

SPONTANEOUS PNEUMOTHORAX DURING PREGNANCY: CASE REPORT AND LITERATURE REVIEW

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ABSTRACT

Pneumothorax during pregnancy is a rare and potentially serious complication for both mother and fetus. Due to an increased need for oxygen during pregnancy and delivery, pneumothorax affects fetal oxygen supply, since it causes hypoxia in the mother. The authors describe a case of pneumothorax during pregnancy and conduct a literature review.

Keywords: *prenatal care, pneumothorax, complications of pregnancy.*

Spontaneous pneumothorax is described as the presence or buildup of air in the pleural cavity resulting from a disruption in pleural continuity. Pleural space, usually virtual, becomes real due to the interposition of gas. Pneumothorax may be classified as spontaneous (primary or secondary) or non-spontaneous (traumatic) (1).

Primary spontaneous pneumothorax occurs in patients with no underlying pulmonary disease and results from the rupture of subpleural bullae, also called blebs, which are usually found in the apices of the lung. However, the etiology of these blebs remains unclear. Secondary pneumothorax results from complications of a known pulmonary disease. In either case, there are no causal factors or agents directly associated with pneumothorax. The incidence is 6 to 10 annual cases per 100.000 people. The condition affects mostly tall and thin men who smoke and are aged between 20-40 years. It is often unilateral and right-sided.

Clinically, it is characterized by dyspnea and sudden chest pain, usually on the affected site. However, pain may spread to the shoulder or scapular region due to phrenic irritation resulting from depression of the diaphragm. The frequency and intensity of dyspnea are determined by the severity of pneumothorax. One-third of patients report having cough (2).

Pneumothorax during pregnancy is a rare and potentially serious complication for both mother and fetus. Due to an increased need for oxygen during pregnancy, particularly upon delivery, pneumothorax affects

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fetal oxygen supply, since it causes hypoxia in the mother (3-5).

There are few reports of spontaneous pneumothorax during pregnancy in the literature, which may hinder management for this period. A review study by Lal et al. (2007) presents five cases of spontaneous pneumothorax during pregnancy among a total of 250 patients over 10 years of observation (6).

Based on these data, we describe a case of spontaneous pneumothorax during the second trimester of pregnancy. We also conducted a literature review considering treatment options and the patient's pregnancy conditions.

CASE REPORT

BPBPC, a 32-year-old married woman living in Bicas, Minas Gerais, Brazil, G2P1A0 (one previous C-section), started prenatal care at the 7th/8th gestational week. This young patient did not smoke and had no history of previous diseases (hypertension, diabetes, asthma, pulmonary or infectious diseases). The previous pregnancy was uneventful and the C-section was performed due to a preterm prelabour amniorrhexis.

Initially, the monthly medical appointments registered no abnormalities, and uterine growth was compatible with gestational age and fetal viability, as confirmed by an ultrasound. Morphological assessment of the fetus did not show any anomalies. Laboratory findings were considered normal.

In the second trimester of pregnancy (October/2012), the patient experienced chest pain after bending down during routine domestic activities. Initially, the patient confused the pain for muscle ache and sought physiotherapy treatment. As the clinical picture worsened, progressing to pulmonary dyspnea, the patient sought medical help and was referred to the emergency department. Initial examination revealed flushed skin, dehydration, no jaundice, no cyanosis, tachypnea, 180/110 mmHg BP, absent vesicular murmur and vocal fremitus on the left side, 20 cm FH (fundal height), rhythmic fetal heart rate, no uterine contractions, closed cervix and no vaginal discharge (blood or amniotic fluid), and no edema in the lower extremities.

The definitive diagnosis was made based on simple chest radiographs performed with the patient in a supine position, wearing a protective shield over the abdomen. A left-sided pneumothorax was identified. The volume of the pneumothorax was

determined by the distance in cm between the apex of the lung and the hemithorax. For practical evaluation purposes, distances shorter or longer than 2 cm were considered indicative of a small or large pneumothorax, respectively (7) (Figure 1A-1). The volume of the pneumothorax may also be assessed by measuring the mediastinum at the level of the hilum (Figures 1A-2) (7-10). In this case, the pneumothorax was classified as large, in a pregnant patient, which required intervention (Figure 1-B). No CT was performed to aid diagnosis or disease control.

Closed pleural drainage was performed with a thin tube inserted into the fifth intercostal space, anterior axillary line, in a closed system, with satisfactory clinical response. The patient was monitored by a multidisciplinary team (thoracic surgery, obstetrics, and internal medicine). During this time, she complained of abdominal pain, with no signs of uterine contractions or cervical dilation. Pain improved with antispasmodic medicine. She also complained of thoracic pain. A chest imaging showed consolidation in the left lung base four days after drainage. The patient was treated with ceftriaxone, and respiratory physiotherapy was increased. The subsequent course was uneventful, with both clinical and laboratory improvement. She was discharged after eight days.

The patient was followed-up during the prenatal period and did not present any clinical changes. At the 38th week of pregnancy, she delivered an alive, single, female fetus by C-section. The postpartum checkup was scheduled for the 7th and 40th day after delivery and did not register any abnormalities.

DISCUSSION

Spontaneous pneumothorax is described in the literature as a clinical entity associated with risk factors (smoking, age, underlying pulmonary disease, and drug abuse, such as cocaine use) (8,9). Smoking is believed to increase the risk of primary spontaneous pneumothorax. There is evidence that the incidence of pneumothorax is proportional to smoking levels (9), as tobacco leads to inflammation of the small airways, inflammatory cell influx, and a decrease in airway caliber. Expiration is then hindered, and a bleb develops (10). A study with 50 patients with spontaneous pneumothorax reported that only 14% of the cases had occurred in women, and that the average age was 37.2 years (11). The same results were reported in another cross-sectional

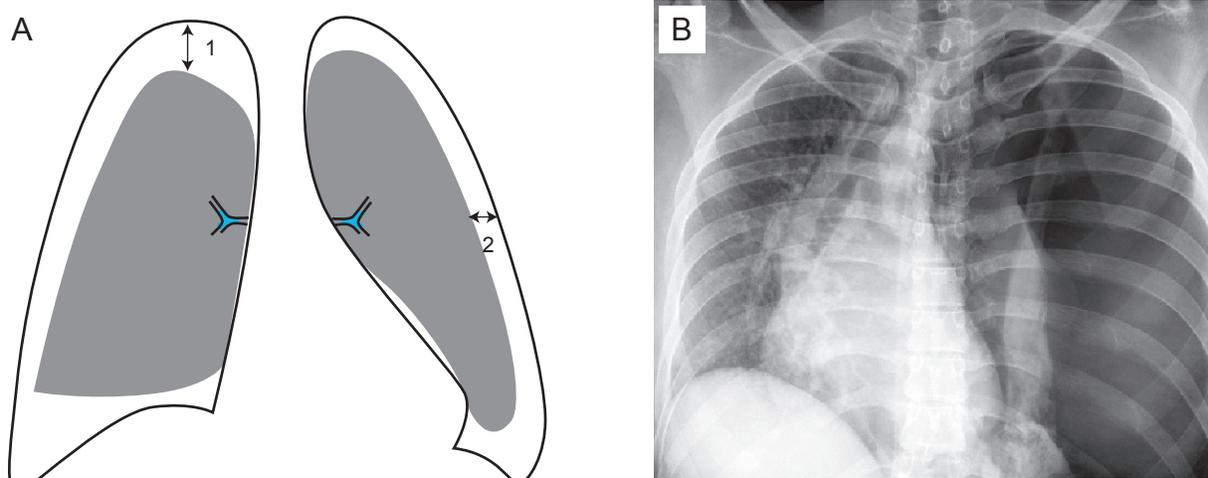


Figure 1: Panel A depicts the size of the pneumothorax measured by the distance between the apex of the lung and the hemithorax (1) and by the length of the mediastinum at the level of the hilum (2). Panel B shows a left-sided large pneumothorax.

study (12). Although our patient did not have any risk factors, some studies reported pneumothorax in patients under the same clinical conditions as ours. This indicates that spontaneous pneumothorax might occur in women with no detectable risk factors. Therefore, obstetricians should carefully consider their patients' clinical complaints, particularly respiratory chest pain, not associated with physical effort (13-17).

However, the patient's biotype (tall and thin) has been associated with a greater frequency of spontaneous pneumothorax. Ectomorph patients are believed to have greater odds of developing pneumothorax when compared to mesomorph or endomorph patients. Ectomorph people are defined as slim, thin, and tall, with an elongated neck, a flat chest, and long limbs compared to the trunk (10). Huang et al. (2007) (18) studied patients with spontaneous pneumothorax and found that a lower body mass index (BMI) increases the risk for bilateral pneumothorax ($p=0,009$). Moreover, recurrence of pneumothorax has been reported in tall and thin patients (19). The usual location of the blebs, in the apices of the lung, is believed to result from the wide pleural pressure gradient at the apices. This gradient is even wider in tall people, leading to a greater occurrence of primary spontaneous pneumothorax in ectomorphs (10).

Treatment for pneumothorax is highly variable and includes conservative management (bed rest, observation, oxygen therapy), aspiration, closed pleural drainage or open thoracotomy

with removal of bullae, pleural abrasion, and pleurectomy. The choice of treatment depends on size of the pneumothorax, on the patient's clinical conditions, on the underlying disease, on its frequency and comorbidities and, in this case, on pregnancy status (10,13-17).

Some authors believe patients with a small primary spontaneous pneumothorax may benefit from conservative measures as long as they are hemodynamically stable, have no hypoxemia, and have only mild complaints. However, pleural drainage should be performed in case of hemodynamic or respiratory instability (1,2,13-17).

Patients in their first episode of primary spontaneous pneumothorax who undergo conservative treatment, simple aspiration or closed pleural drainage may develop recurrent pneumothorax. Based on this, some authors recommend a videothoracoscopy from the second episode on, or even at the first if the patient is an extreme sports practitioner. Videothoracoscopy allows for identification of the cause (subpleural bullae - blebs) and for resection of the impaired area (1,2,13-17). Thoracotomy is recommended if videothoracoscopy is not effective, if anesthetic management is difficult or if pneumothorax is further complicated by lung incarceration (1-2).

Treatment was a closed pleural drainage with a thin tube inserted into the fifth intercostal space, anterior axillary line, in a closed system, with satisfactory clinical response. The choice of treatment was based on the patient's history, size of the pneumothorax, pregnancy status, and need

to protect the fetus from maternal hypoxemia. It should be stressed that hospitalization is mandatory for pregnant patients.

The C-section was recommended by an obstetrician. Some studies report the occurrence of pneumothorax during labor (20), but there is no recommendation of C-sections for patients with a history of spontaneous pneumothorax.

Women, particularly pregnant women, are less affected by spontaneous pneumothorax.

Even so, the obstetrician should be alert to symptoms such as sudden onset of respiratory chest pain, with or without cough. These symptoms should be considered regardless of the presence of risk factors, as spontaneous pneumothorax may occur with no detectable risk factors. Treatment of pneumothorax during pregnancy does not seem to differ from the usual treatment. However, hospitalization is mandatory for pregnant patients.

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