Empyema necessitans secondary to bronchial stenting

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A 62-year-old man presented to the emergency department with a 2-day history of dyspnoea and fever. Two weeks prior, he had undergone bilateral bronchial stent insertion for squamous cell carcinoma of the lung, which had been compressing and occluding both main bronchi, more so on the left. The lung cancer had recently been diagnosed and a week prior to presentation the patient had received his first dose of pembrolizumab.

A chest radiograph and subsequent CT chest scan showed multiple new left-sided lung cavities and an ipsilateral hydropneumothorax (figure 1). The CT scan showed the bronchial stents in both main bronchi were patent; however, disease progression of the underlying lung cancer was noted. Intravenous broad-spectrum antibiotics were initiated and a chest drain was inserted, which drained frank pus. Soon after insertion, the chest drain spontaneously migrated out and the patient later developed extensive subcutaneous emphysema. A large bore chest drain was subsequently inserted. Pleural fluid cultures later grew *Staphylococcus aureus*, *Streptococcus anginosus* and *Streptococcus constellatus* and blood cultures grew *S. aureus*. His antibiotic cover was changed accordingly. The patient soon developed a subcutaneous collection and persistent leakage of frank pus from the skin at the same site of his initial chest drain, indicating empyema necessitans (figure 2). His case was discussed twice with the thoracic surgeons who felt that surgical intervention would not be the best course of action as his condition was not amenable to surgery.

After 4 weeks of inpatient intravenous antibiotics, a multidisciplinary team, including the Respiratory, Microbiology and Palliative Care teams, decision was made in keeping with the patient’s wishes to be managed in an outpatient ambulatory setting, as the patient had been in hospital for 4 weeks and wanted to be with his wife who was suffering from terminal breast cancer. He was discharged with the large bore chest drain connected to a Heimlich valve with weekly reviews in the Pleural Clinic for the next 4 weeks until cessation of drainage, whereupon the

Figure 1  (A) CT chest scan (axial view) prior to stenting showing no lung cavities. There is a left-sided pleural effusion secondary to the lung cancer. (B) Chest radiograph with multiple cavities in the left upper and mid zones, together with a small pneumothorax and a pleural effusion on the left side. (C) CT scan (axial view) showing multiple cavities in the left apex, some peripheral and a small left pneumothorax seen posteriorly. (D) CT scan (axial view) showing bilateral bronchial stents in the main bronchi (red arrows); a left-sided small pleural effusion and a large pneumothorax anteriorly.
drain was removed. He also received further outpatient intravenous antibiotics. A repeat CT chest scan showed resolution of the subcutaneous collection, pneumothorax and subcutaneous emphysema with adequate lung reinflation but a residual pleural collection (figure 2). He sadly passed away 7 months later.

Empyema necessitans is a rare complication of empyema that is characterised by extension of purulent fluid through the parietal pleura into the chest wall.1 This can result from inadequate treatment of empyema and can occur after a necrotising pneumonia or pulmonary abscess. Bronchial stents are associated with and can be complicated by bacterial colonisation and pulmonary infections.2,3 S. aureus is reportedly the most commonly identified pathogen.1

The presumed sequence of events in this patient is that at least one of the peripheral lung cavities, caused by bacterial colonisation of the bronchial stent, ruptured into the pleural space causing empyema and pneumothorax. We present, to our knowledge, the first published case report of empyema necessitans occurring secondary to bronchial stenting.

**Figure 2** Images (A) and (B) are from a CT scan taken during the hospital admission. Images (C) and (D) are from a CT scan taken post discharge. (A) CT chest scan (axial view) shows multiple cavities in the left upper lobe, a shallow pleural effusion, a small anterior pneumothorax and a large bore chest drain seen anteriorly on the left side. There is also extensive subcutaneous emphysema as well as pneumomediastinum. (B) CT scan (coronal view) shows a left-sided pleural collection and a subcutaneous collection with pockets of air within it (yellow arrow) on the left side in keeping with empyema necessitans. (C) CT scan (axial view) shows resolution of the subcutaneous emphysema and pneumothorax and a residual posterior pleural collection with air within it. The chest drain remains in situ. (D) CT scan (coronal view) shows resolution of the left-sided subcutaneous collection.

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**REFERENCES**