

## Diffuse endobronchial metastasis from sigmoid carcinoma presenting as wheezing and respiratory failure

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### Keywords

Endobronchial metastasis, respiratory failure, sigmoid carcinoma, wheezing.

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### Abstract

A 66-year-old Thai man with underlying asthma, history of traumatic right haemothorax, and sigmoid carcinoma with bladder invasion developed productive cough, whitish sputum, dyspnoea, and wheezing for 2 months. Physical examination showed generalized expiratory wheezing in both lungs. Computed tomography scan of the chest revealed diffuse thickening of bronchial wall, predominantly at lower lobes; several various sizes of pulmonary nodules; diffuse interlobular septal thickening; multiple enlarged mediastinal lymph nodes and hilar lymph nodes; and right pleural effusion. The patient was intubated for respiratory failure with persistent wheezing and, subsequently, with difficulty weaning from mechanical ventilation. Bronchoscopy was performed, which revealed diffuse multiple small mucosal nodules in both lungs. Pathology of the nodules showed foci of adenocarcinoma. Positive immunochemical staining with CDX2 confirmed the diagnosis of endobronchial metastasis of sigmoid carcinoma. This case highlighted a rare presentation of endobronchial metastasis from sigmoid carcinoma with persistent wheezing, respiratory failure, and difficulty in weaning from mechanical ventilation.

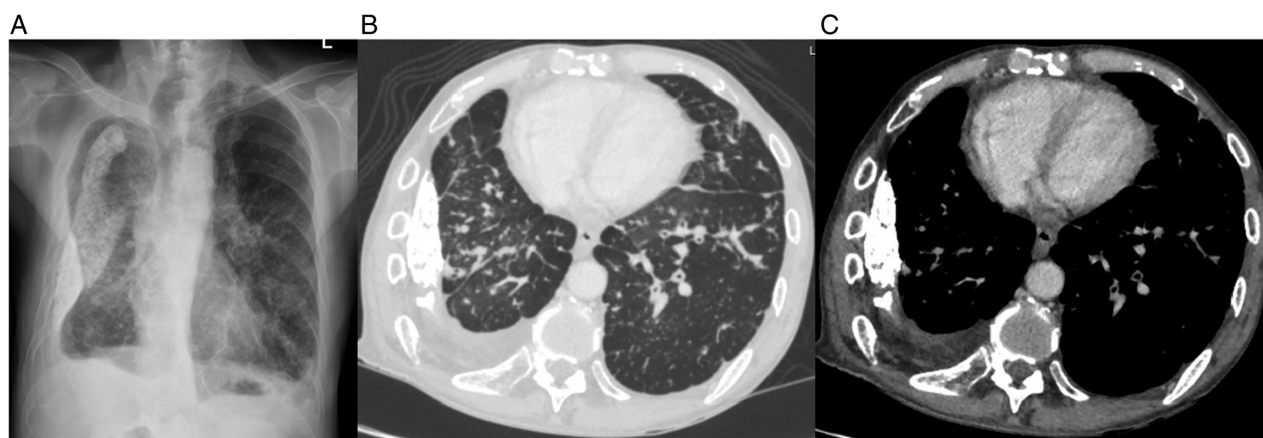
### Introduction

Metastases from non-pulmonary malignancies to the lungs are very common, but endobronchial metastasis from extrathoracic malignancy is rare. Endobronchial lesions have many different histological causes, the most frequent being bronchogenic small cell carcinoma, bronchogenic squamous cell carcinoma, and adenocarcinoma. Only 1.1% of endobronchial tumours are metastatic [1]. The present study reports the case of a patient with diffuse-type endobronchial metastases in the bronchi, who presented with persistent wheezing, respiratory failure, and difficulty weaning from mechanical ventilation.

### Case Report

We reported a case of 66-year-old Thai man, non-smoker, with underlying well-controlled asthma, history of motor vehicle accident with right haemothorax at 30 years ago,

and sigmoid carcinoma diagnosed 6 years ago with bladder invasion (staging T4bN2M0). He previously underwent sigmoidectomy, managed with Hartmann operation, radiation, and chemotherapy, including capecitabine, and subsequently with leucovorin and 5-fluorouracil, but the disease progressed. He developed productive cough, whitish sputum, and progressive dyspnoea with occasional wheezing for 2 months. He went to a clinic and received beclometasone dipropionate/formoterol metered-dose inhaler (MDI) and ipratropium bromide/fenoterol hydrobromide MDI without improvement. He presented to the emergency room because of worsening dyspnoea, productive cough, and low-grade fever. He was intubated due to hypoxic respiratory failure and admitted to the medical intensive care unit. Physical examination showed generalized expiratory polymorphic wheezing in both lungs. Complete blood count and blood chemistry were unremarkable. Chest radiography revealed nodular opacities predominant



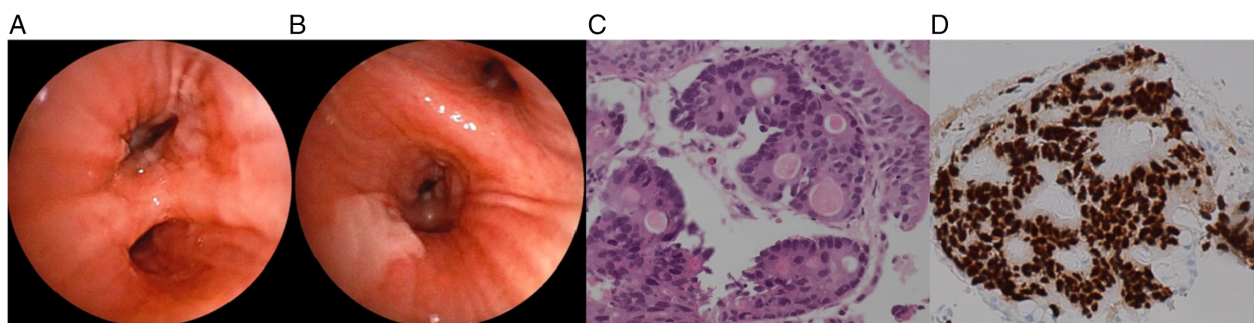
**Figure 1.** (A) Chest radiography showed nodular opacities predominant in both lower lungs, right pleural effusion with pleural thickening, and fusiform-shape calcified right pleura. (B,C) Computed tomography of the chest revealed diffuse nodular opacities in both lungs, predominantly at lower lobes, with interlobular septal thickening, bronchial wall thickening, and right pleural effusion with calcified right pleura.

in both lower lungs, right pleural effusion with pleural thickening, and fusiform-shape calcified right-sided pleura from a prior haemothorax. Computed tomography of the chest revealed diffuse thickening of bronchial wall, predominant on both lower lungs; several various sizes of pulmonary nodules; diffuse interlobular septal thickening; multiple enlarged mediastinal lymph nodes and hilar lymph nodes; and right pleural effusion (Fig. 1). The ventilator waveforms showed scooping of expiration phase consistent with peripheral airway obstruction. He was treated with bronchodilators and antibiotics as his sputum culture revealed *Pseudomonas aeruginosa*. He did not receive systemic corticosteroid due to suspected infection. However, he did not respond to aforementioned treatment, and he was unable to be weaned from mechanical ventilator for more than 1 week. Bronchoscopy was subsequently performed, which revealed diffuse multiple small mucosal nodules in both lungs. Bronchoalveolar lavage (BAL) fluid examination was negative for mycobacterium and fungus. The BAL cytology revealed few atypical cells. Pathology of

the nodules showed bronchial tissue with foci of adenocarcinoma and mucosal lymphatic spreading. Positive immunohistochemical staining with caudal-type homeobox transcription factor 2 (CDX2) confirmed the diagnosis of endobronchial metastasis of sigmoid carcinoma (Fig. 2). His medical condition was not suitable for chemotherapy. No bronchoscopic intervention was applicable in this case due to diffuse lesions. Finally, he expired from ventilator-associated pneumonia.

## Discussion

Lungs are one of the most common metastatic sites of non-pulmonary tumours, the majority of which are found in the lung parenchyma. Although extremely rarely, metastasis can occur directly on the bronchial wall. Braman and Whitcomb reported an autopsy series of 244 patients with solid tumours, excluding primary lung neoplasm. A total of 130 patients had pulmonary metastases (53%), but only five cases (2%) had endobronchial metastases [1].



**Figure 2.** (A,B) Bronchoscopy images revealed multiple diffuse nodules predominantly in the lower lobe bronchus. (C) Microscopic features of the endobronchial tumour in the right lower lobe bronchus with mucosal lymphatic spreading. (D) Immunohistochemical examination revealed positive staining for caudal-type homeobox transcription factor 2 (CDX2).

The symptoms of endobronchial metastasis include cough, dyspnoea, new-onset wheezing, and haemoptysis. In our case, ventilator waveforms showed scooping of expiration phase. This finding highlighted that diffuse peripheral endobronchial metastases can result in a peripheral airway obstruction pattern resembling asthma. However, endobronchial metastasis can also be found in asymptomatic patients.

Three of the most common extrapulmonary malignancies that develop endobronchial metastases are breast, kidney, and colon cancer. The mechanism of metastasis is unclear. Different routes have been postulated for endobronchial metastasis. Secondary invasion from parenchyma or mediastinal deposition, direct lymphatic spreading, transbronchial aspiration, and direct invasion might be the possible routes. For our patient, the direct mucosal lymphatic spreading, which was observed on the pathological feature, is the most likely mechanism. Bronchoscopic examination is recommended to diagnose endobronchial metastasis [2].

There is a variety of radiographic characteristics in endobronchial metastasis. The most commonly reported findings on chest radiography include atelectasis, multiple pulmonary nodules, hilar node enlargement, or a normal chest radiographic finding. Pleural effusion can be detected frequently as a coexisting finding. Computed tomography scan of the chest may reveal multiple nodules, atelectasis, diffuse infiltration, lymphangitic spreading, and mediastinal lymphadenopathy [3].

Fibre-optic bronchoscopy with biopsy and histology examination are valuable tools for the diagnosis of endobronchial metastasis. The histological identification of the tissue can be correlated with previously documented primary tumour or can serve as a guideline for the subsequent investigation of those patients in whom the underlying tumour has not yet been identified. The use of immunohistochemistry may facilitate the differentiation between metastasis and new primary lung cancer. The bronchoscopic findings include polypoid, pedunculated, infiltrating, or haemorrhagic masses that may bleed or show a necrotic component.

Management depends on the type of tumour. Chemotherapy and radiotherapy may be considered appropriate. In most cases, treatment is palliative, and the main aim is

to alleviate symptoms. Interventional bronchoscopy such as cryotherapy, Nd-YAG laser, stent insertion prior to radiation, or chemotherapy could be alternative option in focal lesions [4].

Endobronchial metastasis from colorectal carcinoma is generally less aggressive than other types of carcinomas. Akoglu et al. [5] have reported survival times of 12, 13, and 35 months for metastases of renal, breast, and colon cancers, respectively.

In our case, the patient was unable to be weaned of the mechanical ventilator due to the need of positive end expiratory pressure to maintain airway opening. Diffuse endobronchial metastases are mechanical obstructions that generally do not respond to bronchodilators. In conclusion, endobronchial metastasis from extrapulmonary primary tumours is a rare disease manifestation. Although mean survival time is usually short, early diagnosis is essential. Treatment is chosen according to tumour type, location, evidence of other metastatic sites, and the medical status of the patient. Our case illustrates the case of sigmoid carcinoma with aggressive diffuse endobronchial metastasis resulting in respiratory failure.

## Disclosure Statement

Appropriate written informed consent was obtained for publication of this case report and accompanying images.

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