Wisconsin State Laboratory of Hygiene
UNIVERSITY OF WISCONSIN–MADISON

An Introduction to Pompe Disease

Adapted from sources including Baby's First Test and the Genetics Home Reference

This document includes some detailed information about newborn screening for Pompe disease. Some of the information below may not apply to all babies, especially if the only concerning result so far is from the newborn screening test. Please talk with your health care provider to know how much of this applies to you and your family.

Pompe disease is a rare condition that affects about 1 in 40,000 people in the United States. Pompe disease is called a "lysosomal storage disorder" because it interferes with a person's lysosomes (the recycling center of each cell), making them less able to break down certain types of complex chemicals. This causes undigested sugars and other harmful substances to build up in cells throughout the body, resulting in a variety of symptoms and medical problems. It is a "genetic disease" because it can be passed down from parents to children, even though the parents don't have the disease.

There are two forms of Pompe disease, called classic infantile-onset disease and late-onset disease. Each form of Pompe disease has its own medical problems, age of onset, and likelihood of treatment success. Even in one form of Pompe disease, medical problems may be different from person to person. In the classic infantile-onset form, babies can develop very serious heart and breathing muscle problems. Treatment is more successful if these problems are detected early. This is the main reason to screen for Pompe disease in newborns.

Early Evaluation and Follow-Up Testing

If your baby's newborn screening result for Pompe disease was positive (abnormal), your baby's health care provider will contact you to arrange for your baby to have additional testing. Your baby's health care provider will ask you if your baby is showing any of the problems caused by Pompe disease (see Early Signs, below). If your baby is showing any of these problems, your baby's health care provider may suggest starting treatment within a few days (see Treatment, below). However, starting treatment can normally wait a few weeks until follow-up test results come back.

"Positive" or "abnormal" means that the screening result numbers were outside of the normal range. It is important to remember that an abnormal screening result does not necessarily mean that your child has Pompe disease. An abnormal result may occur because the initial blood sample was too small or for other reasons. However, since some babies with abnormal screening do have Pompe disease, it is very important that you go to your appointment for follow-up testing. Because the harmful effects of untreated Pompe disease can occur soon after birth, follow-up testing must be completed as soon as possible. This will determine

whether or not your baby has Pompe disease and if they have already developed heart problems.

What specific tests will be included in follow up testing?

- A blood test for an enzyme or substance called “acid alpha-glucosidase”
- A blood test for the gene called GAA (a “DNA test”)
    - If these tests show abnormal enzyme function and/or disease-causing changes in the GAA gene, then your health care provider will know your baby has Pompe disease. Unfortunately, it can take about two weeks for these tests to be complete, and sometimes this will need to be followed up with additional tests.
- A faster blood test for another enzyme or substance called “creatine kinase,” or CK, which may tell your health care provider if your baby has muscle damage. However, this test can be falsely elevated and will not tell for sure whether your baby is healthy or not.
- An echocardiogram (ultrasound of the heart) to look for life-threatening heart problems before the enzyme and DNA testing results are back.
- Depending on your baby’s circumstances, a urine test for a sugar called Hex4 may also be ordered. Hex4 can be abnormally increased in the urine of people with Pompe disease.

Early Signs of Pompe Disease

The medical problems and age of onset of Pompe disease differ depending on the form of the disease. The severe form is called “classic infantile-onset Pompe disease.” For babies with this form of Pompe disease, the symptoms begin before or shortly after birth. Symptoms can include:

- Muscle weakness (health care providers call this “myopathy”)
- Failure to gain weight and grow at expected rate (this is called “failure to thrive”)
- Difficulty breathing
- Trouble eating
- Respiratory infections (pneumonia)
- Hearing problems
- A thickened heart muscle that may also be weak

Some children with infantile-onset Pompe disease have a milder version in which symptoms usually occur by age one and may include:

- Delayed motor skills
- Worsening muscle weakness (myopathy)
- Difficulty breathing

The second form of the condition is called “late-onset Pompe disease” because it may develop in childhood, adolescence, or even adulthood. It is also associated with gradually worsening muscle weakness and difficulty with sleep and breathing. However, the symptoms are usually milder and worsen more slowly than the other forms of Pompe disease.

Treatments

Enzyme replacement therapy (ERT) is the standard treatment for Pompe disease. This helps the body break down the sugars and other chemicals that otherwise build up in the cells. Your baby’s health care provider may recommend your baby receive ERT to improve the signs and symptoms of Pompe disease. ERT can often stop or slow damage to a baby’s organs, improve breathing and motor skills, and reduce heart enlargement. When Pompe disease is detected early and proper treatment is started early in life, many babies remain relatively healthy. Those with late-onset disease usually also benefit from ERT with improved health.

What happens next?

All of this information should be discussed with your health care providers. It is normal to have lots of questions and even worries. Please discuss these with your baby's health care providers. If you want to read more, your health care provider may recommend other resources. A good place to start is the Genetics Home Reference (http://ghr.nlm.nih.gov/condition/pompe-disease). Your health care provider will work with you throughout this experience until all results are back, your questions have been answered, and you know whether or not your baby has Pompe disease and what the plan will be for their care.