Successful treatment of a life-threatening air leakage, complicating severe abdominal sepsis, with a one-way endobronchial valve

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Received 11 January 2012; received in revised form 5 April 2012; accepted 10 April 2012

Abstract

A 41-year-old woman had a jeopardizing air leak from an alveolar-pleural and transdiaphragmatic fistula with pulmonary cavitation, secondary to a severe postoperative abdominal sepsis. Her condition dramatically improved by introduction, in the lower bronchus, of a one-way endobronchial valve, leading to immediate cessation of air leakage and removal of extracorporeal membrane oxygenation, and thus avoiding a lower left lobectomy with myoplasty. Furthermore, removal of the valve nine weeks later led to near-complete recovery of the left lower lobe.

Keywords: ARDS • Airway • Endobronchial valve • Alveolar fistula • Endoscopy

CASE REPORT

A 41-year-old woman underwent a laparoscopic sleeve gastrectomy for morbid obesity (weight: 110 kg; height: 1.58 m; BMI = 44.06). Following an uneventful postoperative course, 17 days after gastrectomy she had a retrogastric abscess with fistula, treated by antibiotics and by percutaneous drainage for 20 days. Two months after bariatric surgery, she had gastrointestinal bleeding and underwent a negative exploratory laparoscopy. The next day she suffered multiple organ failure with acute respiratory distress syndrome (ARDS) and pulmonary cavitation of the left lower lobe (Fig 1A). Venovenous extracorporeal membrane oxygenation (ECMO) was then initiated. Laparotomy revealed peritoneal sepsis with gastric fistula and massive air leakage through the left hemi-diaphragm. Emergency thoracotomy was performed in the supine position and revealed extensive alveolar air leakage through the left lower lobe bronchus 13 days after the thoracotomy. The lingula [2]. Other authors have used these methods for treating alveolar leakages, either in a remaining lobe after lobectomy was performed for severe disease, or after surgery for empyema under non-invasive ventilation for one week. She left the intensive care unit five weeks later. The endobronchial valve was removed nine weeks later and the patient left the hospital 11 weeks later. The drain serving to direct the gastric fistula was removed four months after the introduction of the valve. A CT scan performed four months after the introduction of the valve and two months after its removal showed an excellent recovery of the lower lobe parenchyma without pleural sequelae (Fig 2B).

DISCUSSION

Deployment of unidirectional valves into the airways, to collapse the targeted lung parenchyma and decrease its volume, has been introduced in an attempt to lower the risks and costs associated with lung volume reduction surgery. Because this valve blocks air ingress into the affected bronchus, while allowing drainage of mucus, this is also considered to be a promising minimally invasive procedure to deal with peripheral broncho-pleural fistula [1]. These techniques have thus taken precedence over sponges, glue and Gianturco coils, alone or in combination, which have given variable and inconsistent results and exhibited several disadvantages, viz. migration, risk of vascular erosion and (in the case of coils) no possibility of removal, blocking both the ingress and egress of air.

The first to use this system was De Giacomo, in 2006, successfully treating an iatrogenic alveolar leakage in the vicinity of the lingula [2]. Other authors have used these methods for treating alveolar leakages, either in a remaining lobe after lobectomy was performed for severe disease, or after surgery for empyema.
All authors have used between two and four valves for each patient, introduced in the segmental bronchi and after sequential bronchial occlusion test. As a rule, the valves were removed within a month, except in the case of death or severe clinical condition.

Our case differs from those published, in that the patient’s precarious clinical condition did not seem to allow for test occlusion of the segmental bronchi for selective implantation. We did not find any published case on the use of a single valve in a lobar bronchus. The novelty of having treated this alveolopleural fistula (FAP) by valve, secondary to a severe abdominal sepsis, is that it allowed us to avoid the only other possible alternative, which was a lower left lobectomy with protection of the bronchus by myoplasty. Finally, it was because of the severe abdominal sepsis that we elected to leave the valve as long as 10 weeks, which did not prevent a good recovery of the lower lobe ventilation after its removal.

Conflict of interest: The authors declare no commercial association that might pose a conflict of interest in connection with the submitted article.

Funding

The authors certify that no funds were used to support the study or to perform an evaluation and that no property or tested technology was purchased, borrowed or donated to the study.

REFERENCES