ACMG
American College of Medical Genetics and Genomics
Translating Genes Into Health®

ACT Sheet

Newborn Screening ACT Sheet

[Hemoglobin FSA]
Hemoglobin S/Beta Plus Thalassemia
(Hb S/β⁺ Thalassemia)

Differential Diagnosis: Sickle Cell Trait.

Condition Description: Hemoglobin S/Beta Plus (β⁺) Thalassemia is an inherited type of red blood cell disorder characterized by abnormal hemoglobin production. It is due to genetic changes in the beta hemoglobin chain. Although asymptomatic at birth, symptoms begin as HbF decreases and Hb S predominates. The clinical course is highly variable, ranging from asymptomatic to life-threatening infections, acute chest syndrome, splenic sequestion, organ damage, and pain crises; the phenotype is determined by the amount of Hb A present.

You Should Take the Following Actions:

- Inform the family of the newborn screening result.
- Ascertain clinical status (newborns are expected to be asymptomatic).
- Administer prophylactic penicillin.
- Evaluate the newborn (assess for splenomegaly and send CBC).
- Consult with sickle cell specialist immediately with in person follow up by no later than 12 weeks of age.
- Coordinate confirmatory diagnostic testing and management as recommended by specialist.
- Provide family with basic information about Hemoglobin S/Beta Plus (β⁺) Thalassemia including the need for urgent evaluation if fever of ≥ 38.5°C (101°F) or splenic sequestration.
- Refer for genetic counseling.

- Report final diagnostic outcome to newborn screening program.

Diagnostic Evaluation: The hemoglobins are listed in order of the amount of hemoglobin present on the newborn screen (F>S>A). Isoelectric focusing, high performance liquid chromatography (HPLC) or capillary zone electrophoresis is used to confirm the newborn screening result. Complete blood count: the CBC, smear, mean corpuscular volume and reticulocyte count may be normal at birth but over the first few months of life demonstrate a worsening microcytic anemia, with an increasing reticulocyte count and sickle cells on smear. Molecular genetic testing is required to characterize the beta thalassemia variant.

Clinical Considerations: Newborns with Hemoglobin S/β⁺ Thalassemia are generally asymptomatic. Hemolytic anemia and vaso-occlusive complications can develop during infancy or in early childhood. Without appropriate treatment, complications include life-threatening infection, splenic sequestration, pneumonia, acute chest syndrome, pain episodes, aplastic crises, dactylitis, priapism, and osteonecrosis. Comprehensive care including family education, a modified immunization schedule, prompt treatment of infections and of vaso-occlusive events, screening for early signs of organ damage, and consideration of prophylactic penicillin and other disease-modifying interventions, reduces morbidity and mortality. Patients with HbS/β⁺ Thalassemia often have a clinical course that is similar to, but is less severe than those with sickle cell anemia (Hb S/S) and have a longer life expectancy. Their phenotype is determined by the thalassemia variant. Monitoring depends on the specific diagnosis and should be done under the direction of a sickle cell specialist. Solubility testing (Sickledex) should not be used to confirm the diagnosis. Iron supplements should be avoided unless iron deficiency is documented.

Additional Information:

How to Communicate Newborn Screening Results
Gene Reviews (Beta Thalassemia | Sickle Cell Disease)
Medline Plus (Beta Thalassemia | Sickle Cell Disease)
Condition Information for Families- HRSA Newborn Screening Clearinghouse
Sickle Cell Disease Association of America
Clinicaltrials.gov

Referral (local, state, regional, and national:

Find A Hematologist (Filter by Pediatric Hematology-Oncology)
Find a Genetics Clinic Directory
Genetic Testing Registry
National Alliance of Sickle Cell Centers

 (Funded in part through MCHB/HRSA/HHS grant #U22MC03957;#UH9MC30770; National Coordinating Center for the Regional Genetics Networks*)*

Local Resources *(Insert Local Website Links)*

State Resource Site (Insert Website Information)

Name	
URL	
Comments	

Local Resource Site (Insert Website Information)

Name	
URL	
Comments	

Appendix *(Resources with Full URL Addresses)*

Additional Information

How to Communicate Newborn Screening Results
- https://bit.ly/NBSResultsHRSA

Gene Reviews
- https://www.ncbi.nlm.nih.gov/books/NBK1426/
- https://www.ncbi.nlm.nih.gov/books/NBK1377/

Medline Plus
- https://medlineplus.gov/genetics/condition/beta-thalassemia/
- https://medlineplus.gov/genetics/condition/sickle-cell-disease/

Condition Information for Families-HRSA Newborn Screening Clearinghouse
- https://newbornscreening.hrsa.gov/conditions/s-beta-thalassemia

Sickle Cell Disease Association of America
- https://www.sicklecelldisease.org/

Clinicaltrials.gov
- https://clinicaltrials.gov/

Referral (local, state, regional and national)

Find A Hematologist (Filter by Pediatric Hematology-Oncology)
- https://www.hematology.org/education/patients/find-a-hematologist

Find a Genetics Clinic Directory
- https://clinics.acmg.net

Genetic Testing Registry
- https://www.ncbi.nlm.nih.gov/gtr/

National Alliance of Sickle Cell Centers
- https://sicklecellcenters.org/

 (Funded in part through MCHB/HRSA/HHS grant #U22MC03957;#UH9MC30770; National Coordinating Center for the Regional Genetics Networks*)*