

Waardenburg Syndrome (type I)

Also known as: Waardenburg's Syndrome, WS

Clinical Characteristics

Waardenburg syndrome is primarily characterized by hearing loss and pigmentary anomalies of the hair, skin, and eyes. Type I is the "classic" form of Waardenburg syndrome. The manifestations can vary widely among individuals, even those of the same family. The eyes are nearly always widely spaced, owing to a broad nasal bridge. The irides may be brilliantly blue or demonstrate partial or complete heterochromia (typically brown and blue). One of the most striking features of Waardenburg syndrome is a white forelock, found in about 45% of affected individuals. Even if a white forelock is absent, the hair, eyebrows, and eyelashes may show hypopigmentation. Premature graying of the hair is sometimes seen. The frontal hairline is frequently low, and the eyebrows may "connect" at the midline of the face. Hypopigmentation of the skin is less frequent than that of the hair, but white patches are sometimes observed on the face, trunk, and limbs. Occasionally, spina bifida, and cleft lip and palate have been observed.

Waardenburg Syndrome and Hearing Loss

Congenital sensorineural hearing loss is found in about 60% of individuals with Waardenburg syndrome. The loss can be moderate to profound and is usually non-progressive. Hearing loss may be unilateral or bilateral and the laterality can vary among family members.

Natural History

Waardenburg syndrome is diagnosed in both males and females, and in all ethnicities. The prevalence of the syndrome is estimated to be between 1 in 10,000 and 1 in 40,000. Approximately 2-3% of children with congenital deafness have Waardenburg syndrome.

Hearing loss is present at birth. A white forelock, the most common hair pigmentary anomaly, may be present at birth or appear later (often in the teen years). The appearance of a white forelock or other major hair hypopigmentation (e.g. graying of the scalp) usually occurs before age 30. Hair pigmentation anomalies may disappear and reappear, or disappear entirely over time. Hypopigmentation of the skin can be present at birth or seen in later years. The prognosis for those with Waardenburg syndrome is good, overall. Intelligence is usually normal, though educational programs may have to account for the presence of a hearing loss. Life expectancy is normal.

Waardenburg syndrome type II is less common than type I. Type II is also characterized by sensorineural hearing loss and heterochromia, but does not demonstrate widely spaced eyes; a white forelock and white skin patches are far less common.

Waardenburg syndrome types III and IV are both quite rare.

Genetics

In over 90% of individuals with Waardenburg syndrome, a mutation is identified in the *PAX3* gene. This gene, located on chromosome 2, is involved in the regulation of melanocyte development. Waardenburg syndrome is **autosomal dominant**. This means that an affected individual has a 50% chance with each pregnancy of having an affected child, as well as a 50% chance of having a child with no chance of developing the condition. Most individuals with Waardenburg syndrome inherit the condition from a parent, though some cases are *de novo* (spontaneous).

Management

The diagnosis of Waardenburg syndrome is made clinically. Genetic testing is available for confirmation of diagnosis, and prenatal diagnosis if the mutation in the family has been identified.

After an initial diagnosis is made, audiology assessment is the only necessary evaluation. Treatment and interventions for hearing loss depend on the severity of the loss. Hearing aids may be used when appropriate, and cochlear implants have been found to be effective and may be considered for severe to profound loss.

Women with Waardenburg syndrome are highly encouraged to take folic acid supplementation during pregnancy, due to the increased risk of neural tube defects.

A scheduled appointment with a geneticist and/or genetic counselor is recommended.

Resources for Families

Statewide Genetics Program

Phone: 608-267-7148

Fax: 608-267-3824

Email: meyeram@dhfs.state.wi.us

Wisconsin First Step Hotline

Phone: 1-800-642-7837 voice/TTY

Website: www.mch-hotlines.org

Wisconsin Office for Deaf and Hard of Hearing

Phone: 1-608-266-3118 voice/TTY

Website: www.dhfs.state.wi.us/sensory

Regional Children and Youth with Special Health Care Needs Centers

Centers in Green Bay, Wausau, Milwaukee, Madison, and Chippewa Falls

Website: http://dfhs.wisconsin.gov/DPH_BFCH/cshcn/index.HTM

WI Chapter of Families for Hands & Voices

Phone: (920) 437-7370

Website: www.handsandvoices.org

Parent-to-Parent of Wisconsin

Phone: 1-888-266-0028

Email: rmathea@shsmh.org

National Organization for Rare Disorders (NORD)

www.rarediseases.org