



**NEWBORN SCREENING
OFFICE OF HEALTH PROMOTION**
535 W. Jefferson St., 2nd Floor
Springfield, IL 62761
Phone: 217-785-8101
Fax: 217-557-5396

Niemann-Pick Disease

Information for Physicians and Other Health Care Professionals

Definition

Niemann-Pick disease is an inherited metabolic disorder in which harmful amounts of a sphingolipid called sphingomyelin accumulate within lysosomes of cells. Individuals with Niemann-Pick disease types A and B do not produce enough of one of the enzymes (acid sphingomyelinase or ASM) needed to metabolize sphingomyelin. Excessive storage in the lysosomes can cause permanent cellular and tissue damage, particularly in the liver, spleen, bone marrow, lungs, and, in some patients, the brain.

Clinical Symptoms

Niemann-Pick disease is categorized into four types: A, B, C and D. Only types A and B are detected by newborn screening. *Niemann-Pick type A* is the most severe form, with onset in the first 6 months of life and death by ages 3 years to 4 years. Symptoms include an enlarged liver and spleen, cherry-red macula, and progressive weakness and developmental regression. Individuals with *Niemann-Pick type B* (or juvenile onset) typically have an enlarged liver and spleen, abnormal serum lipids, and progressive pulmonary disease, but the central nervous system is generally not affected.

Newborn Screening and Definitive Diagnosis

In Illinois, newborn screening for Niemann-Pick is performed by determination of the activity of ASM. **If newborn screening results indicate abnormal activity of ASM, referral should be made to a metabolic disease specialist.**

Treatment

Individuals with Niemann-Pick disease are best treated by a team of specialists knowledgeable about the disease, who can offer supportive and symptomatic care. Bone marrow transplantation has been attempted in a few patients with type B. Clinical trials for enzyme replacement therapy are underway.

Incidence

The incidence of types A and B combined in the general population is estimated to be one in 250,000. Niemann-Pick disease type A is seen with a higher frequency in the Ashkenazi Jewish population (one in 40,000 births).

Inheritance Patterns

Niemann-Pick disease is inherited in an autosomal recessive pattern. Parents of a child with Niemann-Pick disease are unaffected, healthy carriers of the condition, and have one normal gene and one abnormal gene. With each pregnancy, carrier parents have a 25 percent chance of having a child with Niemann-Pick disease (inheriting two copies of the abnormal gene). Carrier parents have a 50 percent chance of having a child who is an unaffected carrier, and a 25 percent chance of having an unaffected, non-carrier child. These risks would hold true for each pregnancy. **Genetic counseling is recommended for families planning future pregnancies.**

Pathophysiology

In Niemann-Pick disease, an enzyme defect leads to storage of sphingomyelin and other sphingolipids in the lysosomes. The progressive build-up of lipids in the lysosomes causes the clinical findings of the disease.

Key Points for Parents

It is important to reassure parents that not all infants identified by newborn screening as having low ASM activity will turn out to have Niemann-Pick disease. If the child needs additional testing or diagnostic evaluation, make certain the parents understand the importance of following the pediatrician's and/or specialist's recommendations for additional testing and referrals.

Following Confirmation of Diagnosis

These guidelines should be followed after a diagnosis of Niemann-Pick disease has been confirmed:

- 1) Follow up with the child's metabolic disease specialist.
- 2) Use a multidisciplinary approach for long-term management including specialists from pediatrics, genetics, and others experienced with managing individuals with Niemann-Pick disease.
- 3) Ensure that parents understand that treatment for Niemann-Pick disease is not curative and that morbidity cannot always be prevented.
- 4) Recommend genetic counseling services to help the parents understand the complexity surrounding the carrier state and inheritance of this disease.
- 5) Provide parents information on support services, such as the National Niemann-Pick Disease Foundation, early intervention service providers, and the local health department.
- 6) Additional information about newborn screening can be found at:
 - Baby's First Test: <http://www.babysfirsttest.org/>
Health Resource and Service Administration (HRSA), Grant no. U36MC16509, Quality Assessment of the Newborn Screening System.
 - National Center for Biotechnology Information: <http://www.ncbi.nlm.nih.gov/gtr/>
National Center for Biotechnology Information, U.S. National Library of Medicine, 8600 Rockville Pike, Bethesda MD, 20894 USA.