



Case Report

Post-operative subcutaneous emphysema- are anesthesiologists always at fault

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ABSTRACT

Subcutaneous emphysema (SE) following general anesthesia though a rare and benign entity, however if extensive can cause tremendous patient discomfort. Development of post operative SE cannot be simply ignored and may indicate possible grave injuries like injury to the airway that might require prompt recognition and management. We report a rare case of postoperative SE after an emergency laparotomy surgery, secondary to an uncommon iatrogenic cause.

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1. Introduction

Subcutaneous emphysema (SE) following general anesthesia is not a very common encounter in our day to day practice. This rare entity is mostly associated with laparoscopic surgeries with a reported incidence of 0.43% to 2.34%.¹ The etiology of SE includes trauma or surgery involving head and neck, chest, penetrating trauma to the gastrointestinal or respiratory system, iatrogenic (during intubation or laparoscopy, barotrauma, improper chest tube placement) and infectious causes.² Hereby, we report a rare case of post operative SE after an emergency laparotomy in an American Society of Anesthesiologists(ASA) physical grade I patient, secondary to uncommon iatrogenic cause.

2. Case Description

A 30- year- old male, body mass index(BMI) of 20.7kg/m², ASA grade 1 presented to our emergency with the history of pain abdomen and fever since one day. He had no significant medical and surgical history. The patient was diagnosed as a case of perforation peritonitis. Under all aseptic precautions,

abdominal drain of size 32 French (Fr) was inserted to a depth of 18 cm left lumbar area under local anesthesia by the surgical team. Airway examination of the patient revealed mouth opening of 3 fingers, mallampati grade 1 and no neck movement restriction. The preoperative investigations were within normal limits. Preoperative vitals were heart rate – 92/min, blood pressure – 118/70 mm Hg and respiratory rate – 15/min.

The patient was taken up for an emergency exploratory laparotomy under general anesthesia after ASA standard monitoring. Modified rapid sequence induction was done. The patient's trachea was intubated using endotracheal tube of size 8 mm ID (Internal Diameter) and a Macintosh laryngoscope of size 3 in first attempt. The patient had Cormack Lehane grade 1. The patient was maintained with mixture of oxygen, air and sevoflurane. A vertical midline incision was given. Intraoperative peak pressures were between 14-16 mm Hg. Intraoperative course was uneventful with no episode of desaturation and the patient was reversed using injection neostigmine 2.5mg and injection glycopyrrolate 0.2mg intravenously. His trachea was extubated. Patient was comfortable, conscious and vitals were within normal limits. He was shifted from Post Anesthesia Care Unit (PACU) to general ward.

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On postoperative day 2, anesthesia call was received in view of clinical SE due to suspected iatrogenic tracheal injury. The patient did not have any respiratory and abdominal complaints. On general physical examination, he was conscious, hemodynamically stable with a saturation of 95% on room air. The crepitus has extended from abdomen to the anterior chest bilaterally (B/L). His auscultatory findings were normal. Abdominal examination also had no evidence of guarding or induration. His arterial blood gas analysis were within normal limits. Chest x-ray demonstrated B/L subcutaneous emphysema with no evidence of pneumothorax. Pulmonary team was consulted for the same and patient underwent Non Contrast Computed Tomography (NCCT) of the chest and abdomen.

NCCT chest was reported as extensive B/L subcutaneous emphysema extending along the soft tissues of the neck with multiple air foci in the mediastinum with possibility of airway injury. [Figure 1] Patient was then planned for bronchoscopy to rule out tracheal injury.

On postoperative day 3, abdominal drain placed in left lumbar area was removed and the patient started improving. Subcutaneous emphysema resolved completely in a step wise fashion in a day. Repeat CT chest [Figure 2] demonstrated resolution of subcutaneous emphysema and tracheal injury was ruled out. Since symptoms were resolved, bronchoscopy was withheld by the pulmonary team. He was discharged home on postoperative day 6. He was followed up for further six months and the patient had no complaints.



Fig. 1: Magnetic resonance imaging scan of chest showing bilateral subcutaneous emphysema

3. Discussion

From the literature, three categories of SE have been described. First by gas producing infection, secondly due to perforated viscus and third due to gas introduced from outside. It includes postsurgical procedure with trauma being the most common cause.³ Different anesthesia related causes of subcutaneous emphysema includes positive pressure ventilation, traumatic laryngoscopy/intubation



Fig. 2: Magnetic resonance imaging scan of chest showing multiple air foci in mediastinum with suspicion of tracheal injury

causing esophageal/hypopharyngeal perforation, an inappropriately closed pop off valve, faulty anesthesia circuits causing high airway pressures and coughing after closed airway.⁴

In our case, abdominal examination and CT ruled out an abdominal pathology or perforated viscus. Investigations and Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score⁵ of less than 5 ruled out any evidence of infection, suggesting the third category of SE i.e gas introduced from outside. Whilst endotracheal intubation is the most frequently encountered cause of iatrogenic tracheal injury, with a reported incidence of 0.005%.⁶ Over-inflation of cuff and sudden movement of tube were the most reported causes for tracheal injury. Direct tear caused by the tube was rare.⁷⁻⁹ Intraoperatively, he had normal peak pressures with no episode of desaturation and difficulty in ventilation excluding pneumothorax and above mentioned anesthesia causes. He had smooth induction and extubation excluding SE due to coughing against closed airway.

Hence, the 'apparent' tracheal injury and the subcutaneous emphysema were secondary to faulty placement of the abdominal drain in lumbar area which could have probably caused introduction of free air extending into the subcutaneous plane along the retroperitoneal surface and might have clouded the clinical picture. Resolution of SE after drain removal confirmed our diagnosis.

To conclude, it is imperative to perform a differential diagnostic process. Diagnosis can also be recognised by exclusion which can prevent further unnecessary interventions. Our case also describes the differential diagnostic process of postoperative SE including anesthetic and surgical causes.

4. Conflict of Interest

The author(s) declare(s) that there is no conflict of interest.

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