Tracheo-oesophageal fistula and bilateral recurrent laryngeal nerve palsies after blunt chest trauma

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A tracheo-oesophageal fistula resulting from blunt chest trauma is rare, with only 40 cases reported since 1936.1-5 This is a report of the successful treatment of such a fistula, which was combined with a bilateral recurrent laryngeal nerve palsy and is the first such case. It is further unusual in that both presentation and repair occurred within 24 hours of injury.

Case report

A 23-year-old man fell out of his car and was hit by another passing car. He was unconscious from head injuries but was breathing satisfactorily. Surgical emphysema and bruising were present over his upper chest and neck. He vomited once and the vomit was bloodstained. A chest radiograph showed gross surgical emphysema, shallow bilateral pneumothoraces, and multiple right-sided rib fractures. Within an hour of admission his breathing became laboured. He was intubated and put on intermittent positive-pressure ventilation, and drainage tubes were inserted into each pleural cavity. Three hours later gross gastric dilatation was noted (fig 1); it was relieved by nasogastric suction. The arterial gases showed an A-a shunt of 20% with a $P_{aCO_2}$ of 106 mmHg (14.1 kPa) and a $P_{aCO_2}$ of 48.7 mmHg (6.5 kPa).

Rigid bronchoscopy showed a 5 cm longitudinal tear in the posterior wall of the trachea between 23 and 28 cm from the upper incisor teeth and ending 2 cm above the carina. Rigid oesophagoscopy showed, firstly, air bubbling up the oesophagoscope and, secondly, the balloon of the endotracheal tube at 24–25 cm, exactly corresponding with the level of the tracheal tear. The endotracheal tube was replaced by a double-lumen endotracheal tube and the patient underwent an immediate right lateral thoracotomy through the fourth intercostal space, preserving the intercostal muscle bundle for a future pedicle graft.

The oesophagus was found to have two tears. One, a full-thickness anterior tear measuring 6 cm vertically, lay immediately alongside the tracheal tear. The second, a partial-thickness posterior tear measuring 7 cm vertically, was a muscular tear positioned immediately anterior to the vertebral column. The mucosa here was swollen but not ruptured.

The tracheal tear was of full thickness posteriorly and measured 5 cm vertically. There was extensive mediastinal emphysema and moderate inflammation between the trachea and oesophagus, the injury now being 20 hours old. The trachea was mobilised only on the right lateral and posterior aspects. The oesophageal tears were repaired with interrupted 3/0 Ethibond, two layers being used for the full-thickness tear. The trachea was repaired with similar sutures and reinforced with an intercostal muscle pedicle graft. This muscle pedicle was placed behind the oesophagus and made to lie between the trachea and oesophagus, thereby separating the two organs (fig 2). The pleura was reconstituted and the chest closed with drainage.

After surgery, the patient was ventilated through a single-lumen endotracheal tube for four days, the cuff being positioned above the site of the tracheal repair; he was extubated at one week.

The surgical emphysema gradually settled and there was no evidence of a tracheal leak. A gastrografin swallow

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These oesophageal tears indicates that a more severe compression than is usual with a traumatic tracheo-oesophageal fistula is likely to have been present in this case. This may also explain the bilateral recurrent laryngeal nerve palsy. As the left side of the trachea was not dissected at operation, it is unlikely that both nerves were damaged at the time of operation.

This case re-emphasises the following features of diagnosis and management of patients with a tracheo-oesophageal fistula:

**Diagnostic features**
1. Oesophageal injury indicated by bloodstained vomit
2. Oesophageal fistula indicated by gross gastric dilatation during mechanical ventilation
3. Rupture of trachea indicated by gross surgical emphysema and a bilateral pneumothorax

**Steps in management**
1. Bronchoscopy and oesophagoscopy
2. Immediate repair using a graft, such as the intercostal muscle pedicle, to reinforce the suture lines and to separate the two injured organs, thereby preventing recurrent fistulae.

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**References**