FACT SHEET
Healthcare Provider

Propionic Acidemia (PA)

Description:
Propionic academia is an autosomal recessive disorder of branched-chain amino acid metabolism in which a defective enzyme, propionyl-CoA carboxylase, results in an accumulation of propionic acid. In the United States, PA occurs in 1:20-100,000 live births.

Incidence in General Population:
1:75,000 live births

Symptoms:
Affected infants initially present in the first month of life, often with failure-to-thrive due to feeding intolerance and vomiting. Somnolence is often part of the history, so that poor feeding may be erroneously attributed to central nervous system disorders. Other infants have a fulminant initial presentation, with rapidly developing ketoacidosis, dehydration, shock, and a precedent history of lethargy, poor feeding, and rapid breathing that only extends over 1-2 days. Occasionally, an older infant or young child may have a lifelong history of episodic lethargy, anorexia, vomiting, and acidosis that has responded to short hospital stays with intravenous glucose and bicarbonate administration.

In patients who previously have been diagnosed with propionic academia, the acute onset of movement disorders caused by basal ganglia infarction may be a presenting feature. Dystonia, rigidity, choreoathetosis, and dementia in a child with a prior diagnosis of propionic academia suggest a basal ganglia infarction. While most children suffer neurologic damage during a metabolic crisis, rare cases without an identifiable precipitation factor have been reported. The metabolic crisis may result from changes in feeding or may be secondary to an infection.

Diagnosis:
Newborn screening abnormality—Tandem mass spectrometry: increased C3.
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:
Frequent episodes of decompensation can be devastating to the central nervous system. Any source of catabolic stress—such as vomiting, diarrhea, febrile illness, and decreased oral intake—can lead to decompensation, which requires prompt and aggressive intervention.

Monitoring:
- Clinical observation is the most important tool for monitoring patients with PA. 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 ketoacidosis; urinalysis is particularly important in this regard since neonates normally do not excrete large quantities of ketones.

- Central nervous system depression, signifying either severe acidosis or hyperammonemia, may be apparent on examination.
- Any infant with an inborn error also can be affected by other disorders. Suspicion of sepsis based upon the typical nonspecific signs must not eliminate the possibility of underlying disease, such as propionic acidemia, for the differential.

Treatment:
- The use of specific metabolic foods (formulas) deficient in isoleucine, valine, threonine, and methionine is a critical part of management because such foods and formulas provide the essential amino acids in an otherwise protein-deficient diet. Adequate calories to inhibit catabolism are supplied as carbohydrate and fat, and appropriate protein must be supplied to support anabolism.
- The Metabolic Treatment Center will determine the patient's diet prescription that establishes the optimum percentage of fat, carbohydrate, and protein.
- Carnitine supplementation may be a useful therapeutic adjunct to replete intracellular and extracellular stores of free carnitine.
- Use of adjunctive compounds to dispose of toxic metabolites and to increase activity of deficient enzymes and hemodialysis may be used during acute decompensation.
- Liver transplant may ameliorate the disease but does not completely eliminate the disorder because the kidneys are also involved in propionic acid metabolism.
- The parents should have an emergency protocol with them at all times. This protocol can be provided by the Metabolic Treatment Center, and it should contain basic information about the disorder, necessary diagnostic investigations, and guidelines for treatment.
- Infants and children with PA should have regularly scheduled visits at the Metabolic Treatment Center.

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 crucial to closely monitor all growth, development, and biochemical parameters on a regular basis.
- 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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