

Case Report

Recurrent Catamenial Pneumothorax: A Diagnostic Challenge

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Abstract

Endometriosis is a common gynecologic condition that has variable clinical findings. Typical signs and symptoms include dysmenorrhea, pelvic pain, and infertility. However, when endometrial deposits are located outside the pelvis, patients may present in a more unusual fashion. We report a case of extra-pelvic endometriosis that was identified following treatment for recurrent pneumothorax. A 28-year-old nulliparous female presented with recurrent pneumothorax associated with her menstrual cycle. Initial thoracoscopic surgery identified a suspicious apical bleb. Following its resection however, her symptoms persisted. Ovarian suppression using a GnRH-agonist resulted in significant symptomatic control. This prompted a second-look thoracoscopy with a gynecologist in attendance. A right diaphragmatic deposit of ectopic endometriosis was resected with resolution of the problem. We discuss current pathogenic theories of endometriosis and catamenial pneumothorax. Additionally, we review the spectrum of presentation, dilemma of diagnosis, and available therapies used in the treatment of endometrial-associated pneumothorax. We speculate on efficacy of novel therapies (e.g., dienogest) in the treatment of extrapelvic endometriosis. This case study demonstrates the benefit of empiric treatment with ovulation suppression when other diagnostic modalities proved inconclusive. Furthermore, it highlights the importance of interdisciplinary care and stresses the need for increased awareness of endometriosis in non-gynecologic specialties.

Key Words:

Endometriosis; catamenial pneumothorax; thoracic endometriosis; menstrual suppression

Introduction

Endometriosis is relatively common, affecting up to 15% of women [1]. While endometrial deposits are typically confined to the pelvis, other locations throughout the body have been recognized [2]. Numerous theories of pathogenesis for such extra-pelvic disseminations have been proposed, including retrograde menstruation [3], coelomic metaplasia [4], and lymphatic spread [5]. Catamenial pneumothorax (CP) is defined as recurrent spontaneous pneumothorax occurring in women which is temporally related with the onset of menses [6]. It is the most common manifestation of thoracic endometriosis [7]. Estimates suggest that one-third of reproductive-aged women requiring surgery for pneumo-

thorax with have menstrually-related disease [8]. Various medical and surgical management options for CP have been described, used alone or in combination. Medical options rely on ovulation suppression while surgical options may be primarily gynecologic (e.g., hysterectomy and oophorectomy) or thoracic (e.g., wedge resection, talc pleurodesis) [9]. While hysterectomy and surgical castration is considered “definitive surgery” for endometriosis by many gynecologists [10], others advocate for more aggressive treatment which includes the additional resection of any palpable or visible endometriotic lesions to avoid persistent symptoms [11].

Case Presentation

A 28-year-old female presented with a history of recurrent pneumothorax, which she believed to be associated with her menstrual periods. She had a ten-year history of thoracic symptoms associated with the onset of menses. Initially she had experienced right upper quadrant

Article History:

Received: 29/04/2017

Accepted: 09/06/2017

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pain, which progressed to include pain in her right shoulder and a sensation of shifting fluid in her right thoracic cavity. In recent years, these cyclic symptoms had worsened to include shortness of breath and pleuritic chest pain.

Figure 1.



Gross pathologic specimen of resection portion of right hemidiaphragm with multiple endometriosis implants with the powder burn appearance classic for endometriosis pelvis.

Following her second pneumothorax in a span of two months, she underwent a mini-thoracotomy, along with apical bullectomy and pleurodesis. No endometrial deposits or diaphragmatic defects were identified at the time of surgery. The final pathology was significant for only a small sub-pleural bulla. Following surgery, she continued to experience cyclic pleuritic pain, and had a small right apical pneumothorax that spontaneously resolved. To determine whether her thoracic symptoms were truly related to menstruation, a trial of a gonadotropin releasing hormone, leuprolide, was undertaken as a diagnostic test. Menstrual suppression resulted in elimination of her recurrent pneumothorax and significant alleviation of chest pain. Over the course of one year, a total of three courses of oral medroxyprogesterone acetate (5 mg daily for 10 days) were administered to induce withdrawal bleeding and observe for return of symptoms. Onset of bleeding was accompanied each time by a return of right upper quadrant pain radiating to the right shoulder, and lasting about two weeks. Prolonged ovarian suppression was incompatible with the patient's desire for pregnancy, therefore a second tho-

racotomy was proposed in the hope of resecting the suspected foci of endometriosis. After discontinuing leuprolide, an MRI was performed when the patient's thoracic symptoms recurred. A moderate sized right pneumothorax was noted, as well as tiny foci of increased signal on the diaphragmatic and anteromedial pleural surface. Thoracoscopy was performed with a gynecologist in attendance. A diaphragmatic lesion was suggestive of endometriosis (Figure 1). A partial resection of diaphragm and talc pleurodesis was performed. The pathology report was consistent with full thickness endometrial tissue (Figure 2). Six months post-operatively, the patient continued to experience cyclic thoracic pain for two weeks each month, which was satisfactorily managed with anti-inflammatories and she had no further pneumothorax. There had never been any evidence of pelvic endometriosis either based on symptoms or clinical examination therefore no laparoscopy was performed. The patient subsequently went on to have three healthy pregnancies. At the time of her three cesarean sections, significant pelvic endometriosis was noted.

Figure 2.



Same pathologic specimen of right hemidiaphragm in cross section demonstrating a bleb of endometriosis.

Discussion

Thoracic endometriosis is a rare manifestation of a common gynecologic condition. Symptoms such as recurrent pneumothorax, dyspnea, and chest pain typically occur within two days of menses [12]. Multiple etiologic theories have been proposed to explain the phenomenon of catamenial pneumothorax [13]. The first theory is that during menstruation, partial dilation of the cervix and dissolution of cervical mucus allows air to traverse the uterus and fallopian tubes into the abdomen. From here, air passes through diaphragmatic defects. Such fenestrations of the diaphragm are more commonly right-sided, which could account for the predominance of right-sided pleural endometriosis [7]. This theory is weakened by evidence that women undergoing insufflation of the abdomen for laparoscopic surgery do not suffer pneumothorax. However, pelvic instrumentation has been associated with thoracic endometriosis [14]. A second theory proposes that increased prostaglandin F₂ α levels characteristic of menstruation cause concurrent vasoconstriction and bronchospasm, leading to ruptured alveoli and resultant pneumothorax [13]. A third theory proposes that ectopic endometrial tissue in the thoracic cavity degenerates in response to the monthly fluctuations in hormones resulting in bleeding into the thoracic space, thereby causing pneumothorax [15]. By all accounts, thoracic endometriosis remains underdiagnosed for several reasons [14]. Cullen Richardson once said, “The eyes can not see what the mind does not know.” That is, in order for a diagnosis to be made, it must first be considered. Thus, heightened clinical suspicion is required in order to make a diagnosis of thoracic endometriosis. Even the most astute thoracic surgeon may not obtain menstrual history or recognize endometriosis implants at the time of thoracoscopic surgery. Similarly, even a savvy gynecologist is unlikely to include thoracic symptoms in their typical review of systems for endometriosis. Moreover, their systematic inspection of the abdominal cavity at the time of diagnostic laparoscopy may be too cursory to identify diaphragmatic lesions. Diagnosis of thoracic endometriosis proves challenging as there are no non-invasive investigations capable of confirming its presence. Unfortunately, imaging modalities have not proven to be sensitive for diagnosis of thoracic endometriosis and their use is limited to ruling out alternative causes

for symptoms. Both CT and MRI findings have been described [12], however they are non-specific. Cancer antigen 125 (CA 125) has been reported to be elevated in at least one case of CP [16], however this too is a non-specific finding. The optimal treatment for CP is unknown. Hormonal suppression alone is associated with high recurrence rates [8,16]. In one of the largest reviews done to date, Joseph *et al.* [18] suggest that surgery is the superior treatment due to lower recurrence rates. While definitive surgery in the form of hysterectomy and bilateral salpingo-oophorectomy is effective [18], these women often require add-back estrogen therapy and is unclear whether remaining pleural implants would become symptomatic under the effect of exogenous estrogen. Some small case series have described exclusive management with thoracic surgery without subsequent hormonal suppression with good effect [19]. Other authors argue that the risk associated with thoracic surgery should make operative management a last resort [17]. While the current consensus regarding treatment is for adjuvant ovarian suppression following thoracic surgery [12], there is lack of robust evidence to support this approach. Moreover, typically suppressive medication like danazol and leuprolide are not entirely benign and have undesirable side effects. An important avenue for future research would be evaluating the efficacy of novel agents (e.g., dienogest) in the treatment of thoracic endometriosis. Certainly, there is compelling evidence that dienogest is a highly effective adjuvant treatment in treatment of pelvic endometriosis [20-22]. All currently available treatment options offered by gynecology, whether medical or surgical, are incompatible with desire for fertility. It is this population, as the woman in our case, who may benefit from a surgical approach targeted at removing the offending lesions in the chest. In this instance, video-assisted thoracoscopic surgery is of diagnostic and therapeutic value and is considered the treatment of choice for pneumothorax requiring surgical intervention [12]. Thoracic endometriosis is a clinical phenomenon that necessitates involvement of two medical specialties that otherwise rarely intersect. As in our case, surgery can be of both diagnostic and therapeutic benefit. However, the surgeon must be aware of the potential diagnosis in order to detect the often subtle intraoperative findings and refer on to gynecology to discuss the potential clinical implications of endometriosis and the potential need for ovulatory suppression for further symptom control. We suggest that all reproductive-aged women presenting

with a right-sided pneumothorax should be evaluated for endometriosis, especially if significant pelvic symptomatology is present. The overlap between pelvic and thoracic endometriosis cannot be overstated. In a retrospective review of 156 women with women with pneumothorax, pelvic endometriosis symptoms were significantly more common in those found to have thoracic endometriosis [14]. In symptomatic women who went on to laparoscopy, 80% had confirmed pelvic endometriosis. Moreover, if surgical management is undertaken, gynecologic consultation should be considered both intraoperatively and in follow up. While

endometriosis is increasing considered to be a clinical diagnosis [23], in woman investigated with laparoscopy, scrupulous inspection of the diaphragm is warranted even if in the absence of a history of thoracic symptoms as this may identify some women at risk of future pneumothorax.

Acknowledgement

None

Declaration of Interest

R.L.R has been consultant to Allergan, Aspen and Bayer and has served on the Data and Safety Monitoring Board for Merck.

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