WAARDENBURG'S SYNDROME

A CASE REPORT IN A SOUTH AFRICAN FAMILY

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In 1951, Waardenburg,[1] a Dutch ophthalmologist, described a new syndrome combining developmental anomalies of the eyelids, eyebrows and root of the nose, with pigmentary defects of the iris and frontal head hair, and congenital deafness. Based on a study of the pedigrees of 14 families in which 161 individuals were found to be affected, he outlined the characteristics of the syndrome:

1. Lateral displacement of the medial canthi of the eyes and the lacrimal punctae (dystopia canthorum).

2. A broad, high nasal root.

3. Hyperplasia and confluence of the medial portions of the eyebrows.

4. Partial or total heterochromia of the irides.

5. Congenital deaf-mutism or partial deafness.

6. Circumscribed albinism of the frontal head hair (white forelock).

He concluded from his studies that the syndrome was genetically determined and transmitted as an autosomal dominant, with variable penetrance of individual components. Apart from one Swiss subject, all Waardenburg's cases were Dutch. In his original paper he suggested that, from a study of the literature, he believed the syndrome to exist in the United States, Switzerland, Italy and Germany. Further case reports came only from the Netherlands,[2,3] until Mackenzie[4] described an example in Scotland in 1958 and Partington[5] described an English family with the syndrome in 1959.

In 1960 Di George, Olmsted and Harley[6] reported 11 individuals with the syndrome whom they had studied in the United States, and their report included the first instances in the Negro race. They confirmed Waardenburg's observation that the syndrome is genetically determined and transmitted as an autosomal dominant. They suggested possible additional characteristics, including premature greying of the hair, abnormal depigmentation of the skin, and pigmentary changes in the fundi. A more recent case report is that of a 27-month-old Californian,[7] while Scott and van Beukering, in South Africa, reported a sporadic abortive case in an 11-year-old Bantu child a few months ago.[8]

Excellent reviews of this syndrome exist,[1,6] and it is not the purpose of this communication to re-examine the details, but to record the occurrence of the syndrome in South Africa in a family of mixed racial origin, and to draw attention to the existence of an unusual dominantly transmitted cause of congenital deafness and deaf-mutism. This would appear to be the first description of the syndrome in a mixed racial group (Cape Coloured).

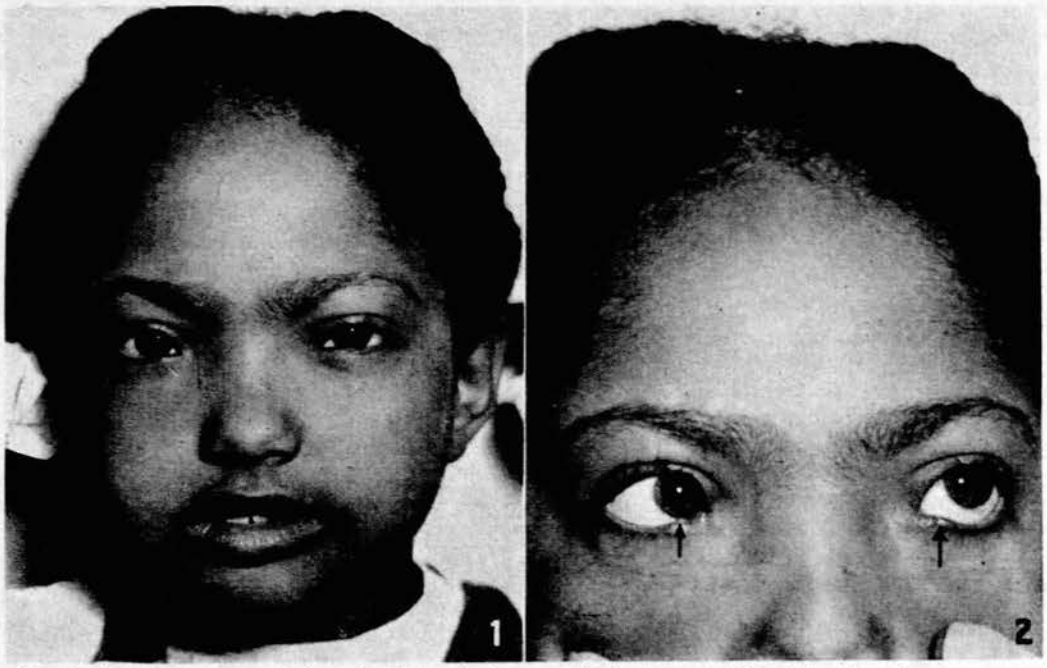

Fig. 1. General appearance of face of subject, showing many of the features of Waardenburg's syndrome.
Fig. 2. Close-up view of the eyes, with arrows pointing to the displaced lacrimal punctae.

CASE REPORT

An 8-year-old Coloured girl (propositus) was admitted to Groote Schuur Hospital with acute rheumatic fever and carditis. She was found to have a primary tuberculous complex which was considered active. Her facial appearance was striking. Five of the 6 characteristics outlined by Waardenburg were present, namely, dystopia canthorum with lateral displacement of the lacrimal punctae, hypertrichosis of the medial portions of the eyebrows with confluence, a broad nasal root, violet-blue eyes (a much deeper colour than the usual blue), and a white forelock (Figs. 1 and 2). There was no clinical evidence of deafness, and pure-tone audiometry did not reveal any hearing loss.

The pedigree (Fig. 3) was obtained from the child's mother, who exhibited the identical features plus one brown and one blue eye, and was confirmed by her aunt who was normal. Her younger half-sister was also examined and found to have dystopia canthorum, displaced lacrimal punctae and confluent eyebrows. In view of her age, 3 months, eye colour (blue) was not regarded as necessarily significant, and the child's failure to respond to loud noises was not regarded as proof of deafness, but as suspicious. The half-brother was not available for examination, but was said to 'look just like his mother', except that he did not have a white forelock. He was not deaf. It seems possible that he exhibits some of the features of the syndrome, but attempts to have him brought from the country for examination were not successful.

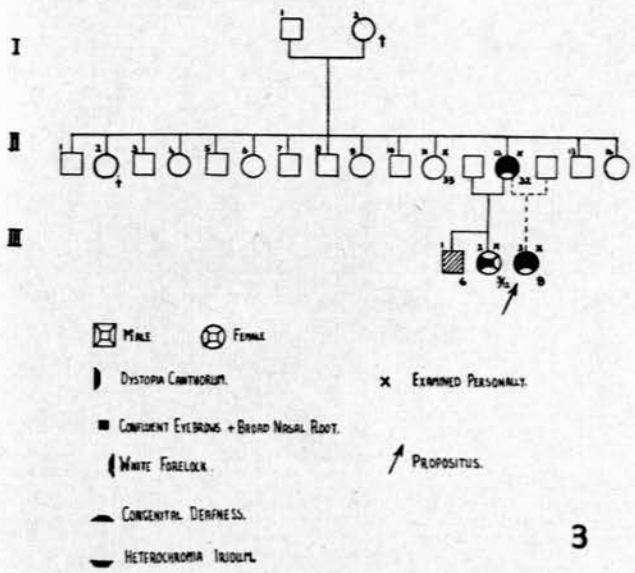

Fig. 3. Subject's pedigree. Superior numbers are generation positions and inferior numbers are the ages of particular members.

DISCUSSION

Apart from its mode of inheritance and the association of deaf-mutism in some instances, the syndrome constitutes little more than a medical curiosity. Analysing the penetrance of individual anomalies in his cases, Waardenburg concluded that the order was probably from 1 to 6 of his list of characteristics. Dystopia canthorum occurred in 99%, congenital deafness in 20%, and white forelock in only 17%. In his survey of 840 deaf mutes in 5 institutions for the deaf in the Netherlands he discovered 12 cases of the syndrome. From his data he estimated that 1·43% of all deaf mutes in the Netherlands owe their deafness to this hereditary pattern.

Di George *et al.*[6] surveyed students at the Pennsylvania School for the Deaf. Of 471 students enrolled, 257 were considered to be congenitally deaf. Six (2·33%) of these were found to have Waardenburg's syndrome. They considered that this incidence was probably too low, since they did not examine all the students at the institution, and not all the students were classified according to the aetiology of their deafness. They considered it possible that some congenitally deaf students escaped examination.

Partington, in a footnote to his paper,[5] stated that the

deafness arises from absence of the organ of Corti and the vestibular membrane.

Since this syndrome has been shown to be apparently commoner in the Netherlands than elsewhere, and in view of the ethnological origin of the Cape Coloured, it should not be surprising that it has been found in South Africa and in the Coloured section of the population. It would seem to be potentially much more important than many other syndromes because of (*a*) the danger of hereditary deafness, and (*b*) the unmistakeable facies being such an obvious indication of possible handicap for the progeny of an affected individual.

Part of the evidence could easily be removed (the confluent eyebrows may be plucked) or attributed to the dictates of fashion (white forelock), but the displacement of the punctum and discrepancy in colour of the irides cannot be disguised. In that respect this syndrome is on a par with fragilitas ossium, and is unlike haemophilia and porphyria, which are not readily detectable without special tests. There are, almost certainly, many more affected individuals in this part of the world. There are no reports of chromosomal studies in affected individuals.

SUMMARY

A case of Waardenburg's syndrome is recorded in a South African Cape Coloured family and its association with hereditary deafness is emphasized.

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