Case report

Dyspnea, focal wheeze, and a slow growing endobronchial tumor

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ABSTRACT

We describe a case of an otherwise healthy woman who presented with nonspecific respiratory symptoms, but was found to have recurrent focal findings on chest radiograph. Her CT scan showed an endobronchial lesion with distal bronchiectasis which was ultimately diagnosed as a mucoepidermoid carcinoma. In this report we discuss the clinical, radiographic, bronchoscopic and pathologic findings of rarely seen endobronchial mucoe- pidermoid tumors.

1. Case presentation

A 46-year-old female presented to the emergency department with limited deep inspiration and an end-expiratory wheeze. There were no other respiratory or constitutional symptoms and review of systems was negative. Her history included ulcerative colitis in remission with mesalamine, pneumonia 4 years prior, and a 20-pack-year history of smoking. There were no significant travel, occupational or environmental exposures. Physical exam revealed a focal wheeze over the lower left chest, anteriorly, and was otherwise unremarkable.

The chest radiograph (CXR) (Fig. 1) showed an ill-defined airspace opacity in the left lower lobe (LLL) and therefore she was treated for pneumonia with antibiotics. One month later, the CXR changes persisted and a computed tomography (CT) of the chest was arranged. Interestingly, comparison to the CXR four years prior during her episode of “pneumonia”, revealed similar changes in the same area of the LLL. The CT (Fig. 2) showed an endobronchial soft tissue density distending the anteromedial basal segmental bronchus with distal bronchiectasis. The CT was otherwise unremarkable.

Bronchoscopy (Fig. 3a and b) revealed a large, well-circumscribed, friable lesion within the anteromedial basal segment of the LLL causing near complete bronchial occlusion. There was no ulceration or apparent invasion into the bronchial wall. Endobronchial ultrasound (EBUS) revealed normal appearance of the paratracheal and subcarinal lymph nodes which were biopsied along with the lesion itself. Fluorodeoxyglucose whole body positron emission tomography (FDG-18 PET) scan revealed that the LLL branching endobronchial lesion was moderately hypermetabolic (SUV max of 4.4) and of indeterminate etiology; there was no evidence of hilar, mediastinal or distant metastases.

Endobronchial forceps biopsy of the lesion revealed fragments of bronchial tissue with cellular nests composed of a dual population of polygonal and mucin-producing cells. There was no significant nuclear pleomorphism, necrosis, or mitosis. The immunohistochemical reactions showed the polygonal cells positive for p40 and CK5 and the mucin-producing cells positive for cytokeratin 7 and low molecular weight cytokeratins. TTF-1, SMA, chromogranin, synaptophysin and GFAP were negative. The Ki67 stain showed proliferation index of less than 1%. The lymph node aspirates were negative for malignancy. This led to a diagnosis of a low grade endobronchial mucoepidermoid carcinoma (MEC).

This patient underwent a successful LLL lobectomy with clear surgical margins. The final pathology report confirmed a locally invasive stage pT2b pN0 MEC.

2. Discussion

MEC is a typical and frequent tumor of the salivary glands. In the lungs, MECs originate from the seromucinous glands in the submucosa of the tracheobronchial tree and account for 0.1–0.2% of all lung cancers.
Due to the rare nature of these tumors, the literature describing them is limited to case series. The mean age at diagnosis is 40 years (range of 6–78 years) with no gender predilection or increased risk due to smoking. Similar to our patient, the majority of patients with MECs present with non-specific respiratory symptoms such as cough and/or wheeze, making the diagnosis based on symptoms alone impossible. Likewise, CXR findings of MECs are often non-specific and include a nodule/mass, findings of airway obstruction (lobar or segmental atelectasis or consolidation), hyperlucent lung or recurrent or non-resolving pneumonia as was in the case of our patient.

CT chest is critical in identifying and characterizing endobronchial masses and associated mediastinal or adjacent parenchymal involvement. The differential diagnosis for an endobronchial lung lesion can be divided into tumors and tumor-like conditions (e.g. foreign body,
broncholith, amyloidosis, mucous plug etc.). The neoplastic lesions fall into three categories: primary lung cancer, primary benign tumor or metastatic tumor. MECs have been described to have a non-specific smooth lobulated appearance with occasional calcifications and are most commonly found to grow along segmental or lobar bronchi. Associated metastases and lymphadenopathy are rare and FDG avidity on PET CT can be variable depending on the grade [2,3]. Other pertinent imaging findings in this case included distal bronchiectasis implying a degree of chronicity, combined with a lack of lymphadenopathy and distant metastases.

Bronchoscopic descriptions of MECs are rare in the literature, but low-grade MECs show similar endoscopic features to other benign low grade endobronchial tumors, including exophytic growth, sessile base and lack of ulceration. They have been described as friable, vascular, polypoid masses the color of the bronchial wall tissue [4,5]. Features that might help distinguishing them from other benign and low-grade tumors include cherry red appearance (carcinoid) and yellow/grey color (hamartoma, lipoma) [3]. High-grade MECs might resemble other bronchocentric carcinomas such as squamous cell carcinoma and small cell carcinoma, present with ulceration and invasive appearance.

A biopsy for pathology is critical in identifying a MEC. MECs are commonly composed of sheets of squamous epithelial cells intermingled with mucin-producing cells, and intermediate cells [4,6]. Low grade tumors show easily identifiable glands with frequent macro and micro cysts and few mitoses. Conversely, higher grade tumors show scant cysts and mucous cells with increased number of mitoses and cellular pleomorphism [1]. High grade MEC is morphologically indistinguishable from adenosquamous carcinoma, but some features are more typical of MECs: exophytic growth, a component of low-grade MEC, and lack of carcinoma in situ in the bronchial epithelium. As these features are usually not assessable in small biopsies, immunohistochemistry is helpful in distinguishing MEC from adenosquamous carcinoma in that MECs stain negative for thyroid transcription factor 1 (TTF1) and Napsin A. Another recent adjunct to the diagnosis of MEC is a specific gene fusion (CRTC1-MAML2) that occurs in both low-grade and high-grade tumors [7]. Despite this diagnostic armamentarium, it can sometimes be impossible to make such distinction. From a practical perspective, both tumors are staged and treated according to non-small cell lung carcinoma (NSCLC) management guidelines and the distinction might be academic.

Fig. 4. (A) Gross picture showing an exophytic endobronchial lesion. The wall of the dilated bronchus is highlighted by the dotted line. A subsegmental bronchus shows post-obstructive ectasia with inspissated mucus (arrow). (B) Low magnification image of H&E stained histological section. Note the empty space (arrows) between the bronchial wall on the right and the tumor on the left (asterisk). (C) High magnification image of H&E stained histological section showing sheets of large polygonal squamous cells (arrows) with interspersed glandular structures with a central lumen and lined by cuboidal to low columnar epithelium with intra-cytoplasmic light basophilic mucin (arrowheads).

Ninety-five percent of MECs are treated with surgery alone. The 3, 5 and 10-year survival for a patient with a resected MEC has been reported to be 94%, 88% and 88% respectively [8]. Zhu et al. published similar numbers in their case series of 69 patients [1]. Risk factors for poor prognosis include advanced stage, grade, positive margins after surgery, and older age [1,9]. Due to the rarity of these tumors, the role of chemotherapy and radiation has not clearly been defined [2,9], but usually follows the guidelines for NSCLC. This case was reviewed at the local thoracic multidisciplinary cancer conference; there was no role for adjuvant chemotherapy or radiation but the patient will be monitored with imaging surveillance.

This clinical case highlights that endobronchial lesions often present with non-specific respiratory symptoms and should be suspected in cases of non-resolving or recurrent focal airspace disease. Radiographic follow up is key to further investigations and making a diagnosis. Imaging findings of distal bronchiectasis associated with an endobronchial lesion suggests a slow growing lesion, favoring more benign lesions. MECs and other low-grade and benign tumors are a rare cause of endobronchial lesions that need to be histologically distinguished from the more common NSCLCs and carcinoid tumors.

Declaration of competing interest

*The Authors have no competing interests to declare.

**This work has not been published previously and is not under consideration for publication elsewhere. It has been approved by all authors. If accepted, it will not be published elsewhere in the same form.

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