

## CASE REPORT

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# Primary spontaneous pneumothorax during pregnancy

## Neumotórax espontáneo primario durante el embarazo

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### ABSTRACT

Primary spontaneous pneumothorax is an extremely rare condition during pregnancy and can occur at any time. Rupture of an apical ampulla or subpleural bulla is the most common cause in young pregnant women. It is thought to be due to increased respiratory activity associated with the peripartum period. Early detection and prompt diagnosis of this condition are important for the prevention of some serious complications. The therapeutic methods used in pregnancy do not differ essentially from those used in non-pregnant patients. Ambulatory drainage of the thorax has been recommended in treatment. Delivery in these women can be performed vaginally, with a second phase of labor without effort. We present a case of primary spontaneous pneumothorax that occurred at 35 weeks of gestation in a healthy 34-year-old primigravida. Its onset was described as pleuritic chest pain and dyspnea of sudden onset. The diagnosis was made by plain chest radiography. The patient was successfully treated with chest tube placement.

**Key words:** Primary spontaneous pneumothorax; Pregnancy.

### RESUMEN

El neumotórax espontáneo primario es una afección extremadamente rara durante el embarazo y puede ocurrir en cualquier momento. La rotura de una ampolla apical o bula subpleural es la causa más común en embarazadas jóvenes. Se cree que se debe al aumento de la actividad respiratoria asociada al período periparto. La detección temprana y el diagnóstico rápido de esta afección son importantes para la prevención de algunas complicaciones graves. Los métodos terapéuticos utilizados en el embarazo no difieren esencialmente de los utilizados en pacientes no embarazadas. El drenaje ambulatorio del tórax se ha recomendado en el tratamiento. El parto en estas mujeres puede realizarse por vía vaginal, con una segunda fase del parto sin esfuerzo. Se presenta un caso de neumotórax espontáneo primario que ocurrió a las 35 semanas de gestación en una primigesta sana de 34 años. Su aparición fue descrita como dolor pleurítico en el pecho y disnea de aparición repentina. El diagnóstico fue realizado por la radiografía simple de tórax. La paciente fue tratada con éxito con colocación de tubo torácico.

**Palabras clave:** Neumotórax espontáneo primario; Embarazo.

### INTRODUCTION

Acute pneumothorax during pregnancy is potentially fatal. Primary spontaneous pneumothorax (PSP) is characterized by the presence of air in the pleural cavity resulting in lung collapse. It is more common in men than in women and is rare during pregnancy. In addition, it is rarely associated with malignant tumors during pregnancy<sup>(1)</sup>. The true incidence of this condition is unknown<sup>(2)</sup>. The most common cause is rupture of a subpleural apical bulla or bleb in a patient with otherwise healthy lungs<sup>(3)</sup>. A case of primary spontaneous pneumothorax during pregnancy is presented.

### CASE REPORT

This is a 34-year-old patient, gestation 4, para 3, 35 weeks pregnant, who came to the emergency room with right-sided pleuritic pain of sudden onset radiating to the right upper limb and back, shortness of breath and dry cough that occurred while she was sleeping. The patient had no fever, nausea, hemoptysis, vomiting or trauma. She denied smoking, illegal or recreational drug use, allergies, bronchial asthma and personal or family history of pulmonary disease.



On physical examination the patient was afebrile, with moderate shortness of breath and no cyanosis, lying left lateral decubitus and unable to sit up due to pain and dyspnea. No tracheal deviation or use of accessory respiratory muscles was observed. Physical examination revealed blood pressure of 100/50 mmHg, heart rate of 110 beats per minute, respiratory rate of 20 breaths per minute and body temperature of 37.8°C. No paradoxical pulse was found. Pulmonary auscultation showed decreased right-sided air entry along with decreased vesicular murmur and heart sounds. Hyperresonance of the right hemithorax to percussion was also found. Peripheral pulse oximetry showed oxygen saturation of 95% with room oxygen. Posteroanterior plain chest radiograph with abdominal guarding showed right pneumothorax with pulmonary margin approximately 6 centimeters from the chest wall, no deviation of the mediastinum and trachea and no evidence of blisters, bullae or cysts (Figure 1). Abdominal examination revealed uterus according to gestational age with fetus in cephalic presentation and fetal heart rate of 143 beats per minute. The cervix was closed, with no evidence of bleeding.

On admission, oxygen via nasal cannula and chest tube on the right side in the fifth intercostal space over the mid-axillary line were placed and connected to a closed system with a water seal. The patient gradually improved and complete re-expansion of the right lung was noted on radiological evaluation. Clinical improvement was evident after 3 days and the chest tube was re-

moved. Due to the clinical improvement and that the lung remained expanded, the patient was discharged 7 days after admission.

Subsequently, the patient was admitted at 40 weeks of pregnancy, in spontaneous labor, delivering a live male newborn of 3,200 grams with Apgar scores of 7 and 9 points at one minute and 5 minutes, respectively. Labor lasted 5 hours and 30 minutes and the second stage of labor was shortened to limit the Valsalva maneuver. No signs of pneumothorax were observed during the immediate and mediate puerperium. Re-evaluation was performed 3 months after delivery and the chest X-ray was normal. No further intervention was planned. The patient has remained asymptomatic two years after delivery.

## DISCUSSION

Increased minute ventilation in pregnancy and the Valsalva maneuver during labor can precipitate the rupture of a subpleural bleb or bulla subpleuralis. Oxygen consumption increases in pregnancy by 20% and up to 50% during labor. Fetal tolerance to hypoxemia is low, as the partial pressure of oxygen in the umbilical vein is 35 to 40 mmHg. Therefore, any reduction in maternal oxygenation may adversely affect the fetus<sup>(4)</sup>. Other reported risk factors for the occurrence of PSP during pregnancy include underlying respiratory infection, bronchial asthma, hyperemesis gravidarum, previous history of pneumothorax, cocaine and ecstasy abuse, iatrogenic causes (central venous line insertion), and endotracheal intubation with positive pressure ventilation<sup>(5)</sup>. In a review of cases of PSP in pregnancy, 46% occurred in the first and second trimester and 54% in the third trimester and puerperium<sup>(6)</sup>.

Typical symptoms of PSP, regardless of the cause, include pleuritic pain associated with dyspnea<sup>(7)</sup>. Tachypnea, tachycardia, cyanosis or decreased ipsilateral breath sounds may be observed on physical examination. Chest radiography is necessary for definitive diagnosis. The potential risks associated with radiologic examination must be weighed against the potential benefits of the study. When the diagnosis of PSP is suspected in a pregnant woman, it is safe to perform standard chest radiography without placing the fetus at substantial risk from ionizing radiation if the abdomen is shielded. The radiation dose from a single standard chest radiograph is 1 millirad, which

FIGURE 1. CHEST X-RAY SHOWING PNEUMOTHORAX WITH THE PULMONARY MARGIN APPROXIMATELY 6 CENTIMETERS FROM THE CHEST WALL.





is well below the level safely permissible during pregnancy (5 rads)<sup>(8)</sup>. CT scanning with shielding is also useful, as it can define the underlying anatomical abnormality and help plan the surgical approach when indicated<sup>(6)</sup>.

The main differential diagnosis in pregnant women is pulmonary lymphangiomyomatosis. This occurs in young women of reproductive age and often causes PSP. On computed tomography images of the chest, multiple rounded cysts can be seen in almost all lung fields. Definitive diagnosis must be made by biopsy of the cysts<sup>(7)</sup>.

PSP is well tolerated due to the absence of underlying lung disease. Secondary spontaneous pneumothorax is an indicator of morbidity and mortality. Common causes include bronchial asthma, chronic obstructive pulmonary disease, cystic fibrosis, pneumonia, pulmonary neoplasms, and tuberculosis. The risk of recurrence in the absence of treatment is 50%<sup>(8)</sup>.

PSP is not associated with significant physiologic compromise unless tension pneumothorax develops. Generally, the same treatment criteria used in non-pregnant patients are used. Cases of small PSP without dyspnea can be treated conservatively. This air in the pleural cavity is absorbed at a rate of 1.5% / day with room oxygen<sup>(9)</sup>. Administration of supplemental oxygen at high concentrations via partial breathing mask increases the reabsorption rate fourfold and is therefore an effective method to accelerate resolution of the clinical picture. It also reduces morbidity and duration of hospitalization and the need for invasive drainage procedures. However, conservative management has a 30-40% risk of recurrence<sup>(2)</sup>.

When dyspnea is severe or the PSP is large, thoracic drainage should be performed, since it is safer, less painful and is not associated with a higher risk of recurrence. It should also be considered in those cases with persistent air leak<sup>(4)</sup>. The use of prolonged drainage is a safe and effective measure for treatment, especially in late pregnancy<sup>(3)</sup>. Other therapeutic options include needle aspiration and decompression, pleurodesis, tube thoracostomy, thoracotomy and thoracoscopy, especially for recurrent, persistent, or bilateral cases<sup>(10-12)</sup>. Surgical treatment during pregnancy carries the risk of hypoxemia, postoperative pain and preterm delivery<sup>(6)</sup>. The advantages of thoracoscopic surgical treatment com-

pared to thoracotomy are decreased anesthetic exposure time, rapid lung expansion, decreased postoperative pain, potentially shorter postoperative period, and decreased pain<sup>(10-15)</sup>.

Spontaneous vaginal delivery after surgical treatment appears safe. In patients who have not undergone definitive surgical therapy, the use of regional anesthesia and forceps is recommended to avoid increased intrathoracic pressure secondary to expulsive effort during the second stage of labor and possible aggravation or recurrence of PSP<sup>(3)</sup>. Cesarean section is reserved for obstetric indications.

It has been proposed that women with a history of PSP during pregnancy, delivery or puerperium are at risk of recurrence in subsequent pregnancies and deliveries. The use of computed tomography has been suggested to identify and define bullae and apical blisters in the lung and to plan surgery<sup>(13-15)</sup>. However, detection of such structures is not necessarily predictive of risk. Although surgery is often considered after the first recurrence, specific criteria for surgical intervention are lacking<sup>(4)</sup>.

In conclusion, primary spontaneous pneumothorax should be considered in those pregnant women with chest pain or dyspnea and should be confirmed by radiological studies to distinguish it from other diseases or conditions. The condition or its treatment does not produce serious adverse effects during pregnancy or delivery, but diagnostic suspicion in certain conditions is essential to avoid complications.

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