Newborn Screening ACT Sheet
[Increased citrulline]
Amino Aciduria/Urea Cycle Disorder

Differential Diagnosis:
- Citrullinemia I,
- Argininosuccinic acidemia;
- Citrullinemia II (citrin deficiency),
- Pyruvate carboxylase deficiency.

Condition Description:
The urea cycle is the enzyme cycle whereby ammonia is converted to urea. In citrullinemia and in argininosuccinic acidemia, defects in ASA synthetase and lyase, respectively, in the urea cycle result in hyperammonemia and elevated citrulline.

MEDICAL EMERGENCY: TAKE THE FOLLOWING IMMEDIATE ACTIONS:
- Contact family to inform them of the newborn screening result and ascertain clinical status (poor feeding, vomiting, lethargy, tachypnea).
- Immediate consult with pediatric metabolic specialist.
- Evaluate the newborn (poor feeding, vomiting, lethargy, hypotonia, tachypnea, seizures and signs of liver disease). Measure blood ammonia. If any sign is present or infant is ill initiate emergency treatment for hyperammonemia in consultation with metabolic specialist.
- Transport to hospital for further treatment in consultation with metabolic specialist.
- Initiate timely confirmatory/diagnostic testing and management, as recommended by specialist.
- Provide family with basic information about hyperammonemia.
- Report findings to newborn screening program.

(See flowchart for information concerning the specific actions)

You Should Take the Following Actions:

Diagnostic Evaluation:
Plasma ammonia to determine presence of hyperammonemia. In citrullinemia, plasma amino acid analysis will show increased citrulline whereas in arginino-succinic acidemia, argininosuccinic acid will also be present. Orotic acid may be increased in both disorders which can be determined by urine organic acid analysis. In citrin deficiency, liver enzymes, lactic acid and bilirubin may be elevated. For pyruvate carboxylase deficiency blood lactate and pyruvate will be elevated.

Clinical Considerations:
Citrullinemia and argininosuccinic acidemia can present acutely in the newborn period with hyperammonemia, seizures, failure to thrive, lethargy, and coma. Later signs include mental retardation. Citrin deficiency may present with cholestatic liver disease in the newborn period. Pyruvate carboxylase deficiency produces coma seizures and life-threatening ketoacidosis. Treatment for ASA and citrullinemia is to promote normal growth and developmental and to prevent hyperammonemia.

Disclaimer: These standards and guidelines are designed primarily as an educational resource for physicians to help them provide quality medical services. In determining the propriety of any specific procedure or test, the healthcare provider should apply his or her own professional judgment to the specific clinical circumstances presented by the individual patient or specimen

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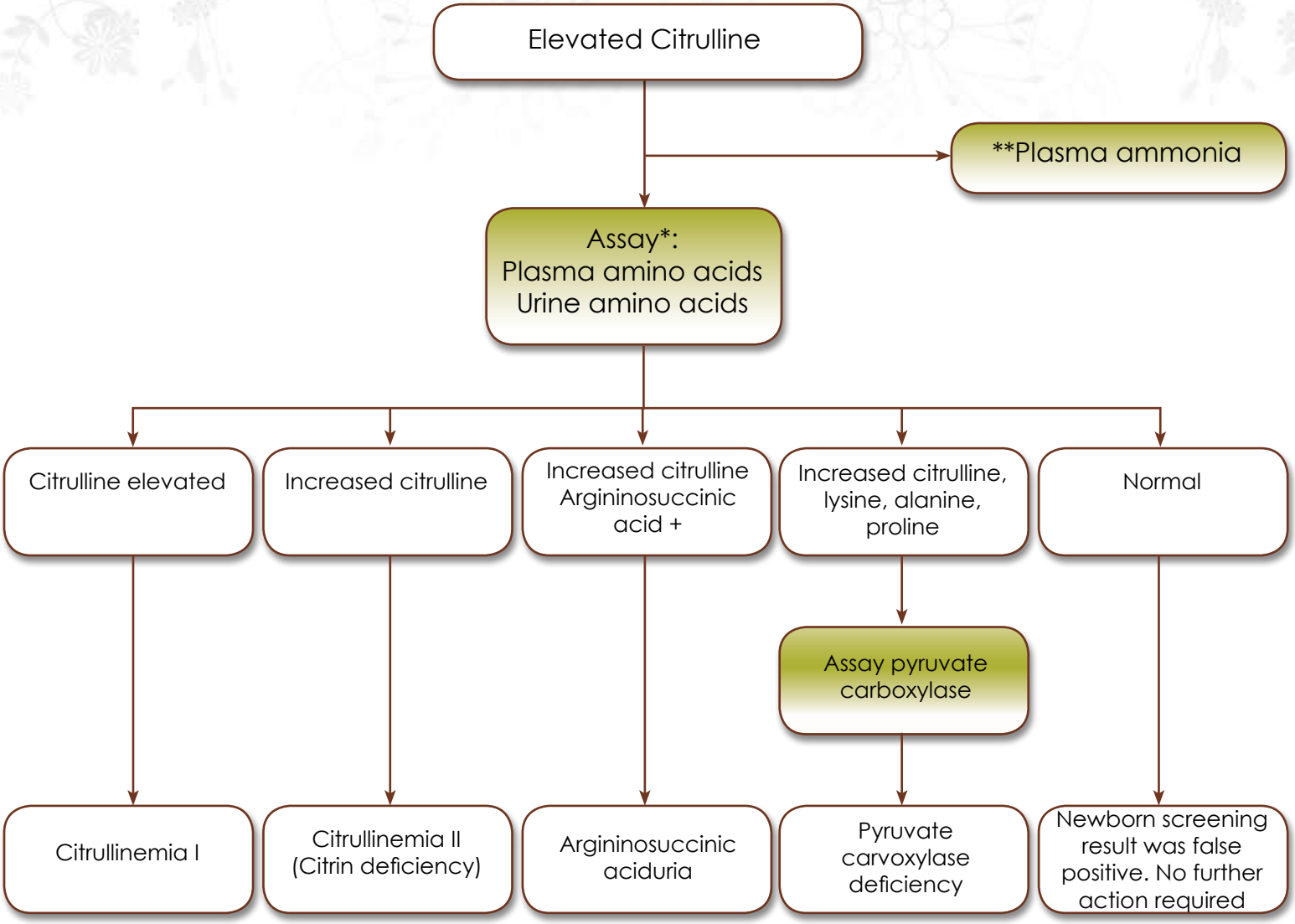
Citrulline Elevated



Actions are shown in shaded boxes; results are in the unshaded boxes.

Abbreviations / Key:

** = When the positive predictive values of screening are sufficiently high and the risk to the infant is high, some initiate diagnostic studies that are locally available at the same time as confirmation of the screening result is done.

* = Urine organic acids (orotic) may be informative.

Disclaimer: These standards and guidelines are designed primarily as an educational resource for physicians to help them provide quality clinical services. Adherence to these standards and guidelines does not necessarily ensure a successful medical outcome. These standards and guidelines 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 healthcare provider should apply his or her own professional judgment to the specific clinical circumstances presented by the individual patient or specimen. It may be prudent, however, to document in the patient record the rationale for any significant deviation from these standards and guidelines.

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