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CASE FOR DIAGNOSIS

An unusual cause of recurrent fever

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Case history

A 49 year old man was referred to our hospital in 1994, because of intermittent fever and production of mucopurulent sputum. His complaints started at 43 yrs of age. The symptoms were mostly self-limiting, and occurred five times a year. Over the years, periods of bronchitis had increased to 12 times a year. In addition, a sinusitis with *Klebsiella ozaenae* became apparent, which was treated with antibiotics and intranasal beclomethasone dipropionate. Coughing was most severe during the night, with production of mucopurulent sputum. The patient's exercise tolerance was normal; he had worked for more than 10 years as a shoemaker. He has no smoking history.

Physical examination and routine laboratory investigations were normal. Posteroanterior and lateral chest radiography and lung function tests were normal. A fibreoptic bronchoscopy was performed and showed many abnormalities of the trachea and bronchi (figs. 1 and 2). Specimens were taken for microbiological analysis, and biopsies were sampled for histological examination (fig. 3). Because of the extent of the abnormalities seen during bronchoscopy, computed tomography (CT) of the chest was performed (figs. 4 and 5).

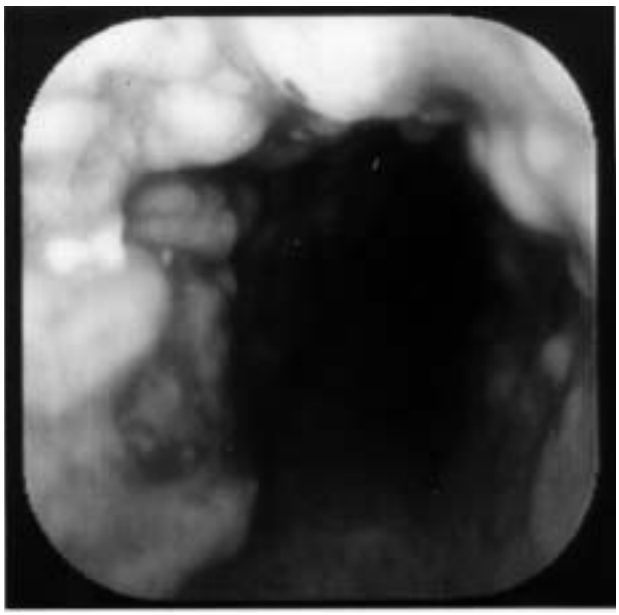

Fig. 1. – Bronchoscopic view, 1 cm beneath the vocal cords.

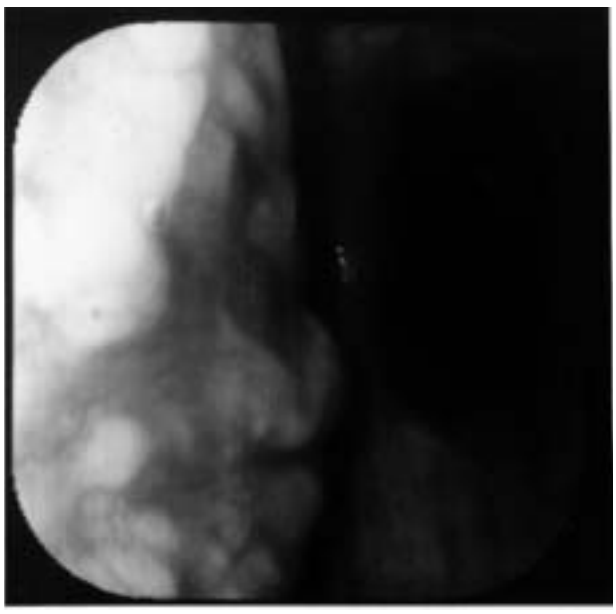

Fig. 2. – The left main bronchus is obliterated by more than 50% by a polyp-like mass, the right main bronchus is open.

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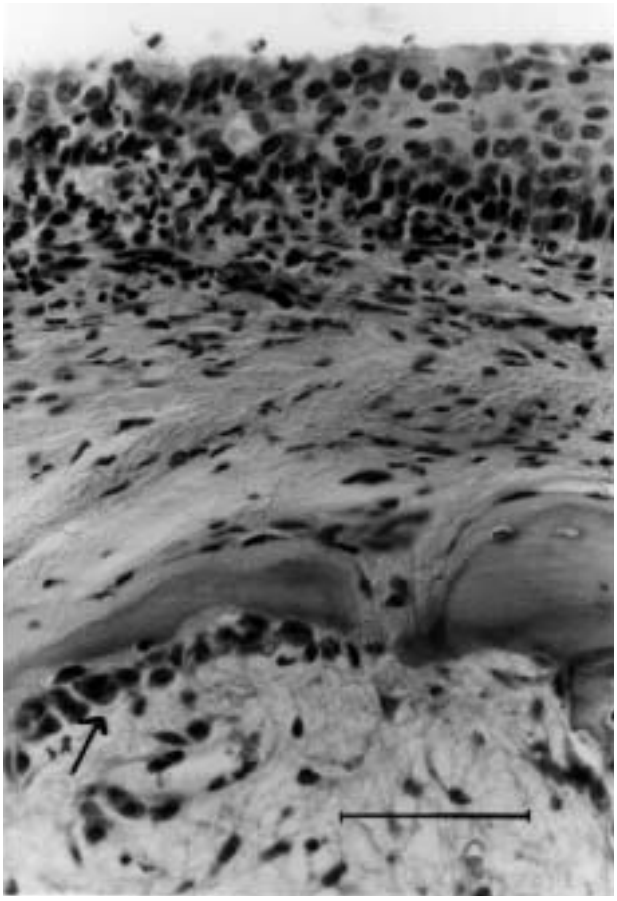

Fig. 3. – Bronchus biopsy. (Haematoxylin and eosin staining; internal scale bar = 50 µm).

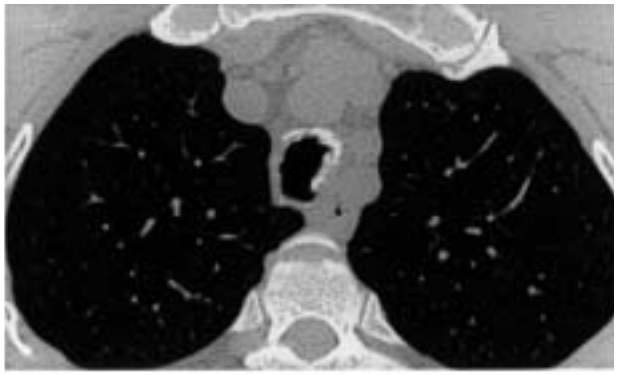

Fig. 4. – Computed tomography (CT) scan, at the level of the trachea.

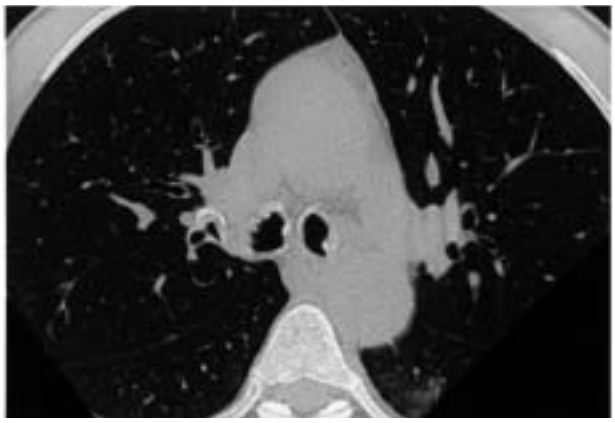

Fig. 5. – Computed tomography (CT) scan, just below the main carina.

BEFORE TURNING THE PAGE: INTERPRET THE COMPUTED TOMOGRAPHY AND BRONCHOSCOPY FINDINGS AND SUGGEST DIAGNOSIS.

Interpretations

Fibreoptic bronchoscopy showed 1 cm beneath the vocal cords, multiple white, hard, polyp-like lesions on the lateral and ventral wall of the trachea (fig. 1), and both left and right main bronchus as far as the segmental bronchi. The lumen of the left main bronchus was obliterated by more than 50% (fig. 2).

The CT of the chest revealed many irregularities and narrowing of the trachea and both main bronchi. Extensive calcification of the wall of the trachea, main and segmental bronchi was seen (figs. 4 and 5).

Histological examination of the bronchial biopsy revealed metaplastic bone in the submucosa, with proliferation of osteoblasts (arrow). The mucosa showed squamous metaplasia of the ciliated epithelium (fig. 3). In view of the bronchoscopic findings, differential diagnosis of tracheobronchopathia osteochondroplastica, papillomatosis, amyloidosis and ecchondrosis was considered.

Diagnosis: "tracheobronchopathia osteoplastica"

This diagnosis was confirmed because of the typical histological findings and the negative outcome of the specific staining for amyloidosis. Microbiological analysis of the secretion showed *Pseudomonas aeruginosa* and *Klebsiella ozaenae*.

Treatment and clinical course

After antibiotic treatment (ciprofloxacin) and chest physiotherapy, the symptoms improved, and during the last year no relapses have occurred.

Discussion

Tracheobronchopathia osteoplastica is a rare disease, first reported by Rokitansky in 1855 (cited by DALGAARD [1]). A few years later (in 1857), WILKS [2] described this entity microscopically, characterized by the presence of bone and/or cartilage in the mucosa of the trachea and bronchi. In 1947, DALGAARD [1] found 90 cases described in the literature, and MARTIN [3] found 245 cases up till 1974.

Tracheobronchopathia osteoplastica is seen predominantly in late adult life, with no gender predominance. It is found in 0.002–0.003% of autopsies [5]. Approximately 5% of cases have been diagnosed during life [6]. It is possible that the incidence is much higher than reported, because of the mild nature of symptoms. Symptoms are absent or nonspecific, sometimes including dyspnoea, cough, haemoptysis or mucopurulent sputum.

The aetiology of this disease is unknown, several hypotheses have been suggested, but none have been validated. An association with amyloidosis [7, 8] was suggested, but not confirmed in a large group of patients. Furthermore, its relationship with malignancies is unclear [9, 10]. The possibility that a disturbance in calcium phosphate metabolism plays a role in the aetiology has not been proved [11]. Very few cases have been described in children, the youngest patient being 12 yrs of age; therefore, there is little evidence of a congenital process [7].

ASCHOFF [12], who originally proposed the term tracheopathia osteoplastica, suggested a cartilaginous metaplasia of the subepithelial connective tissue, but VAN NIEROP *et al*. [5] reported a case in which the pars membranacea was affected. Reports of tracheobronchopathia osteoplastica in conjunction with tuberculosis and *Mycobacterium intracellulare* [13] have been found in the literature.

JEPSEN and SORENSEN [14] stated a relationship with ozaena, in which the respiratory epithelium is transformed into stratified glandless squamous epithelium. Histologically, the same abnormalities are found in tracheobronchopathia osteoplastica [15]. In the study by HARMA and SUURKARI [10], 23 out of 30 cases had rhinitis, and many of them had tracheo-ozaena. In our patient, there was evidence of rhinitis long before the diagnosis had been made. Rhinological investigation showed *K. ozaenae*. Bronchoscopy showed purulent mucus and the culture revealed *K. ozaenae*. Not all patients with *K. ozaenae* develop tracheobronchopathia osteoplastica, some of them may only have a predisposition, depending on genetic [16] and special environmental influences [10].

The radiographic appearance of tracheobronchopathia osteoplastica is an irregular narrowing of the trachea, with nodules protruding into the lumen. Calcification is a characteristic finding, which is clearer on CT scan than on plain radiograph, as in the present patient (fig. 4). Some authors [17] regard the CT scan as diagnostic. Despite this, there is always a need for bronchoscopy to confirm histological evidence and to rule out malignancy [18].

This patient showed an extensive form of the disease; the lesions were located mainly in the distal trachea or central bronchi. He had few complaints, given the extent of endobronchial abnormalities. He demonstrated no need for endobronchial treatment, because conservative treatment resulted in good control of the symptoms. When the disease is progressive, with evidence of recurrent postobstructive pneumonia, therapy with neodymium-yttrium aluminium garnet (Nd-Yag) laser should be considered.

***Keywords*:** Ozaena, tracheobronchopathia osteoplastica.

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