

Pneumomediastinum in the peripartum period: a case report

Neumomediastino en el periparto: reporte de caso

Alexis S. Henales-Ocampo^{1,2*}, Rafael A. Reyes-Monge^{1,2}, Orlando R. Pérez-Nieto^{1,2},
and Ernesto Deloya-Tomas^{1,2}

¹Unidad de Cuidados Intensivos, Hospital General San Juan del Río; ²Universidad Autónoma de Querétaro. Queretaro, Queretaro, Mexico

Abstract

Introduction: *Pneumomediastinum and subcutaneous emphysema are rare complications that can occur during the peripartum period, with an approximate incidence of 1 in every 100,000 births. These conditions are commonly associated with prolonged labor and the performance of intense and sustained Valsalva maneuvers, which significantly increase intrathoracic pressure. Case report:* Here, we present the case of an 18-year-old woman who, after a prolonged expulsive period, developed pneumomediastinum and subcutaneous emphysema. Although uncommon, such complications highlight the importance of carefully monitoring patients during labor and the postpartum period, especially when there are risk factors that may predispose them to these conditions. **Conclusion:** Early recognition and appropriate management are crucial to preventing additional complications and ensuring an optimal recovery for the patient.

Keywords: Intrapartum. Postpartum. Subcutaneous emphysema. Pneumomediastinum.

Resumen

Introducción: *El neumomediastino y el enfisema subcutáneo son complicaciones raras que pueden ocurrir durante el parto, con una incidencia aproximada de 1 en cada 100,000 nacimientos. Estas condiciones están comúnmente asociadas con un trabajo de parto prolongado y la realización de maniobras de Valsalva intensas y sostenidas, que incrementan de manera significativa la presión intratorácica. Caso clínico:* Se presenta el caso de una mujer de 18 años que, después de un periodo expulsivo prolongado, desarrolló neumomediastino y enfisema subcutáneo. Estas complicaciones, aunque inusuales, destacan la importancia de monitorear cuidadosamente a las pacientes durante el trabajo de parto y el posparto, en especial cuando hay factores de riesgo que pueden predisponer a estas condiciones. **Conclusión:** El reconocimiento temprano y la gestión adecuada son cruciales para prevenir complicaciones adicionales y asegurar una recuperación óptima para la paciente.

Palabras clave: Intraparto. Posparto. Enfisema subcutáneo. Neumomediastino.

*Correspondence:

Alexis S. Henales-Ocampo
E-mail: a.henales@gmail.com

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Introduction

Pneumomediastinum and subcutaneous emphysema are uncommon complications that may occur during the peripartum period, with an estimated incidence of 1 in 100,000 deliveries. These conditions are frequently associated with prolonged labor and sustained, intense Valsalva maneuvers, which cause a significant increase in intrathoracic pressure^{1,2}. Clinical presentation typically includes chest pain and dyspnea, as well as crepitus on palpation of the affected areas. Chest radiography is, in most cases, an adequate diagnostic tool for identifying pneumomediastinum and subcutaneous emphysema. Characteristic findings result from air accumulation separating mediastinal structures and the thoracic wall³. Typical radiographic signs include the “continuous diaphragm” sign, the “double bronchial wall” sign, and the “Ginkgo leaf” sign. In addition, air may disseminate through fascial planes to the chest wall, abdomen, head, neck, and extremities, highlighting the notable capacity of these conditions to spread. Chest computed tomography (CT) is superior in terms of diagnosis, localization, and assessment of extent, as well as in establishing the differential diagnosis⁴.

This complication is usually benign and self-limited. Nevertheless, in rare cases, severe complications may occur, such as significant dyspnea and malignant pneumomediastinum requiring surgical intervention^{5,6}. Although uncommon, these complications underscore the need for meticulous monitoring during labor and the postpartum period, particularly in patients with predisposing risk factors.

We report the case of an 18-year-old woman who developed pneumomediastinum and subcutaneous emphysema following a prolonged labor. Her hospital course was uncomplicated, and she required only conservative management.

Case report

An 18-year-old woman with no relevant family history or chronic medical conditions, prior hospitalizations, or surgeries was admitted. She was a primigravida at 40.3 weeks of gestation according to her last menstrual period and 40 weeks based on crown-rump length measurement. Her pregnancy was uncomplicated, and prenatal care was adequate. She was admitted due to increased uterine activity, with 6 cm cervical dilation, 80% effacement, bulging amniotic membranes, and a Bishop score of 11. Estimated fetal weight by the Johnson method was 3,100 g. Laboratory results were

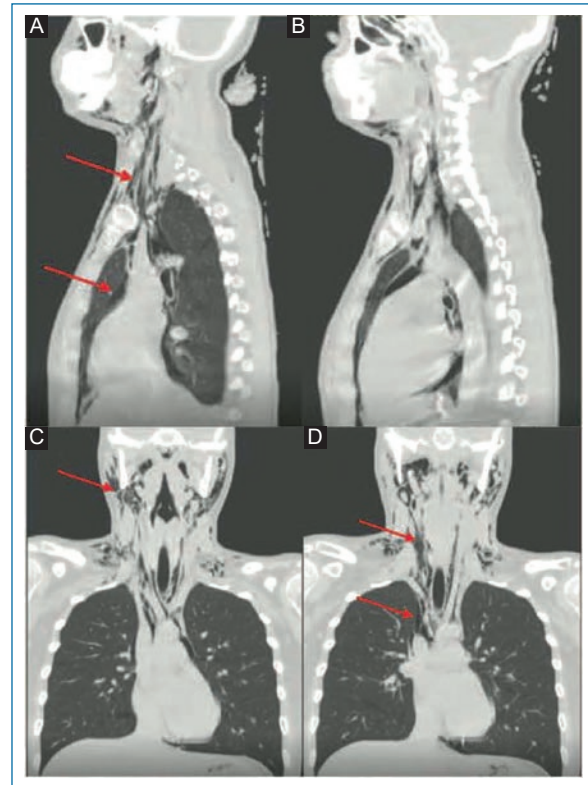


Figure 1. Chest computed tomography images. **A** and **C**: Initial images showing mediastinal and cervical emphysema (arrows). **B** and **D**: Images obtained 3 days after treatment demonstrating reduction of emphysema (arrows).

as follows: hemoglobin 13.4 g/dL, hematocrit 38.8%, platelets $137 \times 10^3/\mu\text{L}$, leukocytes $9.1 \times 10^3/\mu\text{L}$, prothrombin time 10.5 seconds, partial thromboplastin time 25.8 seconds, glucose 79.2 mg/dL, creatinine 0.56 mg/dL, HIV nonreactive, and VDRL nonreactive.

Labor induction was initiated with oxytocin, with a total labor duration of 7 hours. Full dilation and effacement were achieved 6 hours after admission. During labor, a specific maneuver was performed, placing the patient partially in the lithotomy position. A sheet was used so that the patient could pull on it while a staff member provided resistance, thereby increasing pushing effort. After 1 hour, the patient was transferred to the delivery room for vaginal birth. During the expulsive phase, a mediolateral episiotomy was performed after infiltration with lidocaine 20%. Due to ineffective contractions, the patient later reported that the Kristeller maneuver was performed, resulting in abrupt fetal expulsion.

An intrapartum complication included extension of the episiotomy repair toward the posterior fornix, approximately 5 cm in length, which was adequately

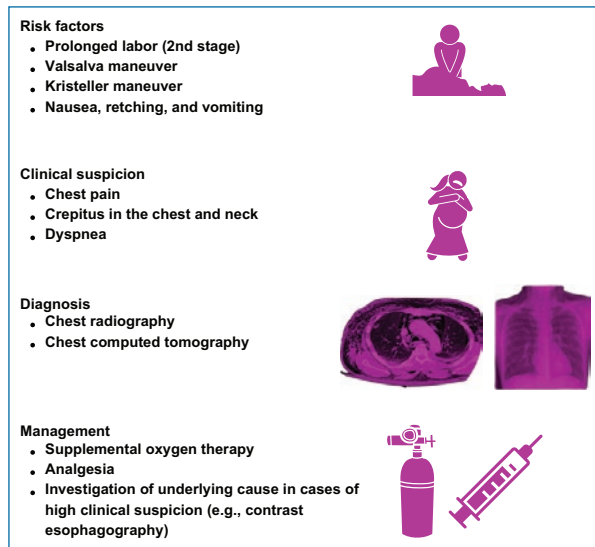


Figure 2. Approach to subcutaneous emphysema and pneumomediastinum in the peripartum period.

repaired during the same procedure. The newborn measured 49 cm and weighed 2,895 g, with Apgar scores of 6 and 9, a Silverman-Anderson score of 3, and a Capurro score of 40. Due to signs of respiratory distress unresponsive to initial resuscitation maneuvers, continuous positive airway pressure was administered, and the newborn was admitted to the neonatal intensive care unit.

In the immediate postpartum period, subcutaneous emphysema was identified in the anterior chest region, right hemineck, and right submaxillary area. The patient was hemodynamically stable: heart rate 95 beats/min, blood pressure 130/87 mm Hg, respiratory rate 22 breaths/min, temperature 36.5 °C, and oxygen saturation 92%. At 48 hours, chest CT revealed spontaneous pneumomediastinum with extension of air into the pericardial space, predominantly in the right hemithorax, as well as dissection of tissue planes toward the right neck, clinically manifesting as cervicothoracic subcutaneous emphysema (Fig. 1).

The condition was interpreted as secondary to a sudden increase in intrathoracic pressure, likely related to intense pushing maneuvers and fundal pressure during the expulsive phase (Kristeller maneuver). Esophageal perforation was ruled out by contrast esophagography, with no evidence of leak or disruption.

Conservative management was initiated with supplemental oxygen via nasal cannula and continuous clinical monitoring. Over the next 72 hours, the patient remained stable and asymptomatic, without dyspnea, chest pain, or signs of respiratory or hemodynamic

compromise. Follow-up CT demonstrated significant reduction of mediastinal and subcutaneous emphysema, and the patient was discharged in good general condition (Fig. 2).

Discussion

We present the case of a postpartum patient diagnosed with pneumomediastinum and subcutaneous emphysema. Although uncommon, these conditions are typically associated with prolonged labor, particularly during the expulsive phase. Factors such as the Valsalva maneuver, coughing, vomiting, and intense physical effort may increase intrathoracic pressure and precipitate these complications^{1,2}.

In this case, the patient was instructed to push while pulling on a sheet held distally by a medical intern, increasing effort. Her legs were flexed for approximately 1 hour. The Kristeller maneuver was also performed. Both interventions increase positive intrathoracic pressure and may trigger pneumomediastinum and subcutaneous emphysema³. Similar cases have been reported in patients undergoing such maneuvers during labor^{4,5}.

From a pathophysiologic standpoint, spontaneous pneumomediastinum is most widely caused by the Macklin effect, which involves rupture of peripheral alveoli due to a sudden increase in intra-alveolar pressure. Air dissects along peribronchial and perivascular sheaths toward the mediastinum without direct injury⁶. This mechanism is the most frequent cause in young patients without underlying pulmonary disease. Sustained expulsive effort during labor may exacerbate this phenomenon⁷.

In more severe cases, airway rupture (trachea or main bronchi) may occur, although rare in obstetric settings. In the presence of suggestive symptoms such as severe odynophagia, intense chest pain, dyspnea, fever, or clinical signs of mediastinitis, esophageal perforation should be considered, and contrast esophagography with water-soluble contrast is indicated^{7,8}. However, due to its low incidence rate, this is not recommended routinely. In this case, chest CT showed no evidence of esophageal or airway injury.

Treatment depends on clinical severity. In most cases, management is conservative and includes rest, supplemental oxygen (to promote mediastinal air reabsorption), analgesia if needed, and close clinical observation^{9,10}. In patients with respiratory compromise, associated pneumothorax, or signs of mediastinal tension, invasive intervention such as mediastinal drainage or thoracotomy may be required.

Our patient was treated with low-flow oxygen via nasal cannula, with good tolerance and progressive improvement. Hospital observation lasted 72 hours, including continuous vital sign monitoring, respiratory evaluation, and follow-up CT documenting significant reduction of mediastinal and subcutaneous emphysema. As she remained asymptomatic without clinical deterioration, she was discharged without complications.

Although spontaneous pneumomediastinum in the obstetric setting is rare, early recognition, targeted clinical management, and appropriate follow-up allow favorable outcomes in most cases.

Conclusions

Pneumomediastinum and subcutaneous emphysema during the peripartum period are rare and usually nonsevere conditions managed with supplemental oxygen, analgesics, and observation. They should be considered in the presence of risk factors such as prolonged labor, arching, vomiting, or situations that increase positive intrathoracic pressure, including the Kristeller maneuver.

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Conflicts of interest

The authors declare no conflicts of interest.

Ethical considerations

Protection of humans and animals. The authors declare that no experiments were performed on humans or animals for this research.

Confidentiality, informed consent, and ethical approval. The authors followed institutional confidentiality protocols, obtained informed consent from the patient, and received Ethics Committee approval. The recommendations of the SAGER guidelines were followed according to the nature of the study.

Statement on artificial intelligence use. The authors declare that no generative artificial intelligence tools were used in the preparation of this manuscript.

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