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Case Report

A Case Report: Pneumothorax in A Patient Posted for Lumbar Stabilization Surgery Under General Anesthesia

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ABSTRACT

Background: Pneumothorax after routine endotracheal intubation during general anesthesia in elective cases is an infrequent complication but potentially life-threatening.

Case: We report a case of a 57-year-old female posted for lumbar stabilization surgery who developed a right-sided pneumothorax after anesthesia induction and prone positioning. The patient was induced and intubated with a flexometallic tube in supine position and then positioned prone for the surgery. After positioning, the air entry on the right side of the chest was decreased on auscultation, and a gradual rise in the airway pressure was noted. Lung ultrasound showed no movement of the pleura. A chest tube was inserted, reducing the airway pressures and improving saturation. The early detection and chest tube insertion prevented the catastrophic events that could have followed if left unrecognized.

Conclusion: High levels of clinical suspicion and basic bedside vigilance are of utmost importance in the management of perioperative complications.

Keywords: Laryngoscopy; Intubation; Barotrauma; Chest tube; Prone position; Auscultation

INTRODUCTION

Pneumothorax is defined as the presence of air in the pleural cavity. Pneumothorax during general anesthesia is a rare but can be a deleterious event, especially when predisposing factors are unknown, making diagnosis very challenging.[1] Intraoperative pneumothorax can result from various causes, like barotrauma, positioning, surgical intervention, or underlying lung pathology.[2] The severity of pneumothorax increases under positive pressure ventilation, which is the mode of ventilation during general anesthesia. Tension pneumothorax causes lung collapse and potential hemodynamic compromise, and also can lead to cardiac arrest if left unrecognized without intervention.[3] The recognition of pneumothorax can be difficult under general anesthesia, and also prone positioning can mask typical signs and thus delay the diagnosis.[2]

We present a case of a 57-year-old healthy female with no history of any respiratory illness posted for lumbar stabilization surgery under general anesthesia. Written informed consent was obtained from the patient for publishing her case report. The patient developed pneumothorax after intubation and prone positioning. A chest tube was inserted, and surgery was postponed to a later date. During follow-up, she was diagnosed to have a small pneumocyst on HRCT thorax.

CASE REPORT

A 57-year-old female was scheduled for lumbar stabilization surgery for degenerative spine disease. She had a history of well-controlled hypertension on regular medications and no known pulmonary pathology. General physical examination was normal. She had a BMI of 28kg/m^2. Laboratory investigations were in the normal range. Chest X-ray was normal [Figure1].She was accepted for surgery under general anesthesia with an ASA status of Grade II.

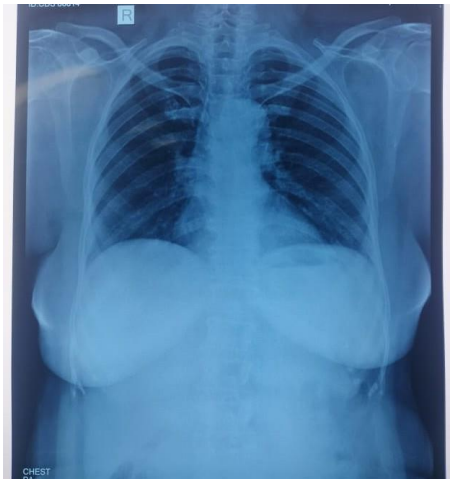


Figure 1: preoperative chest X-ray

Anesthesia and Intraoperative Events:

In the preoperative room, an intravenous line was secured and started on lactated Ringer's solution. The patient was shifted to the operation theatre on the trolley and attached to the monitor, including ECG, pulse oximetry, noninvasive blood pressure, and baseline readings noted, which were within normal limits. General anesthesia was induced with fentanyl 100 mcg, midazolam 1mg, Glycopyrrolate 0.2mg, and propofol 100 mg. Injection Vecuronium 8mg was given for muscle relaxation. The patient was intubated with a flexometallic tube of size 7.5 under direct laryngoscopy, which revealed a Cormack-Lehane grade 1. Cuff was inflated, and after bilateral air entry confirmation, the tube was fixed at the 20 cm mark. The patient was put on a ventilator with volume control mode with parameters of tidal volume 450ml, rate 12/minute, PEEP of 5 cm of H2O, FiO2 of 0.4 along with air and isoflurane. The patient was catheterized in the supine position. After this, the patient was changed to the prone position from the trolley to the OT table. During the change of position, the ventilator was temporarily disconnected, and once the head and tube position were secured, the airway was reconnected to the

ventilator, and all the monitors were connected. As a routine, bilateral air entry was checked after prone positioning, and a right-sided decreased air entry was noted on auscultation. At this point, there was no drop in saturation, but the airway pressures had risen from 18 to 22 cm of H2O. Even though the chances of the tube migrating to the left bronchus are rare, we didn't think of the remote possibility of pneumothorax in her and hence pulled out the endotracheal tube to 18 cm and auscultated. By now, the breath sounds had further decreased, and the airway pressures were 28cm of H2O, and saturation was 94% with FiO2 of 1. We suspected it to be right right-sided pneumothorax and thus shifted to patient to the supine position. An immediate bedside ultrasound confirmed the absence of lung sliding, suggestive of pneumothorax. A chest tube was inserted on the right side, and a gush of air bubbled through the water trap. The patient's oxygenation and airway parameters improved after intervention.

The patient was shifted to the intensive care unit and ventilated. A Bedside Chest X-ray in the ICU showed lung re-expansion [Figure 2]. She was extubated on the same evening, and the chest tube was removed on day 3. The patient was discharged and asked to get an HRCT thorax after a week. The HRCT thorax revealed a small pneumocyst in her right upper lobe [Figure 3].

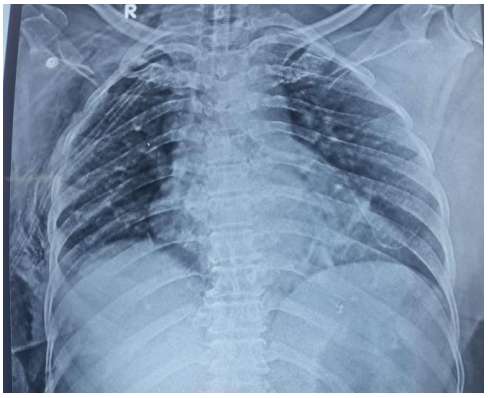
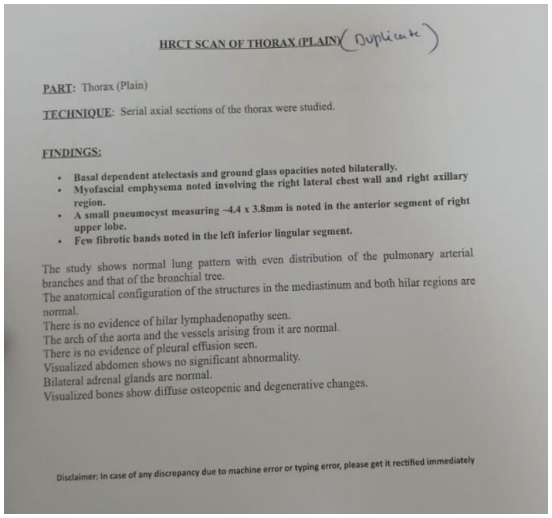


Figure 2: Post-ICD insertion Chest X-ray



HRCT SCAN OF THORAX (PLAIN) (Duplicate)

PART: Thorax (Plain)

TECHNIQUE: Serial axial sections of the thorax were studied.

FINDINGS:

- **Basal dependent atelectasis and ground glass opacities noted bilaterally.**
- **Myofascial emphysema noted involving the right lateral chest wall and right axillary region.**
- **A small pneumocyst measuring ~4.4 x 3.8mm is noted in the anterior segment of right upper lobe.**
- **Few fibrotic bands noted in the left inferior lingular segment.**

The study shows normal lung pattern with even distribution of the pulmonary arterial branches and that of the bronchial tree.
The anatomical configuration of the structures in the mediastinum and both hilar regions are normal.
There is no evidence of hilar lymphadenopathy seen.
The arch of the aorta and the vessels arising from it are normal.
There is no evidence of pleural effusion seen.
Visualized abdomen shows no significant abnormality.
Bilateral adrenal glands are normal.
Visualized bones show diffuse osteopenic and degenerative changes.

Disclaimer: In case of any discrepancy due to machine error or typing error, please get it rectified immediately

Figure 3: HRCT thorax report after 1 week

DISCUSSION

Intraoperative pneumothorax is a rare but serious event, often presenting with increased airway pressures, desaturation, and hemodynamic instability.[4] In this case, the prone position made detection challenging. Possible etiologies include barotrauma from mechanical ventilation or an underlying, undiagnosed pulmonary condition.[5] Though we take precautions in each case to prevent such complications few patients with unknown underlying pathologies do have complications under stressful situations, especially during anesthesia and surgery. A small peumocyst can never be detected preoperatively, as in our case, unless a history of previous significant respiratory events. We suspect that the patient had a similar pneumocyst, which might have burst and led to pneumothorax after positive pressure ventilation. In our case, there were altered respiratory parameters, but the hemodynamic changes were still stable. If the recognition and intervention were to be delayed, we would have landed in further complications, which might have ultimately led to cardiac arrest. Hence, it is of utmost importance to be vigilant in picking early warning signs of catastrophic events, which can be life-threatening if unrecognized. Strong suspicion, along with Bedside ultrasound, played a crucial role in rapid diagnosis and early intervention. Immediate decompression with chest tube insertion led to a favorable outcome in our patient.

This case highlights the importance of vigilance in intraoperative monitoring. Early recognition through vigilant monitoring and appropriate diagnostic tools, such as capnography, lung ultrasonography, is critical. Timely intervention, including immediate decompression and stabilization, can lead to favorable outcomes and underscores the value of awareness and training in managing such intraoperative emergencies.

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