Schwartz-Jampel syndrome

Description

Schwartz-Jampel syndrome is a rare condition characterized by permanent muscle stiffness (myotonia) and bone abnormalities known as chondrodysplasia. The signs and symptoms of this condition become apparent sometime after birth, usually in early childhood. Either muscle stiffness or chondrodysplasia can appear first. The muscle and bone abnormalities worsen in childhood, although most affected individuals have a normal lifespan. The specific features of Schwartz-Jampel syndrome vary widely.

Myotonia involves continuous tensing (contraction) of muscles used for movement (skeletal muscles) throughout the body. This sustained muscle contraction causes stiffness that interferes with eating, sitting, walking, and other movements. Sustained contraction of muscles in the face leads to a fixed, "mask-like" facial expression with narrow eye openings (blepharophimosis) and pursed lips. This facial appearance is very specific to Schwartz-Jampel syndrome. Affected individuals may also be nearsighted and experience abnormal blinking or spasms of the eyelids (blepharospasm).

Chondrodysplasia affects the development of the skeleton, particularly the long bones in the arms and legs and the bones of the hips. These bones are shortened and unusually wide at the ends, so affected individuals have short stature. The long bones may also be abnormally curved (bowed). Other bone abnormalities associated with Schwartz-Jampel syndrome include a protruding chest (pectus carinatum), abnormal curvature of the spine, flattened bones of the spine (platyspondyly), and joint abnormalities called contractures that further restrict movement.

Researchers originally described two types of Schwartz-Jampel syndrome. Type 1 has the signs and symptoms described above, while type 2 has more severe bone abnormalities and other health problems and is usually life-threatening in early infancy. Researchers have since discovered that the condition they thought was Schwartz-Jampel syndrome type 2 is actually part of another disorder, Stüve-Wiedemann syndrome, which is caused by mutations in a different gene. They have recommended that the designation Schwartz-Jampel syndrome type 2 no longer be used.

Frequency

Schwartz-Jampel syndrome appears to be a rare condition. About 150 cases have been reported in the medical literature.

Causes

Schwartz-Jampel syndrome is caused by mutations in the *HSPG2* gene. This gene provides instructions for making a protein known as perlecan. This protein is found in the extracellular matrix, which is the intricate lattice of proteins and other molecules that forms in the spaces between cells. Specifically, it is found in part of the extracellular matrix called the basement membrane, which is a thin, sheet-like structure that separates and supports cells in many tissues. Perlecan is also found in cartilage, a tough, flexible tissue that makes up much of the skeleton during early development. Most cartilage is later converted to bone, except for the cartilage that continues to cover and protect the ends of bones and is present in the nose and external ears.

Perlecan has multiple functions, including cell signaling and the normal maintenance of basement membranes and cartilage. The protein also plays a critical role at the neuromuscular junction, which is the area between the ends of nerve cells and muscle cells where signals are relayed to trigger muscle contraction.

The mutations that cause Schwartz-Jampel syndrome reduce the amount of perlecan that is produced or lead to a version of perlecan that is only partially functional. A reduction in the amount or function of this protein disrupts the normal development of cartilage and bone tissue, which underlies chondrodysplasia in affected individuals. A reduced amount of functional perlecan at the neuromuscular junction likely alters the balance of other molecules that signal when muscles should contract and when they should relax. As a result, muscle contraction is triggered continuously, leading to myotonia.

Learn more about the gene associated with Schwartz-Jampel syndrome

- HSPG2

Inheritance

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

Other Names for This Condition

- Chondrodystrophic myotonia
- Myotonic myopathy, dwarfism, chondrodystrophy, and ocular and facial abnormalities
- Schwartz-Jampel syndrome, type 1
- Schwartz-Jampel-Aberfeld syndrome
- SJA syndrome
- SJS

- SJS1

Additional Information & Resources

Genetic Testing Information

- Genetic Testing Registry: Schwartz-Jampel syndrome type 1 (https://www.ncbi.nlm.nih.gov/gtr/conditions/C4551479/)

Genetic and Rare Diseases Information Center

- Schwartz-Jampel syndrome (https://rarediseases.info.nih.gov/diseases/250/index)

Patient Support and Advocacy Resources

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

Catalog of Genes and Diseases from OMIM

- SCHWARTZ-JAMPEL SYNDROME, TYPE 1; SJS1 (https://omim.org/entry/255800)

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28Schwartz-Jampel%5BTIAB%5D%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3600+days%22%5Bdp%5D)

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