

# Subcutaneous emphysema

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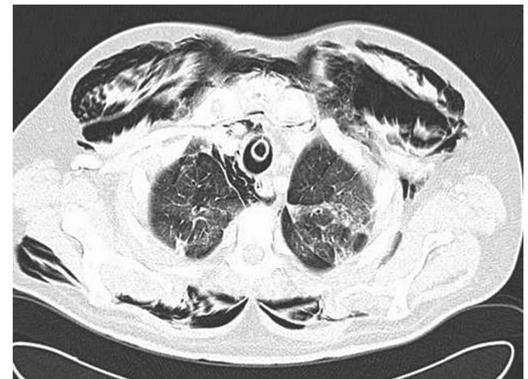
## DESCRIPTION

A 61-year-old man with light chain multiple myeloma underwent autologous bone marrow transplantation (BMT). One week later, a lower respiratory tract infection developed with neutropenic sepsis and multiorgan failure necessitating intensive care unit admission. Progressive and persistent bilateral infiltrates on chest radiography indicated acute respiratory distress syndrome and requirement for high-frequency oscillatory ventilation (HFOV) following a trial of conventional mechanical ventilation. Chest radiography showed bilateral subcutaneous emphysema but no evidence of pneumothorax (figure 1). This rapidly progressed to involve his face, torso, arms and lower limbs. CT showed pneumomediastinum with significant bilateral subcutaneous emphysema but without pneumothorax (figure 2). With no pleural air collection, the risks of chest drain insertion outweighed its benefits and decompression using a skin incision was adopted. The patient was changed to conventional mechanical ventilation with pressure control, the subcutaneous emphysema resolved and he continues to rehabilitate successfully from an acquired critical care weakness.

Subcutaneous emphysema is the clinical state where air is present subcutaneously. Prompt identification remains the key to prevent complications and mortality. First reported in 1850 following a violent coughing fit, spontaneous occurrences are described including that while playing a musical instrument following tooth extraction.<sup>1</sup> Air leak syndromes usually result from alveolar rupture and air escapes into tissues where none is usually present. Pulmonary interstitial emphysema follows with air dissection through perivascular sheaths and towards the hilum (pneumomediastinum) or pleural space (pneumothorax). If further air extravasation occurs, subcutaneous or retroperitoneal emphysema, pneumoperitoneum,



**Figure 1** Chest radiography showing bilateral subcutaneous emphysema in absence of pneumothorax.



**Figure 2** CT showing pneumomediastinum and severe bilateral subcutaneous emphysema.

pneumoscrotum or air embolism can result with the latter occurring if alveoli rupture directly into the pulmonary vasculature. In the post-BMT period, bronchiolitis obliterans may occur and represents a mode of chronic graft-versus-host disease. Air-leak syndromes as described are important albeit rare complications of bronchiolitis obliterans.<sup>2</sup>

## Learning points

- ▶ Subcutaneous emphysema can rarely occur in the absence of pneumothorax.
- ▶ High-frequency oscillatory ventilation (HFOV) carries risks of barotrauma and subcutaneous emphysema despite its use for life-threatening acute respiratory failure.<sup>3</sup>
- ▶ Mainstay of treatment is aimed at removal of the underlying cause (HFOV in our case) resulting in resolution of air within days.
- ▶ While subcutaneous emphysema is usually benign and does not require direct intervention, in cases of respiratory distress, discomfort or impediment of blood flow, treatment options include small cutaneous incisions to release air (as in our case), chest tube insertion (where pneumothorax present) +/- suction and mediastinoscopy (in cases of tension pneumomediastinum).

**Competing interests** None.

**Patient consent** Obtained.

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

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