**KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT**

# NEWBORN SCREENING ACT SHEET

## SCREEN FOR: INCREASED CITRULLINE

## CONDITION: AMINO ACIDURIA/UREA CYCLE DISORDER (CIT/ASA)

***DIFFERENTIAL DIAGNOSIS***: Citrullinemia I, argininosuccinic acidemia; citrullinemia II (citrin deficiency).

***METABOLIC 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 - ACTION TO BE TAKEN IMMEDIATELY:

- Contact family to inform them of the newborn screening result and ascertain clinical status (poor feeding, vomiting, lethargy, and 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.

***CONFIRMATION OF DIAGNOSIS:*** Plasma **ammonia** to determine presence of hyperammonemia. In citrullinemia, plasma amino acid analysis will show increased **citrulline** whereas in argininosuccinic 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.

***CLINICAL EXPECTATIONS:*** 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. Treatment for ASA and citrullinemia is to promote normal growth and development and to prevent hyperammonemia.

***REPORTING:*** Report diagnostic result to family and Kansas NBS program.

## SPECIALISTS:

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| **Children's Mercy** | Kansas City, Missouri | **Bryce Heese MD or Jennifer Gannon MD** | Clinic phone: 816-234-3771<br>Hospital Operator 816-234-3000<br>Office Fax: 816-302-9963 |
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