



Case report

A rare case of endobronchial mucoepidermoid carcinoma of the lung presenting as non-resolving pneumonia

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ABSTRACT

Background: Mucoepidermoid carcinoma (MEC) is the most common malignant salivary gland tumor, and MECs of the lung are rare, accounting for 0.1–0.2% of malignant lung tumors. Pulmonary MECs are commonly found in the segmental or lobar bronchi, rarely presenting as endobronchial lesions.**Case presentation:** Here we describe the case of a 21-year-old female with no comorbid conditions who presented at the emergency room with a cough, yellow phlegm, pleuritic chest pain, and a subjective fever. These symptoms had been present for approximately one week prior to the patient's arrival at the hospital. A chest X-ray revealed right lower lobe alveolar infiltrate and computed tomography of the chest showed dense consolidation of the right lower lobe with ovoid intraluminal density in the right main stem bronchus. Upon fiber optic bronchoscopy, an endobronchial lesion was found in the right main stem sparing the right upper lobe uptake. Endobronchial biopsy results was consistent with MEC of the lung. The patient underwent a bilobectomy with complete resection of the tumor.**Conclusion:** Endobronchial MEC is a rare type of salivary gland tumor. Patients with low-grade MECs have a good prognosis, whereas those with high-grade MECs, which are aggressive and associated with metastatic disease, have a poor prognosis. However, early identification and surgical resection can result in a good prognosis.

1. Introduction

Salivary gland tumors are classified as either benign or malignant. Mucoepidermoid carcinomas (MECs) are malignant salivary gland tumors [1]. The most common site for salivary gland tumors is the parotid gland, with less-common sites including the sublingual and submandibular glands, mouth, and digestive tract [2].

MECs of the lung are rare, accounting for 0.1–0.2% of all malignant lung tumors, and occurring in young people of both sexes. MECs of the lung originate from glandular tissue in the submucosa of the trachea and bronchus and are comprised of mucin-producing cells, glandular cells, and squamous epithelial cells [3].

Pulmonary MEC (PMEC) endobronchial lesions are rare, more commonly found in the segmental or lobar bronchi. Radiologic and clinical manifestations are non-specific, requiring histology for an accurate diagnosis [4].

Here we present a rare case of an MEC endobronchial lesion.

2. Case Presentation

A 21-year-old Hispanic female with no comorbid conditions presented at the emergency room with a one-week history of worsening cough, yellow phlegm, pleuritic right chest pain, and subjective fever. The patient denied any weight loss, hemoptysis, or anorexia, had no history of cigarette use, and never used alcohol or recreational drugs. Two months prior, the patient presented at the emergency room with a cough accompanied with phlegm, was diagnosed with pneumonia, and subsequently treated with antibiotics.

Upon physical examination, the patient was thinly built, not in respiratory distress, febrile (100.4 °F), had a blood pressure reading of 113/66 mmHg, a heart rate of 114 beats per minute, a respiratory rate of 16 breaths per minute, and a peripheral capillary oxygen saturation

Abbreviation: MEC, Mucoepidermoid carcinoma; CT, Computed Tomography

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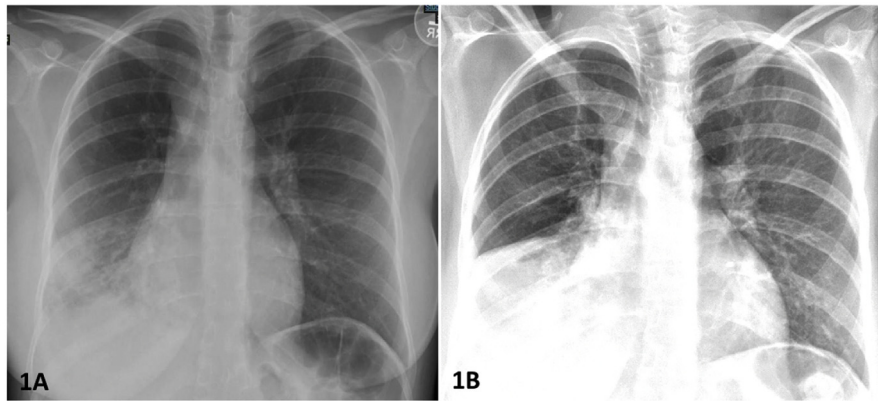


Fig. 1. A – Chest radiograph done 2 months prior showing right lower lobe infiltrates. B – Chest radiograph showing persistent right lower lobe infiltrates.

of 97% when breathing room air. Lung examination revealed reduced air entry and few rhonchi on the right lung fields. Cardiac examination revealed tachycardia with no murmurs. Abdominal and neurologic exams were normal, with no abnormal findings.

Hematology results showed leukocytosis (white blood cell count: 14.5×10^3 cells/ μ L) with a left shift (neutrophil count: 12.3×10^3 cells/ μ L). Chest radiographs from both emergency room visits showed right lower lobe alveolar infiltrates (Fig. 1A and B).

A bedside ultrasound revealed dense pneumonic consolidation with air bronchogram (Fig. 2) while computed tomography (CT) of the chest revealed dense consolidation of the right middle and lower lobes with an ovoid 11-mm intraluminal density in the right lower lobe bronchus after the takeoff of the right upper lobe (Fig. 3A and B).

The patient also underwent a fiber optic bronchoscopy with a trans bronchial biopsy, which located an endobronchial lesion at the right main stem sparing right upper lobe uptake. The left bronchial tree was normal (Fig. 4A and B).

Bronchoalveolar lavage was performed in the right lung, and forceps and brush biopsies were obtained from the obstructing endobronchial lesion.

Histologic examination revealed a neoplastic proliferation comprised of sheets or nests of cells with intervening bands of fibrous tissue. The cells were relatively monomorphic, with some containing eosinophilic clear cytoplasm and others clear cytoplasm; rare cells had intracytoplasmic mucin, which was confirmed with a mucicarmine stain. Staining for synaptophysin, chromogranin, non-specific esterase (NSE),

and transcription factor-1 (TTF-1) was negative. Additional immunostaining was positive for p40, p63, cytokeratin (CK), and caldesmon, but negative for alpha smooth muscle actin (SMA), S100, nuclear protein in testis (NUT-1), calponin, a monoclonal muscle actin antibody (HHF-35), and sex-determining region Y box 10 (SOX-10) (Fig. 5). Fluorescence *in situ* hybridization (FISH) analysis using Ewing sarcoma breakpoint region 1 (EWSR1) break apart probe was negative (data not shown).

The thoracic surgery team evaluated the patient and later performed complete resection of the tumor with bi-lobectomy. Resection of the right lower and middle lobe was necessary as the tumor was completely obstructing both lobes. Gross pathology of the tumor can be seen in Fig. 6.

The patient was discharged on post-operative day 10. The tumor was low-grade, with negative lymph node sampling; therefore no additional adjuvant therapy was recommended and the patient followed up with a pulmonary clinic as an outpatient.

3. Discussion

Tracheobronchial tree tumors can be either benign or malignant. Rare benign tumors include squamous cell papilloma, pleomorphic adenoma, oncocytoma, hamartoma, and neurogenic tumors. Malignant tracheobronchial tree tumors include squamous cell carcinoma, adenocarcinoma, carcinoid, MEC, adenoid cystic carcinoma (ACC), epithelial-MEC, sarcoma, lymphoma, and direct invasion of tumors such as thyroid, laryngeal, lung, esophageal, and hematogenous metastasis from breast, renal cells, colon, and melanoma [5].

In 1952, Smetana first described MEC as a tumor originating from the bronchial gland [6]. The two most common types of primary salivary gland tumors are PMEC and pulmonary ACC (PACC). Of all PACCs, 55% are seen in the trachea and main stem bronchus, while 85% of all PMECs are seen in the peripheral lung. The case presented here had PMEC with an endobronchial lesion [7].

MECs can occur as both low- and high-grade tumors. The low grade occurs in a younger population and the high grade in an older population [8]. As the disease slowly progresses, it presents as cough, fever, hemoptysis, shortness of breath, wheezing, air trapping, atelectasis, stenosis of bronchi, mucoid impaction, and post-obstructive pneumonia. Lesions can be round, oval, polypoidal, or lobulated [9,10]. One-third of patients are asymptomatic, and MECs rarely present as a peripheral pulmonary nodule. Less than 5% of low-grade MECs spread to lymph nodes, and high-grade MECs commonly metastasize distantly. Furthermore, low-grade lesions are cystic while high-grade lesions are solid [11].

An initial chest X-ray may indicate pneumonia, and a CT of the chest may assist in identifying the endobronchial lesion. However, flexible fiber optic bronchoscopy will allow for direct visualization and biopsy

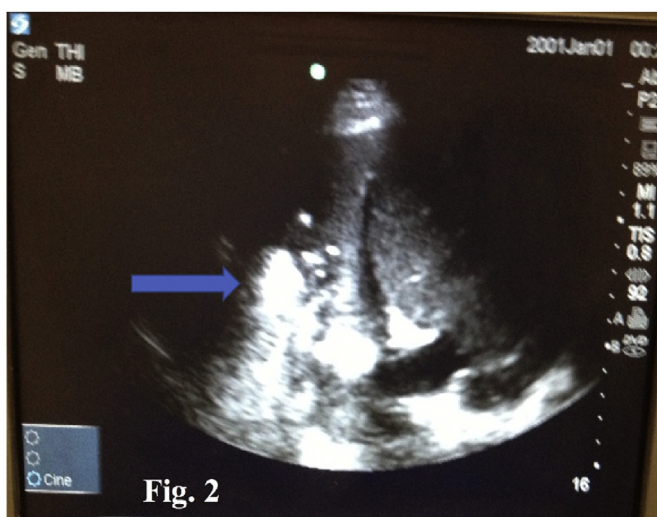


Fig. 2. Bedside ultrasound showing dense consolidation of lung.

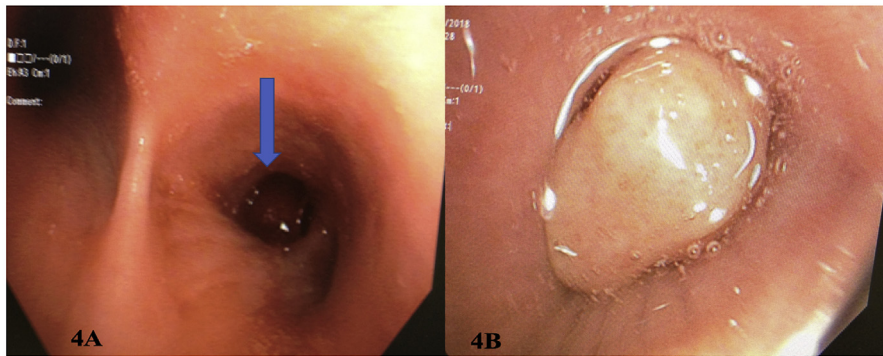


Fig. 3. A – Axial view of computed tomography of chest showing endobronchial lesion with right middle and lower lobe consolidation. B – Coronal view of computed tomography of chest showing endobronchial lesion with right middle and lower lobe consolidation.

of the lesion [12]. A fiber optic bronchoscopy view of a MEC tumor is of a pedunculated, polypoidal, smooth, exophytic lesion that may resemble a carcinoid tumor [13]. A bronchoscopy view of a tracheobronchial hamartoma may also present as pedunculated and polypoidal with a sharp margin and a smooth surface without submucosal involvement. However, CT findings consisting of popcorn calcification and internal fat will distinguish tracheobronchial hamartoma from MEC. A bronchial carcinoid appears as polypoidal with cherry red smooth nodules, and an ACC can be distinguished from MEC by extra-luminal extension. Endobronchial lipoma appears as a soft gray, pedunculated mass with a capsule whereas a mucous gland adenoma appears as a smooth sessile or pedunculated polyp [5].

Histologically, low-grade MEC has cystic spaces with solid nests of tumor composed of mucinous, squamous, and intermediate epithelial cells. Keratinization is rare. High-grade MECs have areas of solid growth with mitotic activity, necrosis, and atypia [14]. Immunohistochemistry analysis for TTF-1 was positive in primary lung adenocarcinomas whereas cytokeratin (CK-7), Muc5Ac, p40, and p63 were positive in MECs, which may provide a method for differentiating between the two carcinomas [15].

MEC translocated-1 (MECT1)-mastermind-like 2 (MAML2) is a fusion product produced by translocation involving t(11; 19) (q14–21; p12–13) that occurs in MEC. Initially, the presence of MECT1-MAML2 was regarded as favorable for a prognosis, and MAML2 is useful for detecting some variants of MEC. Furthermore, epidermal growth factor receptor (EGFR) is overexpressed in two-thirds of MEC cases, with less than 5% of these overexpressing human epidermal growth factor receptor 2 (HER2) [16]. According to Huang et al., no EGFR gene mutations were present in cases of P MEC [17].

The grade assigned to a tumor guides the treatment plan of patients with P MEC. Grading for P MEC is based on cytology and cellular composition while grading for P ACC is based on growth pattern. A grade I

tumor will benefit from surgery, whereas grade II and III P MEC tumors benefit from adjuvant therapy [18].

Traditional surgical resection, sleeve lobectomy, or pneumonectomy may be required for endobronchial MECs. Surgical resection of low-grade tumors can lead to complete recovery [19], but the use of preoperative chemotherapy or radiation therapy in these cases remains unclear. Patients with the EGFR mutation respond well to Gefitinib, a tyrosine kinase inhibitor [20].

Bronchoscopy neodymium-yttrium aluminum garnet laser surgery has also been used in a few cases of MEC, but long-term follow-up of patients is necessary to evaluate incidences of recurrence [21]. Patients with MEC have good survival rates following surgical resection (87% at 5 and 10 years) [22].

4. Conclusions

Endobronchial MEC is a rare type of salivary gland tumor. Low-grade MECs have a good prognosis while high-grade MECs are aggressive and associated with metastatic disease. Fiber optic bronchoscopy may assist in identification of endobronchial lesions in non-resolving pneumonia.

Author disclosure

None of the authors have a financial relationship with a commercial entity that has an interest in the subject of the manuscript. No financial support was used for this case report.

Authors contributions

M Khaja, R Gupta and T Omesh searched the literature and wrote the manuscript. M Khaja conceived and edited the manuscript. M Khaja



Fig. 4. A – Showing an endobronchial lesion in the right mainstem. B – Showing an endobronchial lesion completely obstructing the right main stem.

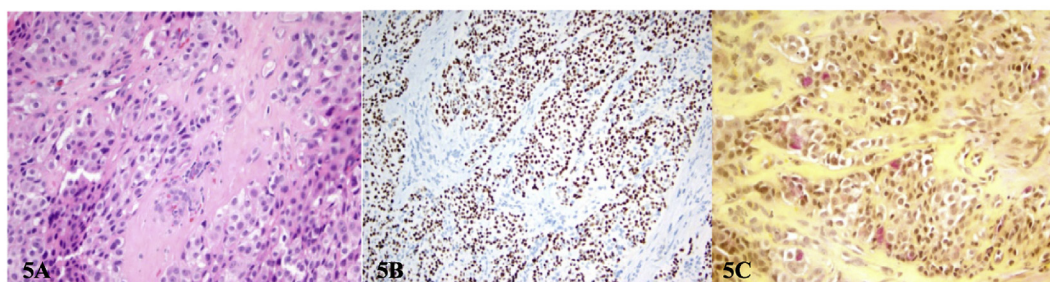


Fig. 5. 5A- Histopathology showing low-grade mucoepidermoid carcinoma. Cystic spaces with variably sized solid nests of tumor, all composed of a mixture of squamous, mucinous, and intermediate epithelial neoplastic cells; 5B- Most cells stain diffusely with p40 immunohistochemical; 5C- rare cells demonstrate intracytoplasmic mucin with a mucicarmine stain.



Fig. 6. Gross pathology specimen of endobronchial lesion post resection.

supervised the patient treatment, critically revised and edited the manuscript. J Burack was involved in patient care along with M Khaja. A Saqi rendered initial diagnosis after reviewing pathology slides. All authors have made significant contributions to the manuscript and have reviewed it before submission. All authors have confirmed that the manuscript is not under consideration for review at any other Journal. All authors have read and approved the final manuscript.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.rmcr.2018.08.014>.

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