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# Bronchial mucoepidermoid carcinoma, recurrent asthmatic symptoms, and pneumonia presenting in pregnancy

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**Keywords**
Bronchial mucoepidermoid carcinoma, interventional bronchoscopy, obstructive pneumonia, pregnant woman, recurrent asthmatic symptoms.

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## Abstract

We report the case of a 37-year-old pregnant Japanese woman (34th week of gestation) with a left main bronchus mucoepidermoid carcinoma. She had left lower lung pneumonia episodes for eight weeks that had been associated with bronchial asthma. Bronchoscopy revealed a membranous endobronchial tumour obstructing most of the left main bronchus. We delivered the baby without any problems by caesarean section, followed by tumour cauterization using a rigid bronchoscope under general anaesthesia. After that, we performed a sleeve resection of the main left bronchus. At one-year follow-up, the patient was disease-free and her baby was growing well.

## Introduction

Primary pulmonary mucoepidermoid carcinomas are rare neoplasms in adults [1]. They are usually centrally located, thus diagnosing these bronchial tumours is difficult, especially in pregnant women, because of preventing radiation exposure. In addition, their management is complex and requires weighing maternal and foetal prognoses. Here, we report the case of a woman with a bronchial mucoepidermoid carcinoma, recurrent asthmatic symptoms, and pneumonia that we treated successfully via interventional bronchoscopy and surgery.

## Case Report

A 37-year-old-Japanese woman was referred to our hospital during the 26th week of her second pregnancy due to asthmatic exacerbation. Bronchial asthma was diagnosed by a general physician 4.5 years before. She was treated with inhaled corticosteroid and formoterol. Until admission, the course of gestation was uneventful.

The vital signs were as follows: temperature, 37.0°C; blood pressure, 116/79 mmHg; pulse rate, 109 beats/min; respiratory rate, 18 breaths/min; and $O_2$ saturation, 98% (2 L nasal cannula). Auscultation revealed no chest rales. She was treated with ceftriaxone under the diagnosis of infectious bronchitis, and a chest X-ray was not performed. It is generally said that 2–25 weeks of gestation is the time when the foetus would be highly radiosensitive. At this time, she was 26 weeks pregnant. Thus, we did not take her chest radiograph. After treatment, her symptoms improved. One week after discharge, she returned to our clinic with fever and cough.

Chest radiography revealed left lower lung atelectasis (Fig. 1A). She was rehospitalized and treated with ceftriaxone. The clinical status gradually improved, and the abnormal shadow improved (Fig. 1B). She was discharged, but two weeks later, she presented with pneumonia in the same area.

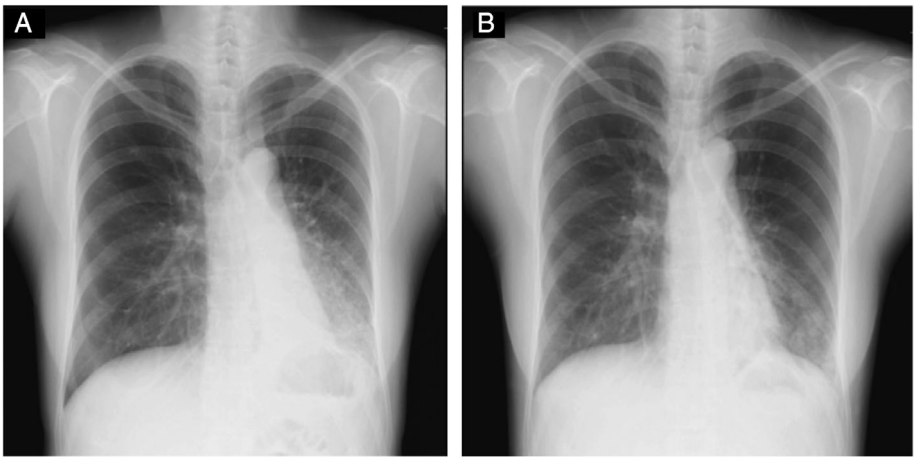


**Figure 1.** Chest X-ray on second admission. (A) The chest X-ray on admission shows consolidation and atelectasis in the left lower lung. (B) The chest X-ray after treatment shows remission of the consolidation in the left lower lung.

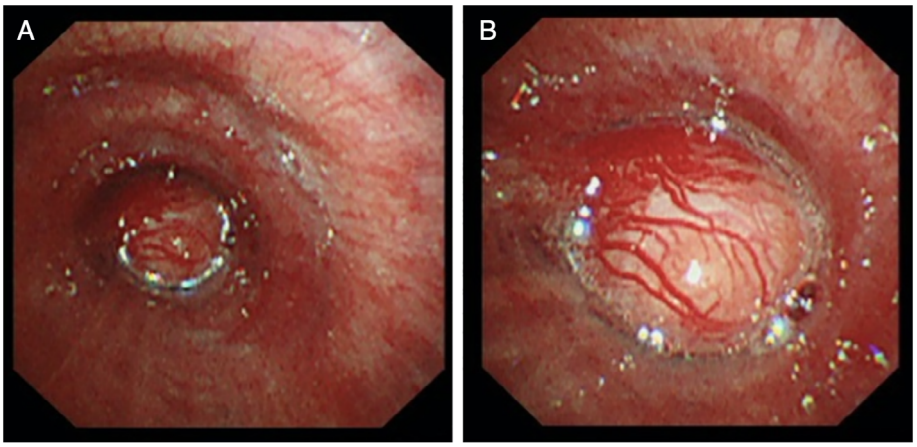


**Figure 2.** Bronchoscopic view of the main left bronchus. (A) The main left bronchus was obstructed by the smooth surface mass that protruded from the membranous portion. (B) Close-range photograph showing a preserved epithelium but abnormal blood vessel growth over the tumour.

Thus, we performed bronchoscopy to detect the cause of the repeated pneumonia in the left lower lung. Bronchoscopy revealed a bronchial tumour that obstructed most of the main left bronchus (Fig. 2).

We were concerned about a worsening respiratory status due to atelectasis associated with tumour progression. She was 34 weeks pregnant, and we worried that the tumour would adversely affect the delivery. We confirmed the fatal well-being by non-stress test, fetal umbilical blood flow, amniotic fluid volume, and fetal biometry measured at a growth scan, and the fetus was judged to be well-being. Therefore, a caesarean section was planned followed by bronchial intervention. The delivery was successful (the foetal weight at birth was 1392 g; the Apgar score after 1 min; 8 points, and after 5 min; 9 points). Chest computed tomography (CT) of the patient one day after the delivery revealed that the tumour was located at the left main bronchus (Fig. 3).

We performed a tumour ablation using the microwave coagulation using a rigid bronchoscope (Efer Medical, France) under general anaesthesia to secure the airway and to make pathological diagnosis. We could not visualize the peripheral side of the tumour (Fig. 4A) and were uncertain about the degree of tumour infiltration into the membranous portion; we cauterized about one quarter of the tumour on the opposite side of its membrane-like portion. We then suctioned purulent sputum and were able to observe the peripheral side of the tumour (Fig. 4B, C). Soon after the intervention, chest X-ray revealed that the atelectasis of the left lung had disappeared. But the next day, the atelectasis reappeared possibly due to oedema at the treatment site. Therefore, we performed a second intervention and cauterized more tumours, and atelectasis was released. The patient's respiratory condition was good. Unfortunately, definite pathological diagnosis could not be made by biopsy samples. Thus, the patient underwent a

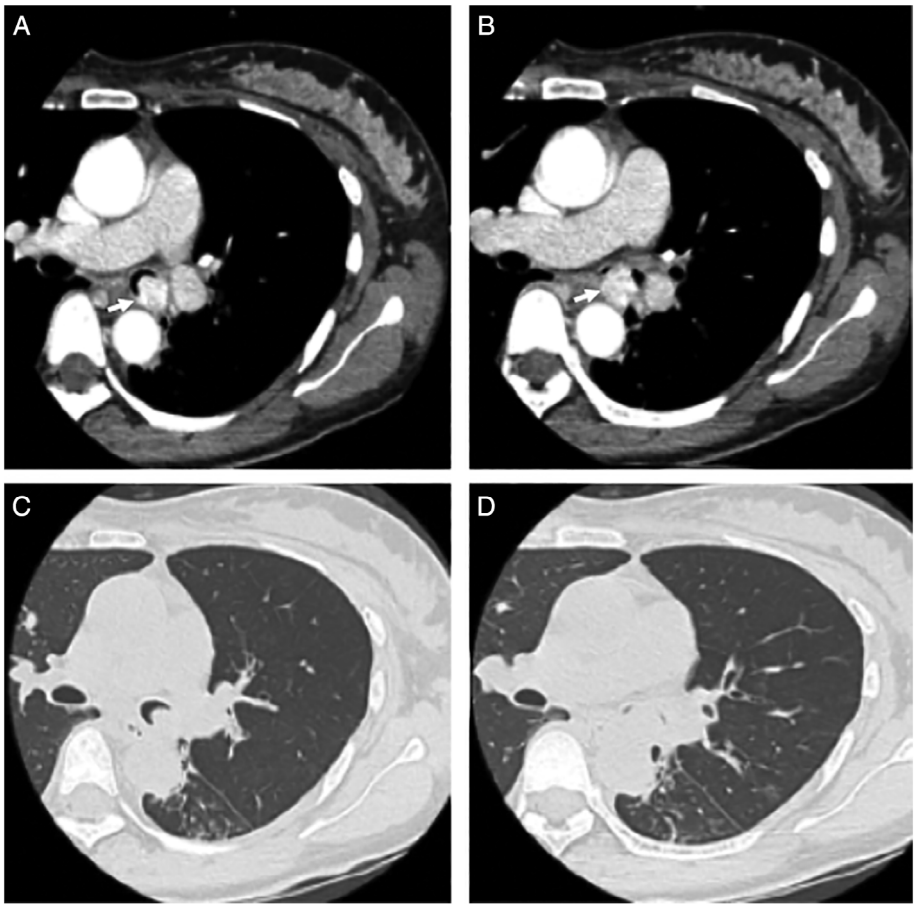


**Figure 3.** Chest computed tomography (CT) before intervention. (A, B) Contrast-enhanced CT study revealing the tumour at the main distant left carina (white arrows). The tumour is regularly round shape and densely enhanced in early phase. No lymph node metastases were detected. (C, D) Plain CT study. Left main bronchus was almost obstructed.

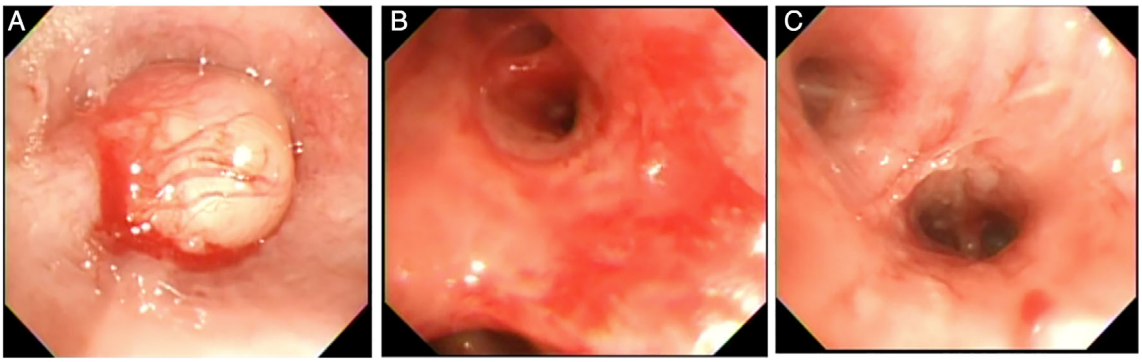


**Figure 4.** Bronchoscopic view of the main left bronchus at first intervention. (A) Before intervention. The left main bronchus was mostly obstructed by the smooth surface mass that protruded from the membranous portion. (B) The left upper bronchus was visible after tumour cauterization. (C) We can observe that the left lower bronchus became visible after tumour cauterization.

sleeve resection of the left main bronchus by thoracic surgeons (K.B. et al.) 50 days after delivery. She was discharged without any complications nine days after surgery. Her baby stayed at neonatal intensive care unit (NICU) for eight weeks after birth, and was discharged and is growing well. The final pathological diagnosis was mucoepidermoid carcinoma (Fig. 5). She has had no recurrences after a year of follow-up, and her baby is growing well.

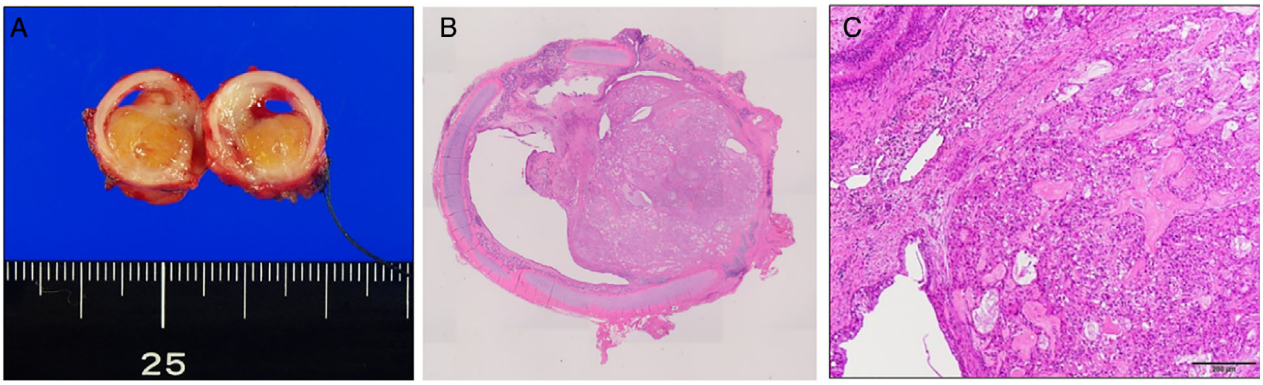


**Figure 5.** Pathological images of the tumour. (A) Macroscopic appearance of the resected specimen showing a tumour within the bronchus. (B) Pathological image of the resected specimen with a loupe showed the tumour arising from the membranous portion. (C) Resected section of the main left bronchus lesion biopsy (haematoxylin–eosin). Submucosal glands with extravasated mucin and few atypical glands suggestive of low-grade mucoepidermoid carcinoma (200× magnification).

## Discussion

Mucoepidermoid carcinoma accounts for 0.1–0.2% of all lung cancers, and it is a rare tumour causing only ~5% of all bronchial tumours [1]. Mucoepidermoid cancer tends to occur more often in young people, and it develops more commonly in the central bronchus. Symptoms include cough and sputum, wheezing, dyspnoea, and recurrent obstructive pneumonia.

These symptoms are very common and unspecific, and it is difficult to diagnose a bronchial tumour based on them. Appropriate radiological diagnostic imaging is necessary for proper diagnosis of bronchial tumours, but these examinations are often delayed in pregnant women to avoid radiological exposure.

Some studies have reported that the foetal radiation dose from a chest CT scan can be effectively reduced by the use of lead shielding [2]. In addition, low-dose CT can greatly reduce the radiation dose. Therefore, the use of lead shielding and low-dose CT in pregnant women may be considered. On the other hand, the dose at which radiation affects the foetus (threshold dose) is 100 mGy. The foetal dose by chest CT is estimated to be less than 1 mGy [3]. Taken together, unnecessary radiation exposure should be avoided, but the foetal exposure on chest CT is very low. Thus, radiological diagnoses should be considered in cases where women have refractory respiratory symptoms. In retrospect, in our case, CT scan should have been performed when second pneumonia occurred. Moreover, bronchoscopy is not available at all hospitals, we think CT scan should be performed first.

Few reports on bronchial tumour during pregnancy exist. Bronchoscopic biopsies carry a risk of bleeding from the tumour, and a case of massive bleeding from a bronchial tumour during caesarean section has been reported [4]. Thus, biopsies can be dangerous for both the mother and child and should be preferentially performed after delivery.

Mucoepidermoid carcinomas that develop in the bronchus are thought to be of intermediate grade most often, followed by low-grade tumours [1]. Our patient had an intermediate grade mucoepidermoid carcinoma without lymph node or distant metastases. The reverse transcriptase-polymerase chain reaction (RT-PCR) analysis of the resected tumour demonstrated a CRTC1/MAML2 chimeric gene. The expression of the CRTC1/MAML2 chimeric gene is frequent in young people and is said to exhibit clinicopathological features with good prognoses [5].

In our patient, we found the bronchial mass during the 34th week of pregnancy. Therefore, we performed a caesarean section before making a biopsy diagnosis. Then, we diagnosed the bronchial tumour and treated it with a rigid endoscope and surgery in two stages. In conclusion, the foetal exposure on chest CT is very low. Thus, radiological diagnoses should be considered in cases where women have refractory respiratory symptoms to avoid delay in diagnosis and treatment. Obstetrics and respiratory medicine and surgery teams should plan the therapeutic approach based on the number of gestation weeks, and carrying out the treatment in two phases may be desirable [6].

## Disclosure Statement

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

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