The Journal of Laryngology & Otology
September 2002, Vol. **116,** pp. 742–743

Hypohidrotic ectodermal dysplasia associated with squamous cell carcinoma of the trachea

S. C. A. Winter, M.R.C.S., G. J. Bates, F.R.C.S.

Abstract

Hypohidrotic ectodermal dysplasia (HED) is a rare condition characterized by abnormalities to ectodermal derived tissues although other organs or systems are frequently involved. Patients with HED can have a number of symptoms that may lead them to present to the otolaryngologist. We present a case of a 37-year-old female with HED who initially presented with nasal obstruction but then very rapidly developed stridor due to a tracheal squamous cell carcinoma. We suggest a possible association between HED and carcinoma of the upper respiratory tract that has not previously been reported.

Key words: Ectodermal Dysplasia; Carcinoma, Squamous Cell

Introduction

Ectodermal dysplasia (ED) was first described by Thurnman in 1848,[1] since then over 170 different pathologic clinical conditions have been described.[2] They all share as common features anomalies of ectodermal derived tissue, however, it is now recognized that the effects are more widespread.[3] The condition is rare with an estimated incidence of 1:100 000.[4]

Hypohidrotic ectodermal dysplasia (HED) is characterized by abnormalities in hair, teeth, nails and sweat glands,[5] it may be inherited as X-linked recessive, autosomal dominant, or as an autosomal recessive trait.[2] Patients with HED frequently present to the otolaryngologist, therefore familiarity with the condition is important.

Squamous cell carcinoma (SCC) has been associated with HED in both the skin[6] and nail beds,[7] however, no reports have previously suggested an association with squamous cell carcinoma of the upper respiratory tract. We present a case of a female with HED and primary SCC of the trachea, that was notable for its very rapid progression.

Case report

A 37-year-old non-smoking female initially presented with nasal blockage. She was known to suffer with HED, that had been diagnosed at birth. At the initial consultation she was found to have a deviated nasal septum, and a nasal saddle deformity, characteristic of HED. Following a full consultation, which included an explanation of how her condition may be contributing to her symptoms she elected to undergo a septorhinoplasty.

Her father suffered from HED and one of two sisters had also been diagnosed with the condition. She had characteristic signs of HED including, baldness, nail dystrophy, and dry non-sweating skin. In the past she had had subcutaneous tissue expansion to her chest but was otherwise well.

Following her initial consultation she successfully underwent a septorhinoplasty procedure, with a general anaesthetic, and endotracheal intubation. Three weeks following the procedure she re-presented with symptoms of worsening shortness of breath, and occasional haemoptysis that she attributed to the endotracheal intubation. Full clinical examination was unremarkable, she had no stridor and no chest signs, a chest radiograph was reported as normal. Therefore she underwent bronchoscopy, which found crusting within the trachea, but no focal lesions (Figure 1). A swab taken at that time cultured *Staphylococcus aureus*.

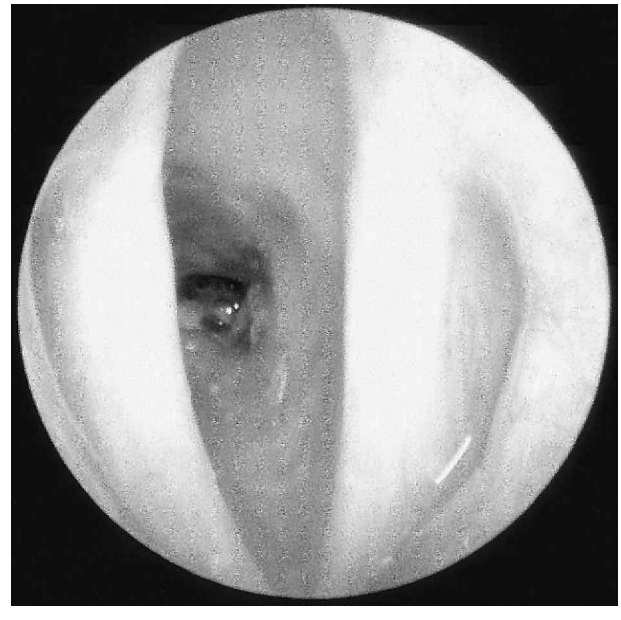

Fig. 1
Subglottic crusting seen at bronchoscopy.

From the Department of Otolaryngology, Radcliffe Infirmary, Oxford, UK.
Accepted for publication: 20 March 2002.

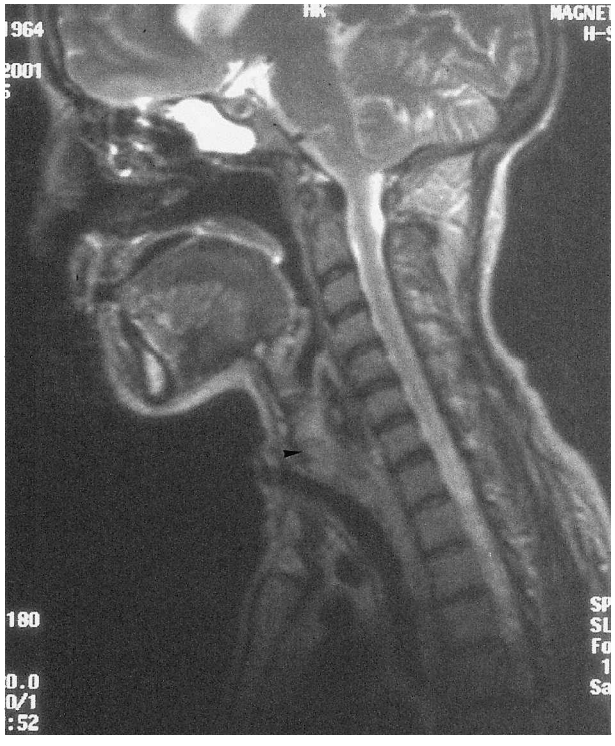

FIG. 2
MRI. Subglottic stenosing lesion (arrow), above the level of the tracheostomy.

It was felt that the infection was responsible for her symptoms as HED predisposes to infections of the respiratory tract. She was treated with appropriate medical and anti-microbial therapy. However, within three weeks she had deteriorated with worsening respiratory distress and stridor, requiring a tracheostomy. At that time no focal lesion was seen and no biopsies taken.

Two weeks following the tracheostomy she underwent a repeated tracheoscopy, which noted a subglottic stenosing lesion arising from below the level of the cricoid, a biopsy of which showed squamous cell carcinoma. The biopsy was subsequently repeated to confirm the diagnosis because of the unusual presentation.

Magnetic resonance imaging (MRI) of the neck and chest (Figure 2), revealed a subglottic stenosing lesion above the tracheostomy with submucosal extension to the level of the carina.

The options of palliative radiotherapy were discussed with the patient. However, the disease clinically progressed rapidly and 12 weeks following the initial bronchoscopy she died from an acute respiratory arrest.

Discussion

ED comprises a group of conditions that are characterized by anomalies to hair, teeth, nails and sweat glands, however, most are also associated with anomalies in other systems and organs.[5] HED was classically thought to be inherited as an X-linked recessive disorder, however, it is now recognized that autosomal dominant and recessive patterns of inheritance are possible.

The genetic basis of HED is not fully understood, the mechanism appears to involve genes responsible for proteins that are specifically expressed in the epidermis, and ectodermal derivatives. These proteins are involved in epithelial-mesenchymal interactions and regulate normal development of appendages. Thus any tissue or organ can be affected where there are epithelial-mesenchymal interactions such as the trachea whose epithelium is endodermal in origin, and its cartilaginous and muscular components are derived from mesoderm.[3]

Clinically the effects of the condition are widespread, typically HED patients have fine dry hypopigmented skin with patches of eczema. The hair is fine and, partial or total alopecia common.[8] Dental abnormalities, such as oligodentia, or anodentia require early dental referral.[9] The nails are generally abnormal, and sweat glands hypoplastic or aplastic. Breast tissue is frequently minimal or absent.[10]

They have characteristic faces, which appear small because of frontal bossing, prominent supraorbital ridges and flattened nasal dorsum with saddle nose deformities.[3]

The dry mucous membranes lead to frequent upper respiratory tract infections, pharyngitis, laryngitis and bronchitis. In addition mucous plugging of the tracheobronchial tree and lethal pneumonias secondary to staphylococcal infection can occur. Presentation to the otolaryngologists can, therefore, be with a variety of symptoms including dry mouth, hoarseness, nasal obstruction, atrophic rhinitis, serous otitis media and cerumen impaction. Less commonly they present with epistaxis, haemoptysis and hyperpyrexia.[11]

Primary SCC of the trachea is very unusual, particularly in young non-smoking females. SCC of the nail bed and skin has been reported in association with HED, however no association with SCC of the trachea has been noted. We report a case of HED in a young woman with primary trachea SCC that progressed very rapidly. HED frequently present to the otolaryngologist, we have therefore reported this case to raise awareness of the possible predisposition of HED to carcinoma of the upper respiratory tract.

References

1 Thurnman J. Two cases in which the skin hair and teeth were imperfectly developed. *Proc R Med Chir Soc* 1848;**71**: 71–81
2 Priolo M, Silengo M, Lerone M, Ravazzolo R. Ectodermal dysplasias: not only 'skin deep'. *Clin Genet* 2000;**58**:415–30
3 Siegel MB, Potsic WP. Ectodermal dysplasia: the otolaryngologic manifestations and management. *Int J Pediatr Otorhinolaryngol* 1990;**19**:265–71
4 Stevenson AC, Kerr CB. On the distributions of frequencies of mutation to genes determining harmful traits in man. *Mutat Res* 1967;**4**:339–52
5 Masse J, Perusse R. Ectodermal dysplasia. *Arch Dis Child* 1994;**71**:1–2
6 McGregor JM, Hawk JLM. Increased risk of skin cancer in patients with ectodermal dysplasia – a contraindication to psoralen and UVA (PUVA) therapy? *Clin Exp Dermatol* 1997;**22**:56
7 Maura JA, Maslyn R, Stein AA. Squamous cell carcinoma of nail bed in hereditary ectodermal dysplasia. *N Y State J Med* 1972;**72**:1065
8 Clarke A, Phillips DIM, Brown R, Harper PS. Clinical aspects of X-linked hypohidrotic ectodermal dysplasia. *Arch Dis Child* 1987;**62**:989–96
9 Itthagarum A, King NM. Ectodermal dysplasia: A review and case report. *Quintessence Int* 1997;**28**:595–601
10 Clarke A. Hypohidrotic ectodermal dysplasia. *J Med Genet* 1987;**24**:659–63
11 Baer ST, Coulson IH, Elliman D. Anhidrotic ectodermal dysplasia: an ENT presentation in infancy. *J Laryngol Otol* 198;**102**:458–9

Address for correspondence:
Mr G. J. Bates, F.R.C.S.,
Department of Otolaryngology,
Radcliffe Infirmary,
Woodstock Road,
Oxford OX2 6HE, UK.

Mr G. Bates takes responsibility for the integrity of the content of the paper.
Competing interests: None declared