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Catamenial Pneumothorax: A rare but important cause of chest pain in young adult females in the Ghanaian population

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Abstract

Catamenial Pneumothorax refers to a spontaneous pneumothorax due to thoracic endometriosis, often associated with menstruation in young women. It forms part of the spectrum of thoracic endometriosis syndrome, a term used to describe the occurrence of pneumothorax, hemothorax, haemoptysis, or chest pain associated with menstruation. We present three females between the ages of 30 and 40 years who sought medical attention at the Emergency Department of the University of Ghana Medical Centre with complaints of chest pain and difficulty breathing associated with their menstrual cycle. In all three cases, chest X-rays revealed right-sided pneumothoraxes. The diagnosis of Catamenial Pneumothorax was made in all three cases based on clinical findings. This write-up aims to underscore the importance of maintaining a high index of suspicion for diagnosing catamenial pneumothorax in young women presenting to the Emergency Department with cyclical chest pain associated with menstruation.

Keywords: Endometriosis, catamenial pneumothorax, female, menstrual cycle

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INTRODUCTION

Catamenial pneumothorax is defined as the spontaneous, often recurrent collection of air in the pleural cavity of women in the reproductive age group. It is closely associated with the menstrual cycle of these women [1]. Although catamenial pneumothorax was previously thought to be a rare clinical entity, recent studies suggest otherwise [2]. We present three cases of women in their reproductive age diagnosed with catamenial pneumothorax based on clinical findings identified at the Emergency Department (ED) of the University of Ghana Medical Centre (UGMC). In all three cases, chest tube thoracostomy was performed, and patients were subsequently discharged

on Zoladex (GnRH agonist) implant 3.6 mg every 28 days for a duration of 6 months. These presentations underscore the importance of clinicians being mindful of this clinical picture in women of reproductive age to enable appropriate and early diagnosis and management.

CASE 1

A 38-year-old female living with endometriosis presented with difficulty breathing accompanied by dull right-sided chest pain, an occasional dry cough and fatigue on minimal exertion. The symptoms had a duration of two weeks and were noticed a week prior to her menstrual period but worsened during the menstrual period. She had a history of a similar episode about a year prior to the presentation, which resolved after taking over-the-counter medication she could not recall. No prior history of trauma was reported, and she was not known to be living with any chronic lung condition. Although her menstrual cycles were

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regular, she experienced secondary dysmenorrhea. Upon arrival, her vital signs were as follows: blood pressure was 121/72 mmHg, pulse was 89 beats/min, respiratory rate was 22 cycles/min, oxygen saturation (SpO₂) was 100% on room air, and temperature was 36.3 °C. However, she had decreased chest expansion hyperresonance on percussion with reduced breath sounds in the right middle and lower zones. The initial erect chest X-ray revealed a right lung collapse with loss of lung markings and increased radiolucency peripheral to the collapsed lung. Bedside ultrasound (USG) revealed absent lung sliding at the apical portion of the right hemithorax. The diagnosis made after clinical assessment was a right pneumothorax in a young woman with endometriosis. She underwent a chest tube thoracostomy using a size 24 Fr chest tube and continued to be managed in the cardiothoracic ward. The tube was removed after eight days of admission, and a repeat chest X-ray at the time of discharge showed complete re-expansion of the right lung without any complication. Subsequently, she was seen by the gynaecologist and started on Zoladex (GnRH agonist) implant 3.6 mg every 28 days for a six-month duration.

CASE 2

A 33-year-old female presented with difficulty breathing and associated right-sided pleuritic chest pain noticed three days after the onset of her regular menses. The presenting symptoms started a day prior to the presentation. She had no associated fever, cough, orthopnea, pedal oedema, hemoptysis, and no prior history of chest trauma. She was not known to have any chronic lung condition and did not smoke. However, her past medical history revealed cyclical episodes of chest pain and mild difficulty breathing during menses over the past six months leading up to the current presentation. Her vital signs on arrival were as follows: blood pressure - 108/79 mmHg; pulse - 93 beats/min; respirations - 20 cycles/min; SpO₂ - 96% on room air;

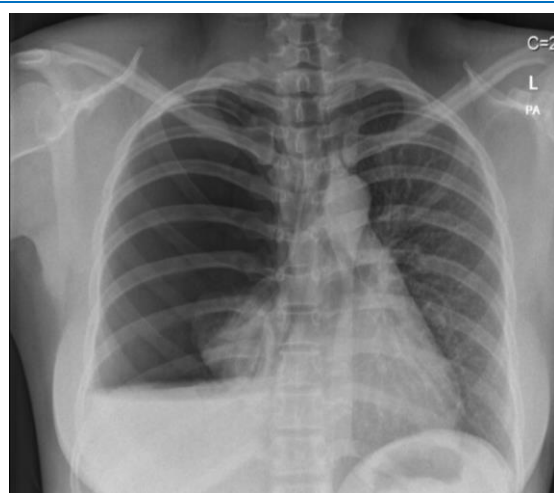


Figure 1. Case 2 Chest X ray on presentation prior to passage of chest tube

temperature - 36.3 °C. However, she had decreased right chest expansion, hyperresonance on percussion, absent vocal fremitus, and absent breath sounds in the right hemithorax. An erect chest X-ray revealed a right lung collapse with loss of lung markings and increased radiolucency peripheral to the collapsed lung. Bedside ultrasound confirmed absent lung sliding on the apical portion of the right hemithorax. The clinical assessment led to a clinical suspicion of catamenial pneumothorax. A chest tube thoracostomy using a 24 Fr chest tube was inserted and connected to an underwater seal, and the patient was subsequently transferred to the cardiothoracic ward for continued management. A repeat chest X-ray on Day 11 showed lung expansion and resolution of the pneumothorax. She was also evaluated by the gynaecologist and started on Zoladex (GnRH agonist) implant 3.6 mg every 28 days for a six-month duration.

CASE 3

A 34-year-old female living with endometriosis presented with a week's history of right-sided chest pain, which progressively worsened and later became associated with shortness of breath. She noticed symptoms 72 hours after she had started her menses. She had no prior history of trauma and was not known to be living with any chronic lung condition but had a similar episode 2 years prior. On arrival, her blood pressure was 121/82 mmHg, pulse was 115 beats/min, respirations were 22 cycles/min, saturation was 95% on room air, and temperature was 37.2 °C. However, there was decreased chest expansion, hyperresonant percussion note in the right hemithorax, and absent breath sounds. An erect chest X-ray showed a right total lung collapse with loss of lung markings and increased radiolucency peripheral to the collapsed lung. The diagnosis made after clinical assessment was a right pneumothorax in a young woman with endometriosis. She underwent a chest tube thoracostomy using a 24 Fr chest

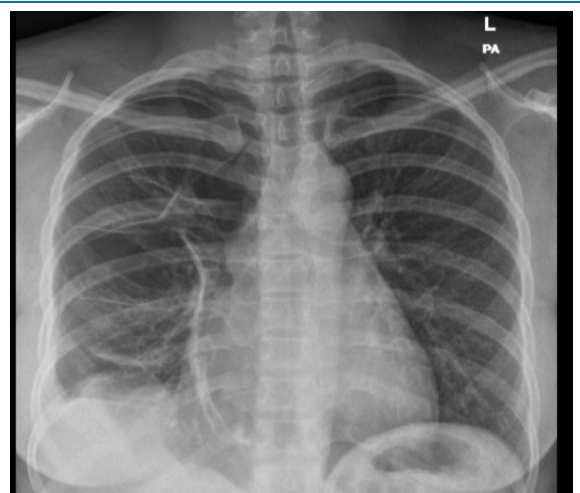


Figure 2. Case 2 - Chest X ray showing lung expansion after removal of chest tube

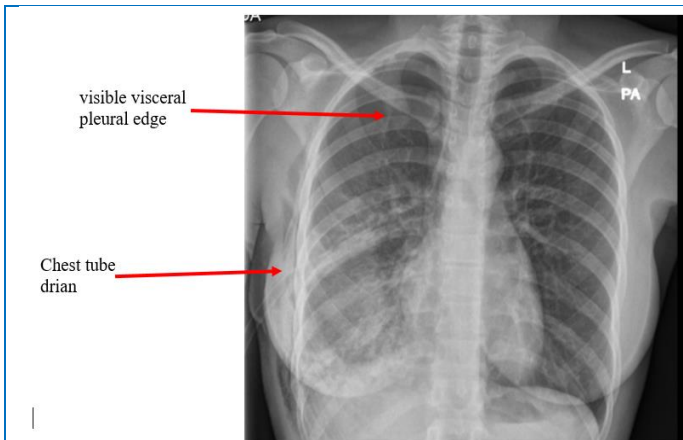


Figure 3. Case 3 Chest X ray showing pneumothorax and chest tube in situ

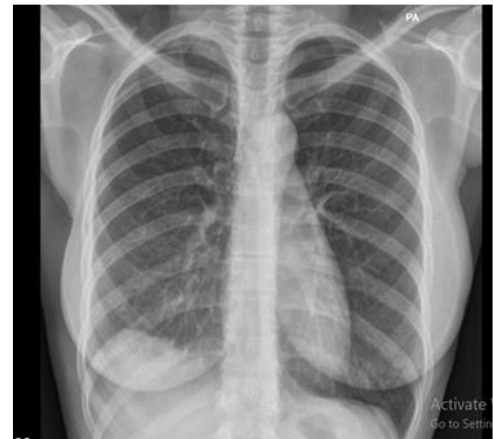


Figure 4. Case 3-Chest X ray showing resolution of pneumothorax.

tube as part of emergency management and was subsequently admitted to the Cardiothoracic ward. She experienced no complications and was discharged after a week of admission when a repeat chest X-ray confirmed full lung expansion. After an evaluation by the gynaecologist, she began a regimen of Zoladex (GnRH agonist) implant, with a dosage of 3.6 mg, to be administered every 28 days for a duration of 6 months.

DISCUSSION

Endometriosis is characterised by the implantation of endometrial tissue outside the uterine cavity [3]. While it typically occurs in the pelvis, it can rarely affect the labia, abdomen and thorax [4]. Tettey M et al. reported a total of 12 cases of thoracic endometriosis syndrome seen between 2004 and 2012 at their centre [3]. Catamenial Pneumothorax forms part of the spectrum of thoracic endometriosis syndrome and is defined as the recurrent spontaneous collection of air in the pleural cavity of women in the reproductive age group, usually occurring within 72 hours before or after the onset of menstrual periods [1]. It may also occur within 5-7 days of menses [5]. Clinical manifestations are predominantly right-sided, although left-sided or bilateral occurrences have been reported in rare cases [6]. The spectrum of thoracic endometriosis syndrome also includes catamenial haemothorax, haemoptysis and relatively uncommon endometrial lung nodules [4,7]. Catamenial Pneumothorax is a rare cause of spontaneous pneumothorax with an incidence of 2.6 - 5.8%, but recent clinical studies have reported a much higher incidence of about 30% [1]. Several theories have been proposed to explain the aetiopathogenesis of the thoracic endometrial syndrome and catamenial pneumothorax. The earliest theory involves retrograde menstruation with implantation in the peritoneum, followed by transdiaphragmatic migration through fenestrations produced by endometriosis [8]. The second theory describes the metastatic spread of endometrial tissue

through the venous or lymphatic system [8]. The third involves coelomic metaplasia of undifferentiated stem cells into endometrial tissue, as both the abdominal and thoracic cavities are covered by the coelomic membrane [8]. Additionally, the pathogenesis of catamenial pneumothorax remains unclear. One explanation posits that ectopic endometrial tissue undergoes menstrual cycle phases, releasing air or blood into the pleural space, causing a recurrent spontaneous hemothorax or Pneumothorax [9]. Other explanations include spontaneous rupture of blebs, alveolar rupture due to prostaglandin-induced bronchiolar constriction, and the absence of a cervical mucous plug allowing the passage of air from the genital tract through diaphragmatic fenestrations [3,9]. A thorough history and clinical examination are crucial for the identification and diagnosis of catamenial pneumothorax [10]. Patients commonly present to the emergency department with complaints of chest pain (90%) and dyspnea (31%) associated with pneumothorax [11]. Additionally, pelvic endometriosis is frequently present, although it may be absent in some cases [3]. Other non-specific symptoms include cough and fatigue [12].

The presence of recurrent spontaneous pneumothorax associated with at least two menstrual periods suggests a catamenial pneumothorax [13]. The cases presented above detail young women of childbearing age who experienced right-sided pleuritic chest pain associated with difficulty breathing during menses. Chest X-rays performed in all the cases revealed a large right pneumothorax with partial or complete collapse of the right lung. Clinical findings in the described cases align with the features associated with thoracic endometriosis syndrome and catamenial pneumothorax. The diagnosis of catamenial pneumothorax is often delayed, hence, the need for clinicians to be mindful of this clinical presentation in women of reproductive age to enable appropriate and early diagnosis and management [14]. Chest X-ray, Computed Tomography (CT) scan, and Magnetic Resonance Imaging (MRI) are usually employed

in the identification of pneumothorax. Chest CT and MRI may further reveal the presence of diaphragmatic and pleural endometrial lesions [7]. However, definitive diagnosis requires video-assisted thoracoscopy, allowing for direct visualisation and resection of endometrial lesions for histopathological analysis [15]. In the cases described, the diagnosis of catamenial pneumonia was based solely on a clinical picture and the presence of pneumonia on a chest X-ray. Emergency management of catamenial pneumothorax follows the same protocol as for other spontaneous and secondary pneumothoraces. Therapeutic options depend on the size and severity, which are crucial considerations. These options include observation, high-flow oxygen therapy, needle aspiration and tube thoracostomy [16]. The use of surgical and hormonal therapy to prevent recurrence is a definitive approach in catamenial pneumothorax management [14]. Surgical options include pleurectomy and resection of endometrial diaphragmatic implants with chemical or mechanical pleurodesis. Hormonal therapy, in most situations, involves the use of gonadotropin-releasing analogues [17].

Conclusion

It is imperative for clinicians to consider catamenial pneumothorax in all young women of childbearing age who present to the Emergency Department with recurrent chest pain and difficulty breathing associated with their menstruation. This consideration allows for prompt diagnosis and management. Long-term management includes surgical options and hormonal therapy using gonadotropin-releasing analogues such as Zoladex.

DECLARATIONS

Ethical consideration

Ethical clearance was granted under the ethical standards of the University of Ghana Medical Center Institutional Review Board. Informed consent was obtained from the patients for the publication of this article.

Consent to publish

All authors agreed on the content of the final paper.

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None

Competing Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Author contributions

EN, GKM, AM-A and EMB participated in the management of the case, drafting of the case, summaries and researching for relevant literature review. PKB, AE, EA and SQ-P participated in drafting and editing the final manuscript. KE supervised the drafting of the report and reviewed the final work for submission. All the authors have read and approved the final version of the manuscript.

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Availability of data

The datasets used and/or analysed during the current study are available from the corresponding author upon reasonable request.

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