

# Airway obstruction caused by massive subcutaneous emphysema due to blunt chest trauma

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Accepted 22 June 2022

## DESCRIPTION

Subcutaneous emphysema is a common complication of blunt chest trauma. Although most cases are managed conservatively, fatal airway obstruction occurs in a few cases.<sup>1</sup> We present a case of blunt chest trauma with massive subcutaneous emphysema extending to the upper airway.

A man in his late 60s with facial swelling presented to the emergency department. He has been admitted to a psychiatric hospital due to schizophrenia. He was referred to our hospital due to sudden worsening of subcutaneous emphysema after a contusion on the right side of the chest due to a fall. He initially had stable vital signs with an oxygen saturation of 98% on room air. However, subcutaneous emphysema, extending from the face to both thighs, was noted.

The chest radiographs and CT scan revealed a fracture of the ninth rib on the right, right-sided pneumothorax, mediastinal emphysema and severe bilateral subcutaneous emphysema. A right thoracic drain was inserted, and the patient was admitted to the intensive care unit (ICU). Following his ICU admission, the patient's emphysema progressed, and he was unable to open his eyes (*figure 1*). Occasional stridor and hypoxemia were noted.

The patient was diagnosed with an upper airway obstruction. Endotracheal intubation was performed in preparation for an immediate cricothyrotomy. A video laryngoscope was used, and the second procedure was successful. Video laryngoscopy showed oedema of the arytenoid cartilage and the region surrounding the vocal folds (*figure 2*).

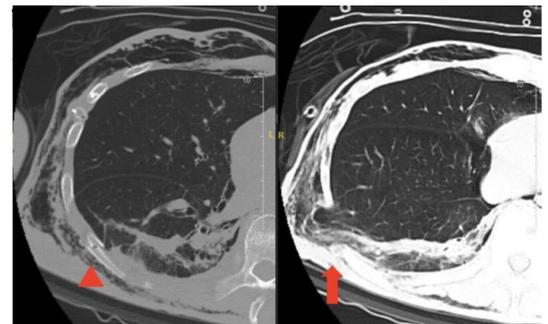


**Figure 1** On admission, the patient presented with orbital oedema from subcutaneous emphysema. The patient was unable to open his eyes.



**Figure 2** Oedema of the arytenoid cartilage and the region surrounding the vocal folds.

The postintubation chest CT showed improvement of the pneumothorax and an intercostal pulmonary hernia (*figure 3*). The hernia, which



**Figure 3** Chest CT demonstrating traumatic lung herniation (arrow) around the ninth rib fracture (arrow head), suspicious of intercostal muscle injury.



**Figure 4** Confirming complete resolution of oedema of the arytenoid cartilage and around vocal fold after tracheal extubation.



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**To cite:** Mitsusada K, Dote H, Tokutake M, et al. *BMJ Case Rep* 2022;**15**:e251068. doi:10.1136/bcr-2022-251068

likely resulted from intercostal muscle injury secondary to chest trauma, was treated conservatively.<sup>2</sup>

After consulting with a thoracic surgeon, the patient received non-operative management because the intercostal muscle tear measured less than 2 cm, and only one rib was fractured (non-displaced).<sup>3</sup> The subcutaneous emphysema improved with continued thoracic drainage (−10 cmH<sub>2</sub>O). On day 3, a cuff-leak test was performed. Since there was no leak, methylprednisolone (mPSL) was administered to improve his airway oedema.<sup>4</sup> After completing the administration of mPSL, the patient was extubated with the tube exchanger intact. After confirming the absence of postextubation stridor, the tube exchanger was removed. Subsequent observation with a laryngo-fiberscope revealed dramatic improvement of the oedema of the arytenoid cartilage and the region surrounding the vocal fold (figure 4).

### Learning points

- ▶ Progressively worsening massive subcutaneous emphysema, especially when the affected area extends to the face and neck, causes fatal airway obstruction and requires reliable airway protection.
- ▶ Patients with massive subcutaneous emphysema, requiring endotracheal intubation, should be managed strategically (gum-elastic bougie, video laryngoscopy or cricothyrotomy).
- ▶ When airway obstruction due to subcutaneous emphysema results in endotracheal intubation, tracking the changes in laryngo-fiberscope findings is useful in determining the timing of tracheal extubation.

On the same day, since there was no noted recurrence of the pneumothorax, the right thoracotomy drain was removed. The massive subcutaneous emphysema almost completely disappeared, and the patient was discharged on the seventh day.

**Acknowledgements** We would like to thank Editage ([www.editage.com](http://www.editage.com)) for English language editing.

**Contributors** All authors have contributed significantly. KM and HD conceived the study. MT and TA supervised the case study. MK drafted the article, and all authors contributed substantially to its revision. KM and HD take responsibility for the paper as a whole. And all authors are in agreement with the content of the manuscript.

**Funding** The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

**Competing interests** None declared.

**Patient consent for publication** Consent obtained directly from patient(s)

**Provenance and peer review** Not commissioned; externally peer reviewed.

Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

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