



Review article

Focal pleural tumorlike conditions: Nodules and masses beyond mesotheliomas and metastasis



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ABSTRACT

A tumorlike condition of the pleura is any nonmalignant lesion of the pleura or within the pleural space that could be confused with a pleural tumor on initial imaging. Tumorlike conditions of the pleura are relatively rare compared with neoplastic lesions such as mesotheliomas and metastases. Imaging-based diagnosis of these conditions can be difficult due to the similarity of appearance. Thus, recognition of certain imaging patterns and interpretation of these patterns in the clinical context are important. Pleural endometriosis, thoracic splenosis, thoracolithiasis, foreign bodies, pleural pseudotumors and pleural plaques are significant examples of focal tumorlike conditions discussed in this article. Computed tomography is the mainstay imaging technique for the primary assessment of pleural disease, but other imaging methods, such as magnetic resonance imaging and positron-emission tomography, can be of great support in the diagnosis.

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1. Introduction

Primary or metastatic tumors and tumorlike conditions may involve the pleura. Imaging plays an important role in the evaluation of pleural disease. Chest radiographs are useful for initial assessment, but findings may not allow confident differentiation of benign from malignant conditions. Computed tomography (CT) is the mainstay imaging technique for primary assessment of pleural disease and affords improved sensitivity for identification of a malignant pleural process. Magnetic resonance imaging (MRI) and positron-emission tomography are complementary techniques that can provide additional staging and prognostic information [1].

Pleural nodules and masses can be divided into tumoral lesions and tumorlike conditions. True tumoral lesions are classified as metastatic or primary, the latter of which can be malignant or benign. The most common pleural tumor is metastatic cancer, and the most common primary pleural tumor is mesothelioma [2,3].

A tumorlike condition is any nonneoplastic lesion of the pleura or within the pleural space that resembles a tumor. These lesions may be classified as focal or diffuse. Focal tumorlike conditions

include thoracic splenosis, pleural endometriosis, thoracolithiasis, foreign bodies, pleural plaques, and pleural pseudotumor [3]. As the imaging characteristics of these conditions can be similar, clinical history and presentation have important roles in differential diagnosis and can help to distinguish the etiology of pleural nodules [1–3].

The purpose of this article is to review the clinical, radiologic, and pathologic findings of focal pleural tumorlike conditions, such as pleural endometriosis, thoracic splenosis, thoracolithiasis, foreign bodies, pleural plaques, and pleural pseudotumor.

2. Pleural endometriosis

Endometriosis is characterized by the growth of endometrium outside the uterine cavity or myometrium. The pelvis and, less frequently, the abdominal cavity are the sites most frequently involved, but endometriosis has been reported in virtually all body compartments [4]. The thoracic cavity is the most frequent extra-abdominopelvic site of endometriosis [5].

Thoracic endometriosis syndrome (TES) is a rare disorder characterized by the presence of functioning endometrial tissue in the pleura, lung parenchyma, or airway [6]. The pathogenesis of this syndrome is not completely understood, and three different theories have been proposed: celomic metaplasia, lymphatic or hematogenous embolization from the uterus or pelvis, and retrograde menstruation with subsequent transperitoneal–transdiaphragmatic migration of endometrial tissue [7,8].

TES includes five well-recognized clinical entities, divided into pleural and pulmonary forms. The pleural form includes catamenial pneumothorax (CP), non-catamenial endometriosis-related pneumothorax, and catamenial hemothorax. The pulmonary form includes catamenial hemoptysis and lung nodules [9]. Affected patients frequently have a history of infertility, severe endometriosis, and recurrent spontaneous pneumothoraces, occurring between 24 h before and 72 h after the onset of menses [10]. The right hemithorax is involved in more than 90% of all forms [5].

A definitive diagnosis of thoracic endometriosis requires histologic confirmation. In certain cases, a presumptive diagnosis can be made based on clinical history and a positive response to appropriate treatment [11]. Invasive methods for the diagnosis of thoracic endometriosis include video-assisted thoracoscopy with biopsy [7]. If possible, this examination should be timed around the beginning of the menstrual flow to allow maximum visibility of potential endometriotic implants [12].

In patients with pleural endometriosis, chest X-rays may reveal pleural effusion, pneumothorax, or pleural nodules, but they are often normal [6]. Sonography of the upper abdomen and chest may show defects in the hemidiaphragm, as well as mixed echogenic materials of endometrial tissue in the pleural space [13].

Although the CT findings of TES are poorly specific, CT remains the first-line imaging method, as it can be used to rule out other diagnoses and map lesions for surgery [9,14]. CT examination during menses is more sensitive, as lesions may vary in size or disappear during other phases of the menstrual cycle [15,16]. CT images can show pneumothorax or hydropneumothorax [17] (Fig. 1), and may also demonstrate nodular lesions that change in appearance during the menstrual cycle [15,18]. Pleural implants appear as hypoattenuating areas on CT, sometimes associated with an isoattenuated component, depending on size and blood content [9]. The pattern will vary depending on the size of the implant, but enhancement is characteristic [9].

MRI is expected to have a prominent role in the examination of patients with CP because it provides better spatial resolution, contrast, and ability to characterize hemorrhagic tissues. MRI is said to be more accurate than CT in the detection of CP [17,19–22].

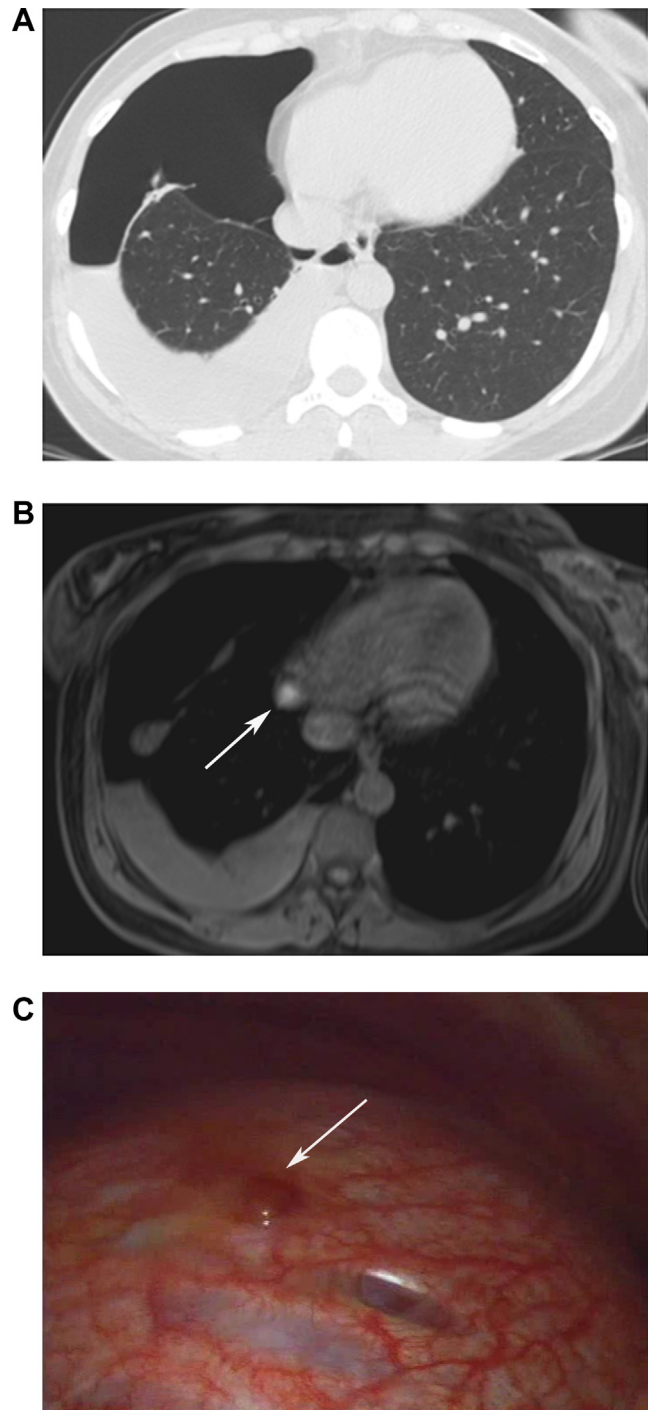


Fig. 1. A 35-year-old woman with pleural endometriosis. The patient presented with chest pain and dyspnea occurring monthly, coincident with menses. A. Computed tomography at the level of the lower lobes of the lungs shows a right hydro-pneumothorax. B. Axial T1-weighted magnetic resonance image reveals an oval, well-defined pleural lesion with intermediate signal intensity (arrow) and hydro-pneumothorax. Pleural effusion also shows intermediate signal intensity, probably due to the blood component of fluid. C. Thoracoscopic view of an endometrial implant (arrows).

Similar to pelvic endometriosis, thoracic endometriosis may show different signal intensities on T1 and T2 images, depending on the stage of the lesion [23]. However, a pleural-based lesion exhibiting homogeneous high signal intensity on T1- and T2-weighted images is distinctive of pleural endometriosis. MRI can be used to identify

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