

## Waardenburg syndrome: A rare genetic disorder, a report of two cases

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Waardenburg syndrome (WS) is a rare genetic disorder. Patients have heterochromia or eyes with iris of different color, increased inter-canthal distance, distopia canthorum, pigmentation anomalies, and varying degree of deafness. It usually follows autosomal dominant pattern. In this report, two cases have been discussed but no familial history of WS has been found. Counseling of the patient is necessary and cases of irreversible deafness have been treated.

**Key words:** Autosomal dominant, deafness, heterochromia, pigmentation anomalies, Waardenburg syndrome

### Introduction

Waardenburg syndrome (WS) is a rare genetic disorder most often characterized by varying degrees of deafness, minor defects in structures arising from neural crest, and pigmentation anomalies. The syndrome got its name from a Dutch ophthalmologist, D. J. Waardenburg, who described the syndrome in detail in 1951.<sup>[1]</sup>

WS has the following features.

Symptoms may vary from one type of syndrome to another and from one patient to another, but they include:

- Very pale or brilliantly blue eye, eyes of two different colors (heterochromia) as eyes with iris having two different colors.

- A forelock of white hair (poliosis) or premature graying of hair.
- Lateral displacement of medial canthi combined with dystopia of lacrimal puncta and blepharophimosis.
- Prominent broad nasal root.
- Moderate to profound hearing impairment (Higher frequency associated with type II).

The different types of physical characteristic determine the type of WS. There are at least four types of WS. Most common are type I and II.

Type I: Persons usually have wide space between inner canthus. Hearing impairment occurs in 20% of cases.

Type II: Persons who do not have a wide space between inner cathus of their eye but have many other characteristics of WS are described in type II. However, 50% have a hearing impairment or are deaf.<sup>[2]</sup>

Type III and IV are less common. WS type III is also known as Klein–WS (Patients have limb abnormality). WS type IV is known as Shah–WS (these patients have Hirshsprung disease).<sup>[3]</sup> Overall, the syndrome affects 1 in 42,000 people. The highly variable presentation of the syndrome makes it difficult to arrive at a precise figure of prevalence.

There is currently no cure for the syndrome. The symptom most likely to be of practical significance is deafness, and this is treated as other irreversible deafness.

### Case Reports

Two different cases of WS from two different age groups are seen.

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### Case 1

One patient of age 22 years presented with history of decreased hearing bilaterally, more on right side. He was having microtia bilaterally. There was increased difference between medial canthus of eyes and broad nasal root. He was also having dysarthria. He was using hearing aid in his left ear since childhood. This patient did not have any neurological defect or any skin abnormality. In the eyes, he had double-colored iris, which was brown in color with bluish margin bilaterally. All clinical features go in favor of WS type I. On CT examination, there is no evidence of ossicles on the right side.

### Case 2

This patient was 5 years of age and presented with history of decreased hearing bilaterally. The patient was a deaf-mute child. He was having blue-colored iris on the right side and brown-colored iris on the left eye. He was having premature graying of hair. All these features go in favor of type II WS.

In both cases, one thing was common that there was no familial history of the syndrome. That means it can be due to mutational changes in genes.

### Discussion

Scientists have identified four different genes for WS PAX3, MITF, EDNRB and EDN3.<sup>[4]</sup>

WS I and III – PAX3,

WS type II – MITF,

WS type IV – EDNRB, and EDN3

The PAX3 gene is located on chromosome 2 and controls some aspects of development of face and inner ear. The MITF gene is located on chromosome 2. It also controls development of ear and hearing.<sup>[1,5]</sup>

This syndrome is autosomal dominant for most persons with type I, II, and III. WS type IV is autosomal recessive with variable penetrance. A small percentage of cases result from new mutations in gene; these occur in people with no history of disorder in their family. In our two case reports, no one had familial history of the syndrome.

Early diagnosis and improvement of hearing defects are most important for psychological development of children with this disease. Genetic counseling is a good idea for patient with this syndrome.

### References

1. Waardenburg PJ. A new syndrome combining developmental anomalies of eye lids, eye brows and nasal root with pigmentary defects of iris and head hair with congenital deafness. *Am J Hum Genet* 1951;3:195-253.
2. National Institute of Deafness and Other Communication Disorder – USA NIH Pub. No. 91-3260, March 1999.
3. Kliegman, Behraman, Jenson Stanton. 18<sup>th</sup> ed. *Nelson Text Book of Pediatrics*. W.B Saunders Company June 2007. Vol. 2. pp. 2683.
4. Fauci, Braunwald, Kasper, Hauser, Longo, Jameson, Loscalzo. *Gene mutation*. 17<sup>th</sup> ed. *Harrison's Internal Medicine*. 2008. McGraw Hill pp. 201, 325.
5. Arias S. Genetic heterogeneity in the Waardenburg syndrome. *Birth Defects Orig Artic Ser* 1971;07:87-101.

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