Horizontal gaze palsy with progressive scoliosis

Description

Horizontal gaze palsy with progressive scoliosis (HGPPS) is a disorder that affects the eyes and the spine. Individuals with this condition are unable to move their eyes side-to-side (horizontally) from birth, although the problem may not be diagnosed until later in infancy. As a result, affected individuals must track moving objects by turning their head instead of moving their eyes. Up-and-down (vertical) eye movements are typically normal.

In people with HGPPS, an abnormal side-to-side curvature of the spine (scoliosis) develops between infancy and childhood. It tends to be moderate to severe and worsens over time. The abnormal spine position can be painful and can interfere with movement. In severe cases, it may impede breathing. It may require external support, such as bracing, and is often treated with surgery early in life.

People with HGPPS have structural abnormalities along the midline of the brain that can only be seen with medical imaging. This imaging shows distinctive malformations that include underdevelopment of brain structures called the pons and cerebellar peduncles and a notch or cleft in the midline of the brain. While most people with HGPPS have a normal intellect, mild intellectual disabilities can occur.

Frequency

HGPPS has been reported in several dozen families worldwide.

Causes

HGPPS is caused by variants (also called mutations) in the *ROBO3* gene. This gene provides instructions for making a protein that plays a critical role in the developing brain before birth. Specifically, this protein is important for communication across the two sides (hemispheres) of the brain.

The ROBO3 protein is important for forming certain nerve pathways in the brain. These include motor nerve pathways, which transmit information about voluntary muscle movement, and sensory nerve pathways, which transmit information about sensory input (such as touch, pain, and temperature). For the brain and the body to communicate effectively, these nerve pathways must cross from one side of the body to the other in the brainstem. The ROBO3 protein is necessary to ensure that motor and

sensory nerve pathways can cross over in the brainstem. In people with HGPPS, these pathways do not cross over; they stay on the same side of the body.

Researchers believe that this miswiring in the brain caused by the lack of the ROBO3 protein is the underlying cause of the eye movement abnormalities that are associated with HGPPS. The cause of progressive scoliosis in people with this condition is unclear.

Learn more about the gene associated with Horizontal gaze palsy with progressive scoliosis

- ROBO3

Inheritance

This condition is inherited in an autosomal recessive pattern, which means both copies of the gene in each cell must have a variant to cause the disorder. The parents of an individual with an autosomal recessive condition each carry one copy of the altered gene, but they typically do not show signs and symptoms of the condition.

Other Names for This Condition

- Familial horizontal gaze palsy with progressive scoliosis
- Familial infantile scoliosis associated with bilateral paralysis of conjugate gaze
- HGPPS
- Progressive external ophthalmoplegia and scoliosis

Additional Information & Resources

Genetic Testing Information

- Genetic Testing Registry: Gaze palsy, familial horizontal, with progressive scoliosis 1 (https://www.ncbi.nlm.nih.gov/gtr/conditions/C4551964/)

Genetic and Rare Diseases Information Center

- Horizontal gaze palsy with progressive scoliosis (https://rarediseases.info.nih.gov/diseases/12682/index)

Patient Support and Advocacy Resources

- National Organization for Rare Disorders (NORD) (https://rarediseases.org/)

Clinical Trials

- ClinicalTrials.gov (https://clinicaltrials.gov/search?cond=%22Horizontal gaze palsy with progressive scoliosis%22)

Catalog of Genes and Diseases from OMIM

- GAZE PALSY, FAMILIAL HORIZONTAL, WITH PROGRESSIVE SCOLIOSIS 1; HGPPS1 (https://omim.org/entry/607313)

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28%28horizontal+gaze+palsy+with+progressive+scoliosis%5BTIAB%5D%29+OR+%28hgpps%5BTIAB%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3600+days%22%5Bdp%5D)

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