Baraitser-Winter Syndrome

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Contributor: Catherine Yang

Baraitser-Winter syndrome is a condition that affects the development of many parts of the body, particularly the face and the brain.

Keywords: genetic conditions

1. Introduction

An unusual facial appearance is the most common characteristic of Baraitser-Winter syndrome. Distinctive facial features can include widely spaced eyes (hypertelorism), large eyelid openings, droopy eyelids (ptosis), high-arched eyebrows, a broad nasal bridge and tip of the nose, a long space between the nose and upper lip (philtrum), full cheeks, and a pointed chin.

Structural brain abnormalities are also present in most people with Baraitser-Winter syndrome. These abnormalities are related to impaired neuronal migration, a process by which nerve cells (neurons) move to their proper positions in the developing brain. The most frequent brain abnormality associated with Baraitser-Winter syndrome is pachygyria, which is an area of the brain that has an abnormally smooth surface with fewer folds and grooves. Less commonly, affected individuals have lissencephaly, which is similar to pachygyria but involves the entire brain surface. These structural changes can cause mild to severe intellectual disability, developmental delay, and seizures.

Other features of Baraitser-Winter syndrome can include short stature, ear abnormalities and hearing loss, heart defects, presence of an extra (duplicated) thumb, and abnormalities of the kidneys and urinary system. Some affected individuals have limited movement of large joints, such as the elbows and knees, which may be present at birth or develop over time. Rarely, people with Baraitser-Winter syndrome have involuntary muscle tensing (dystonia).

2. Frequency

Baraitser-Winter syndrome is a rare condition. Fewer than 50 cases have been reported in the medical literature.

3. Causes

Baraitser-Winter syndrome can result from mutations in either the *ACTB* or *ACTG1* gene. These genes provide instructions for making proteins called beta (β)-actin and gamma (γ)-actin, respectively. These proteins are active (expressed) in cells throughout the body. They are organized into a network of fibers called the actin cytoskeleton, which makes up the cell's structural framework. The actin cytoskeleton has several critical functions, including determining cell shape and allowing cells to move.

Mutations in the *ACTB* or *ACTG1* gene alter the function of β-actin or γ-actin. The malfunctioning actin causes changes in the actin cytoskeleton that modify the structure and organization of cells and affect their ability to move. Because these two actin proteins are present in cells throughout the body and are involved in many cell activities, problems with their function likely impact many aspects of development, including neuronal migration. These changes underlie the variety of signs and symptoms associated with Baraitser-Winter syndrome.

3.1. The genes associated with Baraitser-Winter syndrome

- ACTB
- ACTG1

4. Inheritance

This condition is described as autosomal dominant, which means one copy of the altered gene in each cell is sufficient to cause the disorder. The condition almost always results from new (de novo) mutations in the *ACTB* or *ACTG1* gene and occurs in people with no history of the disorder in their family.

5. Other Names for This Condition

- BRWS
- cerebro-frontofacial syndrome, type 3
- Fryns-Aftimos syndrome
- iris coloboma with ptosis, hypertelorism, and mental retardation

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