Juvenile Paget disease

Juvenile Paget disease is a disorder that affects bone growth. This disease causes bones to be abnormally large, misshapen, and easily broken (fractured).

The signs of juvenile Paget disease appear in infancy or early childhood. As bones grow, they become progressively weaker and more deformed. These abnormalities usually become more severe during the adolescent growth spurt, when bones grow very quickly.

Juvenile Paget disease affects the entire skeleton, resulting in widespread bone and joint pain. The bones of the skull tend to grow unusually large and thick, which can lead to hearing loss. The disease also affects bones of the spine (vertebrae). The deformed vertebrae can collapse, leading to abnormal curvature of the spine. Additionally, weight-bearing long bones in the legs tend to bow and fracture easily, which can interfere with standing and walking.

Frequency

Juvenile Paget disease is rare; about 50 affected individuals have been identified worldwide.

Causes

Juvenile Paget disease is caused by mutations in the *TNFRSF11B* gene. This gene provides instructions for making a protein that is involved in bone remodeling, a normal process in which old bone is broken down and new bone is created to replace it.

Bones are constantly being remodeled, and the process is carefully controlled to ensure that bones stay strong and healthy. Mutations in the *TNFRSF11B* gene lead to a much faster rate of bone remodeling starting early in life. Bone tissue is broken down more quickly than usual, and when new bone tissue grows it is larger, weaker, and less organized than normal bone. This abnormally fast bone remodeling underlies the problems with bone growth characteristic of juvenile Paget disease.

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

- chronic congenital idiopathic hyperphosphatasemia
- familial idiopathic hyperphosphatasemia
- familial osteoectasia
- hyperostosis corticalis deformans juvenilis
- hyperphosphatasemia with bone disease
- hyperphosphatasia, familial idiopathic
- idiopathic hyperphosphatasia
- JPD
- juvenile Paget's disease
- osteochalasia desmalis familiaris
- osteoectasia with hyperphosphatasia

Diagnosis & Management

Genetic Testing Information

- What is genetic testing?
  /primer/testing/genetictesting
- Genetic Testing Registry: Hyperphosphatasemia with bone disease

Research Studies from ClinicalTrials.gov

- ClinicalTrials.gov
  https://clinicaltrials.gov/ct2/results?cond=%22juvenile+Paget+disease%22+OR+%22Paget%27s+Disease+of+Bone%22

Additional Information & Resources

Health Information from MedlinePlus

- Health Topic: Bone Diseases
  https://medlineplus.gov/bonediseases.html

Genetic and Rare Diseases Information Center

- Juvenile Paget disease
  https://rarediseases.info.nih.gov/diseases/2831/juvenile-paget-disease
Additional NIH Resources
• National Institute of Arthritis and Musculoskeletal and Skin Diseases: Understanding Bone Health
  https://www.niams.nih.gov/community-outreach-initiative/understanding-bone-health

Educational Resources
• MalaCards: paget disease of bone 5, juvenile-onset
  https://www.malacards.org/card/paget_disease_of_bone_5_juvenile_onset
• Orphanet: Juvenile Paget disease
  https://www.orpha.net/consor/cgi-bin/OC_Exp.php?Lng=EN&Expert=2801

Patient Support and Advocacy Resources
• National Organization for Rare Disorders (NORD)
  https://rarediseases.org/rare-diseases/hereditary-hyperphosphatasia/
• Paget's Association
  https://www.paget.org.uk/

Scientific Articles on PubMed
• PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28juvenile+paget+disease%5BTIAB%5D%29+OR+%28juvenile+paget's+disease%5BTIAB%5D%29+OR+%28idiopathic+hyperphosphatasia%5BTIAB%5D%29+OR+%28osteoeectasia+with+hyperphosphatasia%5BTIAB%5D%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3600+days%22%5Bdp%5D

Catalog of Genes and Diseases from OMIM
• PAGET DISEASE OF BONE 5, JUVENILE-ONSET
  http://omim.org/entry/239000

Sources for This Summary
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/14672344
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/12189164
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/12541187

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/16932700

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/15777670

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/17229006

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/18328984

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/12124406

Reprinted from Genetics Home Reference:

Reviewed: February 2010
Published: July 16, 2019

Lister Hill National Center for Biomedical Communications
U.S. National Library of Medicine
National Institutes of Health
Department of Health & Human Services