Developing X-ALD Education Materials

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XALD
X-Linked Adrenoleukodystrophy

TEXAS Health and Human Services

Texas Department of State Health Services

About XALD
(X-Linked Adrenoleukodystrophy)

XALD is a disease that affects the body's ability to break down very long chain fatty acids (VLCFAs). As a result, VLCFAs build up in the body and cause damage to the adrenal glands, which produce hormones that help the body function normally. The nervous system can also be affected. About 1 in 17,000 babies are born with XALD.

Screening for XALD

VLCFA levels are measured in the blood from the newborn screening test. If VLCFA levels are high, then genetic testing is done to see if your baby has a variation in the ABCD1 gene. XALD is caused by variants or changes in the ABCD1 gene.

IF ABCD1 TESTING IS POSITIVE:
Genetic testing that is positive for ABCD1 gene variants or changes suggests that your baby may either have XALD (boys) or be an XALD carrier (girls). Your baby will need to see a metabolic specialist for further evaluation.

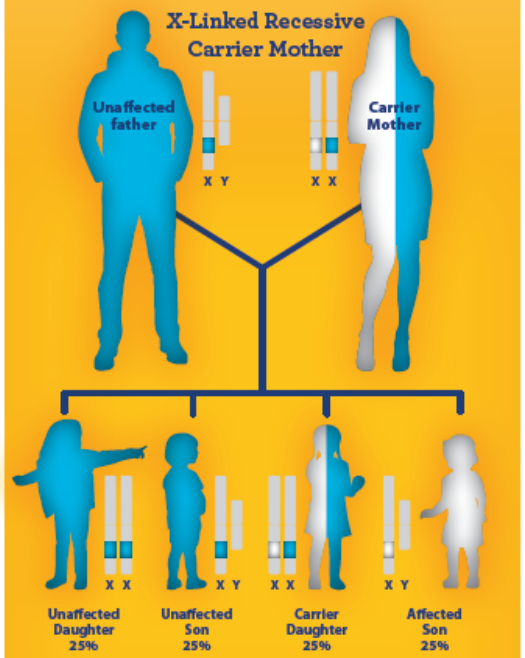
IF ABCD1 TESTING IS NEGATIVE:
If VLCFA levels are high, but genetic testing is negative for ABCD1 variants/changes, your baby will need to see a metabolic specialist. XALD is a part of a group of disorders known as peroxisomal disorders. Other peroxisomal disorders besides XALD can cause high VLCFA levels. Because newborn screening testing may not be conclusive, additional testing may be needed to figure out if your baby has XALD or another peroxisomal disorder.

Symptoms of XALD

BOYS
Baby boys with XALD usually appear healthy at birth. XALD symptoms can develop in childhood, but some boys do not have symptoms until they are adults. Symptoms can involve the adrenal glands, the nervous system, or both. When and how symptoms occur is different for everyone. There are four main types of XALD: cerebral XALD, adrenomyeloneuropathy (AMN), Addison's disease, and asymptomatic XALD.

How XALD is Inherited

Because the ABCD1 gene is located on the X chromosome, XALD is passed on from mother to son by "X-linked inheritance." Boys have only one X chromosome, which means they only have one ABCD1 gene. Boys have XALD when their only ABCD1 gene is not functioning properly. Girls have two X chromosomes, which means they have two ABCD1 genes. Girls who have a non-functioning ABCD1 gene on one X chromosome still have a normal ABCD1 gene on the other X chromosome, so they are called XALD carriers.



CEREBRAL XALD
Cerebral XALD involves the brain and is the most severe type of XALD. Boys with cerebral XALD have leukodystrophy in the brain. A protective coating ("white matter") surrounds the nerves in the brain. Leukodystrophy occurs when the protective coating is damaged or destroyed. Leukodystrophy can be detected on an MRI scan of the brain. Cerebral XALD affects about 40% of boys with XALD and usually develops in childhood.

Symptoms of cerebral XALD include behavioral problems, loss of developmental skills, and seizures. Untreated cerebral XALD is usually fatal.

ADRENOMYELONEUROPATHY (AMN)
AMN involves progressive damage to the nerves of the body and the spinal cord. AMN occurs in adulthood, between the ages of 30 and 40 years. Almost all boys with XALD will eventually develop AMN. Symptoms of AMN include pain and stiffness in the legs, loss of coordination, and problems with bowel and bladder function. Some men have weakness in the arms and hands. About 20% of men with AMN eventually go on to develop cerebral XALD.

ADRENAL INSUFFICIENCY/ADDISON'S DISEASE
The adrenal glands produce hormones that help our bodies function properly. Adrenal glands affected by XALD do not produce enough hormones, causing adrenal insufficiency. Boys with cerebral XALD or AMN can also have adrenal insufficiency. When adrenal insufficiency occurs without cerebral XALD or AMN, it is called Addison's disease. About 10% of boys with XALD will develop Addison's disease. Adrenal insufficiency can develop in childhood or adulthood. Symptoms of adrenal insufficiency include muscle weakness, weight loss, low blood pressure, darkening of the skin, and fatigue.

ASYMPTOMATIC XALD
For some boys, it may take many years for symptoms to appear. Even if your baby does not have symptoms of XALD, it is important for him to be monitored by a neurologist and an endocrinologist.

GIRLS
About half of girls who are XALD carriers will develop symptoms of AMN by the time they are 40 to 50 years old. Girls who are XALD carriers rarely develop cerebral XALD or adrenal insufficiency.

Treatment of XALD

CEREBRAL XALD
Hematopoietic stem cell transplantation (HSCT), or bone marrow transplantation, is the only treatment that can stop brain damage from getting worse in cerebral XALD. HSCT only works when leukodystrophy is mild on the MRI brain scan and before symptoms have developed. This is why it is very important for boys with XALD to see a neurologist regularly.

ADRENOMYELONEUROPATHY (AMN)
No currently available treatments can cure AMN. A neurologist can help treat the symptoms of AMN, such as pain and stiffness.

ADRENAL INSUFFICIENCY/ ADDISON'S DISEASE
Boys with XALD need to be seen regularly by an endocrinologist, even if they have no symptoms of adrenal insufficiency or Addison's disease. The endocrinologist will measure adrenal hormone levels. When boys develop symptoms of adrenal insufficiency and have abnormal adrenal hormone levels, they will need treatment with steroid (adrenal) hormone replacement therapy. It is important to treat adrenal insufficiency to improve symptoms and prevent serious and life-threatening complications.

Other Treatment

Other treatments may include medication to relieve symptoms like stiffness and seizures; physical therapy, which can help relieve muscle spasms and reduce muscle rigidity, and experimental dietary therapies.

More Information on XALD

Texas Department of State Health Services
1-800-252-8023 ext. 3957 or www.dshs.texas.gov/newborn

ALD education and resources:
www.babysfirsttest.org

ALD and rare genetic diseases:
ghr.nlm.nih.gov

Advocacy, education, and financial support:
myelin.org

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GUIDING QUESTIONS

What is the overall goal of the education?
What is the issue that needs to be addressed?
Are the plans people and purpose driven?
What type of information dissemination will meet the goal?

Why does the issue need to be addressed?
What is the cause of the issue?
What is the motivation to address the issue now?
How high is the priority?

Who is the target audience?
What is the geographical target area?
What special considerations are necessary for the target population?

When does the intended change need to take place?
Is there an urgent need to address the issue? Provider needs, family needs etc.

What modalities and distribution strategies are planned?
What resources are available for developing new materials or modifying existing materials?
What other barriers exist in developing/implementing?
What is the best modality for the target population?

Is the need, desired outcome, or audience unprecedented?
Are there existing education materials available to meet this need?

baby's first test