Clinical picture

Massive subcutaneous emphysema in a long-term ventilated patient

An 81-year-old woman with congestive heart failure was hospitalized with respiratory failure following surgery for a femoral neck fracture. Almost a month postoperatively, she developed severe sepsis with respiratory failure and was intubated and ventilated. The patient remained completely ventilator dependent, and 28 days after intubation, a bedside tracheostomy was performed. Three weeks after tracheostomy, the patient suddenly developed a massive swelling of her face, and a sudden drop in her ventilation pressures was noted. A chest X-ray and a computed tomography (CT) scan demonstrated the presence of extensive subcutaneous emphysema (Figure 1a and b, white arrows) as well as pneumomediastinum (Figure 1b, black arrow). Laryngoscopy was performed, and a perforation of the posterior tracheal wall into the mediastinum ~2.5 cm above the carina was observed. Several options were considered for managing this patient’s condition. The patient was too high a risk for open surgical repair, and stent insertion was not technically feasible. Finally, the treating medical team simply opted to replace the tracheostomy tube with a longer one with improvement in the patient’s subcutaneous emphysema. Despite gradual resolution of the subcutaneous emphysema, the patient died during her hospitalization from another episode of septic shock.

Tracheal rupture is a rare complication of tracheal intubation. Although tracheal rupture has been described and characterized in the medical literature mainly as a complication of endotracheal intubation, the findings are also probably relevant to a rupture after tracheostomy. Several risk factors (mechanical and non-mechanical) for tracheal rupture postintubation have been recognized. Some of the mechanical factors include multiple attempts at intubation, overinflation of the cuff and

Figure 1. (A) Chest X-ray demonstrating subcutaneous emphysema (white arrows). (B) CT scan of the chest demonstrating subcutaneous emphysema (white arrows) and pneumomediastinum (black arrow).

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repositioning the tube without deflation of the cuff. Non-mechanical factors include congenital tracheal abnormalities, chronic obstructive pulmonary disease, chronic use of steroids, advanced age and female sex. Emergency intubation is also an important risk factor. The most common clinical manifestations of postintubation tracheal rupture include subcutaneous emphysema, mediastinal emphysema and pneumothorax. A chest CT may assist in the diagnosis of tracheal rupture, but the diagnosis should be confirmed by bronchoscopy. There is no clear agreement regarding the optimal treatment of tracheal rupture, and the two main therapeutic options include surgical repair and conservative management. The latter possibility is especially preferred in patients with small ruptures, less than 2 cm, and includes intubation with the cuff distal to the area of the rupture. Airway stenting is considered in cases of failure of the conservative treatment and high surgical risk. Because of the marked increase in the number of elderly patients undergoing tracheostomy and long-term ventilation in Western countries, greater awareness of this life-threatening complication is warranted.

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References


