August 24, 2010

Newborn TREC Screening in Louisiana to detect severe T cell lymphopenia in newborn infants.
Follow up of abnormally low TREC results.

Newborn screening for severe T cell lymphopenia in Louisiana will be possible through a collaboration of the Louisiana Laboratory of Public Health, Louisiana Department of Health and Hospitals in Metairie, Louisiana and the Newborn Screening Laboratory of the Wisconsin State Laboratory of Hygiene in Madison. Clinical reporting and monitoring of abnormal results will be performed by qualified immunologists working in academic centers in Louisiana with the collaboration of the Research Institute for Children in New Orleans and the Jeffrey Modell Diagnostic Center for Immunodeficiencies in New Orleans.

The team that will deal with abnormal TREC results consists of newborn screening nurses of the Research Institute for Children. This team will receive the report of an abnormal TREC result reported by Wisconsin and communicate with the primary care physician and specialists as appropriate.

The general guideline to report an abnormal TREC result is outlined in the algorithm at the end of this document.

Communication of an abnormal or an inconclusive result. A TREC result defined as inconclusive l by the Wisconsin laboratory (low TRECS and low control β-actin) will be communicated to the primary care physician or designated referral physician to inform them of the newborn screening results and a repeat screening card.

Communication of an abnormal result

A low Trec result will be communicated to the primary care physician or designated referral physician to inform them of the newborn screening results and ascertain current status and if there is a history of SCID in the family.

Two basic actions will then be recommended depending on the gestational age of the newborn:

1. If the newborn is premature, additional Guthrie card samples will be requested every 2-3 weeks until TRECS normalize. The gestational age of a newborn is recorded at the time of obtaining the Guthrie card sample. If TRECS remain low by 37 weeks of gestational age, further testing and/or referral to an immunologist is recommended (see next).

2. If the newborn is a term baby with low TREC results, two options will be presented to the primary care physician:

- Obtain a whole blood sample for a CBC with differential, flow cytometry (enumeration of CD3+ T cell CD4+ T helper cells, CD8+ T suppressor cells, CD19+ B cells and CD16/56+ NK cells). A copy of the test results will be requested regardless of the outcome of the test. If this second tier tests show T cell lymphopenia (*or low percentage of naïve CD4 or CD8 T cells)*, referral to an Immunology center for further evaluation, diagnosis and treatment is indicated.

- Refer directly to an immunology center for evaluation. This option will be encouraged if the newborn does not appear to clinically healthy.

The family will not be contacted directly unless the primary care physician requests it. Contact with the family will be done by one the immunologists on a list provided to the primary care physician (see list of immunologists and referral centers, below).

Differential diagnosis of low TRECSs:

- Prematurity,
- Severe combined immune deficiency (SCID),
- Complete DiGeorge syndrome,
- Idiopathic T cell lymphopenias,
- Congenital HIV infection,
- Intestinal lymphangiectasia
- Other disorders resulting in a profound loss of lymphocytes.

Brief condition description*s*

Prematurity. TRECS mature at different rates in different babies. Some premature babies may have very low TRECS that will increase with time. When the baby reaches 37 weeks of gestational age, low TRECS become clearly abnormal and additional testing is required.

SCID is an inherited (X-linked or autosomal recessive) condition causing a deficiency in T cell lymphocytes, with or without an associated defect in B cells and/or NK cells. Affected infants are susceptible viral, fungal and bacterial infections. Patients become symptomatic only after onset of infections or other complications like graft versus host disease.

DiGeorge Syndrome (22q11.2 deletion syndrome) is a rare congenital disease whose symptoms in the newborn period vary greatly but may include hypocalcemic titanic seizures, heart defects, and characteristic facial features. In severe (or “complete”) cases (<1%), the presentation can share features of SCID. These infants may be candidates for thymic transplantation.

Idiopathic T cell lymphopenias are relatively frequent. They may have different causes and their prognosis is still under evaluation.

Referral summary for confirmed low TREC results

1. Initial Testing: Confirmatory testing: CBC with differential, Flow cytometry can be performed at local or commercial laboratories
2. Advanced immunology evaluation: lymphocyte proliferation, identification of molecular abnormality is recommended to be done by Clinical immunologists.

Referral information. Centers and Clinical Immunologists

New Orleans

Jeffrey Modell Diagnostic Center (JMC) for Immunodeficiencies at Children's Hospital. The JMC team can be reached by calling 504 896 9589 during working hours and 504 899 9511. After hours requesting to talk to the fellow on call for Allergy/Immunology. The JMC staff includes:

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Stem cell transplantation (bone marrow or cord blood) in Louisiana is available at Children's Hospital in New Orleans through the clinical immunologists at Children's Hospital: Dimitriades, Paris and Sorensen.

TREC screening algorithm.

Modified from the recommendation of the Working group on Newborn Screening for T cell lymphopenia/SCID--development of "ACT" from the Primary Immunodeficiency Committee of the American Academy of Allergy, Asthma and Immunology