Parkes Weber syndrome

Parkes Weber syndrome is a disorder of the vascular system, which is the body's complex network of blood vessels. The vascular system consists of arteries, which carry oxygen-rich blood from the heart to the body's various organs and tissues; veins, which carry blood back to the heart; and capillaries, which are tiny blood vessels that connect arteries and veins.

Parkes Weber syndrome is characterized by vascular abnormalities known as capillary malformations and arteriovenous fistulas (AVFs), which are present from birth. The capillary malformations increase blood flow near the surface of the skin. They usually look like large, flat, pink stains on the skin, and because of their color are sometimes called "port-wine stains." In people with Parkes Weber syndrome, capillary malformations occur together with multiple micro-AVFs, which are tiny abnormal connections between arteries and veins that affect blood circulation. These AVFs can be associated with life-threatening complications including abnormal bleeding and heart failure.

Another characteristic feature of Parkes Weber syndrome is overgrowth of one limb, most commonly a leg. Abnormal growth occurs in bones and soft tissues, making one of the limbs longer and larger around than the corresponding one.

Some vascular abnormalities seen in Parkes Weber syndrome are similar to those that occur in a condition called capillary malformation-arteriovenous malformation syndrome (CM-AVM). CM-AVM and some cases of Parkes Weber syndrome have the same genetic cause.

Frequency

Parkes Weber syndrome is a rare condition; its exact prevalence is unknown.

Causes

Some cases of Parkes Weber syndrome result from mutations in the *RASA1* gene. When the condition is caused by *RASA1* gene mutations, affected individuals usually have multiple capillary malformations. People with Parkes Weber syndrome who do not have multiple capillary malformations are unlikely to have mutations in the *RASA1* gene; in these cases, the cause of the condition is often unknown.

The *RASA1* gene provides instructions for making a protein known as p120-RasGAP, which is involved in transmitting chemical signals from outside the cell to the nucleus. These signals help control several important cell functions, including the growth and division (proliferation) of cells, the process by which cells mature to carry out specific functions (differentiation), and cell movement. The role of the p120-RasGAP protein is

not fully understood, although it appears to be essential for the normal development of the vascular system.

Mutations in the *RASA1* gene lead to the production of a nonfunctional version of the p120-RasGAP protein. A loss of this protein's activity disrupts tightly regulated chemical signaling during development. However, it is unclear how these changes lead to the specific vascular abnormalities and limb overgrowth seen in people with Parkes Weber syndrome.

Inheritance Pattern

Most cases of Parkes Weber syndrome occur in people with no history of the condition in their family. These cases are described as sporadic.

When Parkes Weber syndrome is caused by mutations in the *RASA1* gene, it is sometimes inherited from an affected parent. In these cases, the condition has an autosomal dominant pattern of inheritance. Autosomal dominant inheritance means one copy of the altered gene in each cell is sufficient to cause the disorder.

Other Names for This Condition

- Parkes-Weber syndrome
- PKWS

Diagnosis & Management

Genetic Testing Information

- What is genetic testing?
  /primer/testing/genetictesting
- Genetic Testing Registry: Parkes Weber syndrome
  https://www.ncbi.nlm.nih.gov/gtr/conditions/CN074207/

Research Studies from ClinicalTrials.gov

- ClinicalTrials.gov
  https://clinicaltrials.gov/ct2/results?cond=%22Parkes+Weber+syndrome%22+OR+%22Vascular+Malformations%22

Other Diagnosis and Management Resources

- GeneReview: RASA1-Related Disorders
  https://www.ncbi.nlm.nih.gov/books/NBK52764

Additional Information & Resources

Health Information from MedlinePlus

- Encyclopedia: Arteriovenous Malformation - Cerebral
  https://medlineplus.gov/ency/article/000779.htm
- Health Topic: Arteriovenous Malformations
  https://medlineplus.gov/arteriovenousmalformations.html
- Health Topic: Vascular Diseases
  https://medlineplus.gov/vasculardiseases.html

Genetic and Rare Diseases Information Center

- Parkes Weber syndrome
  https://rarediseases.info.nih.gov/diseases/9787/parkes-weber-syndrome

Additional NIH Resources

- National Heart, Lung, and Blood Institute: How the Heart Works
  https://www.nhlbi.nih.gov/health-topics/how-heart-works
- National Institute of Neurological Disorders and Stroke: Arteriovenous Malformation
  https://www.ninds.nih.gov/Disorders/All-Disorders/Arteriovenous-Malformation-Information-Page

Educational Resources

- Boston Children's Hospital
  https://www.childrenshospital.org/conditions-and-treatments/conditions/p/parkes-weber-syndrome
- Cincinnati Children's Hospital Medical Center: Arteriovenous Malformations
  https://www.cincinnatichildrens.org/health/a/arteriovenous
- Cincinnati Children's Hospital Medical Center: Capillary Malformations
  https://www.cincinnatichildrens.org/health/c/capillary
- MalaCards: parkes weber syndrome
  https://www.malacards.org/card/parkes_weber_syndrome
- Orphanet: Parkes Weber syndrome
  https://www.orpha.net/consor/cgi-bin/OC_Exp.php?Lng=EN&Expert=90307

Patient Support and Advocacy Resources

- National Organization for Rare Disorders (NORD): Arteriovenous Malformations
  https://rarediseases.org/rare-diseases/arteriovenous-malformation/

Clinical Information from GeneReviews

- RASA1-Related Disorders
  https://www.ncbi.nlm.nih.gov/books/NBK52764

Scientific Articles on PubMed

- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28parkes+weber+syndrome%5BTIAB%5D%29+OR+%28pkws%5BTIAB%5D%29+OR+%28parkes-weber+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

- CAPILLARY MALFORMATION-ARTERIOVENOUS MALFORMATION 1
  http://omim.org/entry/608354

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