

Endobronchial Metastasis of Hepatocellular Carcinoma

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Endobronchial metastasis (EBM) secondary to extrathoracic malignancies is rare among the various modes of pulmonary metastases. Of the many types of extrathoracic tumors capable of EBM, only one case of EBM from hepatocellular carcinoma has been reported, but radiologic findings were not described. We present the radiologic findings of surgically proven EBM in a patient with hepatocellular carcinoma. A chest radiograph revealed a tubular mass-like opacity in the right suprahilar region combined with mild volume decrease of the right upper lobe. Fiberoptic bronchoscopy had erroneously led to a diagnosis of endobronchial aspergilloma. The metastatic lesion was manifested as a branching pattern of enhanced endobronchial mass at the anterior segment of the right upper lobe on computed tomography.

Key Words: Endobronchial metastasis, computed tomography, hepatocellular carcinoma

INTRODUCTION

Endobronchial metastasis (EBM), being the rarest of the thoracic metastatic modes from extrathoracic malignancies, is defined as a metastatic lesion of a major bronchus.¹ Symptoms and roentgenographic findings are not distinguishable from those of primary lung cancer, and their bronchoscopic presentations are also similar to primary bronchogenic carcinoma.^{1,2} Various types of primary extrathoracic tumors are capable of EBM, although breast, colon, and renal malignancies predominate.^{3,4} To our knowledge, only one case of EBM from hepatocellular carcinoma has been

reported in the English literature, but the radiologic findings were not described.⁵ We herein report the radiologic findings of a surgically proven EBM from hepatocellular carcinoma.

CASE REPORT

A 61-year-old female had suffered from blood-tinged sputum and a cough for 1 month. She had been diagnosed with hepatocellular carcinoma 16 months previously and had been treated with segmentectomy. The hepatocellular carcinoma recurred locally adjacent to the segmentectomy area 4 month later. She was again treated with transarterial chemoembolization and percutaneous ethanol injection. The alpha-fetoprotein was elevated to 1215 ng/ml in a subsequent laboratory examination. She was admitted for further evaluation of hepatocellular carcinoma recurrence.

On admission, she complained of mild dyspnea. Her breathing sound had decreased in the right upper lung area during the physical examination. A complete blood count revealed a hemoglobin value of 10.7 g/dl and a platelet count of 78,000/ul.

A chest radiograph performed upon admission revealed a tubular contour of mass in the right suprahilar area (Fig. 1A). Upward displacement of the right minor fissure was also evident, suggesting ongoing atelectasis of the right upper lobe. A chest CT scan revealed an elongated contour of well-enhanced mass occupying the lumen of the anterior segmental bronchus of the right upper lobe (Fig. 1B and C). The mass was revealed to have a branching appearance along the bronchial trees. The orifice of the right upper lobar bronchus was totally occluded by the proximal endoluminal

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extension of the mass (Fig. 1D). Other parenchymal pathologies, abnormal hilar or mediastinal adenopathy were not seen.

Fiberoptic bronchoscopy (FBS) revealed an endobronchial mass obstructing the right upper lobar bronchial lumen. Bronchoscopic biopsies of the endobronchial mass were performed. Pathologically, only many fungal hyphae showing an acute to rectangular branching pattern and the occasional true septa were observed in the biopsy specimen; a pathologic finding consistent with endobronchial aspergilloma. However, because the CT findings were compatible with endobronchial tumorous lesion, the patient underwent FBS a second time after 1 week. Deep introduction of the biopsy forcep into the mass caused active bleeding. The patient underwent an emergent right upper lobectomy to control the bleeding.

The surgical specimen revealed that the lumen of the right upper lobar bronchus and its branches were filled with hemorrhagic blood clots and necrotic material. The anterior segmental bronchial lumen was totally replaced by a polypoid, multinodular, yellowish endobronchial mass. A cross section of the tumor showed a greenish, bile-stained color, which is a gross characteristic of hepatocellular carcinoma (Fig. 1E). The tumor was infiltrating the distal anterior segmental bronchial wall, but only the proximal portion. The peribronchial lung parenchyma was free from tumor infiltration. Microscopic examination of the specimen revealed that the tumor was a typical well-differentiated, hepatocellular carcinoma (Fig. 1F). The most proximal lesion obstructing the right upper lobar bronchus was an admixture of necrotic material and fungal hyphae consistent with aspergillus species, as diagnosed in the initial bronchoscopic biopsy. Multiple tumor emboli were found in submucosal lymphatics of the bronchial wall, but intra-arterial tumor emboli were not seen. No evidence of metastatic deposits were detected in several, surgically sampled, right hilar and peribronchial lymph nodes. The final diagnosis was EBM from hepatocellular carcinoma. The patient remained well for 18 months postoperatively without radiographic or laboratory evidence of tumor recurrence.

DISCUSSION

EBM has received little discussion and is seldom considered in diagnosis because the vast majority of endobronchial masses represent primary lung cancers, with only about 1% being metastatic.⁶ The incidence of EBM from extrathoracic malignancies depends on how they are defined. If secondary invasion of the bronchus by parenchymal masses or lymph nodes is included, the incidence of EBM has been reported up to 25-50%.⁵ If EBM is strictly limited to the metastasis occurring directly on the bronchial wall, the prevalence of EBM has been reported to be about 2% of all pulmonary metastases.^{5,7} Breast, colorectal and renal malignancies are predominantly responsible for EBM, although many types of extrathoracic tumors are capable of EBM.^{3,4}

Various possible modes for the development of EBM have been considered.^{1,4} Kiryu, et al. proposed the following 4 types of developmental modes of EBM: type I, direct metastasis to the bronchus; type II, bronchial invasion by a parenchymal lesion; type III, bronchial invasion by mediastinal or hilar lymph node metastasis; and type IV, peripheral lesions extended along the proximal bronchus.⁸ The EBM in our report may be type I or IV because there was no dominant parenchymal lesion or lymph node metastasis.

Diagnosis of EBM in major airways can be readily made by bronchoscopic examination because most lesions are within the view and grasp of the bronchoscopic field.⁴ However, there are several situations in which bronchoscopic biopsy may not prove diagnostic, such as metastatic adenocarcinoma diagnosed as primary lung cancer, or epidermoid carcinoma as metastatic disease.⁷ The value of bronchoscopic examination, in our case, was also limited because the admixture of necrotic material and fungal hyphae occupying the most proximal portion of the endobronchial mass interfered with the procedure's ability to obtain a proper diagnostic specimen.

When there is metastatic involvement of a major airway, both clinical and roentgenologic manifestations are quite similar to those produced by centrally located, bronchogenic carcinoma.^{1,2} The roentgenographic changes due to EBM are quite variable.^{1,7} Lobar or segmental atelectasis, or

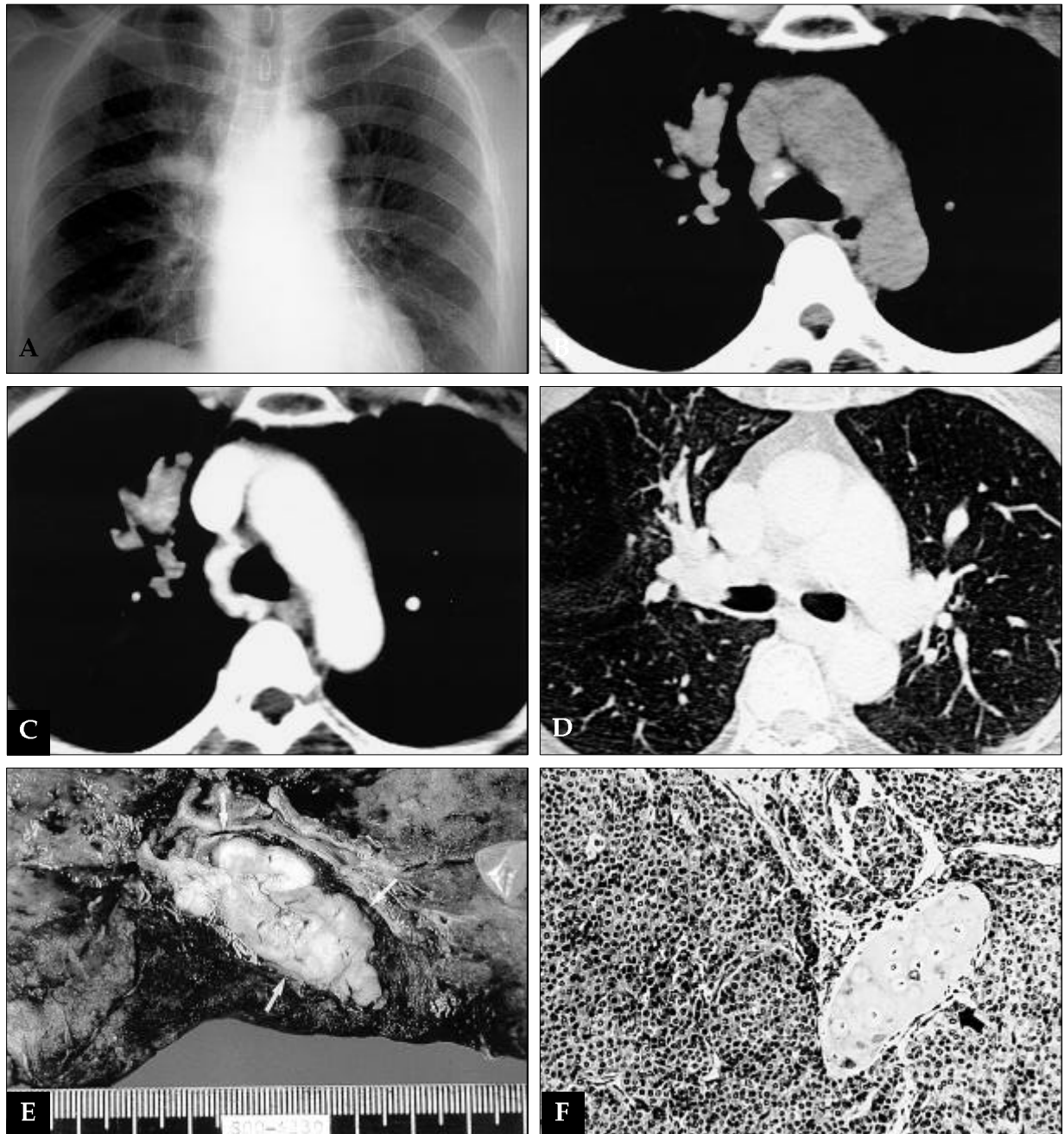


Fig. 1. A 61-year-old female with endobronchial metastasis from hepatocellular carcinoma. (A) Chest radiograph reveals a well-defined tubular mass at the right suprahilar area. (B) Precontrast CT scan demonstrates a branching pattern of tubular mass at the anterior segment of the right upper lobe. (C) Contrast-enhanced CT scan shows the mass as a homogeneously, well-enhanced lesion. (D) The mass contiguously extends to the orifice of the right upper lobar bronchus. (E) Gross specimen reveals a tubular contour of mass protruding into the lumen of the anterior segmental bronchus, which shows characteristic green color. The wall of the anterior segmental bronchus is indicated (arrows). (F) High magnification photograph of the endobronchial tumor demonstrates typical hepatocellular carcinoma showing trabecular pattern with entrapped bronchial cartilage (arrow), (H and E, $\times 200$).

obstructive pneumonitis, is commonly observed. Pneumonic infiltrations or parenchymal metastases are also encountered. Occasionally, a hilar

mass is the only roentgenographic abnormality, as observed in our case. The CT finding of our case was very impressive because the entire mass was

located within the bronchial lumen, manifesting itself as a branching pattern, an unlikely parenchymal lesion. Furthermore, the mass demonstrated homogeneous enhancement, mimicking the enhancement pattern of a primary hepatocellular carcinoma, which gave the impression of an endobronchial tumorous lesion. Reported CT findings of EBM as a pure endobronchial location are rare; only one out of six EBM cases showed pure endobronchial location without evidence of a lesion outside the affected bronchus on CT in a one report.¹

It is generally agreed that the prognosis of EBM is poor, the mean overall survival period ranging from 9 to 15 months after diagnosis.^{2,8} However, some clinicians suggest that EBM involvement does not necessarily indicate a gloomy prognosis, especially with solitary EBM.⁵ The patient of our report was still alive after 18 months without tumor recurrence.

In conclusion, the case presented here is the first known English report concerning the radiologic findings of EBM from hepatocellular carcinoma. Aspergilloma was erroneously diagnosed by FBS, but CT demonstrated that the lesion was an endobronchially located tumor, which led to the correct diagnosis. EBM is typically manifested

as a branching pattern of enhanced endobronchial mass on CT, as observed in our report.

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