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Case Report

Waardenburg syndrome: A rare case with bilateral congenital cataract: An unusual entity

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Introduction

Waardenburg syndrome is a rare genetic disorder most often characterized by varying degrees of deafness, minor defects in structures arising from the neural crest cells and pigmentation anomalies. Waardenburg syndrome is named after Waardenburg (1886–1979), a Dutch ophthalmologist, who in 1951, first described a patient with hearing loss, dystopia canthorum (i.e. lateral displacement of the inner canthi of the eyes), and retinal pigmentary differences.¹ The condition he described is now categorized as Waardenburg syndrome type 1 (WS1). Since then, four subtypes (type 1–4) with variable penetrance and gene expression of different clinical features have been described.^{2–4} Overall, the syndrome affects around 1 in 42,000 people.⁵ All races and both sexes are affected equally. Waardenburg syndrome accounts for about 2–5% cases of congenital deafness.⁵

We report a 2-year-old boy who presented with characteristic features of Waardenburg syndrome along with congenital cataract in both eyes. Although different subtypes and phenotypic variations are known, association with congenital cataract is a rare one.

Case report

A 2-year-old boy (Fig. 1) product of a non-consanguineous marriage was brought to OPD for eye evaluation by parents when they noticed white reflex in pupillary area in right eye. On general examination brilliant blue color of iris was striking. Child had centrally placed white forelock in frontal area. Patches of depigmentation were present on forearm and trunk. Broad nasal bridge with increased intercanthal distance was noticed (dystopia canthorum). Child had congenital sensorineural hearing impairment for which he was given hearing aid. Child was active with normally attained milestones.

On ocular evaluation, child was able to look and follow light. He reached for objects held close. Palpebral fissure was shortened horizontally to 19 mm with lateral displacement of canthi and lacrimal puncta. Interanthal distance was 8 cm and medially sclera was visible to a lesser extent. Pupils were central circular briskly reacting to light. Lamellar cataract was present in both eyes more dense in right eye than left eye (Fig. 2). Dilated fundus evaluation showed normal fundus in both eyes without any obvious pigmentary changes.

Screening of family members including parents and close siblings was done. Mother gave history of being diagnosed as a case of pre-senile cataract both eyes 2 years ago and had

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Fig. 1 – Dermatological lesions in Waardenburg syndrome.

undergone cataract surgery in right eye. No ocular abnormality was found in father or siblings who were examined.

Child was evaluated for cataract surgery and underwent uneventful cataract extraction (phacoemulsification with foldable IOL) in both eyes.

Discussion

Waardenburg syndrome is auditory – pigmentary complex disorder with features characterized by failure of proper melanocyte differentiation affecting skin, hair, eyes or stria vascularis of cochlea. With the exception of those in the

Fig. 2 – Cataract in Waardenburg syndrome.

retina, melanocytes are derived from the embryonic neural crest. Read and Newton suggested that Waardenburg syndrome and its subtypes are neurocristopathies with additional involvement of frontal bone, limb muscles and enteric ganglia.⁴ Waardenburg syndrome has also been associated with a variety of other congenital disorders, such as intestinal and spinal defects, elevation of the scapula, and cleft lip and palate.^{2,6}

Most, if not all, cases of WS1 are caused by mutations in the PAX3 gene located on chromosome band 2q35 and transmitted mostly autosomal dominant pattern.^{7,8} PAX3 belongs to a family of paired-domain proteins that bind DNA and regulate gene expression. Mutations in the microphthalmia-associated transcription factor (MITF) gene, located on chromosome band 3p14.1–p12.3, cause some cases of WS2. Other cases of WS2 have been linked to another locus on band 1p; still others remain unlinked to other loci.

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

- Very pale or brilliantly blue eyes, eyes of two different colors (complete heterochromia), or eyes with one iris having two different colors (sectoral heterochromia);
- A forelock of white hair (poliosis), or premature graying of the hair;
- Wide-set eyes (hypertelorism) due to a prominent, broad nasal root (dystopia canthorum);
- Moderate to profound hearing loss;
- A low hairline and eyebrows that touch in the middle;
- Patches of white pigmentation on the skin, limb abnormalities and neurologic manifestations may be present.

Dystopia canthorum is the most penetrant feature of WS and is found in 41.2–99% of the reported cases.³ Hearing loss is not a universal feature of WS but penetrance of sensorineural hearing loss has been observed to be 69% in WS1 and 87% in WS2.⁵ Cutaneous pigmentary defects occur in 8.3–50% of patients.³ Piebaldism-like achromic spots may occur on face, trunk or limbs or even hyperpigmented macules may be seen.^{3,9} Hair changes may be in form of a white forelock that usually involves the forehead but may occur elsewhere. Partial or complete heterochromia iridis occurs in 21–28% of patients with WS, hypoplastic blue iris occur in 14.9–42% of cases.³ Fundus may be albinotic or may show pigment mottling in the periphery.

Congenital cataract is not a common association noted with this disorder. Literature search showed very few reports documenting such an association.¹⁰ Bilateral lamellar cataract involving visual axis was the presenting feature in our case and required surgical intervention. Early diagnosis with definitive intervention helped in visual rehabilitation of the patient which will help in long-term social and vocational rehabilitation.

Conflicts of interest

All authors have none to declare.

REFERENCES

1. Waardenburg PJ. A new syndrome combining developmental anomalies of the eyelids, eyebrows and nose root with pigmentary defects of the iris and head hair and with congenital deafness. *Am J Hum Genet.* 1951;3:195–253.
2. Arias S. Genetic heterogeneity in the Waardenburg syndrome. *Birth Defects Orig Artic Ser.* Mar 1971;07(4):87–101.
3. Dourmishev AL, Dourmishev LA, Schwartz RA, Janniger CK. Waardenburg syndrome. *Int J Dermatol.* 1999;38:656–663.
4. Read AP, Newton VE. Waardenburg syndrome. *J Med Genet.* 1997;34:656–665.
5. Nayak CS, Isaacson G. Worldwide distribution of Waardenburg syndrome. *Ann Otol Rhinol Laryngol.* 2003;112:817–820.
6. Campbell B, Campbell NR, Swift S. Waardenburg's syndrome. *Arch Dermatol.* 1962;86:718–724.
7. Farrer LA, Grundfast KM, Amos J, et al. Waardenburg syndrome (WS) type I is caused by defects at multiple loci, one of which is near ALPP on chromosome 2: first report of the WS consortium. *Am J Hum Genet.* May 1992;50(5):902–913.
8. Assabehji M, Read AP, Newton VE, et al. Waardenburg's syndrome patients have mutations in the human homologue of the Pax-3 paired box gene. *Nature.* Feb 13 1992;355(6361):635–636.
9. Ghosh SK, Bandyopadhyay D, Ghosh A, Biswas SK, Mandal RK. Waardenburg syndrome: a report of three cases. *Indian J Dermatol Venereol Leprol.* 2010;76(5):550–552.
10. Mullaney PB, Parsons MA, Weatherhead RG, Karcioğlu ZA. Clinical and morphological features of Waardenburg syndrome type II. *Eye (Lond).* 1998;12:353–357.