Congenital contractural arachnodactyly

Congenital contractural arachnodactyly is a disorder that affects many parts of the body. People with this condition typically are tall with long limbs (dolichostenomelia) and long, slender fingers and toes (arachnodactyly). They often have permanently bent joints (contractures) that can restrict movement in their hips, knees, ankles, or elbows. Additional features of congenital contractural arachnodactyly include underdeveloped muscles, a rounded upper back that also curves to the side (kyphoscoliosis), permanently bent fingers and toes (camptodactyly), ears that look "crumpled," and a protruding chest (pectus carinatum). Rarely, people with congenital contractural arachnodactyly have heart defects such as an enlargement of the blood vessel that distributes blood from the heart to the rest of the body (aortic root dilatation) or a leak in one of the valves that control blood flow through the heart (mitral valve prolapse). The life expectancy of individuals with congenital contractural arachnodactyly varies depending on the severity of symptoms but is typically not shortened.

A rare, severe form of congenital contractural arachnodactyly involves both heart and digestive system abnormalities in addition to the skeletal features described above; individuals with this severe form of the condition usually do not live past infancy.

Frequency

The prevalence of congenital contractural arachnodactyly is estimated to be less than 1 in 10,000 worldwide.

Causes

Mutations in the FBN2 gene cause congenital contractural arachnodactyly. The FBN2 gene provides instructions for producing the fibrillin-2 protein. Fibrillin-2 binds to other proteins and molecules to form threadlike filaments called microfibrils. Microfibrils become part of the fibers that provide strength and flexibility to connective tissue that supports the body's joints and organs. Additionally, microfibrils regulate the activity of molecules called growth factors. Growth factors enable the growth and repair of tissues throughout the body.

Mutations in the FBN2 gene can decrease fibrillin-2 production or result in the production of a protein with impaired function. As a result, microfibril formation is reduced, which probably weakens the structure of connective tissue and disrupts regulation of growth factor activity. The resulting abnormalities of connective tissue underlie the signs and symptoms of congenital contractural arachnodactyly.
Inheritance Pattern
This condition is inherited in an autosomal dominant pattern, which means one copy of the altered gene in each cell is sufficient to cause the disorder.

Other Names for This Condition
- arthrogryposis, distal, type 9
- Beals-Hecht syndrome
- Beals syndrome
- CCA
- contractural arachnodactyly, congenital
- DA9
- distal arthrogryposis type 9

Diagnosis & Management
Genetic Testing
- Genetic Testing Registry: Congenital contractural arachnodactyly

Other Diagnosis and Management Resources
- GeneReview: Congenital Contractural Arachnodactyly
  https://www.ncbi.nlm.nih.gov/books/NBK1386
- MedlinePlus Encyclopedia: Arachnodactyly
  https://medlineplus.gov/ency/article/003288.htm
- MedlinePlus Encyclopedia: Contracture Deformity
  https://medlineplus.gov/ency/article/003185.htm
- MedlinePlus Encyclopedia: Skeletal Limb Abnormalities
  https://medlineplus.gov/ency/article/003170.htm

General Information from MedlinePlus
- Diagnostic Tests
  https://medlineplus.gov/diagnostictests.html
- Drug Therapy
  https://medlineplus.gov/drugtherapy.html
- Genetic Counseling
  https://medlineplus.gov/geneticcounseling.html
• Palliative Care
  https://medlineplus.gov/palliativecare.html
• Surgery and Rehabilitation
  https://medlineplus.gov/surgeryandrehabilitation.html

Additional Information & Resources
Health Information from MedlinePlus
• Encyclopedia: Arachnodactyly
  https://medlineplus.gov/ency/article/003288.htm
• Encyclopedia: Contracture Deformity
  https://medlineplus.gov/ency/article/003185.htm
• Encyclopedia: Skeletal Limb Abnormalities
  https://medlineplus.gov/ency/article/003170.htm
• Health Topic: Connective Tissue Disorders
  https://medlineplus.gov/connectivetissuedisorders.html
• Health Topic: Muscle Disorders
  https://medlineplus.gov/muscledisorders.html

Genetic and Rare Diseases Information Center
• Congenital contractual arachnodactyly
  https://rarediseases.info.nih.gov/diseases/5899/congenital-contractural-arachnodactyly

Educational Resources
• Orphanet: Congenital contractual arachnodactyly
  https://www.orpha.net/consor/cgi-bin/OC_Exp.php?Lng=EN&Expert=115

Patient Support and Advocacy Resources
• CLIMB: Children Living with Inherited Metabolic Diseases
  http://www.climb.org.uk/
• National Organization for Rare Disorders (NORD)
  https://rarediseases.org/rare-diseases/congenital-contractural-arachnodactyly/
• The National Marfan Foundation: Beals Syndrome
  http://www.marfan.org/beals-syndrome

Clinical Information from GeneReviews
• Congenital Contractural Arachnodactyly
  https://www.ncbi.nlm.nih.gov/books/NBK1386
Research Studies from ClinicalTrials.gov

- ClinicalTrials.gov
  https://clinicaltrials.gov/ct2/results?cond=%22congenital+contractural+arachnodactyly%22+OR+%22Arthrogryposis%22

Scientific Articles on PubMed

- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28congenital+contractural %5BTIAB%5D%29+OR+%28beals+syndrome%5BTIAB%5D %29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last +3600+days%22%5Bdp%5D

Catalog of Genes and Diseases from OMIM

- ARTHROGRYPOSIS, DISTAL, TYPE 9
  http://omim.org/entry/121050

Sources for This Summary

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/19006240

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/11754102

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/15121784
  Free article on PubMed Central: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1735765/

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/17345643

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/16740166
  Free article on PubMed Central: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1524931/

Reprinted from Genetics Home Reference:

page 4