Atypical Presentation of Tracheobronchopathia Osteochondroplastica: Is Chronic Inflammation a Perpetrator?

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Introduction
Tracheobronchopathia osteochondroplastica (TO) is characterized by development of multiple osseous and cartilaginous nodules in the submucosa of the trachea and the main bronchus [1, 2]. Patients usually present with cough, recurrent respiratory tract infections, and occasionally hemoptysis [3, 4]. TO is not usually suspected until fiber-optic bronchoscopy is performed; the bronchoscopy views together with histopathological examination of the nodules confirm the diagnosis.

Case Report
A 59-year-old male smoker (30 pack-years) was investigated for productive cough of 1 month. He had a past history of pulmonary tuberculosis (25 years ago; unavailable medical records) and mentioned occasional episodes of dry cough every year for the last 3 years. His family and occupational history were not significant. One month earlier, he had been diagnosed with pulmonary tuberculosis at another institution, but his sputum smear and culture
a better respiratory status. The patient was managed with broncho-
gime (to verify that his airway changes were not drug-induced).
Within 1 week of discontinuation, his symptoms eased and he had
submucosa with a moderate degree of squamous metaplasia
presence of cartilaginous and osseous nodules in the bronchial
trachea (fig. 1a). Bronchoscopy showed tracheal stenosis with
worsening cough and occasional blood-tinged sputum. CT re-
up scheduled after 1 month. At follow-up, the patient reported
experienced relief of symptoms and was discharged, with follow-
cin + isoniazid + pyrizinamide + ethambutol) was initiated with a
was negative. An antimycobacterial combination regime (rifampi-
were negative for acid-fast bacilli at the time of admission. His
physical examination was unremarkable apart from the respira-
tory rate of 21/min. Laboratory studies revealed a white blood cell
count of $5.54 \times 10^9$/l, platelet count of $104 \times 10^9$/l, neutrophils
72.6%, and an erythrocyte sedimentation rate of 21 mm/h. Liver
and renal function tests were normal except for a high uric acid
level (937.9 μmol/l). He tested negative for HIV and HBV antibod-
ties. CT demonstrated increased density in the lateral segment of
the right middle lobe, but was otherwise normal. The bronchial
provocation test with methacholine was unremarkable. Bronchos-
copy revealed an uneven layer of inflamed mucosa. Histopatho-
logical examination showed bronchial mucosal inflammation with
squamous metaplasia but serum bone morphogenetic protein 2
was negative. An antimycobacterial combination regime (rifampi-
cin + isoniazid + pyrizinamide + ethambutol) was initiated with a
provisional diagnosis of endobronchial tuberculosis. The patient
experienced relief of symptoms and was discharged, with follow-
up scheduled after 1 month. At follow-up, the patient reported
worsening cough and occasional blood-tinged sputum. CT re-
vealed an increased density in the cartilage ring surrounding the
trachea (fig. 1a). Bronchoscopy showed tracheal stenosis with
white, hard spicules (fig. 1b, c). Histopathology confirmed the
presence of cartilaginous and osseous nodules in the bronchial
submucosa with a moderate degree of squamous metaplasia
(fig. 1d). An interdepartmental consultation recommended a tem-
porary discontinuation of the antimycobacterial combination re-
ge (to verify that his airway changes were not drug-induced).
Within 1 week of discontinuation, his symptoms eased and he had
a better respiratory status. The patient was managed with broncho-
scopic nodule removal and laser ablation. At the 4-month follow-
up, radiographic findings were negative and the patient reported
progressive relief in his symptoms.

Discussion

TO is limited to the large airways and does not involve
the lung or other organs [1]. Changes at the mucosal sur-
face and altered clearance of secretions result in recurrent
inflammation and infection [3]. These lesions typically
spread over the anterior and lateral walls of the airways
(but not the posterior wall). Studies suggest that only 51%
of patients with TO are accurately diagnosed during their
lifetime [5]. Our patient was reevaluated after 1 month,
CT and bronchoscopy revealed features suggestive of TO,
but acute deterioration is not typical of this disease [6].
Classic hypotheses include ecchondrosis and exostosis
arising from the cartilaginous rings, or metaplasia of the
submucosal elastic and connective tissue [1–3]. An asso-
ciation with lung cancer (adenocarcinoma in particular)
has also been suggested [7]. Cystic fibrosis coupled with
bacterial infection induces metaplastic bone replacement,
as well as destruction and elimination of the bronchial
cartilage. Degenerative changes in the cartilage and in-
creased perichondrial fibrosis have been demonstrated in
patients with chronic obstructive pulmonary disease and
bronchial asthma. We assume that chronic inflammation
of the large airway, in part due to recurrent infection, may
have been the cause for our patient’s initial complaint of
cough. Moreover, the acute changes in the airways ob-
erved 1 month after starting the antimycobacterial com-
bination regime and the symptomatic recovery after dis-
continuation of the drugs are an interesting association
that remains unexplained. Whether the antimycobac-
terial drugs played a synergistic role by accelerating the in-
flammatory process is debatable. There are reports sug-
gest coexistence of tracheobronchial amyloidosis and
TO [8]. Isolation of Klebsiella ozaenae, both in atrophic
rhinitis and TO, suggests a link between these disorders
[9]. Other differential diagnoses of TO include calcified
lesions secondary to tuberculosis, carcinoma, papilloma,
fibroma, endobronchial sarcoidosis, polychondritis, and
Wegener’s granulomatosis of the proximal airways. Im-
munohistochemical studies of TO lesions suggest a role
for bone morphogenetic protein 2 [10]. The above-men-
tioned features were not evident in our patient, and the
short history made understanding his case rather com-
plex. Multiple factors are probably involved in the patho-
genesis of TO; the cartilage ossification seen in our pa-
tient may possibly be the result of an intense inflammatory reaction in the bronchial mucosa. More case reports and studies on the etiology of the condition will help to clarify this issue.

There is lack of consensus among clinicians on the optimum treatment, while conservative therapy aims at maintenance of airway humidity, control of infection, and avoidance of airway irritants, treatment modalities include bronchoscopy-guided excision of the nodule, laser ablation, surgical resection, and radiotherapy [1–4].

Conclusion

This case report showed that TO should be considered in patients with cough not explained by noninvasive testing and not responsive to empiric medications. CT results may be suggestive, but bronchoscopy examination, followed by histopathological findings is diagnostic of TO. Interventional bronchoscopy has an important role in the symptomatic treatment of TO.

References