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Thoracic Endometriosis Presenting as Catamenial Pneumothorax: A Case Report and Surgical Management with Vats and Diaphragmatic Repair

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ABSTRACT:
Catamenial pneumothorax is a rare form of spontaneous pneumothorax that occurs in temporal association with menstruation, typically within 72 hours of the onset of menses. It is the most common manifestation of thoracic endometriosis syndrome, a condition characterized by the presence of functional endometrial tissue within the thoracic cavity. Although underdiagnosed, it primarily affects women of reproductive age and is often linked to diaphragmatic defects, pleural implants, or intrathoracic endometrial lesions. We report the case of a 32-year-old woman with recurrent right-sided pneumothorax coinciding with her menstrual cycle and a background suggestive of pelvic endometriosis. Clinical suspicion led to a multidisciplinary evaluation, and the patient underwent Video-Assisted Thoracoscopic Surgery (VATS), which revealed diaphragmatic fenestrations and pleural endometrial lesions. Concurrent diagnostic laparoscopy identified pelvic endometriosis, and histopathology confirmed thoracic endometriosis. Surgical excision of ectopic tissue was followed by initiation of hormonal therapy to prevent recurrence. The patient had an uneventful recovery and remained symptom-free at follow-up. This case highlights the importance of considering catamenial pneumothorax in differential diagnoses for spontaneous or recurrent pneumothorax in women of childbearing age. Recognition of thoracic endometriosis requires a high index of suspicion and is best managed through an interdisciplinary approach combining thoracic surgery, gynecology, and pathology. Early diagnosis and coordinated treatment—incorporating surgical intervention and hormonal suppression—are essential to achieving symptom control and reducing the risk of recurrence.

Keywords: Catamenial pneumothorax, Thoracic endometriosis, VATS, Diaphragmatic fenestration, Pleurodesis, Endometriosis

INTRODUCTION:

Catamenial pneumothorax is a rare clinical entity predominantly affecting women between the ages of 30 and 40, often underdiagnosed that presents a unique intersection between pulmonology and gynaecology. It refers to the spontaneous collapse of the lung occurring in close temporal association with the menstrual

cycle—typically within 72 hours of menstruation onset. The cyclic hormonal changes associated with menstruation lead to inflammation, bleeding, or tissue breakdown at these sites, which may result in pneumothorax, hemothorax, or hemoptysis. Though this entity may not be the first consideration in a differential diagnosis for spontaneous pneumothorax in women, it is an important one, especially for women in their reproductive years. The condition is frequently associated with thoracic endometriosis syndrome (TES), which includes pleural, diaphragmatic, or pulmonary parenchymal endometrial implants. While endometriosis is a common gynaecological condition, thoracic involvement is less frequent and often overlooked. The subtle and nonspecific nature of symptoms—ranging from mild chest discomfort to acute respiratory distress—can delay diagnosis and treatment. For many patients, symptoms recur over months or even years before a correct diagnosis is made. Moreover, due to the anatomical preference for right-sided involvement, many cases may be misclassified as idiopathic right-sided pneumothorax without further investigation.

Several mechanisms have been proposed to explain the pathophysiology of this condition. The most widely accepted theory is the transdiaphragmatic passage of endometrial cells from the pelvis into the thoracic cavity. This is thought to occur through small congenital or acquired defects in the diaphragm, particularly on the right side, which allows endometrial tissue to migrate and implant on the pleura, lung parenchyma, or diaphragm itself.

Another proposed mechanism involves hematogenous or lymphatic dissemination, where endometrial cells travel through the bloodstream or lymphatic system to reach thoracic structures. Once implanted, these ectopic endometrial tissues undergo cyclical changes in response to hormonal fluctuations during the menstrual cycle, leading to local inflammation, necrosis, or hemorrhage, which can ultimately result in alveolar rupture and air leakage into the pleural space.

In addition, prostaglandin-mediated effects may contribute by causing bronchospasm or vasospasm, increasing the fragility of the alveolar-capillary barrier and predisposing the lung to rupture. Structural alterations in the diaphragm, such as fenestrations or blebs, may also predispose patients to the development of pneumothorax during menstruation due to increased intrathoracic pressures and hormonal influences on connective tissue.

CASE REPORT:

A 31-year-old woman with a long-standing history of severe dysmenorrhea since menarche, progressively worsening over the past 6–7 years, her menstrual cycles were regular (6–9/26–28 days), accompanied by heavy bleeding lasting 6–7 days with passage of clots. She had a known diagnosis of fibroid uterus and a 1 cm haemorrhagic/endometriotic cyst. A prior laparoscopy had been scheduled but was abandoned intraoperatively due to dense pelvic adhesions. Now she presented with complaints of shortness of breath and headache for 7 days, along with low back and neck pain for 2 months. She also reported lower abdominal pain associated with vomiting, generalized body aches during menstruation, and increased bowel and bladder frequency. On examination, vital signs were within normal limits: PR 92 bpm, RR 24 bpm, SpO_2 96% on room air, BP 110/80 mmHg. Chest auscultation revealed decreased breath sounds on the right side. High-resolution computed tomography (HRCT) of the chest showed a moderate right-sided pneumothorax with complete collapse of the right upper and middle lobes and partial collapse of the right lower lobe. Laboratory investigations revealed Hb 11.5 g/dL, TLC 16,400/mm^3, and platelets 2.41 lakh/mm^3. She was admitted and managed with oxygen supplementation at 2–4 L/min. Bronchoscopy revealed normal upper airways and trachea, with collapse of the right upper and middle lobes due to

pneumothorax. A 2D echocardiogram showed an ejection fraction of 63%, mild pulmonary arterial hypertension, and no regional wall motion abnormalities. MRI of the spine showed mild disc bulge at C3-C4 to C5-C6 and L5-S1 disc desiccation with central protrusion causing bilateral foraminal narrowing. In view of the patient's past history of endometriosis and prior hysteroscopy, a diagnostic laparoscopy was planned. A provisional diagnosis of right-sided catamenial pneumothorax was considered based on the clinical presentation and temporal association with the menstrual cycle. A thoracic surgery consult confirmed the diagnosis, and surgical management was planned. The patient received a comprehensive pharmacological regimen tailored to address both perioperative needs and underlying pathophysiology during her hospital stay. Inj. Pantoprazole 40 mg once daily was administered as prophylaxis against stress-related mucosal injury and to reduce gastric acid secretion from day 1 to day 10. Paracetamol 1 g three times daily was prescribed for antipyretic and analgesic effects, ensuring consistent pain control from day 1 to day 10. To manage neuropathic pain and enhance overall pain modulation, Amitriptyline 10 mg once daily was included from day 1 to day 10. Tramadol 50 mg twice daily and a Buprenorphine transdermal patch (single application) provided opioid-based analgesia for moderate to severe pain, ensuring sustained relief post-surgery. Progesterone 10 mg twice daily was initiated to suppress ovarian hormonal activity, thereby minimizing the risk of recurrence of endometriotic lesions. Ondansetron 8 mg twice daily was used to prevent nausea and vomiting associated with both anaesthesia and opioid use. Tranexamic acid 500 mg twice daily was prescribed to minimize postoperative bleeding through antifibrinolytic action. To prevent infection, Cefoperazone–Sulbactam 1.5 g twice daily was administered as broad-spectrum antibiotic coverage. Lactulose 30 ml once daily was provided to prevent opioid-induced constipation and support gastrointestinal function. This multi-drug regimen reflects a multidisciplinary strategy aimed at pain control, hormonal suppression, infection prophylaxis, and optimal postoperative recovery.

The patient underwent diagnostic VATS (Video Assoisted Thoracoscopic Surgery) with diaphragmatic endo-excision, primary repair, apical pleurectomy, and talc pleurodesis. Intraoperatively, a 10 mm port was placed 4 cm below the xiphisternum, along with two 5 mm right lateral ports and intercostal incisions at the 5th and 9th intercostal spaces for thoracic access and ICD placement. Thoracic findings included a fenestration on the right hemidiaphragm adjacent to the central tendon, which was excised and repaired. Approximately 100 ml of haemorrhagic pleural fluid was drained. Endometriotic nodules were excised from the apical pleura, chest wall, superior vena cava, and both diaphragmatic surfaces. A minor apical pleural leak was noted. Talc pleurodesis with 3 g of Steritalc (sterile, asbestos-free, endotoxin-free talc for instillation in the case of malignant pleural effusion or pneumothorax) was performed, and a 28F ICD was inserted. Simultaneously, diagnostic laparoscopy was performed. Findings included complete obliteration of the pouch of Douglas due to bowel adhesions, sigmoid mesocolon and rectum adherent to the posterior uterine surface, and bluish endometriotic lesions on both diaphragmatic surfaces. A 1x1 cm subserosal myoma on the uterine fundus was also identified and excised. The Enzian classification was as follows

- **Peritoneum (P0):** No superficial peritoneal lesions
- **Ovaries (O0/0):** No endometriomas noted in either ovary
- **Tubes (T0/0):** Bilateral fallopian tubes were normal
- **Rectovaginal space (A3):** Complete obliteration of the pouch of Douglas due to bowel adhesions to the posterior uterine surface
- **Ligaments (B0/0):** No abnormalities or nodules in the uterosacral or cardinal ligaments
- **Rectum (C0):** No rectal nodules observed

- **Diaphragm (F(D)):** Bluish endometriotic spots measuring 1 × 1 cm on the right side and 1.5 × 1.5 cm on the left side; right diaphragmatic fenestration 5 × 5 mm
- **Thorax (F(T)):** Endometriotic nodules (1 × 1 cm) noted in apical pleura and superior vena cava; an additional 5 × 5 mm nodule seen on the chest wall
- **Sigmoid colon and rectum:** Adherent to the posterior uterine surface and fundus
- **Subserosal uterine myoma:** A 1 × 1 cm subserosal fibroid was excised from the left fundus

Staging:

- **ENZIAN Classification:** P0 O0/0 T0/0 A3 B0/0 C0 F(D)(T)
- **AAGL Stage:** 2 (Score: 9)

Specimens sent for histopathological examination included diaphragmatic endometriotic lesions, thoracic pleural nodules, and the uterine myoma. Final results confirmed endometriotic pathology. Postoperatively, the patient's recovery was uneventful. The ICD was removed. The patient showed significant symptomatic improvement and was discharged in stable condition.

At discharge, the patient was prescribed the following medications- Liquid Paraffin + Milk of Magnesia 15 ml once daily for constipation; Gabapentin NT 200 mg once daily for neuropathic pain and migraine prophylaxis; Esomeprazole+ domperidone 40 mg once daily before breakfast for acid suppression; Cefpodoxime + Clavulanic Acid 325 mg twice daily for 5 days as antibiotic therapy; Paracetamol 650 mg thrice daily for 3 days for pain relief; Norethisterone 10 mg twice daily for hormonal regulation and management of abnormal uterine bleeding; and Zincovit once daily as a nutritional supplement. The patient was also advised to continue incentive spirometry exercises to support respiratory recovery.

DISCUSSION:

Catamenial pneumothorax presents a clinical challenge not only because of its rarity but also due to the overlapping symptomatology with more common pulmonary conditions. Its association with the menstrual cycle often goes unnoticed unless a detailed menstrual history is taken, and many women are left undiagnosed or misdiagnosed for prolonged periods. This case reinforces the critical need for heightened clinical suspicion, particularly in women of childbearing age who present with recurrent or right-sided pneumothorax.

In this patient's case, the intraoperative findings of diaphragmatic fenestrations and pleural endometriotic nodules provided compelling evidence of thoracic endometriosis. Her previous diagnosis of pelvic endometriosis and the cyclical nature of her symptoms further strengthened the diagnosis. Interestingly, the presence of endometrial tissue near the superior vena cava and chest wall underscores the potential for widespread thoracic involvement, beyond the more commonly observed diaphragmatic and pleural surfaces. The role of video-assisted thoracoscopic surgery (VATS) cannot be overstated in the management of catamenial pneumothorax. It allows for direct visualization of thoracic pathology, excision of endometrial implants, repair of diaphragmatic defects, and definitive treatment via pleurodesis. Additionally, concurrent laparoscopic evaluation of the pelvis ensures a comprehensive approach to endometriosis management, tackling both thoracic and abdominal disease burdens. Another important aspect of management is the consideration of hormonal therapy postoperatively to suppress ovulation and reduce the likelihood of recurrence. Gonadotropin-releasing hormone (GnRH) analogs, oral contraceptives, or progestins are often employed in long-term care strategies. While surgical correction addresses immediate structural issues, long-term disease control often requires hormonal therapy.

Hormonal treatment plays a critical role in suppressing the cyclical hormonal stimulation of ectopic endometrial tissue, thereby reducing the likelihood of recurrence.
Hence, catamenial pneumothorax should be part of the differential diagnosis in women with unexplained, recurrent pneumothorax, especially if there is any correlation with their menstrual cycle or a history of endometriosis. Early recognition and a multidisciplinary treatment approach are vital in reducing morbidity and preventing recurrence.

CONCLUSION:

Catamenial pneumothorax remains a rare but clinically significant condition that warrants heightened awareness among healthcare professionals. This case emphasizes the necessity of considering thoracic endometriosis in reproductive-age women presenting with recurrent or spontaneous pneumothorax, particularly when symptoms correlate with the menstrual cycle. Early recognition and a coordinated, multidisciplinary approach—utilizing both thoracic and pelvic surgical evaluation—can lead to accurate diagnosis, effective treatment, and prevention of recurrence. Enhancing clinician awareness across specialties is essential to reduce diagnostic delays and improve outcomes for patients affected by this underdiagnosed disorder.

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