Potocki-Shaffer Syndrome

Subjects: Genetics & Heredity

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Potocki-Shaffer syndrome is a disorder that affects development of the bones, nerve cells in the brain, and other tissues.

genetic conditions

1. Introduction

Most people with this condition have multiple noncancerous (benign) bone tumors called osteochondromas. In rare instances, these tumors become cancerous. People with Potocki-Shaffer syndrome also have enlarged openings in the two bones that make up much of the top and sides of the skull (enlarged parietal foramina). These abnormal openings form extra "soft spots" on the head, in addition to the two that newborns normally have. Unlike the usual newborn soft spots, the enlarged parietal foramina remain open throughout life.

The signs and symptoms of Potocki-Shaffer syndrome vary widely. In addition to multiple osteochondromas and enlarged parietal foramina, affected individuals often have intellectual disability and delayed development of speech, motor skills (such as sitting and walking), and social skills. Many people with this condition have distinctive facial features, which can include a wide, short skull (brachycephaly); a prominent forehead; a narrow bridge of the nose; a shortened distance between the nose and upper lip (a short philtrum); and a downturned mouth. Less commonly, Potocki-Shaffer syndrome causes vision problems, additional skeletal abnormalities, and defects in the heart, kidneys, and urinary tract.

2. Frequency

Potocki-Shaffer syndrome is a rare condition, although its prevalence is unknown. Fewer than 100 cases have been reported in the scientific literature.

3. Causes

Potocki-Shaffer syndrome (also known as proximal 11p deletion syndrome) is caused by a deletion of genetic material from the short (p) arm of chromosome 11 at a position designated 11p11.2. The size of the deletion varies among affected individuals. Studies suggest that the full spectrum of features is caused by a deletion of at least 2.1 million DNA building blocks (base pairs), also written as 2.1 megabases (Mb). The loss of multiple genes within the deleted region causes the varied signs and symptoms of Potocki-Shaffer syndrome.

In particular, deletion of the *EXT2*, *ALX4*, and *PHF21A* genes are associated with several of the characteristic features of Potocki-Shaffer syndrome. Research shows that loss of the *EXT2* gene is associated with the development of multiple osteochondromas in affected individuals. Deletion of another gene, *ALX4*, causes the enlarged parietal foramina found in people with this condition. In addition, loss of the *PHF21A* gene is the cause of intellectual disability and distinctive facial features in many people with the condition. The loss of additional genes in the deleted region likely contributes to the other features of Potocki-Shaffer syndrome.

The Genes and Chromosome Associated with Potocki-Shaffer Syndrome

- ALX4
- EXT2
- PHF21A
- chromosome 11

4. Inheritance

Potocki-Shaffer syndrome follows an autosomal dominant inheritance pattern, which means a deletion of genetic material from one copy of chromosome 11 is sufficient to cause the disorder. In some cases, an affected person inherits the chromosome with a deleted segment from an affected parent. More commonly, the condition results from a deletion that occurs during the formation of reproductive cells (eggs and sperm) in a parent or in early fetal development. These cases occur in people with no history of the disorder in their family.

5. Other Names for This Condition

- chromosome 11p11.2 deletion syndrome
- P11pDS
- proximal 11p deletion syndrome

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