

# Tracheal injury after intubation



Fumu Wang, MD, Haiming Wang, MD

Department of Respiratory Medicine, Xiuzhou District People's Hospital, Zhejiang, China.

## PRESENTATION

A 73-year-old woman underwent general endotracheal anesthesia for elective rotator cuff repair. Six hours postoperatively, she developed cough, palpitations, and neck pain. Physical examination revealed tachycardia (114 bpm) and palpable subcutaneous emphysema with crepitus extending to the neck and upper chest.

## ASSESSMENT

Chest computed tomography (CT) demonstrated extensive pneumomediastinum and subcutaneous emphysema. Axial imaging at the level of the brachiocephalic vessels revealed a defect in the posterior tracheal membrane (Fig. 1, lung window; Fig. 2, mediastinal window). Flexible bronchoscopy identified a 1.5 × 2.0 cm longitudinal defect in the posterior membranous trachea, approximately 2 cm above the carina (Fig. 3). Dynamic assessment showed the defect functioned as a check valve, opening during inspiration and closing during expiration, facilitating unidirectional air entry into the mediastinum.

## DIAGNOSIS

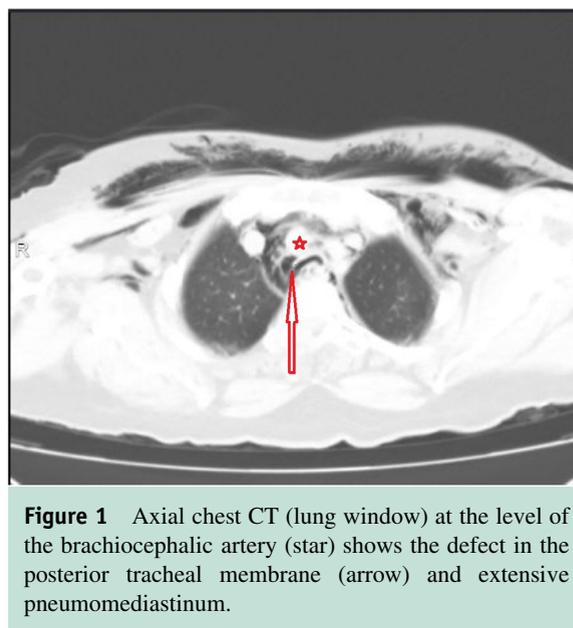
The findings confirmed a post-intubation tracheal injury. The check-valve mechanism explained the rapid development of tension pneumomediastinum. Although pneumomediastinum is often benign after thoracic procedures, in this setting, it became life-threatening due to the continuous air leakage under pressure, potentially compromising cardiac function and venous return.<sup>1</sup>

## MANAGEMENT

The patient was managed conservatively with high-flow oxygen, broad-spectrum antibiotics, and avoidance of positive-pressure ventilation. She was monitored in the intensive care unit for signs of respiratory or hemodynamic compromise. Her symptoms resolved gradually over 1 week.

## TEACHING POINT

Post-intubation tracheal injury, though rare, can lead to tension pneumomediastinum—a potentially fatal condition due to mediastinal compression.<sup>2</sup> Early recognition of subcutaneous emphysema and respiratory distress warrants immediate CT and bronchoscopic evaluation. Understanding the check-valve mechanism is critical, as it changes management urgency and may necessitate surgical intervention in unstable patients.<sup>3</sup>



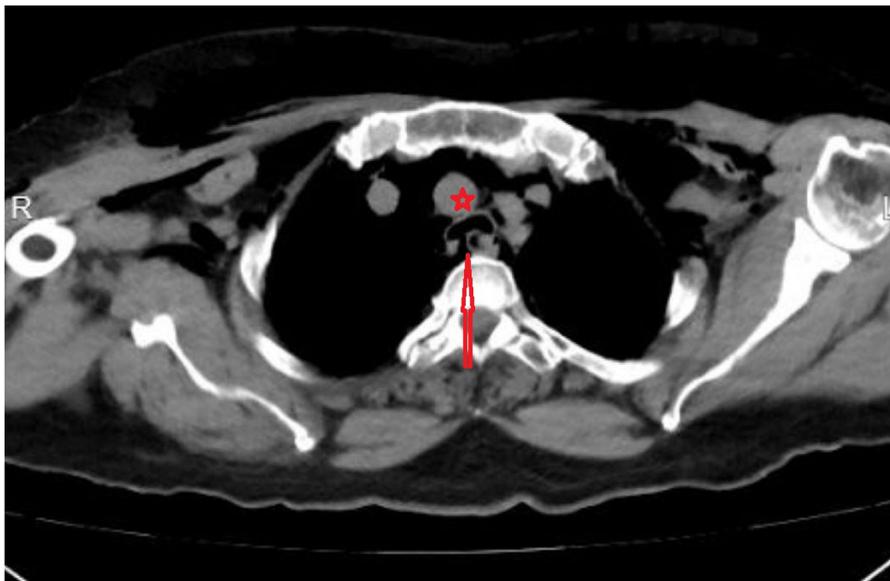
**Figure 1** Axial chest CT (lung window) at the level of the brachiocephalic artery (star) shows the defect in the posterior tracheal membrane (arrow) and extensive pneumomediastinum.

All authors had access to the data and a role in writing this manuscript.

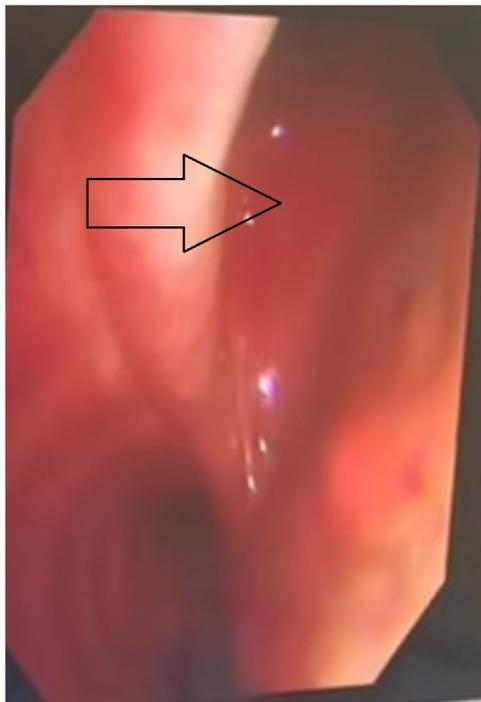
**Credit Authorship Contribution Statement:** Fumu Wang: Writing – review & editing, Methodology, Formal analysis, Data curation, Conceptualization. Haiming Wang: Writing – original draft, Visualization, Software, Resources, Investigation.

Corresponding author.

E-mail address: 286581370@qq.com



**Figure 2** Axial chest CT (mediastinal window) at the same level clearly demonstrates the brachiocephalic artery (star) and the tracheal defect (arrow) with adjacent mediastinal air.



**Figure 3** Bronchoscopic view of the trachea showing a 1.5 × 2.0 cm defect (arrows) in the posterior membranous wall, approximately 2 cm above the carina.

### Funding

None.

### Declaration of competing interest

The authors have no financial, professional, or personal relationships that could be perceived as influencing the objectivity, content, or interpretation of this work.

### References

1. Miñambres E, Burón J, Ballesteros MA, Llorca J, Muñoz P, González-Castro A. Tracheal rupture after endotracheal intubation: a literature systematic review. *Eur J Cardiothorac Surg* 2009;35(6):1056–62. <https://doi.org/10.1016/j.ejcts.2009.01.053>.
2. Carbognani P, Bobbio A, Cattelani L, Internullo E, Caporale D, Rusca M. Management of iatrogenic tracheobronchial injuries: a retrospective analysis of 29 cases. *Ann Thorac Surg* 2007;83(6):1960–4. <https://doi.org/10.1016/j.athoracsur.2007.01.042>.
3. Leinung Steffen, Möbius Christian, Hofmann Hans-Stefan, Ott Rudolf, Ruffert Henrik, Schuster Ernst, Eichfeld Uwe. Iatrogenic tracheobronchial ruptures - treatment and outcomes. *Interact Cardiovasc Thorac Surg* 2006;5(3):303–6. <https://doi.org/10.1510/icvts.2005.117242>.