

# Conservative treatment of postintubation tracheal laceration with pneumomediastinum, bilateral pneumothorax, and massive subcutaneous emphysema

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## ABSTRACT

Postintubation tracheal laceration (PITL) is a rare, potentially life-threatening complication requiring prompt diagnosis and treatment. Patients typically present with subcutaneous emphysema and pneumomediastinum, whereas concomitant pneumothorax is rarely reported. A conservative treatment is indicated in selected respiratory stable patients with small lacerations. Herein, we reported an unusual case of PITL with bilateral pneumothorax that was treated with chest tube drainage and conservative measures in the intensive care unit. The key success of the PITL management is early recognition of signs and symptoms and an adequate selection of management approaches.

**KEY WORDS:** Intubation, pneumomediastinum, tracheal laceration

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## INTRODUCTION

The tracheal laceration is a rare but potentially serious complication of endotracheal intubation and it requires prompt diagnosis and treatment. It can present with a wide range of clinical symptoms depending on the location and size of the tracheal injury, patient's comorbidities, and intensity of air accumulation in mediastinal, pleural, and subcutaneous compartments. Therefore, management may include conservative treatment with monitoring of respiratory function, chest tube drainage, or surgical repair of the tracheal defect. The diagnosis is based on a high clinical suspicion in a patient with respiratory difficulties, hemoptysis, dysphonia, and subcutaneous emphysema, and it must be followed by diagnostic confirmation, which is achieved by X-rays, computed tomography (CT)-scan, and direct visualization of

the tracheal laceration by bronchoscopy which will reveal the size and site of the lesion. Considering a high number of intubations, it is important for all clinicians to have on mind postextubation complications, which may occur either immediately or after several days delay. We report a case of postintubation tracheal laceration (PITL) after elective hernia surgery, whose only physical sign was sub-cutaneous emphysema of the thorax, neck, and face.

## CASE REPORT

A 64-year-old female underwent open ventral hernia repair under general anesthesia. She was a nonsmoker

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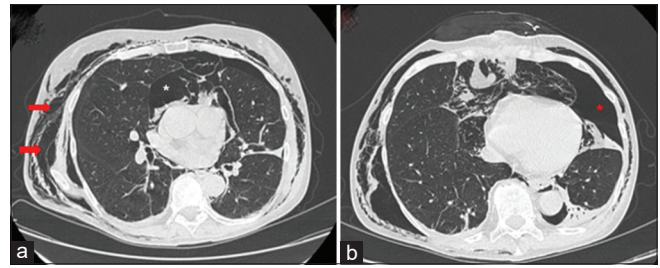
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and had no significant comorbidities. The anesthetic team reported straightforward intubation and extubation with a surgery length of 120 min and no central venous catheter was placed. A size 7.0-mm internal diameter cuffed oral endotracheal intubation was done with a Macintosh size 4 laryngoscope. The immediate postoperative course was unremarkable, but on the postoperative day 2, the patient developed puffy head-and-neck swelling with crepitation on palpation. She had no respiratory difficulties, but she complained of slight throat burning, nasal speech and inability to open her eyes completely. Laboratory findings were normal, and oxygen saturation remained 97%–99% throughout. Urgent CT scan was done that showed pneumomediastinum, bilateral pneumothorax, and extensive subcutaneous emphysema of the head, neck, and thorax [Figures 1 and 2]. There was a suspicion of a 1–5 cm wide posterior tracheal tear 2 cm proximal to the bifurcation [Figure 3]. Fiberoptic bronchoscopy was done and revealed a tear on the membranous part of the distal trachea with no signs of air leak or active bleeding. Since there was no respiratory embarrassment, and no signs of mediastinitis, we indicated conservative treatment in the intensive care unit (ICU) with monitoring of vital functions and oxygen saturation, wide-spectrum antibiotics, and tube drainage of pneumothoraces. The patient was discharged from the ICU after 2 days, emphysema and pneumothorax regressed till postoperative day 6 when chest tubes were removed. The patient was discharged home after 12 days. Moreover, she was asymptomatic at the outpatient's clinic 3 months later.

## DISCUSSION

Orotracheal intubation is a routine and common procedure that has potential complications, including tracheal lacerations, which are rare, but serious consequences of the tracheal injury. It was estimated that the incidence of PITL is 1/20,000 intubations, but despite low incidence, clinicians should be aware of possible life-threatening complications of such injuries.<sup>[1]</sup> It is important to recognize signs of pneumothorax and subcutaneous emphysema before severe respiratory stress or mediastinitis develop. Early detection of tracheal defects may allow therapeutic bronchoscopic interventions and prevent further air leakage or mediastinitis.<sup>[2]</sup> Our case suggests that even small tracheal laceration may cause impressive subcutaneous emphysema and pneumo thorax/mediastinum, but still, it may not have clinically significant respiratory repercussions. Moreover, such cases can be treated conservatively, without need for a surgical tracheal repair; however, chest drainage may be required if the bilateral pneumothorax is present.

This is confirmed by recent studies which suggest that patients who are clinically stable, with no respiratory difficulty or air leakage, no signs of clinical progression (emphysema or pneumomediastinum), and no symptoms of infection should be managed conservatively.<sup>[3]</sup>



**Figure 1:** Thoracic computed tomography scan showing: (a) Subcutaneous emphysema (red arrow) and pneumomediastinum (white asterisk); (b) Left-sided pneumothorax (red asterisk)



**Figure 2:** Bronchoscopy showing tracheal tear on the posterior wall (white arrow)



**Figure 3:** Chest X-rays showing resolution of pneumothoraces and pneumomediastinum after bilateral chest tube insertion

This management may also include intubation with the cuff distal to the area of rupture, continuous tracheal aspiration, use of a pleural drain if required, and appropriate empirical antibiotic therapy. When tracheal laceration is sealed and pneumothorax drained, subcutaneous and mediastinal emphysema usually regress within 4–7 days. The options for surgical repair are multiple and depend on the type and extension of the lesion and may include sutures of

the pars membranosa or end-to-end anastomosis in the tracheal section.<sup>[4]</sup>

Our patient had some typical signs of tracheal rupture (pneumomediastinum and surgical emphysema), but bilateral pneumothorax is not the usual presentation of such injury and this probably developed due to rupture of mediastinal pleura under increased intramediastinal pressure or due to concomitant alveolar rupture.

Rigid bronchoscopy offers the best means of identifying and defining the extent of tracheal tears, while sometimes it may be therapeutic as well (fibrin glue injection and hemostasis).<sup>[5]</sup>

The delay in presentation in our case may be explained by the fact that the patient had no previous respiratory disorders that would provoke intensive cough. In addition, and peritracheal fascia may have prevented a significant air leak in spite of the tracheal tear which may have led to gradual air accumulation outside the bronchoalveolar tree.

## CONCLUSION

PITL is a rare complication of general anesthesia, but it may pose a great diagnostic and therapeutic challenge for clinicians. Our case suggests that tracheal rupture may lead to both pneumomediastinum and pneumothorax with extension to the subcutaneous tissue of the head and neck. It also demonstrates that conservative management may

be used successfully in selected patients in good clinical condition.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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## Conflicts of interest

There are no conflicts of interest.

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