ABSTRACT

Pneumothorax is quite unusual to occur during or following cesarean section, as only six cases have been reported so far, and only one of them was bilateral. Here, we report a 19-year-old, previously healthy, non-smoking primigravida who underwent a cesarean section under general anesthesia, and whose oxygen saturation level quickly dropped to 81% following endotracheal intubation. Although an initial chest radiograph did not demonstrate pneumothorax, a CT scan performed on the following day showed the patient had developed bilateral pneumothorax. Chest tubes were inserted on both sides, and the patient was discharged on the sixth postoperative day in stable condition. This case underlines the need to include pneumothorax in the differential diagnosis when managing a patient with acute respiratory distress during cesarean section or in the immediate post-operative period.

Key words: Cesarean section, differential diagnosis, general anesthesia, pneumothorax

Introduction

Pneumothorax is the collapse of the lung when air accumulates inside the pleural space. It can happen spontaneously and it can result from trauma.[1] Pneumothorax is not uncommon in the general population, especially among young males. However, it is quite rare during pregnancy or in the postpartum period. Only six cases of pneumothorax associated with cesarean section have been reported so far, and only one of them was bilateral.[2-4] This case report describes an otherwise healthy female who developed a bilateral pneumothorax after the initiation of general anesthesia, which underlines the need to include pneumothorax in the differential diagnosis when managing a patient with acute respiratory distress during cesarean section or in the immediate post-operative period.

Case Report

A 19-year-old, previously healthy, non-smoking primigravida presented at term and underwent an emergency lower segment cesarean section (LSCS) due to signs of fetal distress seen on cardiotocography (CTG). By that time, the cervix had been at 5-cm dilatation and an artificial rupture of membranes had been performed. Her history was unremarkable for any pulmonary or systemic disease. She had no history of fever, trauma or hyperemesis gravidarum during pregnancy, and she had no history of drug abuse. Also, there was no significant family history. Her body mass index was 22.5.

The procedure was done under general anesthesia due to practitioner’s preference and expertise. Anesthesia...
was induced with propofol and atracurium. Endotracheal intubation was successful on second attempt after facing unexpected high airway resistance on the first attempt, and shortly after intubation the oxygen saturation level dropped to 81%. Auscultation of the chest revealed bilateral breath sounds, and no tracheal deviation was noted. The blood pressure and heart rate remained unchanged from preinduction values. One hundred percent oxygen was administered and led to a saturation level of 90%–94% that was maintained throughout the procedure. The surgery was concluded with the uneventful birth of a healthy female child weighting 3.9 kg. The patient was in respiratory distress once she regained consciousness, as her oxygen saturation was 87% despite oxygen supplementation with a nasal cannula at 6 L/min, and so it was switched to a non-rebreather facemask at 10 L/min. A chest radiograph was performed shortly afterwards and showed bilateral lung infiltrates. A rapid COVID-19 test was done and the result was negative.

A CT scan was performed on the following day at a nearby hospital and demonstrated bilateral pneumothorax that was more prominent on the left side. Additionally, there was a minimal right-sided pleural effusion and multiple scattered patchy small ground glass opacities [Figure 1]. Subsequently, tube thoracostomy was performed on the left side and led to some symptomatic relief. Two more rapid COVID-19 tests came out negative, and a COVID-19 antibody titer test showed the patient had never been infected. Moreover, the laboratory evaluation showed a white blood cell count of 12.6 and a CRP level of 179, but the patient remained afebrile. On the second postoperative day, a chest radiograph showed right-sided pneumothorax, and so another chest tube was inserted on the right side, also leading to symptomatic relief. Another chest radiograph was obtained on the third postoperative day and showed only minimal pneumothorax on both sides, while complete resolution was seen on the fourth postoperative day [Figure 2]. Oxygen saturation by that time was 96% on room air, and both chest tubes were clamped. The tubes were then removed on the fifth postoperative day, and the patient was discharged on the sixth postoperative day in stable condition.

**Discussion**

Pneumothorax occurs only rarely during pregnancy, but it can lead to serious consequences for both the patient and the fetus. A pregnant patient has a 20% increased oxygen demand during pregnancy and a 50% increased oxygen demand during labor, which makes her more vulnerable to developing hypoxia should any ventilation impairment occur compared to non-pregnant women. Moreover, the fetus has an umbilical vein partial pressure of oxygen of approximately 35 mm Hg, and so is very susceptible to the ventilation impairment that can result from its mother having a pneumothorax.[5]

Risk factors for pneumothorax during pregnancy include smoking, drug abuse, hyperemesis gravidarum, asthma, respiratory infection, and a previous history of pneumothorax. Additional factors like maternal pushing during labor, the use of nitrous oxide for anesthesia, and the barotrauma caused by positive pressure ventilation can also precipitate pneumothorax. It has been suggested that at least some of the patients who developed pneumothorax might have had a clinically silent, spontaneous pneumothorax during the antepartum period that became symptomatic following the use of positive pressure ventilation during general anesthesia.[5] This might have been true in our case, but the difficulty faced by the anesthesiologist during intubation makes barotrauma the more likely culprit.
Given this case report and the previous ones, pneumothorax should be considered in the list of differential diagnosis when a pregnant or parturient patient develops acute respiratory distress along with pulmonary, amniotic fluid, and air embolism. Asthma, pulmonary edema and pneumonia can also cause respiratory distress, albeit with less acute onset. The pneumothorax diagnosis is usually confirmed using chest radiography, but other imaging modalities can be used if the radiograph failed to demonstrate pneumothorax and clinical suspicion remained. Our patient’s diagnosis was confirmed using CT scan after the initial chest radiograph showed only bilateral lung infiltrates, probably due to aspiration pneumonia. It should be noted, however, that ultrasonography could have been used instead of CT scan, as it is quicker, doesn’t expose to ionizing radiation, and is almost as sensitive as CT scan.[7]

We found six reported cases of pneumothorax following cesarean section in the English literature. Four of them underwent general anesthesia and two had regional anesthesia. This indicates that pneumothorax was not necessarily always the result of a barotrauma following endotracheal intubation, but since intubation is a potential precipitating factor, we believe regional anesthesia is the preferred option and should be opted for, whenever feasible. Furthermore, this case report demonstrates the need for obstetric anesthesiologists to be able to swiftly recognize and deal with pneumothorax. It also demonstrates the need for labor wards to be fully equipped to deal with such scenarios.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

References
1. Benbow MK, Nanagas MT. Pneumothorax beyond the newborn period. Pediatr Rev 2014;35:356-7.
2. Madan K, Singh N, Jain V, Aggarwal AN. Spontaneous pneumothorax following caesarean section under spinal anaesthesia. BMJ Case Rep 2013;2013:bcr2012008507. doi: 10.1136/bcr-2012-008507.
3. Aye CY, McKean D, Dark A, Akinsola SA. Bilateral primary spontaneous pneumothoraces postcaesarean section–another reason to avoid general anaesthesia in pregnancy. BMJ Case Rep 2012;2012:bcr0220125724. doi: 10.1136/bcr.02.2012.5724.
4. Khan BA, Reddy PM, Khan AM. Spontaneous pneumothorax in the immediate post-operative hour in a primigravida following emergency caesarean section under spinal anaesthesia. Indian J Anaesth 2015;59:126-9.
5. VanWinter JT, Nichols FC 3rd, Patirolero PC, Ney JA, Ogburn PL Jr. Management of spontaneous pneumothorax during pregnancy: Case report and review of the literature. Mayo Clin Proc 1996;71:249-52.
6. Harris EA. Tension pneumothorax in a parturient undergoing cesarean delivery. Anesth Analg 2000;90:1173-4.
7. Volpicelli G. Sonographic diagnosis of pneumothorax. Intensive Care Med 2011;37:224-32.