Autosomal recessive spastic ataxia of Charlevoix-Saguenay

Autosomal recessive spastic ataxia of Charlevoix-Saguenay, more commonly known as ARSACS, is a condition affecting muscle movement. People with ARSACS typically have abnormal tensing of the muscles (spasticity), difficulty coordinating movements (ataxia), muscle wasting (amyotrophy), involuntary eye movements (nystagmus), and speech difficulties (dysarthria). Other problems may include deformities of the fingers and feet, reduced sensation and weakness in the arms and legs (peripheral neuropathy), yellow streaks of fatty tissue in the light-sensitive tissue at the back of the eye (hypermyelination of the retina), and less commonly, leaks in one of the valves that control blood flow through the heart (mitral valve prolapse). An unsteady gait is the first symptom of ARSACS. It usually appears between the age of 12 months and 18 months, as toddlers are learning to walk. The signs and symptoms worsen over the years, with increased spasticity and ataxia of the arms and legs. In some cases spasticity disappears, but this apparent improvement is thought to be due to degeneration of nerves in the arms and legs. Most affected individuals require a wheelchair by the time they are in their thirties or forties.

This condition was first seen in people of the Charlevoix-Saguenay region of Quebec, Canada. The majority of people with ARSACS live in Quebec or have recent ancestors from Quebec. People with ARSACS have also been identified in Japan, Turkey, Tunisia, Spain, Italy, and Belgium. The signs and symptoms of ARSACS seen in other countries differ from those in Quebec. In people with ARSACS outside of Quebec, hypermyelination of the retina is seen less often, intelligence may be below normal, and symptoms tend to appear at a later age.

Frequency

The incidence of ARSACS in the Charlevoix-Saguenay region of Quebec is estimated to be 1 in 1,500 to 2,000 individuals. Outside of Quebec, ARSACS is rare, but the incidence is unknown.

Causes

Mutations in the SACS gene cause ARSACS. The SACS gene provides instructions for producing a protein called sacsin. Sacsin is found in the brain, skin cells, muscles used for movement (skeletal muscles), and at low levels in the pancreas, but the specific function of the protein is unknown. Research suggests that sacsin might play a role in folding newly produced proteins into the proper 3-dimensional shape because it shares similar regions with other proteins that perform this function. Mutations in the SACS gene cause the production of an unstable sacsin protein that does not function normally. It is unclear how the abnormal sacsin protein affects the brain and skeletal muscles and results in the signs and symptoms of ARSACS.
Inheritance Pattern

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

- ARSACS
- Charlevoix-Saguenay spastic ataxia
- spastic ataxia of Charlevoix-Saguenay
- spastic ataxia, Charlevoix-Saguenay type

Diagnosis & Management

Genetic Testing Information

- What is genetic testing? 
  /primer/testing/genetictesting
- Genetic Testing Registry: Spastic ataxia Charlevoix-Saguenay type

Research Studies from ClinicalTrials.gov

- ClinicalTrials.gov
  https://clinicaltrials.gov/ct2/results?cond=%22autosomal+recessive+spastic+ataxia+of+Charlevoix-Saguenay%22

Other Diagnosis and Management Resources

- GeneReview: ARSACS
  https://www.ncbi.nlm.nih.gov/books/NBK1255

Additional Information & Resources

Health Information from MedlinePlus

- Health Topic: Degenerative Nerve Diseases
  https://medlineplus.gov/degenerativenervediseases.html
- Health Topic: Movement Disorders
  https://medlineplus.gov/movementdisorders.html
- Health Topic: Neurologic Diseases
  https://medlineplus.gov/neurologicdiseases.html
Genetic and Rare Diseases Information Center

- Spastic ataxia Charlevoix-Saguenay type

Educational Resources

- Kennedy Krieger Institute: Movement Disorders
  https://www.kennedykrieger.org/patient-care/conditions/movement-disorders
- MalaCards: spastic ataxia, charlevoix-saguenay type
  https://www.malacards.org/card/spastic_ataxia_charlevoix_saguenay_type
- Merck Manual Home Edition for Patients and Caregivers: Coordination Disorders
Sources for This Summary

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/10655055

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/15319698

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/14718707

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/17716690

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/15156359

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/16961075

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/17853117

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