

CLINICAL CASE

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Tracheobronchopathia Osteochondroplastica – Case Report

Tracheobronchopatia osteochondroplastyczna – opis przypadku

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Abstract

Tracheobronchopathia osteochondroplastica (TO) is a rare and usually benign disorder affecting the trachea and occasionally the bronchi. The authors described a case of 42-year-old man who was diagnosed to have TO by chance because of difficult intubation preceding cholecystectomy. Fiberoptic bronchoscopy revealed a characteristic picture of TO: multiple whitish, irregularly shaped nodules in the walls of the trachea and the main right bronchus excepts in the *pars membranacea*. CT-scan revealed a moderate narrowing of the trachea with a irregularity of the walls related to the presence of nodules containing calcium deposits. Despite macroscopic changes lung function tests were within normal limits. The histological examination confirmed the diagnosis of TO and the immunocytochemical analysis of a dysplastic epithelium did not reveal the overexpression of cancer molecular markers. The case presented here demonstrates that even progressive TO may remain asymptomatic (*Adv Clin Exp Med* 2005, 14, 6, 1327–1330).

Key words: tracheobronchopathia osteochondroplastica, computed tomography, bronchoscopy, immunocytochemistry.

Streszczenie

Tracheobronchopatia osteochondroplastyczna (TO) jest rzadkim i zwykle łagodnym schorzeniem tchawicy oraz oskrzeli. Przedstawiono przypadek 42-letniego mężczyzny, u którego powodem skierowania na oddział pulmonologiczny były trudności w intubacji przed zabiegiem usunięcia pęcherzyka żółciowego. Podczas bronchofiberoskopii stwierdzono charakterystyczny obraz dla TO: liczne białawe, nieregularne guzki na wszystkich ścianach, poza częścią błoniastą, tchawicy oraz głównego prawego oskrzela. Tomografia komputerowa wykazała częściowe zwężenie światła tchawicy, w której ścianach były widoczne uwapnione guzki. Wyniki badań czynnościowych płuc mieściły się w granicach wartości prawidłowych. Badanie histopatologiczne potwierdziło rozpoznanie TO. Badanie immunocytochemiczne dysplastycznego nabłonka nie wykazało wzmożonej ekspresji markerów nowotworowych (*Adv Clin Exp Med* 2005, 14, 6, 1327–1330).

Słowa kluczowe: tracheobronchopatia osteochondroplastyczna, tomografia komputerowa, bronchoskopia, immunocytochemia.

Tracheobronchopathia osteochondroplastica (TO) is a relatively rare benign disease of the trachea and major bronchi. The first cases were described by Rokitansky (1855), Luschka (1856), and Wilks (1857) and since then approximately 400 cases have been reported [1]. The disease is characterized by osseocartilaginous submucosal nodules projecting in

the tracheobronchial tree [1]. The etiology of the disease remains unknown. The disorder is usually benign and clinical signs like dry cough, dyspnea, recurrent respiratory infections and occasionally haemoptysis are unspecific. In exceptional cases the diagnosis of TO is established during a difficult intubation, as in the present case [2, 3].

Case Report

A 42-year-old man was admitted to Pulmonary Department Wrocław Medical University because of difficulty in endotracheal intubation preceding cholecystectomy. His medical past history revealed chronic cholecystitis and cholelithiasis. He had been a cigarette smoker for 30 years. Three years before the admission an appendectomy was done without any intubation's problems.

On admission he was alert, cooperative and gave no complaints. The physical examination revealed a well-developed, thin, middle aged male, with normal vital signs, pulse 76 beats/min, blood pressure 130/60, temperature 36.8°C and respiratory rate 14 breaths/min, with normal breath sounds over both lung fields. The routine blood, coagulation and serum biochemistry studies were within normal limits. The pulmonary function tests including indices of expiratory and inspiratory flow-volume curves, bodyplethysmography, diffusing capacity and airway resistance were within normal limits. The chest roentgenogram showed a little narrowing of the middle trachea. The computed tomography (CT) scan of the thorax revealed a moderate narrowing of the trachea with irregularity of the walls related to the presence of calcified nodules.

The bronchoscopy showed numerous whitish nodules of a hard consistency when grasped with biopsy forceps (Fig. 1). They were extending from the infra-glottic space to the proximal part of the right main bronchus. The posterior wall of the trachea was not involved and had a normal mobility and a movement during either active or passive respiratory maneuvers. Small amount of a pus was evacuated and the bacteriological examination revealed *Klebsiella ozaenae* and *Pseudomonas aeruginosa*. Because the histological examination showed metaplastic changes with the suggestion of a neoplastic disease we performed the rigid bronchoscopy under a central anaesthesia to obtain more representative histological material. The procedure was not complicated.

The histological examination of the biopsy material showed the osteochondrial tissue situated in the submucosa. The osteoid lamellae were lined by an adult bone tissue. The mucosa had undergone squamous metaplasia with signs of dysplasia (Fig. 2). This proved the diagnosis of tracheobronchopathia osteochondroplastica.

Additionally more detailed pathological procedures were done to find out any possible molecular changes. Taking into account the severe dysplastic mucous changes visible in a light microscopy, the patient's younger age than commonly observed in this disease and a long-term

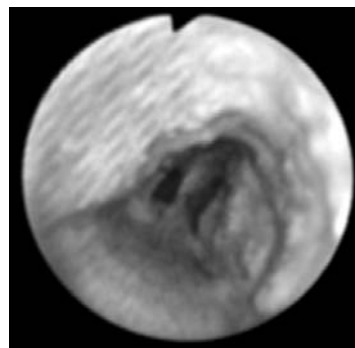


Fig. 1. Endoscopic view of the trachea shows widespread bony and/or cartilaginous nodules. The posterior wall of the trachea is not involved

Ryc. 1. Obraz bronchoskopowy tchawicy: liczne kostne i chrzęstne guzki, tylna ściana tchawicy nie jest zajęta

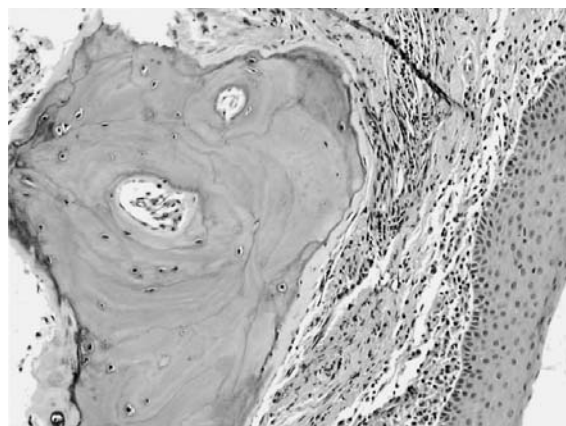


Fig. 2. The histological examination of the biopsy material showed the osteochondrial tissue situated in the submucosa. The osteoid lamellae were lined by an adult bone tissue. The mucosa had undergone squamous metaplasia with signs of dysplasia (HE x200)

Ryc. 2. Badanie histopatologiczne wycinka błony śluzowej tchawicy wykazuje tkankę chrzęstnokostną w tkance podśluzowej. Widoczna jest również metaplasja płaskonabłonkowa błony śluzowej oraz cechy dysplazji (HE 200x)

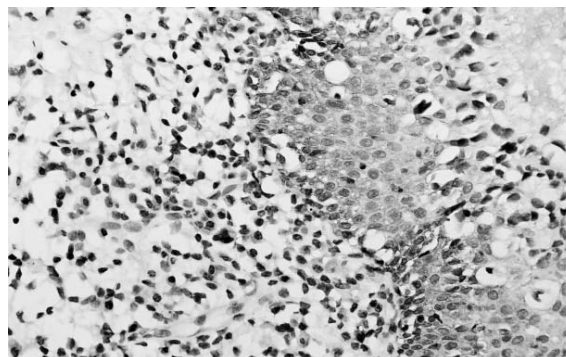


Fig. 3. Expression of EGFR in a dysplastic epithelial tissue. Membrane staining with weak cytoplasmic reactivity (immunoperoxidase x400)

Ryc. 3. Mała ekspresja EGFR na komórkach nabłonka dysplastycznego (immunoperoxydaza, 400x)

smoking history, the immunohistochemical method was performed using mono- and polyclonal antibodies against common neoplastic tumor markers. The results revealed negative immunohistological staining for p53 and Ki-67. The EGFR expression was seen on 30% of cells and ERBB2 was occasionally positive on 10% of cells (Fig. 3).

After the establishing the diagnosis the patient was discharged and has been observed with no evidence of the disease progression.

Discussion

Tracheobronchopathia osteochondroplastica is usually regarded as a benign condition. It is usually diagnosed after the age of 50 years but has already been described in children [2, 4]. Most often TO is diagnosed occasionally during an autopsy, with the incidence of 3/1000 [1]. In the other cases when symptoms of TO occur they are unspecific and include dry cough, dyspnea, stridor, and haemoptysis. Patients frequently complaint of recurrent respiratory infections. As in described case they are caused most often by *Klebsiella ozaenae* [1, 5]. There are reports about the rarer infective pathogens coexisting with TO like *Mycobacterium* spp. as well [5, 6].

The presenting case is an example of an asymptomatic tracheobronchopathia osteochondroplastica, that was diagnosed because of the difficulties in the tracheal intubation. There are few reports about an unexpected difficult intubation due to TO [2, 3]. One of the cases was so severe that a size 4.0 micro-laryngoscopy tube was placed using rigid bronchoscopy. A difficult intubation should be followed by an endoscopy in order to confirm the diagnosis. The endoscopic findings are diagnostic. They include: whitish, hard nodules, projecting into the tracheal lumen from the anterior and lateral walls, with sparing of the posterior wall [1, 4, 7]. When the lesions are tiny, the tracheobronchial tree may assume a cobblestone appearance. In rarer cases main bronchi can be involved, as in described patient [3]. According to authors' experience biopsies are often difficult to perform because of the hard consistency of the nodules [8]. The differential diagnosis of multiple nodular lesions of the trachea and bronchi includes papillomatosis, amyloidosis, endobronchial sarcoidosis, calcificating lesions of tuberculosis and lung cancer. The spirometry parameters of a ventilation function are usually normal or show an obstructive pattern [4].

A chest X-ray is commonly normal but in few cases may demonstrate irregularity, calcifications or as in described patient narrowing of the trachea and mainstem bronchi. The calcifications are best

demonstrated on the lateral chest radiograph, as they involve the anterior and lateral walls of the trachea [7]. Some authors have recently insisted on using CT-scanning to confirm the diagnosis [7, 8]. CT of the trachea and major bronchi reveals calcified nodules projecting into the lumen, thus distorting their normal configuration. As in presented case these calcified deposits are absent in their posterior wall [7].

The histopathological findings of TO consisted typically of bony and cartilaginous nodules (some even demonstrating haemopoiesis) situated in the submucosa with connections of bone, cartilage or connective tissue to the perichondrium of the tracheal rings [3]. Some authors observed that the nodules are independent of the cartilaginous rings [7].

The etiology of TO remains unknown. Two major pathogenic theories have been proposed: a) Virchow suggested that TO is the result of an ecchondrosis and an exostosis from the perichondrium of cartilage rings, b) Aschoff thought that TO is due to the cartilaginous and bony metaplasia of an elastic tissue [2]. The last hypothesis remains the currently held view but stimulus of this metaplasia are still not known. Association between TO and upper respiratory tract infections such as atrophic rhinitis/ozena have been reported [1]. Described patient had no signs of rhinitis but the bacteriological examination of the bronchial washing revealed *Klebsiella ozaenae*. Sakula and John et al. put forward the theory that tracheobronchopathia might be a form of primary localized amyloidosis of the lower respiratory tract that has undergone ossification [5, 9]. However, histology findings do not support this suggestion. Moreover, few cases have been associated with lung cancer, and few with thyroid tumor or thymoma [1, 10].

The published data indicated that aberrant expression of p53 and EGFR family members are common features in bronchial neoplasia and the p53 with EGFR co-expression in preneoplastic lesions of the bronchial epithelium may predispose to the development of carcinoma of the lung [11, 12].

To authors' knowledge there have been no analysis of molecular changes including cell cycle regulators of the pathological tissue in tracheobronchopathia osteochondroplastica. No alteration of p53, Ki-67, EGFR and ERBB 2 were diagnosed in this case and that observation proved the hypothesis that the changes in mucosa are unspecific.

The prognosis of TO is generally good. There is no specific therapy of tracheobronchopathia osteochondroplastica. In most cases the cessation of smoking and the support therapy with expectorants are sufficient. In patients with severe symptoms a removal of the obstructing lesions using forceps biopsy or laser therapy is advisable [7].

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