Endobronchial valve migration

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Abstract

Endobronchial valves are increasingly used as a treatment modality as a less invasive alternative to lung volume reduction surgery in patients with severe emphysema. Endobronchial valves have also been used to treat patients with persistent pulmonary air leaks and those with bronchopleural fistulae. We report a case of a 61-year-old male with severe bullous emphysema. Following video-assisted thoracoscopic surgery and giant bullectomy, he had a persistent air leak. We inserted two endobronchial valves (in the lingular lobe and the anterior segment of the upper lobe) and the air leak ceased immediately. However, over the subsequent 5 months following the insertion of the endobronchial valves, the patient suffered recurrent chest infections and the endobronchial valves were found to have migrated to the orifice of the basal segment of the left lower lobe and the orifice of the basal segments of the right lower lobe.

Keywords: Emphysema; Persistent air leak; Endobronchial valve

1. Background

Endobronchial valves (EBVs) are an emerging treatment modality as a less invasive alternative to lung volume reduction surgery (LVRS) for highly selected patients with severe emphysema. The promising early experiences describe short-term improvements in both spirometry and quality of life in this high-risk population [1–3]. More recently, the Endobronchial Valve for Emphysema Palliation (VENT) trial described the benefits of endobronchial valves in patients with advanced heterogeneous emphysema, with modest improvements in lung function, exercise tolerance and symptoms [4]. EBVs have also been used to good effect when treating persistent pulmonary air leaks and to close bronchopleural fistulae [5–8].

Complications associated with EBV appear common. In a case series of 98 patients [2], every patient developed at least one complication within 90 days of insertion. The commonest complications documented were exacerbation of chronic obstructive pulmonary disease (COPD), pneumonia of the non-valved lobes, pneumothorax and prolonged air leak. Other possible complications include excessive secretion production and haemoptysis [2,4].

So far, there have been no reports on EBV migration. We present an unusual case of this phenomenon.

2. Case report

A 61-year-old male was referred to our thoracic team for surgical assessment and intervention, having failed conservative management for a left-sided spontaneous secondary pneumothorax. He was known to have severe bullous emphysema predominantly affecting the upper lobes bilaterally. He underwent video-assisted thoracoscopic surgery (VATS) and giant bullectomy from the apical segment of the left upper lobe. Postoperatively, he developed a significant air leak, which resulted in a collapsed lung when off suction. The air leak persisted despite two chemical pleurodeses and thoracotomy with oversewing and application of glue to the staple line.

To control the air leak, the patient underwent insertion of EBV. Under general anaesthesia and positive pressure ventilation, a flexible bronchoscope was introduced through the single-lumen endotracheal tube. When the lingular lobe and the anterior segment of the upper lobe were occluded with an Arndt endobronchial blocker, the air leak ceased. After appropriate sizing, 4.5-mm and 5.5-mm Pulmonx Zephyr Endobronchial valves (Calmedical Ltd., Lanark, UK) were placed in the anterior segment and lingular lobe, respectively. The air leak immediately ceased, the drain was removed and the patient discharged home 3 days later with the position of the EBV being clearly seen on PA chest X-ray (Fig. 1).

Over the subsequent 5 months, the patient suffered recurrent chest infections treated mainly in the community,
but required admission to his local hospital on two occasions. The patient requested to be re-admitted for removal of the EBVs. Following 5 ml of nebulised 2% lignocaine augmented with topical 2% lignocaine via the bronchoscope and target-controlled sedation with propofol and remifentanil titrated to effect, a flexible bronchoscope was introduced. Copious, thick, white secretions were encountered. The first EBV was found to be occluding the orifice of the basal segments of the left lower lobe, while the second was occluding the orifice of the basal segments of the right lower lobe. Both EBVs were removed easily without complications, using grasping forceps through the working channel of the bronchoscope, and a thorough bronchial lavage performed.

When reviewed retrospectively, a CXR performed at his local hospital 2 month’s post insertion demonstrated one valve to have already migrated into the left lower lobe, while the position of the EBVs on pre-removal CXR confirms their bilateral position and abnormal lie (Fig. 2).

3. Discussion

Over the past few years, there has been an increasing use of EBVs electively for LVRS, resulting in published guidance from the National Institute for Health & Clinical Excellence (NICE), allowing their use within the UK only within the context of clinical trials with careful follow up [9]. Complications from EBV case series’ have been reported up to 24 months post-insertion [1], with pneumothorax, bronchospasm and bronchopneumonia as the commonest. The pneumothoraces are felt to be related to volume changes within the excluded lobe, rather than procedural [2]. The VENT trial described increased exacerbations of COPD, pneumonia and haemoptysis as the main complications [4].

EBVs are also being used in the management of patients with persistent air leaks, and bronchopleural fistulae [5–8]. Our patient suffered with a persistent air leak and recurrent collapse of the left lung when suction was disconnected, despite two pleurodeses, and a minithoracotomy. Following insertion of the two appropriately sized valves, the air leak ceased immediately, allowing the patient to be discharged home without a chest drain. There is little literature regarding the optimal timing for removal of EBVs when used in this setting. The EBVs are, however, designed to be easily grasped and removed, should the need arise.

Migration and erosion of bronchial stents have been well reported [10]; we are unaware of any reports describing migration of EBVs.

In conclusion, we have shown that despite appropriate sizing and satisfactory placement upon insertion, EBVs can still migrate. The optimal time for removal in the setting of control of air leak remains to be determined. EBVs are easily removed, as demonstrated in our case report.

References


