Pendred's Syndrome

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Key Words

Pendred's syndrome • Sensorineural deafness • Goitre

Abstract

Vaughan Pendred, whilst still a junior doctor, wrote the original account of familial sensorineural deafness associated with goitre, now known as Pendred's syndrome. His account is reproduced verbatim.

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Neurologists sometimes encounter Pendred's syndrome, one of the most frequent causes of congenital deafness, accounting for about 10% of all cases of hereditary deafness. Pendred (1869–1946) was a Guy's Hospital graduate and is said to have become a general practitio-

ner. Pendred's syndrome is an autosomal recessive disorder defined by congenital sensorineural deafness, goitre, and impaired iodide organification [1]. Patients are usually euthyroid. The sensorineural deafness is typically associated with a malformation of the inner ear in which the normal cochlear spiral of 2.5 turns is replaced by a hypoplastic coil of 1.5 turns, referred to as Mondini cochlea. It is caused by mutations in the pendrin (PDS) gene, a 21-exon gene located on chromosome 7q22–31.1 and expressed in the thyroid, the inner ear, and in the kidney. The administration of perchlorate in these patients results in a partial discharge of radiolabelled iodide from the thyroid, indicating an impaired organification of this trace element into thyroglobulin.

The Lancet of August 22, 1896, carries the report [2] from Pendred, as shown in figure 1:

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND
THERAPEUTICAL.

DEAF-MUTISM AND GOITRE.
BY VAUGHAN PENDRED, M.R.C.S. Eng., L.R.C.P. LOND.,
LATE HOUSE SURGEON GUY'S HOSPITAL

The curious association of deaf-mutism and goitre occurring in two members of a large family has induced me to record these cases. Why this association? Perhaps some readers of THE LANCET may be able to throw some light on the causes of this combination of diseases: Absence of thyroid-cretinism; overgrowth of thyroid—deaf-mutism. I append the family history as recounted to me by the mother. The family is an Irish one, and the parents have been upwards of forty years resident in Durham. The father, aged sixty-six

years, and the mother, aged sixty-seven years, are alive and healthy. They have had ten children, five sons and five daughters. In an epidemic of small-pox twenty-five years ago the whole family was attacked with the exception of the younger of the deaf-mutes, and four males and one female died, although all had been vaccinated, and that recently, as they were children. The remaining son and two of the daughters are healthy and vigorous. The first goitre case is the first-born of the family—a spare woman now aged thirty-eight years. She is deaf and can only mumble indistinctly; little care has been taken to educate her and so she is imbecile. The goitre is a large multilobular hard tumour, the greater part on the right side of the neck; from time to time she suffers from dyspnoeic attacks. The growth was first observed after the small-pox—i.e., at thirteen years of age. The second surviving girl is now aged twenty-eight years, and is the fifth of the family; she is a small, spare, intelligent woman, her expression being in marked contrast to her sister's. She is not absolutely deaf and can mumble incoherently; her education has been attended to with so much success that she has been 'in service.' The tumour is larger than in the other case, but is of the same character; it has been growing for about fifteen years, and during the last year has caused both dyspnoea and dysphagia, which have become so urgent that I have sent her to-day to Newcastle Infirmary for operation. Durham.

Fig. 1. Pendred's 'Clinical Notes', Lancet 1896.

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It was exactly a century later that Coyle et al. [3] and Sheffield et al. [4] in consecutive papers in *Nature Genetics* showed that the disorder maps to chromosome 7q.

References

- 1 Gillam MP, Bartolone L, Kopp P, Bevenga S: Molecular analysis of the PDS gene in a non-consanguineous Sicilian family with Pendred's syndrome. *Thyroid* 2005;15:734–741.
- 2 Pendred V: Deaf-mutism and goitre. *Lancet* 1896;2:532.
- 3 Coyle B, Coffey R, Armour JA, Gausden E, Hochberg Z, Grossman A, Britton K, Pembrey M, Reardon W, Trembath R: Pendred syndrome (goitre and sensorineural hearing loss) maps to chromosome 7 in the region containing the nonsyndromic deafness gene DFNB4. *Nat Genet* 1996;12:421–423.
- 4 Sheffield VC, Kraiem Z, Beck JC, Nishimura D, Stone EM, Salameh M, Sadeh O, Glaser B: Pendred syndrome maps to chromosome 7q21–34 and is caused by an intrinsic defect in thyroid iodine organification. *Nat Genet* 1996;12:424–426.