

Management of Spontaneous Pneumothorax in Pregnancy in a Low-Income Country during COVID-19 Pandemic

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Abstract

Spontaneous pneumothorax is a rare and life-threatening emergency. When it occurs in pregnancy, it poses a serious danger for both the mother and the fetus. A high index of suspicion, early diagnosis, and proper management are recommended. We present the case of a 35-year-old pregnant woman at the 34th week of gestation who presented via the emergency department complaining of sudden onset of dyspnea and chest pain. The clinical and radiologic evaluation confirmed the right-sided pneumothorax. She had a closed tube thoracostomy drainage (CTTD) following which the patient's condition improved. She subsequently had chest tube removal with no recurrence beyond delivery as she had a good outcome.

Keywords: Chest tube, COVID-19, pregnancy, spontaneous pneumothorax

INTRODUCTION

Spontaneous pneumothorax is a rare and potentially dangerous condition, particularly during pregnancy. It can cause serious injuries to both the mother and the unborn fetus. The ventilation impairment in the gravid state causes severe hypoxia. This causes decreased maternal partial pressure of oxygen which may seriously affect fetal oxygenation leading to fetal distress and potential fetal loss.

Overall, <15% of patients with spontaneous pneumothorax report a positive family history.^[1] Rare connective tissue diseases account for some of these cases, but these are largely uncommon even in pregnancy.^[2-4] Several families with familial spontaneous pneumothorax do not show clinical evidence of these disorders. HLA genotyping, alpha-1-antitrypsin phenotyping, and recently, mutations in the folliculin gene have been suggested to be useful pointers to the risk of spontaneous pneumothorax in some individuals.^[5,6] We present the case of a 35-year-old woman in her third pregnancy who presented at 34 weeks of gestation with primary spontaneous pneumothorax relieved by CTTD.

CASE REPORT

A gravid 35-year-old woman (G₄P₃⁺⁰A₃) presented at our hospital via the Accident and Emergency department following

a referral from a private health-care facility with dyspnea and pleuritic chest pain. The symptoms were of sudden onset and progressed rapidly over four days before presentation. She had a Medical Research Council Dyspnea Scale of five. This was amid the confusion of the COVID-19 pandemic. There was no associated trauma, previous lung surgeries, fever, cough, and contacts with chronically coughing persons. She had never smoked and was not asthmatic. She had no previous history of pneumothorax. She had no family history of spontaneous pneumothorax or pulmonary disease. There was neither recent travel history to COVID-19 endemic states at the time nor history of contact with anyone with recent travel history. Her last menstrual period was on September 9, 2019. Pregnancy was booked, and she was regular with antenatal clinic visits as well as routine pregnancy medications.

She was tachypneic on physical examination with a respiratory rate of 36 cycles per minute, a pulse rate of 132 pulsations per

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minute, blood pressure of 130/90 mmHg, and temperature of 36.5°C. Oxygen saturation on room air was 91%. She was well nourished (height – 1.66 m; weight – 84 kg) with a body mass index of 30.5 kg/m². Chest examination revealed hyperresonance with absent breath sounds over the right hemithorax. Chest radiograph of the posteroanterior (PA) and left lateral views (chest X-ray [CXR] - PA and lateral) revealed an almost complete radiolucency with absent vascular markings (pneumothorax) of the right hemithorax [Figure 1]. Abdominal examination revealed a 34-week gravid uterus with vertex presentation and fetal heart rate (FHR) of 153 beats/min. The cervical os was closed.

Ultrasound examination of the fetus revealed a normal biophysical profile. Basal foetal heart rate in obstetric ultrasound scan was 150 beats per minute, and no uterine contraction was present. CXR (PA view) was suggestive of a total right-sided pneumothorax. She had slight leukocytosis which is common in pregnancy.^[7-9]

Due to the degree of breathlessness, there was great suspicion of the patient being a case of COVID-19.^[10] There was apprehension by nurses and other paramedics despite referral with a CXR film from a private facility. The cardiothoracic surgery unit was immediately invited to review. We reviewed the patient as well as the CXR noting that her symptomatology and examination findings were in keeping with spontaneous pneumothorax.

Obstetricians were invited, and they requested COVID-19 test to be done because of the rarity of such occurrence while emphasizing isolation protocol till the result of the test. The patient had emergency closed tube thoracostomy drainage (CTTD) done with immediate resolution of symptoms. The patient gradually improved with the saturation of 98% at room air and resolution of dyspnea. Re-expansion of the lung was confirmed radiologically [Figure 2], and the tube was removed on the fifth-day postinsertion. The patient was counselled on things to avoid and advised on the likelihood of recurrence.

The result of the requested COVID-19 test came out negative after 72 h due to non availability of test kits as is the case in most teaching hospitals in Nigeria except in the COVID-19 epicenters such as Lagos, the economic capital, and Abuja, the political capital of Nigeria as well as other designated virology centers.

She subsequently had a spontaneous vaginal delivery of a live male infant three weeks later with no reoccurrence of initial presenting symptoms.

Spontaneous pneumothorax is defined as the sudden presence of air in the pleural space and its occurrence during pregnancy is rare.^[11-13] It is commonly a result of a ruptured bleb or bullae. Spontaneous pneumothorax has potentially serious complications for the mother and the fetus.

No case report exists in the country, however, an instance of primary spontaneous pneumothorax in non pregnant females has been reported.^[14,15] The most common causes of spontaneous pneumothorax in pregnancy highlighted by others are rupture of a subpleural apical bulla and pulmonary lymphangiomas.^[16,17] According to the literature, spontaneous pneumothorax can occur during the perinatal period, 25% in the first trimester, 22% in the second trimester, and 53% in the third trimester.^[10]

Respiratory infection, asthma, history of previous spontaneous pneumothorax, hyperemesis, and cocaine use are potential risk factors for spontaneous pneumothorax in pregnancy. Others include lymphangiomyomatosis, alpha-1-antitrypsin deficiency, and familial spontaneous pneumothorax. Trophoblastic tumors in pregnancy have also been implicated in spontaneous pneumothorax in pregnancy. The onset of which may be the first pointer to the diagnosis in rare instances.^[18,19]

The diagnosis of spontaneous pneumothorax requires a high index of suspicion and is mainly based on the clinical presentation and standard chest radiograph.^[20-22] The tendency for difficulty in breathing and chest pain to be ascribed to pregnancy symptoms make the likelihood of missed diagnosis



Figure 1: Right-sided pneumothorax



Figure 2: Resolved pneumothorax following CTTD

highly likely. The COVID-19 pandemic also created a challenge as dyspnea was highlighted as a common symptom in affected cases.

The benefits and risks of exposure to ionizing radiation have to be considered due to its potential to harm the fetus, especially in early pregnancy. The use of a lead shield, however, helps in mitigating the effect of radiation.^[20]

Management strategies of pneumothorax in pregnant women are the same as in nonpregnant women. However, any ventilatory problem associated with pneumothorax has a consequence for both the pregnant patient and her fetus, thus intervention has to be done emergently.^[21]

Initial inpatient observation is usually warranted even with small pneumothorax (15%–20% or less of the hemithorax). During hospitalization, supplemental oxygen should be administered as much as this accelerates the rate of pleural absorption.

The option of treatment is affected by the gestational age, size of pneumothorax as well as recurrence.^[22,23] These range from hospitalization and simple observation in cases of small pneumothorax to thoracostomy and thoracotomy as the need arises. In cases of recurrent pneumothorax, needle aspiration, needle decompression, pleurodesis, thoracotomy, and recently, thoracoscopy are viable options. Thoracoscopy is preferred over thoracotomy due to advantages such as decreased exposure to anesthetic drugs, rapid lung expansion, less postoperative pain, and hospital stay. This option is, however, not readily available in the authors setting. Treatment of patients who present in the third trimester and later stages are generally considered safe and effective.

Surgical intervention should nevertheless be avoided in pregnancy as much as possible to reduce complications such as preterm delivery or abortions, especially in a precious pregnancy.

Spontaneous pneumothorax is not an indication for cesarean delivery as spontaneous vaginal delivery is reported to be safe, although some authors have advocated the use of epidural anesthesia and instrumental delivery.^[24]

CONCLUSION

Spontaneous pneumothorax in pregnancy is rare with this being the first reported case of the condition in the authors setting as well as the country to the best of our knowledge. The coincidental presentation during this period of the pandemic is a subtle reminder that pneumothorax and other pathologies still account for symptoms that may mimic COVID-19. Thus, patients should be properly investigated with appropriate personal protective equipment.

Declaration of patient consent

The authors certify that they have obtained all appropriate

patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Chiu HT, Garcia CK. Familial spontaneous pneumothorax. *Curr Opin Pulm Med* 2006;12:268-72.
2. Lopes C, Manique A, Sotto-Mayor R, Cruz J, Mendes de Almeida M, Cravino J, *et al.* Ehlers-Danlos syndrome - A rare cause of spontaneous pneumothorax. *Rev Port Pneumol* 2006;12:471-80.
3. De Paepe A, Devereux RB, Dietz HC, Hennekam RC, Pyeritz RE. Revised diagnostic criteria for the Marfan syndrome. *Am J Med Genet* 1996;62:417-26.
4. Johannesma PC, van den Borne BE, Gille JJ, Nagelkerke AF, van Waesberghe JT, Paul MA, *et al.* Spontaneous pneumothorax as indicator for Birt-Hogg-Dubé syndrome in paediatric patients. *BMC Pediatr* 2014;14:171.
5. Fröhlich BA, Zeitz C, Mátyás G, Alkadhi H, Tuor C, Berger W, *et al.* Novel mutations in the folliculin gene associated with spontaneous pneumothorax. *Eur Respir J* 2008;32:1316-20.
6. Zhu JF, Shen XQ, Zhu F, Tian L. Novel folliculin (FLCN) mutation and familial spontaneous pneumothorax. *QJM* 2017;110:23-6.
7. Pughikumo OC, Pughikumo DT, Omunakwe HE. White blood cell counts in pregnant women in Port Harcourt, Nigeria. *IOSR-JDMS* 2015;14:01-3.
8. Akinbami AA, Ajibola SO, Rabiun KA, Adewunmi AA, Dosunmu AO, Adediran A, *et al.* Hematological profile of normal pregnant women in Lagos, Nigeria. *Int J Womens Health* 2013;5:227-32.
9. Mutua DN, Njagi EN, Orinda GO. Hematological profile of normal pregnant women. *J Blood Lymph* 2018;8:1-6.
10. Singhal T. A review of coronavirus disease-2019 (COVID-19). *Indian J Pediatr* 2020;87:281-6.
11. Terndrup TE, Bosco SF, McLean ER. Spontaneous pneumothorax complicating pregnancy—Case report and review of the literature. *J Emerg Med* 1989;7:245-8.
12. Lal A, Anderson G, Cowen M, Lindow S, Arnold AG. Pneumothorax and pregnancy. *Chest* 2007;132:1044-8.
13. Tanase Y, Yamada T, Kawaryu Y, Yoshida M, Kawai S. A case of spontaneous pneumothorax during pregnancy and review of the literature. *Kobe J Med Sci* 2007;53:251-5.
14. Awotedu AA, Adebo OA, Oluboyo PO, Osinowo O, Okoli CO, Onadoko BO, *et al.* Spontaneous pneumothorax in adult Nigerians. *East Afr Med J* 1989;66:259-63.
15. Nwankwo NC, Maduforo CO. Spontaneous pneumothorax following air travel in a Nigerian woman: A case report. *J Med Med Sci* 2012;3:001-4.
16. Garg R, Sanjay VD, Usman K, Rungta S, Prasad R. Spontaneous pneumothorax: An unusual complication of pregnancy—A case report and review of literature. *Ann Thorac Med* 2008;3:104-5.
17. Wong MK, Leung WC, Wang JK, Lao TT, Ip MS, Lam WK, *et al.* Recurrent pneumothorax in pregnancy: What should we do after placing an intercostals drain? *Hong Kong Med J* 2006;12:375-80.
18. Multani SS, Luna Russo MA, Sims HB, Ridgway M. A metastatic intermediate trophoblastic tumor of unspecified subtype presenting as pneumothorax. *Gynecol Oncol Rep* 2015;12:17-9.
19. Bouquet de la Jolinière J, Khomsi F, Fadhlou A, Ben Ali N, Dubuisson JB, Feki A. Placental site trophoblastic tumor: A case report

- and review of the literature. *Front Surg* 2014;1:31.
20. McCollough CH, Schueler BA, Atwell TD, Braun NN, Regner DM, Brown DL, *et al.* Radiation exposure and pregnancy: When should we be concerned? *Radiographics* 2007;27:909-17.
 21. Henry M, Arnold T, Harvey J; Pleural Diseases Group, Standards of Care Committee, British Thoracic Society. BTS guidelines for the management of spontaneous pneumothorax. *Thorax* 2003;58 Suppl 2:ii39-52.
 22. MacDuff A, Arnold A, Harvey J; BTS Pleural Disease Guideline Group. Management of spontaneous pneumothorax: British Thoracic Society Pleural Disease Guideline 2010. *Thorax* 2010;65 Suppl 2:ii18-31.
 23. Miller A. Spontaneous pneumothorax. In: Light RW, Lee YC, editors. *Textbook of Pleural Diseases*. 2nd ed. London: Arnold Press; 2008. p. 445-e63.
 24. Traoré A, Doumiri M, Bensghir M, Haimeur C, Tazi AS. Management of spontaneous pneumothorax during pregnancy: A case report and review of literature. *Rev Pneumol Clin* 2015;71:306-8.