Video-assisted thoracic surgery lung resection after endobronchial valve placement

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Endobronchial valve (EBV) placement has emerged as an alternative approach for treating patients with severe emphysema. The improvements in lung function after EBV placement, which allows video-assisted thoracic surgery (VATS) lung resection in a previously nonsurgical candidate, have not been reported. We present a case of VATS lung resection after EBV placement in a patient with severe emphysema to illustrate clinical and surgical aspects in this new category of patients.

Clinical Summary
A 70-year-old female ex-smoker, who was known to have severe emphysema with multiple admissions for exacerbation, was treated with EBVs. The EBVs were placed in both lower lobes including the apical segments, thereby achieving total bilateral lower lobe collapse (Figure 1). During the following year, she had significant clinical improvement confirmed by serial pulmonary function tests showing an increase in forced expiratory volume in 1 second from 0.61 L (39% predicted) to 1.46 L (75% predicted), and in forced vital capacity from 1.67 L to 2.08 L. The diffusing capacity of lung for carbon monoxide of 7.3 mL · mm Hg · min (50% predicted) remained the same. However, at 1 year’s follow-up after the EBV procedure, an incidental finding of a new solitary pulmonary nodule in the left upper zone was detected on the chest radiograph. Computed tomography (CT) showed a 1.5-cm solitary pulmonary nodule arising from the left upper lobe with no mediastinal lymphadenopathy. The collapsed lower lobes with 4 in situ EBVs were also visualized on CT (Figure 1). Because of the clinical suspicion of primary lung malignancy in an ex-smoker, surgical exploration with frozen section of the lung nodule was planned. Fine-needle aspiration cytology of the lung nodule was considered but not performed. The patient made an uneventful recovery from surgery.

Discussion
In general, patients with severe emphysema have a higher risk for lung cancer. The prognosis, in terms of survival at 5 years, for patients with severe emphysema is similar for patients with lung cancer. Given the poor survival of patients with severe emphysema with or without lung cancer, the real significance of a new pulmonary nodule in this group of patients is often debatable. Some patients with emphysema simply would not tolerate lung surgery, whereas the wisdom of performing high-risk lung resection in others with limited life expectancy requires justification and further investigation. At present, it is difficult to predict whether the lung cancer or the underlying emphysema will be the terminal condition. Over the past few years, EBVs have been offered to patients with advanced emphysema, and the appearance of suspicious nodules in these patients who have undergone EBV placement has important implications.

If the nodule is located in the collapsed parenchyma, it might be difficult to identify when the collapsed lung has density and enhancement similar to soft tissue tumors. Usually, lung nodule enhancement of more than 15 Hounsfield units on high-resolution chest CT is strongly suggestive of malignancy; however, differentiation between atelectasis and malignancy could be difficult and surgical exploration may be necessary to rule out malignancy. Furthermore, a recent study by Matsuoka and colleagues showed that CT findings cannot be used reliably to discriminate between malignant and benign pulmonary nodules in patients with associated severe emphysema. In addition, if the nodule appears in the noncollapsed parenchyma, such as in our patient, there will be changes in the pulmonary anatomy after EBV placement, which can make the proper localization and adequate intraoperative palpation of the lesion more difficult. Placement of EBVs before lung resection for pulmonary nodule may significantly improve pulmonary function in patients with severe emphysema, thereby reducing the risk of surgery, or even allow previously nonsurgical candidates to undergo VATS lung resection. Our patient had post-EBV forced expiratory volume in 1 second of 1.46 (75% predicted), which would have allowed for lobectomy if the nodule were malignant.

References
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nterior mediastinal masses most commonly are asso-
ciated with thymic, thyroid, parathyroid, and lym-
phatic origin. Excluding aortic disease, vascular ori-
gin for anterior mediastinal masses is not common.
We present a case of an aneurysm of the internal thoracic vein
presenting as an enlarging anterior mediastinal mass.

Clinical Summary
A 52-year-old woman underwent a triple arthrodesis of the right
foot for orthopedic injuries sustained in a car crash 16 months
earlier. One week later while she was at home, acute shortness of
breath with wheezing developed. Results of a contrast computed
tomographic (CT) scan of the chest were negative for pulmo-
nary embolism. CT scan, however, revealed a 2.2-cm round mass
anterior to the superior vena cava and adjacent to the ascending
aorta. There was no mediastinal lymphadenopathy (Figure 1, A).
The patient was referred for further treatment. Review of the CT
scans obtained at the time of the car crash demonstrated the
presences of this mass, albeit, smaller (Figure 1, B).

The patient’s chest was explored through a limited partial upper
sternotomy incision. The mass was found to be an aneurysm of the
right internal thoracic vein just before its connection to the innom-
inate vein (Figure 2). The right internal thoracic vein was ligated
on both sides of the aneurysm, and the mass was excised. The
patient made an uneventful recovery. Pathologic examination was
negative for malignancy.

Discussion
Anterior mediastinal masses may present a challenge in diagnosis.
Depending on the age of the patient and symptoms, these may