Case report - Thoracic oncologic

Successful salvage right upper lobectomy and flap repair of trachea-esophageal fistula due to severe necrotizing pneumonia

Betsy Evans, Iain MacKenzie, Charles Malata, Aman Coonar

1. Case report

A 55-year-old previously well, male, smoker was admitted to his local hospital with a fulminant pneumonia. He was intubated approximately 5 h after admission. He continued to deteriorate. Three days after intubation, CT-scan demonstrated a fistula in the distal trachea (Fig. 1) and right main bronchus. Endoscopy showed air bubbling from the right lung and pleural space. Bilateral main bronchi intubation was required. Emergency surgery was performed with a latissimus dorsi and serratus anterior muscle flap to close the tracheal and esophageal fistulae. The right upper lobe was found to be destroyed and resected. It was possible to salvage the patient who was discharged home despite challenging anesthetic and surgical circumstances.

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Keywords: Trachea-esophageal fistula; Necrotizing pneumonia; Selective endobronchial intubation; Pedicled muscle flap

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esophageal leak managed by a restriction of oral intake to a soft diet and supplementary jejunal nutrition. Esophageal stenting was planned for three months post-presentation to allow a period of quiescence, possible tissue recovery and improvement in his nutritional status.

2. Comment

Severe necrotizing pneumonia is recognized though relatively rare. In this case an aggressive illness with infection may have caused small vessel ischemia and necrosis leaving the trachea and esophagus vulnerable. The mediastinal surface of the right upper lobe had broken down and at surgery an empyema was found. The precise timing of the development of the fistula cannot be determined. This patient needed intubation and it is possible that the low-pressure cuff contributed to development of the fistula. The mechanism of this is speculative as the cuff would have been above the level of the fistula. In our case bilateral endobronchial intubation was then used to temporarily support the patient. The subsequent decision to offer definitive surgery was made because the patient’s fulminant course appeared to leave a short time window in which to intervene. The underlying diagnosis of malignancy was unknown and the acute deterioration related to a severe chest infection and fistulae. We considered stenting but chose not to do this as it may have been impossible due to difficult ventilatory needs and carried a high risk of further damaging the fragile airway or esophagus, which may have been terminal.

Severe necrotizing infections may be successfully managed by timely and wide surgical resection. We have not been able to find a similar case in which a patient with fulminant respiratory failure was salvaged with differential intubation followed within a few hours by tracheal and esophageal repair and anatomical lung resection. Intraoperatively it appeared that lobectomy would allow us to clear the main site of infection and that primary reconstruction was technically possible. In this context, we felt that even though the patient may have had advanced malignancy, short-term survival was dependent on success-
ful surgery. We also felt that surgery was justified in view of his good quality of life until a few days before presentation. Surgery for salvage may be controversial but it is the sicker, higher risk patient who may have the most to gain.

Elective repair of tracheal defects by similar techniques as ours is described. Intra-thoracic transposition of the latissimus dorsi muscle for mediastinal reinforcement and filling of spaces was first described as a buttressed repair of a broncho-pleural fistula (BPF) in 1911 by Abrashanoff [1]. Authors suggest that up to half the tracheal circumference can be repaired in this way, and if needed a bone graft can be used to splint the repair [2, 3]. Tracheal and esophageal fistulae are often repaired as elective or semi-elective cases. Emergency repairs are usually for trauma and often direct repair is sufficient. Another situation in which emergency tracheal repair has been well described is for trachea-inominate artery fistula. In some cases an interposition muscle flap has been used as part of the repair [4, 5]. AlloDerm® (Lifecell, NJ, USA), an allogeneic acellular dermal matrix has also been used with a muscle flap to reconstruct the membranous trachea [6].

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References