

CT and MRI findings of bronchopulmonary endometriosis: a case presentation

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Abstract

Intrathoracic endometriosis is classified into pleurodiaphragmatic endometriosis and bronchopulmonary endometriosis. Bronchopulmonary endometriosis is rare. Computed tomography (CT) findings of bronchopulmonary endometriosis are lung nodules, with or without cavities, or surrounding ground-glass opacities. Features vary with menstrual status. Recently, the usefulness of magnetic resonance imaging (MRI) was reported for diagnosis of intrathoracic endometriosis, but most published reports were about pleurodiaphragmatic endometriosis. We present CT and MRI findings of bronchopulmonary endometriosis in the left lung that showed a gradually enlarging nodule with enhancing area.

Keywords

Thorax, computed tomography, CT, magnetic resonance imaging, MRI, lung, endometriosis

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Introduction

Intrathoracic endometriosis is classified into pleurodiaphragmatic endometriosis and bronchopulmonary endometriosis according to the migration of endometrial tissue. Bronchopulmonary endometriosis is rare. Intrathoracic endometriosis frequently occurs in the right thorax (1). Computed tomography (CT) findings of bronchopulmonary endometriosis are lung nodules, with or without cavities, or surrounding ground-glass opacities (GGO). Features vary with menstrual status (2,3).

Recently, the usefulness of magnetic resonance imaging (MRI) was reported for the diagnosis of intrathoracic endometriosis, but most published reports were about pleurodiaphragmatic endometriosis (4–9). We present CT and MRI findings of bronchopulmonary endometriosis that showed a gradually enlarging nodule in the left lung.

Case history

A 49-year-old woman received a routine medical check-up. An abnormal shadow was found on chest X-ray (CXR). She visited her home doctor and underwent a

CT scan. CT showed a nodular lesion in the left lower lobe and she was referred to our hospital.

Her medical interview revealed that she suffered flu-like symptoms and hemoptysis two months previously and was cured by medication within one week. The relation between the symptoms and menstrual period was not clear.

Her past surgical history was an operation for descensus uteri 16 years previously and her obstetric history was two deliveries and two abortions. Her smoking history was 20 pack-years and she was an ex-smoker and who had quit smoking about one year previously. Complete blood count and blood chemistry were normal. No coagulation disorder was found.

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CXR revealed a nodular shadow in the left lower lung field (Fig. 1a and b). CT showed a round-shaped nodule with a smooth border in the left lower lobe adjacent to the pleura. The long axis of the nodule was 20 mm on CT (Fig. 2a). The differential diagnosis was pulmonary hamartoma, sclerosing pneumocytoma, and solitary fibrous tumor of the pleura. She was followed up by her home doctor.

Ten months later, hemoptysis recurred and she visited our hospital again. CT revealed that the nodule enlarged to 30 mm in the long axis. The nodule consisted of a low-density area and a small high-density area and showed inhomogeneous enhancement. There was no GGO or consolidation surrounding lung parenchyma (Fig. 2b–d). T1-weighted (T1W) imaging and T2-weighted (T2W) imaging both showed high and low signal intensities in the nodule; it was partly enhanced after injection of contrast medium (Fig. 3). A signal void in the nodule may have reflected cavity formation or hemosiderin deposition. Diffusion-weighted imaging (DWI) showed a diffusion-

restricted area and an enhanced area in the nodule (Fig. 4). The nodule had increased in size and malignancy was suspected. Video-assisted thoracotomy was performed. In thoracoscopic findings, there was no pleural lesion and the nodule was located in the subpleural lung parenchyma. She had a good course and without any complications after surgery.

Formalin-fixed material showed a yellowish-white colored nodule protruding from the lung parenchyma. Hemorrhage was visible in the central area in the nodule. Microscopically, endometrial tissue with many glands and interstitia were found. There was hemorrhage with tissue laceration and hemosiderin deposition in only a small part. In adjacent lung parenchyma, collagen was deposited in a band-like area containing bronchiolar or other lung tissue. A large number of hemosiderin-laden macrophages were observed in the surrounding lung parenchyma caused by pulmonary hemorrhage (Fig. 5). The final pathological diagnosis was bronchopulmonary endometriosis.



Fig. 1. (a, b) CXR showed a nodular shadow in the left lower lung field (white arrow) on first visiting to our hospital.

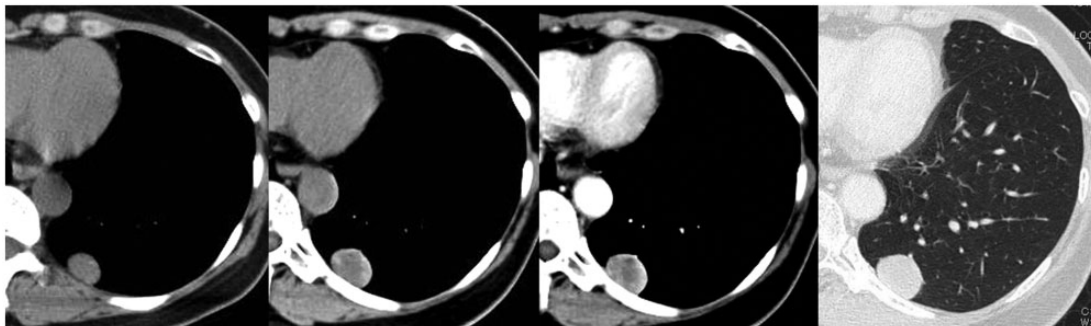


Fig. 2. Pre- and post-contrast-enhanced CT. (a) CT showed a round-shaped nodule in the left lower lobe on the first visit to our hospital. The nodule was enlarged ten months later and contained (b) small high-density areas with (c) inhomogeneous enhancement and there was no GGO or consolidation surrounding the nodule (d).

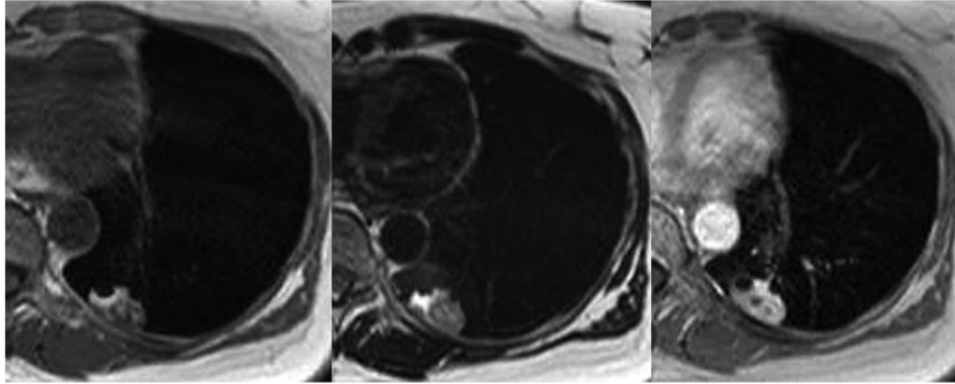


Fig. 3. TIW imaging, T2W imaging, and contrast-enhanced TIW imaging. TIW (a) and T2W imaging (b) both showed high and low signal intensity areas and a small signal void in the nodule. (c) After administration of contrast medium, there was a nodular enhancing area in TIW imaging

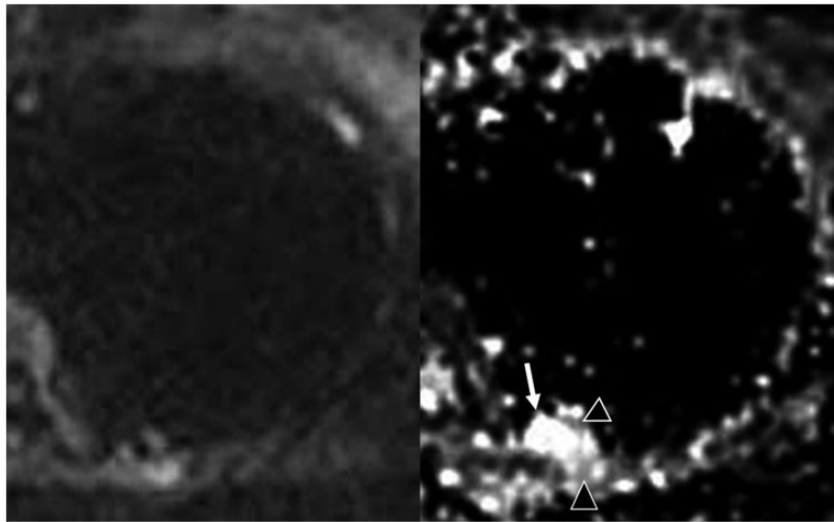


Fig. 4. (a, b) DWI and apparent diffusion coefficient (ADC) map. In DWI ($b = 1000$), the nodule had a diffusion-restricted area (black arrow head) and an enhanced area (white arrow).

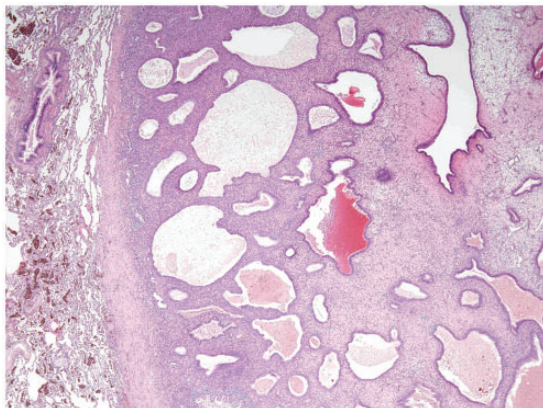


Fig. 5. Microscopic findings (hematoxylin and eosin stain 20). Microscopic view revealed endometrial tissue with hemorrhage and hemosiderin-laden macrophages surrounding the alveolar space. Microscopic view revealed endometrial tissue with hemorrhage and hemosiderin-laden macrophages surrounding the alveolar space.

After surgery, her symptoms disappeared and no recurrence was seen even without hormonal therapy for about five years.

Discussion

Intrathoracic endometriosis is classified into two categories, pleurodiaphragmatic and bronchopulmonary endometriosis. This case was categorized as the latter and endometrial tissue was in the bronchiole or lung parenchyma. Pregnancy, delivery, and hysterectomy are risk factors. The right thorax is predominant and hemoptysis or hemoptysis within the menstrual period are general symptoms (1). However, in other reports there was no laterality in bronchopulmonary endometriosis compared with pleuro-diaphragmatic endometriosis (2). Several etiologies were hypothesized and microembolism of endometrial tissue is the most

likely one. Risk factors are trauma or uterine manipulation. According to this hypothesis bronchopulmonary endometriosis would occur in both lungs. However, catamenial hemoptysis is also a symptom of bronchopulmonary endometriosis, and this symptom shows right-side predominance (1). Clearly explaining the reason for laterality of bronchopulmonary endometriosis has not been possible and further discussion is needed.

Bronchopulmonary endometriosis usually results in a hematoma or alveolar hemorrhage in the lung. Consolidation, nodular shadow, or miliary shadow were reported on CXR. CT showed consolidation, GGO, nodules with cavitation, or GGO surrounding lung parenchyma. The lesions appeared or disappeared in relation to menstruation, so a normal image finding was also possible (2,3).

In this case, the nodule gradually enlarged and we suspected a malignant tumor. Bronchopulmonary endometriosis occurs during the child-bearing years and showed various CT findings; nodules appeared in more elderly women compared with other entities of thoracic endometrial syndrome. Joseph et al. supposed hormonal weakness is not involved in aggressive findings such as cavity formation or surrounding hemorrhage (1). This case was a 49-year-old premenopausal woman. The pathological findings showed a soft organization lacking constrictive fibrosis and with no marked menstrual hemorrhage or tissue response.

Recently, the usefulness of MRI for the diagnosis of thoracic endometriosis was reported (4–9). T1W imaging showed high signal intensity and DWI was sensitive for small hematomas in pleurodiaphragmatic endometriosis (5,7,9). To the best of our knowledge, there has been no report about MRI findings of bronchopulmonary endometriosis. In this case, T1W and T2W imaging both showed high and low signal intensity and DWI showed diffusion-restriction and enhancement areas in the nodule, probably caused by hematoma during various periods. Low signal intensity in the part of the nodule showed that contrast enhancement might correspond to endometrial tissue. Therefore, these MRI findings are valuable for diagnosis. A signal void in the nodule may reflect cavity formation or hemosiderin deposition. Pathological findings revealed there was collection of red blood cell in dilated endometrial glands and a small amount of hemosiderin or hemosiderin-laden macrophages were present in the interstitium of the endometrial tissue. The nodule was composed of fresh hematoma and hemosiderin deposition, so these findings might reflect various periods of hemorrhage in MRI.

Pleurodiaphragmatic endometriosis and bronchopulmonary endometriosis also showed hemorrhagic disease and showed similar signal intensities in MRI.

The difference between these two diseases can be seen where there is endometrial tissue in pleura and the diaphragm or lung parenchyma. Bronchopulmonary endometriosis showed cavity formation or GGO and consolidation in the form of pulmonary hemorrhage in CT. However, catamenial hemoptysis is more important for diagnosis. MRI findings of this case showed a hemorrhagic nodule with a partly enhanced area. These findings are not specific in bronchopulmonary endometriosis and also show hematoma with granulation tissue in pulmonary laceration, hemorrhagic nodules such as metastatic choriocarcinoma, or angiosarcoma. If catamenial hemoptysis is present, a diagnosis of bronchopulmonary endometriosis is possible and past clinical histories are also helpful for diagnosis.

We reported a case of bronchopulmonary endometriosis that occurred in the left lung. The disease showed a gradually growing pulmonary nodule with an enhanced area. T1W imaging, T2W imaging, and DWI showed signal intensity of hemorrhage during various periods and enhancing areas associated with endometrial tissue.

Declaration of conflicting of interests

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