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Laryngeal candidiasis: A cause of airway obstruction in the immunocompromised child

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Abstract
Laryngeal involvement with candida is usually secondary to pulmonary candidiasis and is seen in patients with impaired immunity. We report a case of isolated laryngeal candidiasis involving the vestibular folds and presenting with stridor in a one-year-old child with Down's syndrome and hypogammaglobulinaemia. Vestibular fold reduction and fluconazole achieved resolution of the disease. Candidiasis should be considered in any potentially immunodeficient child presenting with symptoms of laryngeal disease.

Introduction

Since Langdon Down described the condition of 'Mongolian idiocy' in 1866, more than 100 separate clinical signs have been associated with Trisomy 21 (Gorlin *et al.*, 1990). The otolaryngologist is familiar with cases of Down's syndrome presenting with upper airway obstruction secondary to adenotonsillar and tongue base factors (Bailey and Croft, 1987), but is less likely to meet associated laryngeal obstruction other than subglottic stenosis (Miller *et al.*, 1990).

Laryngeal involvement in mycotic disease is well recognized, but usually as a part of more widespread involvement in a severely immunocompromised host (Michaels, 1984) although cases have been reported in whom no apparent immunodeficiency existed (Tedeschi and Cheren, 1968).

We describe a case in which invasive candidiasis was restricted to the larynx, and led to a Down's syndrome child presenting with airway obstruction.

Case report

A 19-month-old Caucasian boy with Down's syndrome and dystonic cerebral palsy was referred with a four-month history of recurrent URTI, hoarseness, increasing biphasic stridor, lethargy and difficulties with feeding. He was born after a normal pregnancy and delivery at 33 weeks gestation. He required emergency surgery for duodenal atresia but after an uneventful post-operative recovery had no other past medical history and in particular no history of croup, airway obstruction or chest infections.

On examination, he was pale and slightly sweaty. There was tracheal tug and sternal recession associated with good air entry. There was no lymphadenopathy or abnormality in the oral cavity. Pre-operative investigations including serum electrolytes, chest X-ray, Cincinatti view and lateral neck X-ray were found to be normal.

On microlaryngoscopy, hyperplasia of the vestibular folds (false cords) only was found (Fig. 1). He was treated by staged biopsy and reduction of the vestibular folds.

Histology of the laryngeal mucosa revealed an acute and chronic inflammatory reaction (Fig. 2). Silver methenamine stain showed yeast forms of candida. These were sharply defined, round or oval bodies, three to four microns in diameter (Fig. 3). A full investigation for immunodeficiency revealed normal T-cell function, but hypogammaglobulinaemia and hypoalbuminaemia.

Treatment was with oral fluconazole for three weeks. On direct microlaryngoscopy six weeks later, the larynx was normal. He remains well at three months follow-up.

Discussion

Upper airway obstruction causing stridor in children has a wide differential diagnosis (Cinnamond, 1987). The history provides important clues to the likely pathology responsible and when there is any suspicion of immunodeficiency the possibility of mycotic disease must be entertained (Hass *et al.*, 1987). More than ten separate mycoses can afflict the larynx (Friedmann and Ferlito, 1988) and although one large series of patients admitted for mycotic disease to a hospital in New Orleans showed 14 per cent laryngeal involvement, none of these were candidal (Lyons, 1966).

The interaction between the normally saprophytic candida and host tissues is complex, involving both non-specific factors such as epithelial integrity and local immune factors such as immunoglobulins that can function in the absence of complement (Epstein *et al.*, 1984). Laryngeal infection with candida had been classified into superficial and invasive forms (Yonkers, 1973) and although the larynx is usually involved secondary to pulmonary or pharyngeal candida, it can occasionally affect the larynx primarily (Michaels, 1984).

Predisposing factors which have previously been noted in the paediatric age group include cytotoxic therapy for malignancy (commonest), AIDS (Hass *et al.*, 1987; Williams, 1987), maternal antibiotic treatment with suspected candidal transmission vaginally (Perrone, 1970; Jacobs *et al.*, 1982), inhaled corticosteroids for asthma (Babu and Samuel, 1988) and neutrophil motility disorder (Murphy *et al.*, 1984).

Clear evidence of immunodeficiency is not always forthcoming (Tedeschi and Cheren, 1968) and the disease is ascribed to 'general debility'. Immunodeficiency is one of the features of Down's syndrome, but as with the other features there is considerable variation in expression among individual cases (Ochs and Wedgwood, 1989). Specific abnormalities include: disturbed immunoglobulin balance; T-cell deficiency with a low

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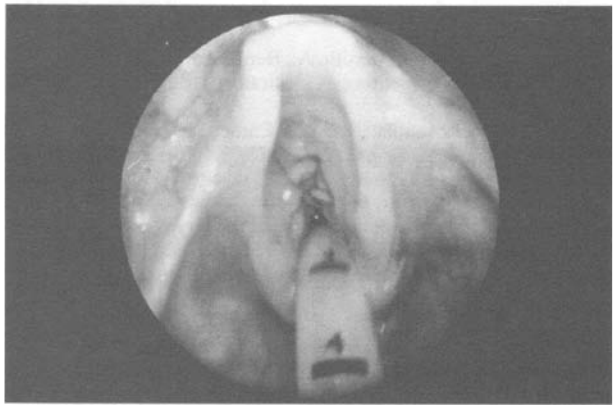

FIG. 1

Appearances at microlaryngoscopy demonstrating the hyperplastic reaction of the vestibular folds (false cords).

helper/suppressor ration; reduced bacterial killing; reduced phagocytosis and increase in neoplasia (Shearer and Anderson, 1989; Gorlin *et al.*, 1990). Abnormalities can fluctuate quantitatively or change qualitatively with the passage of time in the individual child.

The symptoms of laryngeal candidiasis relate to the size of the airway and hence the age of the patient. Younger children are likely to present with stridor and respiratory distress whereas in older children and adults, hoarseness, and dysphagia will be more evident (Tashjian and Peacock, 1984). Pain will lead to poor feeding in all age groups especially if the oesophagus is involved in addition (Kobayashi *et al.*, 1980). Whilst clinical signs of oral candidiasis will be helpful if they are present, this is usually not to be found and diagnosis therefore depends upon a careful direct laryngoscopy with culture and histology of biopsy specimens. Special fungal staining is essential and chest radiography is recommended to exclude pulmonary involvement (Yonkers, 1973).

Failure to detect the condition ante-mortem could be reduced by more readiness to endoscope susceptible symptomatic children. Signs at laryngoscopy include oedema, erythema, hyperkeratosis, adherent white plaques, shallow ulceration and even 'papillomatous' lesions (Tedeschi and Cheren, 1968; Jacobs *et al.*, 1982; Bye *et al.*, 1987). The most characteristic feature is adherent white plaques and the vocal folds are most commonly involved. However, several cases have presented with sparing of the vocal folds (as in our case) and a picture of supraglottitis (Cole *et al.*, 1987; Walsh and Gray, 1987). Candidiasis can also produce a subglottic mass (Hass *et al.*, 1987). Histological examination of biopsies will often show non-specific inflammatory cell infiltrates and hyperplastic changes, and diagnosis depends upon the demonstration of candidal yeasts, hyphae and pseudohyphae (Michaels, 1984). Confusion has occurred with tuberculosis, due to granulomatous reactions (Friedmann and Ferlito, 1968; Tadeschi and Cheren, 1968) and even squamous cell carcinoma has been suspected. Delay in diagnosis can result in at best laryngeal scarring with permanent voice impairment, and at worst demise from unrelieved airway obstruction. In such cases diagnosis will usually be made *post-mortem*.

Once diagnosed, treatment is aimed at relief of airway obstruction if critical, and antifungal measures. Nystatin for mild cases and amphotericin B for severe cases have been the mainstay of treatment, but the toxicity of the latter has led to its gradual replacement with newer antifungal agents such as miconazole and fluconazole (Cole *et al.*, 1987; Friedmann and Fer-

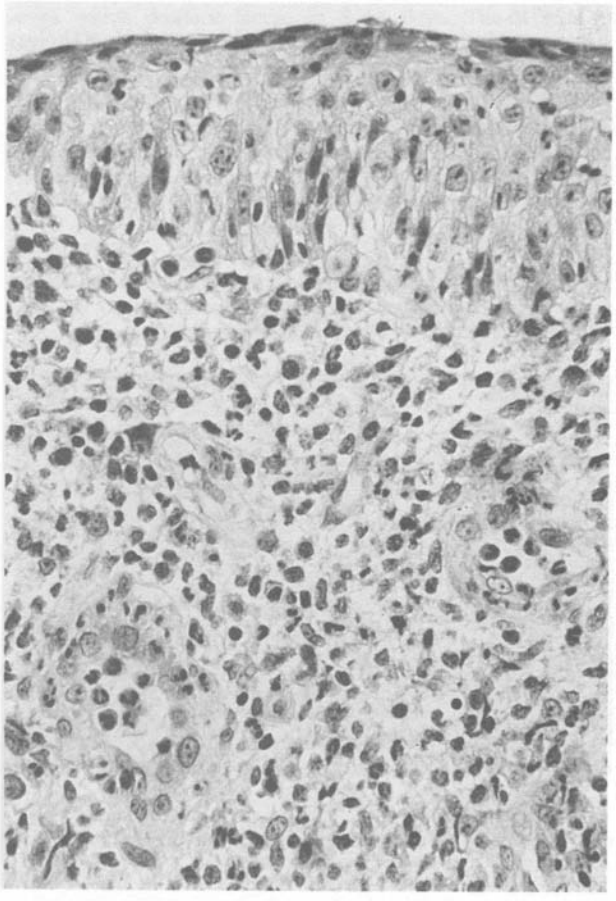

FIG. 2

Laryngeal mucosa showing acute and chronic inflammation (Section stained with H&E) (Mag. ×400)

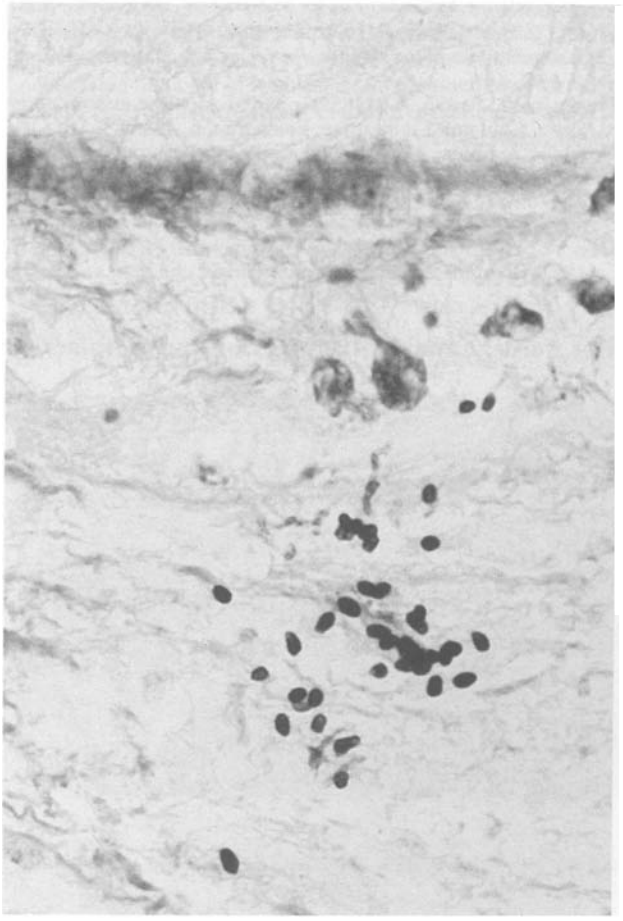

FIG. 3

Laryngeal candidasis: A Grocott silver methenamine stain showing black spores of Candida (Mag ×800)

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lito, 1988). In our case the surgical reduction of the affected vestibular folds helped both to relieve obstruction and provide adequate biopsy material. No such surgical manoeuvre has hitherto been described.

With the increasing incidence and awareness of immunodeficiency that has come with the AIDS epidemic, we would recommend that the otolaryngologist should consider candida whenever a potentially immunocompromised child presents with hoarseness or stridor.

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