'Unexplained intermittent hemoptysis with normal chest radiograph necessitates bronchoscopy'—mucoepidermoid carcinoma of lung: Case report

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ABSTRACT

Hemoptysis is the predominant symptom of tuberculosis and is considered as important clue toward evaluation of tuberculosis and treatment accordingly, especially in high burden countries like India where disease is endemic. 8-25% cases of pulmonary tuberculosis are having hemoptysis during course of their illness. Unexplained hemoptysis with normal chest radiograph needs further evaluation including CT thorax and bronchoscopy. Bronchoscopy would be ideal choice for confirming diagnosis and to localize exact site of bleeding as well. In this case report, we describe a case of a young male who presented with cough and intermittant hemoptysis. During fiberoptic video-bronchoscopy we noted exophytic endobronchial growth in right main stem bronchus. Histopathological evaluation suggests mucoepidermoid carcinoma (MEC) of salivary gland type originating from main stem bronchus right side. PAS and mucicarmine staining differentiated MEC from Adenocarcinoma in our case.

Key words: Bronchoscopy, mucoepidermoid carcinoma, normal chest radiograph, unexplained hemoptysis

INTRODUCTION

Mucoepidermoid carcinoma (MEC), primary salivary gland type lung cancers are slow growing, low grade malignant neoplasms which are derived from the submucosal glands of the tracheobronchial tree and bear structural homology with exocrine salivary glands. These tumors commonly involve major and minor salivary glands, but lung involvement is quite uncommon. Primary salivary gland type lung cancers are extremely rare intrathoracic malignancies and account for approximately 0.1 to 0.2% of thoracic malignancies. The age at presentation varies, but almost half of patients with mucoepidermoid carcinoma occur in patients under 30 years of age. There is no significant association with tobacco use, mucoepidermoid carcinoma (MEC) of the lung is a rare form of lung cancer that is classified into low grade and high grade based on histological features. Mucoepidermoid carcinoma is defined by the World Health Organization as a tumor characterized by a combination of mucus-secreting, squamous, and intermediate cell types and is not an uncommon tumor in general.[1] MECs proliferate in a polyp-like form in the central bronchial lumen up to the segmental bronchus level. Surgical resection is the primary treatment for low-grade MEC with excellent outcomes, while high-grade MEC is a more aggressive form of malignancy. Surgical resection is the treatment of choice. Complete surgical resection is associated with excellent prognosis. In this report, we describe the case of a 24-year-old-young male who presented with intermittent recurrent hemoptysis and an endobronchial lesion in the right main stem bronchus which was diagnosed as mucoepidermoid carcinoma of the lung.

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CASE REPORT

A 24-year-old male, attended outdoor of Pulmonary Medicine of MIMSR medical college, with history of intermittent hemoptysis since 3 months. Initially patient visited general physician, undergone investigations, CBC with Hb- 12.4 gm% Platelet count- 3.1 lacs, Sputum for AFB-Negative and Chest X-ray PA showing no abnormality, after which general physician considered as a case of Sputum Negative Pulmonary Tuberculosis and started him on HRZE, *i.e.* four drug ATT. Patient had received ATT regularly with good compliance and tolerance for 2 months, still complaint of intermittent hemoptysis was continuous with no response to ATT. He visited respiratory therapist working in private sector for similar complaints which was not responding to ATT and other medications. Respiratory therapist documented wheezing on clinical evaluation, again performed chest X-ray PA and CBC, which were showing similar findings with apparently normal chest radiograph, considered as case of bronchitis with reactive airway disease. Started on inhaled corticosteroids and bronchodilators, patient was taken prescribed medicines regularly for 3 weeks. Patient's complaint of intermittent hemoptysis was persistent, hence patient attended outdoor of Pulmonary Medicine department of our institute.

During initial evaluation, moderately built male patient with no additions, history of factory employment for 8 year work in bengalgram daal factory, no history of similar complaints in family. General physical examination reveals no pallor, cyanosis or clubbing, oral hygiene was good. Repiratory system evaluation, found to have monophonic wheeze which was localized to right infrascapular and mammary area with no added sound over rest of right chest and also no added sounds heard during auscultation over chest on left side.

We evaluated case of intermittent hemoptysis, performed CBC, sputum for AFB, Chest X-ray, Bleeding time and clotting time, CT thorax. Investigations were as:

CBC: Hemoglobin 9.8 gm%

Platelet count: 2.1 lacs

Total white cell count: 7200/mm^3

Peripheral smear negative for atypical cells or parasites

Coagulation Profile (BT, CT, PT) - Normal

Chest X-ray: apparently normal [Figure 1].

Sputum smears for AFB- negative

CT thorax was showing [Figures 2 and 3] — Lobulated lesion in right main bronchus just distal to carina extending to intermediate bronchus leaving behind pinhole patent bronchus opening. No abnormality noted in lung parenchyma. No mediastinal lymphadenopathy.

We performed fiberoptic videobronchoscopy in bronchoscopy suit of Pulmonary Medicine department as per BTS (British Thoracic Society) guidelines on Bronchoscopy and observed abnormality on right main bronchus distal to carina. Predominant abnormality was polypoidal, nodular growth arising from posterior wall of right main stem bronchus extending to upper lobe bronchus, hypervascular, bleeds on touch, bronchoscope could not negotiated distal to growth. Bronchoscopic punch biopsy taken and hemostasis was achieved by instillation of cold saline and adrenaline injection locally. Biopsy specimen was sent in formalin saline to histopathology unit [Figures 4 and 5].

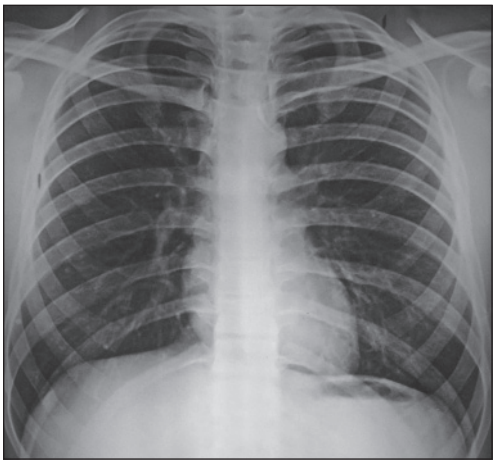

Figure 1: Chest Xray PA view — apparently normal radiograph without any abnormality

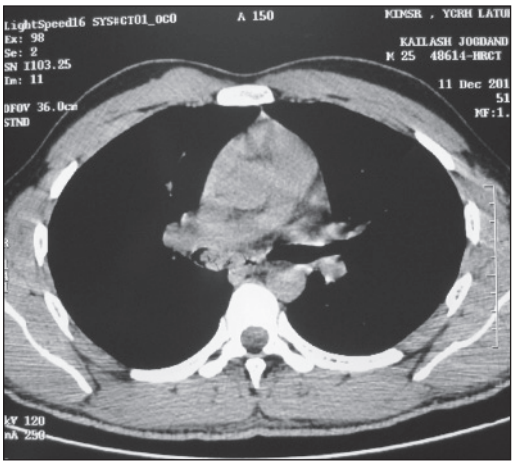

Figure 2: CT thorax Mediastinal window- showing lobulated growth blocking Right main Bronchus slit like patent opening without mediastinal lymphadenopathy

After complete histopathological evaluation, we confirmed to have mucoepidermoid carcinoma of Lung Low grade variety salivary gland type [Figures 6 and 7].

DISCUSSION

Mucoepidermoid carcinoma (MEC) originates from glandular tissue identical with salivary glands located in the submucosa of the trachea and bronchus, it is included among carcinomas of salivary-gland types along with adenoid cystic carcinoma according to the WHO histological classification of lung cancer.[1] As MEC generally occurs in the central bronchial region, and many of these tumors are detected based on symptoms such as coughing, sputum, bloody sputum and wheezing, and chest pain and sometimes cases of postobstructive pneumonia or cases of recurrent pneumonia at same location.

MEC is a malignant tumor of bronchial gland origin first described by Smetana in 1952,[2] with a presumed incidence of 0.1-0.2% of all lung cancers.[3] This tumor has been reported to occur in relatively young persons as compared with most other lung cancers.[4,10] Mucoepidermoid carcinoma of the bronchus mainly arises from the large airways, including the trachea and the main or lobar bronchi, but occasionally may involve segmental bronchi or, rarely, the peripheral lung.[5-7] It usually presents as an exophytic luminal mass, which can be sessile, polypoid with a broad base connected to the bronchial wall, or pedunculated with a well-formed stalk.

HPE of Mucoepidermoid carcinoma reveals three components: Mucus-secreting, squamous, and intermediate cells. The intermediate cells have a polygonal shape and eosinophilic cytoplasm, but lack obvious squamous or glandular differentiation. These three cell types can be organized into different patterns including glands, tubules, cysts, nests, and solid areas.[5] The relative frequency of these three cell types in a given case varies considerably

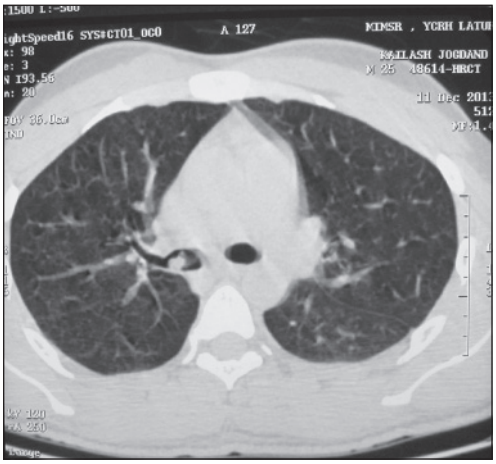

Figure 3: CT thorax Lung window - showing growth with stem of attachment at posterior wall without obvious abnormality in lung parenchyma

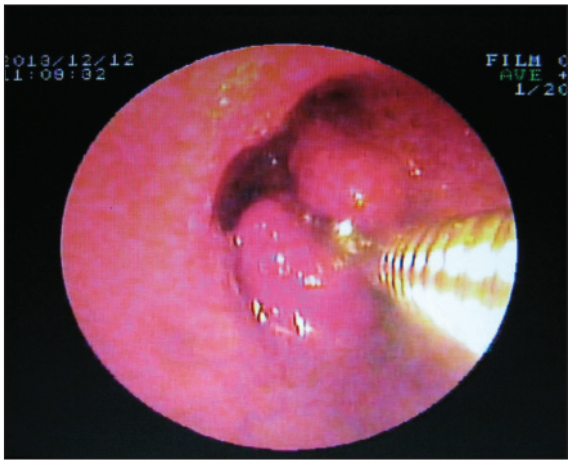

Figure 5: Showing Forcep biopsy from intraluminal growth during bronchoscopy

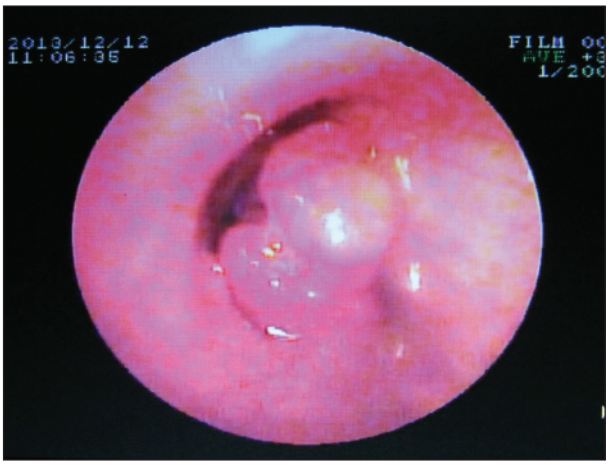

Figure 4: Showing exophytic endobronchial polypoidal, hypervascular growth with stem attached to main stem bronchus during Fiberoptic videobronchoscopy

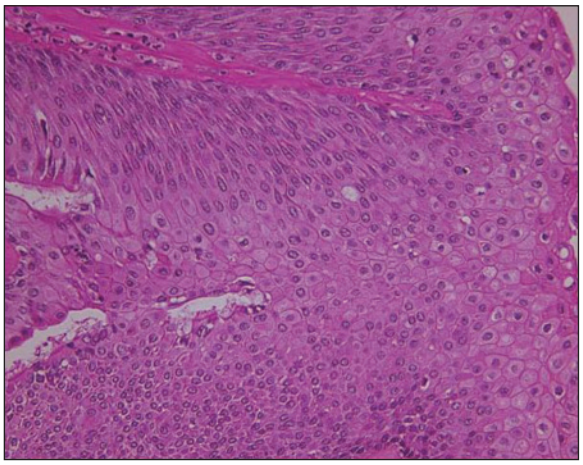

Figure 6: H & E stain shows Tumor cells had a scattering of mucus-producing epithelial components in papillary growth of stratified squamous epithelia with anisokaryosis and minimal pleomorphism suggestive of Mucoepidermoid carcinoma

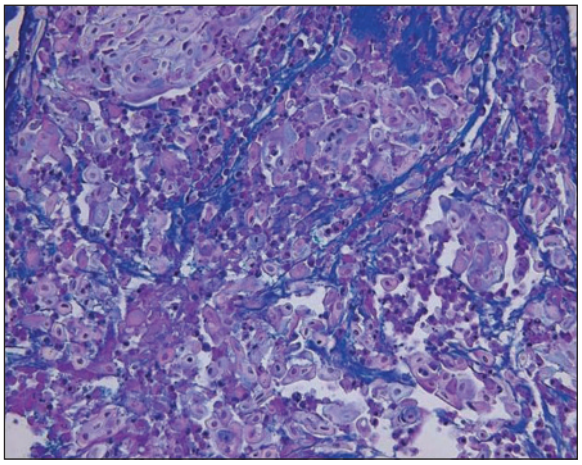

Figure 7: Immunohistochemical staining revealed that tumor cells were positive for Periodic acid-Schiff stain (PAS): Histopathology findings

and serves as one of the histologic criteria for grading this tumor. Most MEC cases show low-grade 1-2 nuclear atypia with many squamous epithelial components, while high-grade cases have predominantly mucus-producing cells. Therefore, MEC has been considered difficult to differentiate from adenosquamous cancer.[8] The mucus-secreting cells are usually large and have light blue-gray mucinous cytoplasm. Variants of mucus-secreting cells are reported in the literature, including columnar, goblet, cuboidal, clear, or, occasionally, oncocytic cells. Mucoid substance of similar appearance can also be identified in extracellular spaces or in the lumina formed by the neoplastic cells. The squamous cells may be admixed with the mucus-secreting cells and intermediate cells, or they can form small nests of their own. The squamous cells have intercellular bridges, but keratin whorls and pearls are not seen. The intermediate cells usually do not demonstrate specific differentiation and are characterized by a polygonal shape, a centrally or eccentrically located bland nucleus, and relatively abundant amphophilic or slightly eosinophilic cytoplasm. The intermediate cells are usually located at the periphery of the glands or form nests. Other unusual features of mucoepidermoid carcinoma of the bronchus include calcification and prominent lymphoid proliferation.[6,9]

There still remains some debate regarding the definition of high-grade mucoepidermoid carcinoma in this location. High-grade lesions usually demonstrate necrosis, nuclear pleomorphism, active mitosis (average of 4 per 10 high-power fields) and a solid or nested pattern of growth for the intermediate or squamous cells. Low-grade mucoepidermoid carcinoma usually lacks these features. Most common differential diagnosis of MEC on histopathology is Immunohistochemistry (IHC). PAS staining and TTF-1 would differentiate MEC from adenocarcinoma. Immunoperoxidase staining with antibodies to cytokeratin (CK) 7 and thyroid transcription factor 1 (TTF-1) may be useful, for example, in differentiating mucoepidermoid carcinoma of the bronchus from primary lung adenocarcinoma. In a recent small series of six cases, Shilo *et al.*[9] showed that all mucoepidermoid carcinomas of the bronchus in their series were negative for TTF-1.

Almost all of the tumors reported in patients younger than 30 years have been low-grade tumors, which are mostly endobronchial and have an excellent prognosis. There is a low reported incidence of lymph node metastases (about 2 percent). Local recurrence has been reported with incomplete excision and adequate excision may require a lobectomy, bronchoplastic procedure (sleeve lobectomy), or pneumonectomy. High-grade tumors, which tend to invade the adjacent lung parenchyma, are associated with an older population and carry a worse prognosis. High-grade mucoepidermoid carcinomas tend to behave in a manner similar to the more common non-small cell carcinomas.[11]

In this case, we performed therapeutic bronchoscopy and complete removal of endobronchial mass was carried out bronchoscopically with the help of snare, cautery and lasers. Histopathological examination reveled diagnosis of MEC from excised tumor specimen from right main stem bronchus specimen. Patients operative course was uneventful, now patient is apparently well without any symptoms of endobronchial pathology.

CONCLUSION

Unexplained recurrent hemoptysis with normal chest radiograph needs more evaluation than routine diagnostic tools. Bronchoscopy should be considered in all such cases, found to have maximum yield without any adverse events. Histopathology expertise have key role in defining exact histological type and more emphasis should be given to typing of lung malignancies as per world health organization classification of lung cancer. Mucoepidermoid carcinoma is rare, having low grade and high grade type lung malignancy. Immunohistochemistry with at least TTF-1 and PAS will differentiate MEC from Adenocarcinoma. Surgical complete excision is treatment of choice for all the cases of MEC and having good prognosis.

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