European Journal of Ophthalmology / Vol. 9 No. 2, 1999 / pp. 130-133

SHORT COMMUNICATION

Case report

Bilateral keratoconus associated with Hashimoto's disease, alopecia areata and atopic keratoconjunctivitis

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ABSTRACT: Keratoconus is a progressive non-inflammatory corneal ectasia. Alopecia areata is complete loss of hair patches on the hairy areas of the body in association with some ocular manifestations such as cataract, or disorders of the conjunctiva, iris, lens, choroid and retina pigment epithelium. A ten-year-old patient with atopic keratoconjunctivitis, keratoconus and alopecia areata is presented. This patient has also been receving treatment for Hashimoto thyroiditis (chronic lymphocytic thyroiditis) for more than three years. The possible association of keratoconus with multisystem autoimmune disease is discussed. (Eur J Ophthalmol 1999; 9: 130-3)

KEY WORDS: Keratoconus, Alopecia areata, Hashimoto's thyroiditis, Atopic keratoconjunctivitis

Accepted: February 2, 1999

Keratoconus is a fairly common corneal ectasia in which the cornea undergoes progressive thinning and bulging and takes on the shape of an irregular cone. Alopecia areata involves rapid and complete loss of hair patches on the scalp, the bearded area, the eyebrows, the eyelashes and other hairy areas of the body. The patches are round or oval, and have a diameter of 1 to 5 cm (1-5). Although the etiology is unknown, focal infections, emotional stress, genetic penetrance, vascular pathologies, endocrine disturbance, autoimmune diseases and atopy are some of the predisposing causes (1, 2, 6, 7). However, alopecia areata may rarely be associated with autoimmune thyroid diseases. Auto-antibodies against thyroid tissue have been established in some alopecia areata cases which no clinical autoimmune disease (6).

Cataract with alopecia areata was first reported by Müller in 1963 (8). Since then other ocular manifestations such as lens alterations, retinal pigment epithelium, iris, choroid and conjunctival involvement have been reported (2). To our knowledge, alopecia areata has not been reported with keratoconus.

A patient with alopecia areata, Hashimoto's disease, atopic keratoconjunctivitis and keratoconus is described in this paper.

Case Report

A ten-year-old boy had been treated for Hashimoto' s thyroiditis for more than three years. After two years he had rapid and complete hair loss in small areas on different parts of the scalp. Eventually, the bald areas increased in size and number. With progression of the alopecia areata, hair loss occurred in other hairy parts of the body including eyebrows and lashes (Fig. 1). He had been suffering from severe ocular symptoms such as itching, burning, ocular irritation, photophobia and lacrimation and said these symptoms occurred most frequently in the presence of animals and house dusts. He has the habit of eye rubbing. He reported no history of atopy.

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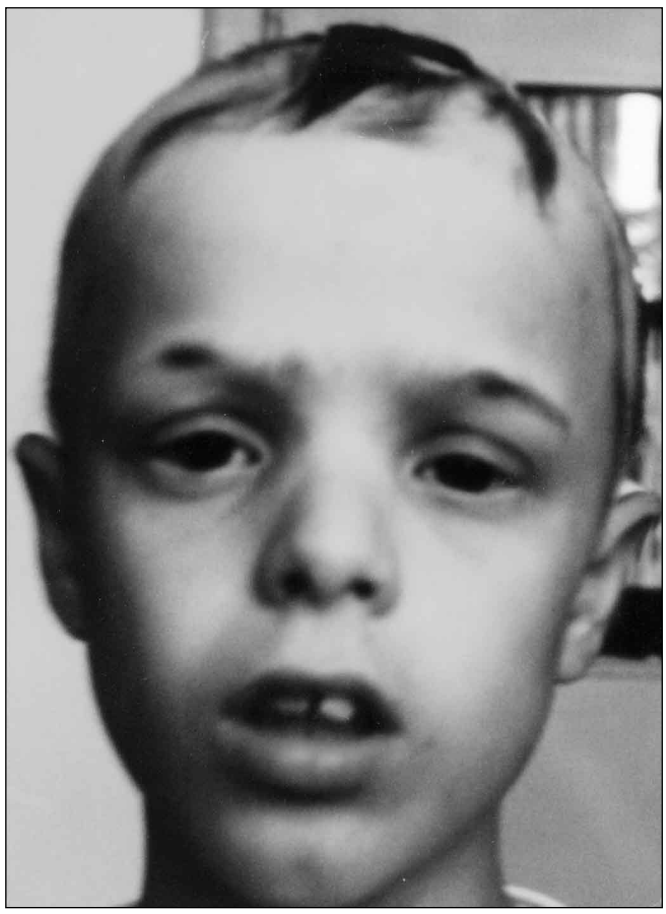

Fig. 1 - *Facial appearance of the 10-year-old patient with alopecia areata. He had progressive hair loss of eyelashes and eyebrows and on the scalp.*

METHODS

The patient was subjected to systemic and ocular examinations. Eye movements were checked in all cardinal positions; visual acuity was measured with Snellen charts, and refractive correction was done. Slit lamp evaluation was done for the anterior segment. After full mydriasis with 1% cyclopentolate, the posterior segment was examined by direct and indirect ophthalmoscopy. Keratometric (Haag-Streit®, Switzerland) and A-mode ultrasonographic (Sonomed®, USA) measurements were made.

In view of his history of Hashimoto's thyroiditis we did laboratory tests: free T_3, free T_4, total T_3, total T_4, thyroid stimulating hormone (TSH), anti-tyroglobulin antibody (anti TG), anti-microsome antibody (anti M), anti-parietal cell antibody, IgE, complete blood count, blood glucose.

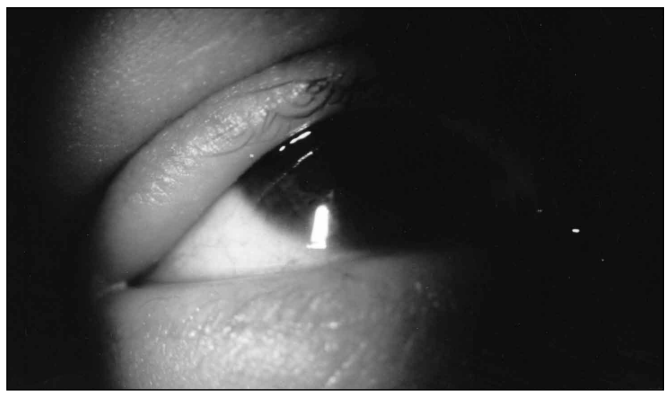

Fig. 2 - *The patient had madarosis, blepharitis, minimal keratinization on the lid margin, diffuse chemosis and keratoconus.*

RESULTS

Best corrected visual acuity was 0.2 (-8.00/-3.00 at 140°) in the right eye and 0.8 (-6.50/-1.50 at 10°) in the left. He had high irregular myopic astigmatism with a scissoring reflex at retinoscopy. Keratometry confirmed bilateral irregular corneal astigmatism. During keratometric measurement, the central mires could not be superimposed and the keratometric values were as follows: K_1=54.00 D, K_2=was more than 60.00 D in the right eye and K1=51.50 D, K_2=52.75 D in the left. Axial length of the eye measured by ultrasonography, was 23.27 ± 0.04 mm on the right and 23.16 ± 0.02 mm on the left.

Slit lamp examination revealed that the lid margins showed hyperemia, madarosis, minimal segment keratinization and blepharitis. The tarsal conjunctiva had a severe papillary reaction and follicules. Papillary hypertrophy was more marked in the inferior conjunctival fornices. The bulbar conjunctiva had diffuse chemosis, and erythema (Fig. 2). The OD temporal bulbar conjunctiva had a significant follicular reaction. Excessive mucous discharge and punctuate epithelial keratopathy were also found. Corneal thinning and protrusion caused angulation of the lower lid on downgaze, which has been referred to as Munson's sign. A partial fine iron ring in the basal epithelium was identified in the right cornea; this Fleischer ring is one of the characteristic findings of keratoconus.

On both sides the iris tissue, lens and anterior vitreous were normal. No significant fundus abnormalities were found by ophthalmoscopy.

The patient's results and normal laboratory values are listed in Table I. Anti-TG and anti-M were extremely high confirming the autoimmune disease of the thyroid gland. On physical examination the thyroid gland was large and nodular. Ultrasonographic examination of the gland showed that the parenchyma was granular, with low density; of the right lobe of the thyroid gland measured 31x10x11 cm, and of the left lobe 27x12x7 cm.

The patient had no other systemic abnormality. He has no family history for alopecia areata, endocrine disturbance, atopy or keratoconus. There is no known consanguinity.

Treatment

In view of the allergic conjunctivitis we suggested topical treatment with flouromethanol and cromolyn sodium four times daily. The ocular symptoms disappeared and there was significant improvement of the symptoms after four weeks of treatment.

The patient had been treated with L-thyroxine sodium 0.1 mg day for three years so his free T_3, free T_4, total T_3, total T_4 were normal, but the TSH was significantly reduced (Tab. I).

TABLE I - LABORATORY FINDINGS IN A TEN-YEAR-OLD BOY WITH HASHIMOTO'S THYROIDITIS AND KERATOCONUS

	Values for the patients	Normal values
T_3	4.05	1.8-6.0 pg/ml
T_4	1.27	0.7-2.0 ng/dl
IgE	21.80	<120 kIU/ml
TSH	0.260	0.49-4.67 uIU/ml
Anti-TG	32424	<200
Anti-M	7513	<100
Glucose	84	74-110 mg/dl
White blood cell count	5.6	4.8-10.8 K/ul
Red blood cell count	4.27	4.2-6.2 M/ul
Hemoglobin	14.9	11.8-17.8 g/dl
Hematocrit	43.6	37-52%

(See Methods section for abbreviations)

DISCUSSION

Alopecia areata has been associated with several autoimmune diseases including pernicious anemia, Addison's disease, vitiligo, insulin-dependent diabetes mellitus, Hashimoto's disease (chronic lymphocytic thyroiditis), Graves' disease and atopy. Immune factors play a role in the pathogenesis of alopecia areata. Antibodies against parietal cells, adrenal cells, thyreoglobulin and thyroid cells were reported in some studies (1, 2, 9). We found high levels of anti-TG and anti-M. These results support the theory of an association between alopecia areata and autoimmune disease such as Hashimoto's thyroiditis though alopecia areata associated with autoimmune thyroid disease is extremely rare. Gül (6) mentioned no case of associated Hashimoto's thyroiditis in a series of 40 alopecia areata cases.

Some authors report different types of ocular abnormalities in alopecia areata. Tosti et al (10) found a high incidence of lens alterations and retinal pigmentary epithelium changes in their series of 83 cases, but no patient with keratoconus or other corneal changes. Akova et al (2) also reported some alterations of the lens, the retinal pigment epitheliurn, iris, choroid and conjunctiva, but no corneal changes in 100 patients with alopecia areata. We were unable to find any report of alopecia areata with keratoconus in the literature.

Keratoconus describes a condition in which the cornea assumes a conical shape because of thinning and protrusion. Although sophisticated computer-assisted corneal power mapping devices can detect the early stages of the disease, visual distortion due to irregular corneal astigmatism, scissoring reflex on retinoscopy, keratometric measurements, characteristic signs on slit lamp examination, Munson's sign and Fleischer rings are the main diagnostic criteria, which we also found in this case (11, 12).

Keratoconus is a non-inflammatory process which may also occur in non-inflammatory connective tissue disorders. The relationship between allergic con-

ditions such as vernal or atopic kerato-conjunctivitis and keratoconus is widely reported and has been statistically demonstrated. Several reports have implicated eye rubbing as an important etiological factor in the development of keratoconus. The microtrauma associated with eye rubbing may be the causal link between conical cornea and associated ocular disease, itching, burning, ocular irritation and eye rubbing being common features of atopic disease (11, 13, 14).

The case described had typical atopic conjunctivitis with minimal corneal involvement and a history of vigorous eye rubbing. Although he had no typical history of atopy – with none of the characteristic seasonal variation – the bilateral lid changes and significant papillary hypertrophy in the inferior conjunctival fornices were sufficient for the clinical diagnosis of atopic keratoconjunctivitis. Keratoconjunctivitis and keratoconus most frequently occur in puberty, as in this case, which appears to be the first report of keratoconus in a patient with alopecia areata who also had Hashimoto's disease and atopic keratoconjunctivitis.

Through the presence of keratoconus may be a mere coincidence in this instance, the associations of between alopecia areata and atopy, and atopy and keratoconus must be kept in mind, especially in patients with visual symptoms and high refractive error.

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