Emergency management of aorto-bronchial fistula after implantation of a self-expanding bronchial stent

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Abstract

We report a case of aorto-bronchial fistula 7 years after implantation of a self-expanding metal stent into the left main bronchus. The clinical presentation was characterised by left-sided chest pain, dyspnea and a single bout of haemoptysis. The fistula was surgically managed by aortic resection and primary repair of the aorta, and patch repair of the left main bronchus over a Polylex covered bronchial stent. When haemoptysis occurs in a patient with a history of bronchial stent implantation, the presence of an aorto-bronchial fistula should be considered. Early diagnosis offers the only possibility of recovery through a lifesaving surgical procedure. © 2001 Elsevier Science B.V. All rights reserved.

Keywords: Aorto-bronchial fistula; Bronchial stent; Haemoptysis

1. Case report

Aorto-bronchial fistula (ABF) can occur after bronchial stenting. Untreated, it may cause massive haemoptysis, and an expeditious surgical intervention is essential. We report a successful surgical case of an ABF following bronchial stenting in an adult with collapsible trachea and left main bronchus (tracheomalacia–bronchomalacia).

A 40-year-old lady was admitted from the surgical review clinic for bronchoscopy with a 10 days history of left-sided chest pain and one mild episode of haemoptysis the night before the clinic. She had undergone splenectomy 20 years previously for idiopathic thrombocytopaenic purpura (ITP), and developed post-intubation tracheal stenosis, involving the lower trachea. She presented with dyspnoea on moderate exertion since 1982 and required many bronchoscopies, tracheal dilatations and laser ablations. She underwent tracheal resection and primary anastomosis in January 1993, complicated by mediastinitis and wound dehiscence with subsequent recovery. Her symptoms improved initially, but recurred due to collapsible trachea and left main bronchus. Two Gianturco–Roche Z stents were inserted, one in the trachea and the other in the left main bronchus, in February 1994 with moderate symptom relief. However, she continued to require regular bronchoscopy, laser ablation of granulation tissue and tracheo-bronchial dilatations.

On admission, she was breathless on exertion; her blood pressure was 121/75, and her pulse rate was 83/min and regular. Heart sounds were normal with no added sounds or murmurs, and peripheral pulses were normal. The general examination was otherwise unremarkable. The following morning she had a bout of massive haemoptysis. She was resuscitated, intubated and transferred to theatre. Her endotracheal tube was replaced with a right-sided Robertshaw bronchial tube. An aortogram showed a connection between the aorta and the left main bronchus (Fig. 1).

Left posterolateral thoracotomy was performed. There were no haemothorax or pleural adhesions, the distal aortic arch and the proximal descending thoracic aorta were mobilised. A heparin-bonded Gott shunt was placed between the aortic arch proximal to the ligamentum arteriosum and the distal thoracic aorta. The aorta was cross-clamped above and below the fistula and mobilised from the bronchus. The bronchial stent could be seen eroding through the bronchial wall and had caused a 2 × 4 mm fistula in the medial aspect of the descending thoracic aorta. The bronchial stent was removed and extensive suction was applied within the bronchus. The aorta was circumferentially trimmed and anastomosed with a continuous 4/0 Prolene suture. A Polylex stent was placed through the bronchial defect into the left main bronchus and the defect was covered using autologous pericardium, reinforced by the fifth intercostal...
muscle bundle. Haemostasis was secured and the chest was closed in a routine manner. Immediate post-operative bronchoscopy showed a well-positioned stent in left main bronchus with some clots distally in the lobar bronchi.

She required ventilatory support until the second post-operative day and was transferred from the Intensive Care Unit (ITU) to the ward 2 days later. She made an uneventful recovery and was discharged home 2 weeks following her surgery with well-expanded lungs (Fig. 2). She no longer requires laser ablations, but receives bi-monthly bronchoscopies for surveillance and clearing secretions retained distal to the bronchial stent.

2. Discussion

ABF is a serious condition, which is fatal if not treated. Chronic aortic aneurysm is the most common cause [1], but it can occur as a complication of thoracic aortic graft interposition or coarctation repair [1], aortic arch replacement [2] and endovascular stent repair of thoracic aorta [3]. It can also occur after tracheo-bronchial stenting for critical airway obstruction due to malignancy [4], extrinsic compression [5], or collapsible trachea or main bronchus (tracheomalacia–bronchomalacia) [6].

Major complications of expandable metal stents include stent migration with airway obstruction [7], dysphagia, and large volume haemoptysis [8,9]. To our knowledge, there are only four cases of large volume haemoptysis in adults occurring after airway stenting reported in the literature [6]. We are not aware of any reports of ABF in the adult population, after tracheo-bronchial stenting for bronchomalacia.

ABF often presents with signs of airway compression followed by episodic haemoptysis, which could be fatal. These signs were confounded in our patient due to the underlying pathology and it was only the single bout of haemoptysis which led to her admission. In a patient with previous aortic surgery/stenting or tracheo-bronchial stenting, haemoptysis should raise a high level of clinical suspicion and urgency.

A possible cause for the development of ABF in our patient was stent migration. Chest roentgenograms are often non-diagnostic and the correct diagnosis is usually achieved with a contrast-enhanced computed tomographic scan. In our patient, due to the emergency circumstances, diagnosis was confirmed by aortography immediately prior to operation.

The treatment of ABF is by surgery, but there are reports of successful cases managed by endovascular stent grafts [10]. Closure of the aortic fistula can be achieved either by direct suture or by patch repair, but larger defects may require interposition of a prosthetic graft. This may require partial or full cardiopulmonary bypass. In our patient, we repaired the aortic defect with resection and primary anastomosis.

The bronchial defect can be simply sutured or repaired over a covered stent using a pericardial patch. This repair can be reinforced and isolated from the aorta by a pedicled intercostal muscle flap. Uncommonly, an extensive pulmonary resection may be required.

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References


