

Spontaneous Pneumomediastinum in 3rd Trimester of Pregnancy

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A 25-year-old primiparous woman in her third trimester (36. week) of pregnancy presented with spontaneous pneumomediastinum and cervical subcutaneous emphysema. The patient's symptoms were completely resolved after 2 weeks of supportive management. A Caesarean section was performed in 40. week under general anaesthesia resulting in the birth of a healthy infant. Spontaneous pneumomediastinum is very rare and generally dangerous for a pregnant woman and infant. (Ann Thorac Cardiovasc Surg 2006; 12: 362–4)

Key words: spontaneous pneumomediastinum, subcutaneous emphysema, pregnancy

Introduction

Pneumomediastinum and associated subcutaneous emphysema are a rare complication of pregnancy and labor. The estimated incidences are between 1:2,000 and 1:100,000. Approximately 200 cases of subcutaneous emphysema and pneumomediastinum in labor and delivery have been reported in the literature.¹⁾ The first reference to the condition was probably in 1618, when Louise Bourgeois, midwife to the Queen of France, wrote, "I saw that she tried to stop crying out and I implored her not to stop for fear that her neck might swell".²⁾ The condition was described by Hamman in 1945 and bears his name.³⁾ Although many authors have stated that pneumothorax does not co-exist with this syndrome during labour and delivery, Reeder has reported on 2 cases.⁴⁾ We present a new case report. Spontaneous pneumomediastinum occurring during third trimester of pregnancy is caused by barotrauma of alveola.

Case Report

A 25-year-old primigravida was admitted at 36 weeks'

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gestation following an uncomplicated pregnancy. There was a history of chronic bronchitis in the past and she was a nonsmoker.

At the time of admission, she was complaining of respiratory discomfort and right substernal chest pain after a severe dry cough attack. There was no obvious cause for the bronchospasm. In particular, she did not have any ongoing chest infections and the pregnancy was uneventful.

Clinical examination showed an anxious, afebrile and slightly dyspnoeic woman. She had a respiratory rate of 26 breaths/min and an oxygen saturation of 90% on room air. There was no sign of cyanosis. Arterial blood gases showed an O₂ tension of 65 mmHg, a CO₂ tension of 37 mmHg and a pH of 7.39. Her pulse rate was 120 beat/min, and arterial pressure 140/95 mmHg. Her skin appearance was dry and extensive subcutaneous emphysema in the neck, both clavicles, and upper chest was found by physical examination. Auscultation of the chest revealed diffuse bilateral wheezing. The patient immediately received 100% oxygen via a face mask, nebulised salbutamol 5 mg, and hydrocortisone 200 mg intravenously. The following day her oxygen saturation was 94% on room air, the chest pain had decreased and there was no recurrence of bronchospasm.

Urgent obstetric examination and fetal ultrasonography showed that the patient was normal with a normal fetal heart rate. The membranes were intact and the fetus was in cephalad presentation.

A chest X-ray and thorax computed tomography (CT) revealed obvious pneumomediastinum along the right bor-

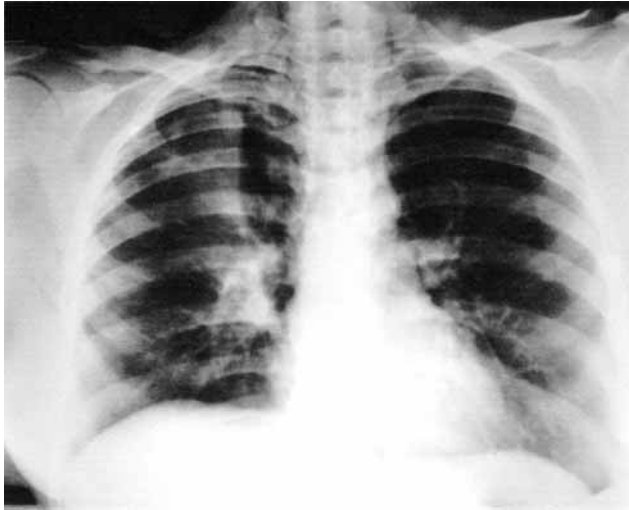


Fig. 1. Chest X-ray of the patient on admission indicated pneumomediastinum along the right tracheal border.



Fig. 2. Thorax CT of the patient on admission revealed subcutaneous emphysema in the bilateral cervical and upper chest areas.

der of the trachea, and extensive subcutaneous emphysema in the neck and upper chest (Figs. 1 and 2). There were no other pulmonary abnormalities.

Within 3 days of hospitalization, respiratory function had returned to normal and mental function had recovered. The pneumomediastinum and subcutaneous emphysema gradually diminished. On the 14th day of admission (38. week) the patient was discharged from the hospital after review by the physician's team. A Caesarean section was planned by obstetrician in 2 weeks. After an uneventful 2-week period (40. week), she underwent a Caesarean section under general anaesthesia. The physician's team observed her surgery. A healthy female infant was delivered weighing 2,850 g with an APGAR score 9 at 5 min. There was no complications perioperative or postoperative. She was discharged, fully recovered, 7 days after delivery. There was no any complication after 2 months.

Discussion

Subcutaneous emphysema and pneumomediastinum (Hamman's syndrome), with or without pneumothorax, occur mostly in the second stage of labor in healthy primiparous patients, who have undergone a prolonged and protracted labor and have larger than usual babies.⁵⁾

Its occurrence is related to the Valsalva manoeuvre during the expulsive phase of labor when "pushing down" acutely raises intra-alveolar pressure. The Valsalva ma-

noeuve, consisting of forced expiration against a closed glottis, occurs with strong coughing, vomiting, screaming and pushing in labor. It may increase the intrathoracic pressure up to 50 mmH₂O or higher.²⁾ Although the onset of symptoms usually develops during the second stage of labor, pregnancy-related pneumomediastinum has been reported during the first stage of labor, and earlier antepartum during episodes of coughing, hyperemesis, or spontaneously at rest.⁵⁾

It is probable that, air from ruptured alveoli tracks along the perivascular sheath into the mediastinum.⁶⁾ Air may then track through fascial planes into subcutaneous and retroperitoneal tissues. Other reported mechanisms include esophageal rupture during childbirth,⁶⁾ or dissection of a pneumoperitoneum,⁷⁾ secondary to epidural catheter placement or Caesarean section.⁶⁾

The crepitus which is palpable in the face and neck is virtually pathognomic of the condition and the appearance of subcutaneous emphysema in labor is the hallmark of pneumomediastinum. Other features of pneumomediastinum include substernal chest pain, often radiating to the neck and arms, dyspnea, a change of voice, dry cough, sore throat and tachycardia.⁴⁾ Mediastinal crunch (Hamman's sign), a fine auscultatory crepitation synchronous with the heart beat may be heard along the left sternal border.³⁾ Massive subcutaneous emphysema in the neck can compress the trachea and cause upper respiratory obstruction. ECG changes include nonspecific ST and T wave abnormalities in 25% of patients. Abnormal

arterial blood gases have also been noted.⁴⁾ Differential diagnoses include tension pneumothorax, cardiac tamponade, angina pectoris, pericarditis, dissecting aortic aneurysm, mediastinitis, pulmonary embolism and oesophageal tear.^{6,8)}

Conventional radiography and thorax CT are diagnostic. Lateral chest X-ray and CT views are particularly helpful because they improve the visibility of air in the anterior mediastinum.⁹⁾ In our patient there was obvious air in the mediastinum and cervical and upper chest subcutaneous areas on the chest X-ray and thorax CT.

The majority of the patients with pneumomediastinum without pneumothorax require conservative management alone. The patient should be observed closely. Treatment consists of sedation, analgesics and oxygen supplementation. Opioids can be used safely, as the risk of respiratory failure is small with intramuscular pethidine. The insertion of a lumbar epidural catheter is recommended in these cases as it avoids further exertion and provides good analgesia that can easily be converted to anaesthesia for Caesarean delivery and postoperative period. A subarachnoid block should be administered cautiously if required, as a high spinal block may compromise respiratory function. The preferred patient control analgesia (PCA) is opioid (Tramadol HCl®) in antepartum conservative treatment and postoperative period.

The use of general anaesthesia is probably contraindicated because it is likely to cause further expansion of the pneumomediastinum and pneumothorax with risk of developing a tension pneumothorax.¹⁾ If Caesarean section is required, it is better performed under epidural anaesthesia. If general anaesthesia is indicated for urgent operation or due to other conditions, facilities for insertion of a chest drain should be immediately available and nitrous oxide (N₂O) must be avoided.¹⁾ Our patient was observed very closely during operation under general anaesthesia it was necessary to insert of a chest tube, as there are no clear pulmonary complications in preoperative

clinical and radiological examinations.

Recurrence in subsequent pregnancies is uncommon.¹⁰⁾ No special care is required in subsequent pregnancies as only 2 cases have been reported.

In conclusion, spontaneous pneumomediastinum and subcutaneous emphysema are rare complications of labor, especially in late pregnancy period but they are usually self-limiting. Management includes avoidance of exacerbative factors and close observation with supportive treatment.

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