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A CASE REPORT OF PNEUMOTHORAX WITH SUBCUTANEOUS EMPHYSEMA AS A COMPLICATION OF NASAL INTUBATION IN A PATIENT POSTED FOR ADENOTONSILLECTOMY

Anaesthesiology

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ABSTRACT

Introduction: Pneumothorax as a complication of intubation is rare but has detrimental effects on the cardiorespiratory status of the patient, resulting in death if not intervened immediately. **Case Study:** A 12-year-old girl posted for elective adenotonsillectomy developed pneumothorax with subcutaneous emphysema after intubation, with a probable cause being excessive positive pressure ventilation with an underlying lung lesion missed on a chest X-ray. This complication was diagnosed earlier and treated effectively. **Conclusion:** The aim of this case study is to emphasize the possibility of occurrence of pneumothorax with subcutaneous emphysema as a complication of intubation even after thorough preparation and the need for early diagnosis and treatment.

KEYWORDS

pneumothorax, subcutaneous emphysema, nasal intubation, adenotonsillectomy

INTRODUCTION:

Intubation is the crucial procedure during induction of general anaesthesia [1]. Traumatic/failed intubation might occur despite training and thorough preparation, resulting in rare but potentially dangerous complications like pneumothorax with subcutaneous emphysema [2]. Known causes of iatrogenic pneumothorax with subcutaneous emphysema include hypopharyngeal injury during intubation, overinflation of the cuff of the endotracheal tube (ETT), and excessive positive pressure ventilation in the presence of a pre-existing lung lesion [3]. Early diagnosis and intervention are of utmost significance in such cases [2]. Here is a case of a 12-year-old girl who developed pneumothorax with subcutaneous emphysema following intubation during general anaesthesia (GA).

Case Report:

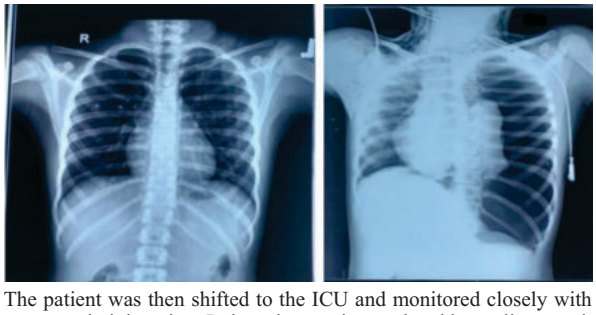
A 12-year-old girl weighing 25 kg was admitted under the otorhinolaryngology department at Hassan Institute of Medical Sciences, Hassan, for elective adenotonsillectomy.

Preanesthetic evaluation revealed that the patient was otherwise healthy. Physical examination, laboratory testing, and chest X-ray were within normal limits.

Patient was shifted to OT. Basic monitoring was established, and the IV line was secured using a 20-G cannula. Patient was preoxygenated for 3 min using 100% O2, premedicated using Inj. Glycopyrrolate 0.1 mg (0.01 mg/kg) and Inj. Fentanyl 50 mg (1-2 mg/kg), and induced using Inj. Propofol 50 mg (1-2 mg/kg) and Inj. Atracurium 12 mg (0.5 mg/kg).

Patient was nasally intubated using 5 mm cuffed ETT under vision, but left-sided air entry was less. Therefore, reintubation was done orally using 5.5 mm cuffed ETT. Air entry still diminished over the left side. Then there was the development of subcutaneous emphysemaover the neck. Oxygen saturation dropped from 99% to 94%. Left-sided pneumothorax was suspected. An emergency needle puncture was performed in the 2nd intercostal space at the midclavicular line. Following the procedure, breath sounds on the left side showed improvement. Oxygen saturation increased back to 99%. An emergency chest X-ray was done on the table, which showed extensive subcutaneous emphysema with left-sided tension pneumothorax. Intercostal drainage (ICD) was inserted at the left 5th intercostal space in the anterior axillary line with the help of a surgeon. The chest X-ray was repeated, and the position of the ICD was confirmed.

The patient was monitored closely. Since the patient had adequate respiratory efforts and the vitals were within the normal range, extubation was done after thorough suctioning and reversal using Inj. Neostigmine 1.25 mg (0.05 mg/kg) + Inj. Glycopyrrolate 0.5 mg (0.01 mg/kg). Patient was conscious and oriented with stable vitals following extubation.



The patient was then shifted to the ICU and monitored closely with oxygen administration. Ryles tube was inserted and kept nil per oral. CT thorax revealed mild emphysema over the neck and chest wall and patchy areas of consolidation with large atelectasis bands in the superior segment of the left lower lobe. Chest physiotherapy was performed adequately using a spirometer, and the emphysema resolved gradually. ICD was removed after 72 hours, and the patient was shifted to the ward. Oral feed was allowed gradually. Patient was discharged after a week and followed up.

The patient was operated on 8 months later under general anaesthesia without any untoward complications.

DISCUSSION-

This case reports an unusual occurrence of pneumothorax with subcutaneous emphysema following intubation and manual ventilation in an otherwise healthy individual. The possible causes are incidental spontaneous pneumothorax with subcutaneous emphysema, pneumothorax due to excessive positive pressure ventilation in a patient with a pre-existing lung lesion, and trauma to the trachea or hypopharynx (mostly pyriform fossa) at the time of intubation [4].

The cause of pneumothorax in our case might be the rupture of alveoli due to excessive positive pressure ventilation in the lungs with a pre-existing lesion that was not found on the chest X- ray. The pathogenesis involves air from ruptured alveoli traveling into the interstitium and along lung vessels to reach the mediastinum, eventually spreading into the neck or head tissues and presenting as subcutaneous emphysema. [5].The severity of deterioration in the cardiorespiratory condition of the patient depends on the amount of air extravasated and the extent of pneumothorax with subcutaneous emphysema [6]. The cardiorespiratory parameters in our case did not reduce significantly as the complication was attended to immediately and was intervened.

Chest X-ray is the first line of investigation to diagnose pneumothorax. However, non-contrast computed tomography of the chest is the

investigation of choice and is more sensitive as it detects even small amounts of extravasated gas [6].

The management of pneumothorax intends on providing re-expansion of the lungs and avoiding recurrence. It depends on the cause, size of the pneumothorax, whether it is open or closed, and simple or tension pneumothorax [6]. British Thoracic Society (BTS) guidelines 2010 recommend drainage of the tension pneumothorax with emergency needle decompression in the second anterior intercostal space in the mid-clavicular line, followed by insertion of a chest drain in the fourth or fifth intercostal space in the anterior axillary line [7]. Since our case showed left tension pneumothorax, emergency needle decompression was done, followed by insertion of the chest drain.

Subcutaneous emphysema in our case was managed conservatively since it occurred due to pneumothorax, and the later was treated effectively.

Typically, extubation is not recommended [7]. However, given that our patient demonstrated adequate respiratory effort and stable vital signs, we proceeded with extubation. This case illustrates that extubation may be considered in certain scenarios, depending on factors such as air entry, hemodynamic variables, and the overall condition of the patient.

Our patient was then shifted to the ICU and monitored closely with continuous O2 administration. Since the pre-existing lung lesion was missed on the chest x-ray done pre- operatively, we assumed that the subcutaneous emphysema with pneumothorax might be due to hypopharyngeal injury also. So the patient was fed through a ryles tube, avoiding oral feed with broad-spectrum antibiotic therapy.

CONCLUSION:

Early diagnosis is the mainstay to improve the outcome and avoid the morbidity and potentially life-threatening course of such trauma.

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