

Tracheal diverticulum as a cause of subcutaneous emphysema following positive-pressure ventilation

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A 70-yr-old woman underwent gastroscopy for evaluation of Barrett's esophagus. Induction of general anesthesia and tracheal intubation were unremarkable. The lungs were ventilated in pressure support mode (positive end-expiratory pressure, 3 cm H₂O; pressure support, 7 cm H₂O). Gastroscopic evaluation went uneventfully. The patient was discharged home without complaints. The next day, however, she was admitted to the emergency department because of bilateral subcutaneous emphysema of the neck and upper thorax. There was no respiratory distress. Computed tomography (CT) confirmed extensive subcutaneous emphysema of the neck and pneumomediastinum. In addition, there was a small (7 × 2 mm), air-filled protrusion of the right posterolateral tracheal wall 3 cm above the carina (Figure A, B). Esophagography with oral contrast showed no esophageal perforation or tracheoesophageal fistula. Bronchoscopy revealed an outpouching of the right posterolateral distal

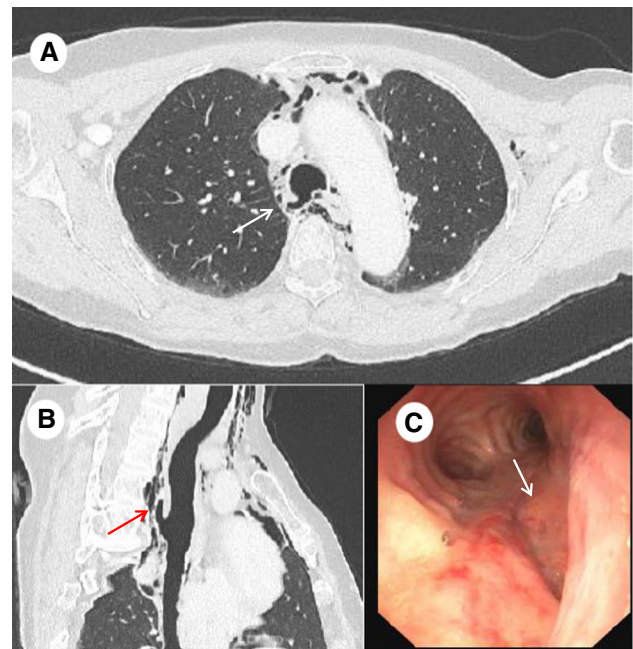


Figure Transverse (A) computed tomography (CT) image of the distal trachea showing pneumomediastinum and a small (7 × 2 mm), air-filled protrusion (white arrow) of the right posterolateral tracheal wall 3 cm above the carina. The corresponding sagittal CT image (B) shows the posterosuperior location of the diverticulum (red arrow). The bronchoscopic view of the carina (C) shows the outpouching of the right posterolateral distal membranous tracheal wall

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tracheal wall, with no obvious sign of laceration or fistula (Figure C). Within three days, the subcutaneous emphysema resolved spontaneously, and the patient was discharged. She continued to be asymptomatic other than a chronic cough that had been present before the described event. The lesion was no longer visible on follow-up CT six months later.

Two types of tracheal diverticula have been described: congenital and acquired. An acquired diverticulum is a mucosal herniation through a weakness in the tracheal wall due to increased endoluminal pressure. These diverticula are mostly asymptomatic and diagnosed incidentally. They are commonly found on the right posterolateral tracheal wall, supposedly because of lack of support of the aortic arch or esophagus, unlike that on the left side. They may cause chronic cough and recurrent respiratory infections. We speculated that the subcutaneous emphysema in our patient was caused by a small perforation of the diverticulum, although no such perforation was visualized directly. Treatment is generally conservative unless the patient remains symptomatic.^{1,2}

The follow-up CT of our patient suggested that the herniation resolved spontaneously after normalisation of the endoluminal pressure. To the best of our knowledge, this finding has not been reported previously. The occurrence of subcutaneous emphysema subsequent to positive-pressure ventilation emphasizes the importance of acknowledging the risk of a tracheal diverticulum. Anesthetic considerations include preferential spontaneous ventilation, bronchoscopic guidance in case

of endotracheal intubation, and consideration of using a double-lumen endotracheal tube (that extends beyond the diverticulum) when needed for positive-pressure ventilation.^{2,3}

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Conflicts of interest None declared.

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