
Beta-kethothiolase deficiency is an inborn error of isoleucine catabolism characterized by urinary excretion of 2-methyl-3-hydroxybutyric acid, 2-methylacetoacetic acid, tiglylglycine, and 2-butanone.

Incidence in General Population:
1:100,000 live births

Symptoms:
The clinical manifestations range from an asymptomatic course to severe life threatening ketoacidosis with coma and cardiomyopathy. The onset of symptoms occurs in late infancy or childhood. The mean age at presentation is 15 months (range 3 days to 48 months). There are documented cases of asymptomatic patients with enzyme deficiency. Frequency of decompensation attacks decreases with age and decompensation is uncommon after the age of 10 years. Clinical outcome varies widely, with a few patients suffering severe psychomotor retardation or death as a result of their initial attack and others having normal development and no episodes of acidosis. Despite severe recurrent attacks, appropriate supportive care can result in normal development. Symptoms include intermittent episodes of severe metabolic acidosis and ketosis accompanied by vomiting (often hematemesis), diarrhea, and coma that may progress to death. There is great clinical variability between patients. Infancy is the period of highest risk for decompensation. Death or neurologic complications can occur. Clinical complications can include cardiomyopathy, prolonged QT interval, neutropenia, thrombocytopenia, poor weight gain, renal failure, and short stature. If neurologically intact, patients are normal between episodes.

Diagnosis:
Newborn screening abnormality—Tandem mass spectrometry: increased C5:1
A second dried blood spot filter paper card may be requested by the Newborn Screening Laboratory if the initial screening result is above the normal range. Infants with presumptive positive screening (critical) results require prompt follow up. If this occurred, the clinician would be contacted by the Metabolic Treatment Center. When notified of these results, the clinician should immediately check on the clinical status of the baby and facilitate referral to the Metabolic Treatment Center. The Metabolic Treatment Center will provide consultation and assistance with diagnostic testing.

Situations That Risk Metabolic Decompensation:
Metabolic decompensation can be triggered by the catabolic processes that occur in the course of infections, after an immunization, increased physical activity, dehydration, or with a prolonged period of fasting.

Monitoring:
- Clinical observation is the most important tool for monitoring patients with BKT. It is important for the primary care provider and the Metabolic Treatment Center to develop an ongoing collaborative relationship in caring for these patients.
- Carefully assess infants presenting with unexplained vomiting for signs of metabolic acidosis and ketosis; urinalysis is particularly important in this regard since neonates normally do not excrete large quantities of ketones.

Treatment:

- Acute management of the ketoacidosis is supportive with IV glucose and bicarbonate.
- Bicarbonate therapy is often required long term.
- Protein rich diets and ketogenic diets should be avoided.
- Carnitine supplementation can be used.
- The family should monitor urinary ketones to be alert for impending metabolic crisis.

Illness:

- **Any** illness can potentially lead to metabolic decompensation.
- Prevention and/or early intervention are of particular importance.
- Consult with the Metabolic Treatment Center within 24 hours of the onset of the illness.

Immunization:

- Immunizations must be kept current. Influenza vaccinations are also recommended.

Surgical/Surgical Procedures:

- Discuss any plans for surgical and dental procedures with the Metabolic Treatment Center.
- Any procedure requiring anesthesia should be done at a hospital with a metabolic service.

Growth and Development:

- It is critical to closely monitor all growth, development, and biochemical parameters on a regular basis.
- Normal development is possible with early diagnosis and treatment.
- The child should be referred to an early intervention program, and developmental progress should be closely monitored by both the metabolic team and the primary care provider.

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