

How to avoid “en masse” lobectomy using VATS technique in presence of hilar fibrosis

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Abstract

Perivascular fibrosis is technically one of the most challenging issue to manage during thoracoscopic lobectomy and it is associated with increased risk of hemorrhagic injury. Here we report a case of thoracoscopic right lower lobectomy performed with individual dissection of segmental arteries due to dense adventitial fibrosis around the right lower lobe pulmonary artery. This approach may be considered as an alternative to the so-called “en masse” lobectomy and a way to avoid conversion to thoracotomy.

Introduction

In the last decades, video-assisted thoracic surgery (VATS) has been widely adopted by many thoracic surgeons for the treatment

of early-stage lung cancer, showing better outcomes in the immediate postoperative period than open surgery. Overcoming the initial learning curve, high volume thoracic surgical centers began to perform complex cases of VATS lobectomy due to chemo-radiotherapy, centrally located tumors, dense hilar lymphadenopathy, etc. [1]. Perivascular and peribronchial fibrosis are one of the most complex scenarios encountered during major lung resection in minimally invasive surgery and may require, in such instances, simultaneous stapling of lobar bronchus and pulmonary artery or vein [2]. Here we present an alternative approach to perform VATS lobectomy in presence of dense fibrous tissue around bronchovascular structures.

Case Report

A 68-year-old man was admitted to our hospital for surgical treatment of pulmonary adenocarcinoma located in the right lower lobe (Figure 1A) and classified as clinical T1cN0M0 according to the 8th edition of the TNM classification for non-small lung cancer. He underwent video-assisted thoracoscopic right lower lobectomy and lymph node dissection using a standardized three-port anterior approach. During the procedure we found a perivascular fibrosis around the right lower lobe pulmonary artery (Figure 1B) with no apparent cleavage plane between inferior lobar artery and right lower lobe bronchus. After transection of the inferior pulmonary vein, the basal segmental arteries were exposed in the fissure using a radiofrequency-based device, dissected separately with a right-angle clamp and individually divided with a vascular endostapler (Figure 2). The lobectomy was then completed by staple-division of the right lower lobe bronchus plus a single superior segmental artery and performing hilar-mediastinal lymph node dissection. The patient had an uneventful recovery and was discharged home on the fourth postoperative day. Pathological stage was IA3.

Discussion

When hilar vessels and bronchi are involved by dense fibrous adhesions, the individual dissection of the bronchovascular structures during VATS lobectomy can be so difficult to require planned or emergency conversion to thoracotomy. In such instance, some authors propose the so-called “en masse” or “en bloc” lobectomy which consist of a bulk hilar division with stapler [3]. The international community of thoracic surgeons expressed doubts regarding the safety of this technique due to potential adverse events such as intraoperative bleeding and

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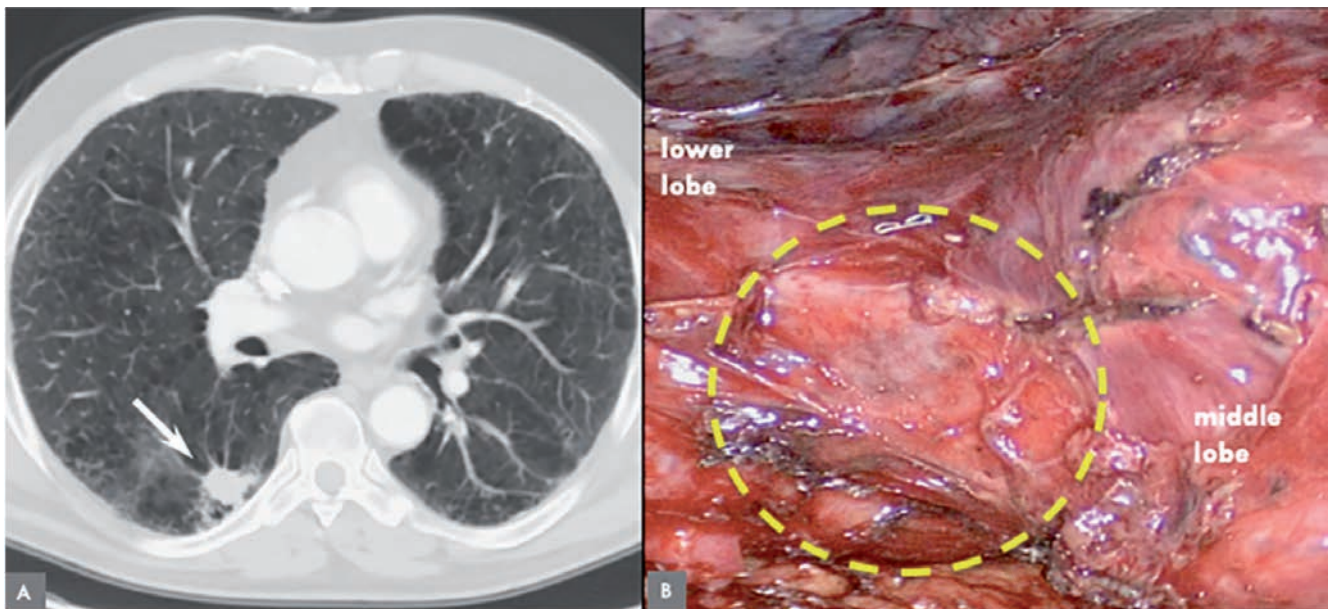


Figure 1. A) Chest computed tomography (CT) scan showing lung cancer in the right lower lobe (white arrow). B) Adventitial fibrosis of the right lower lobe artery (dashed yellow circle highlights the area) encountered during the dissection of the major fissure.

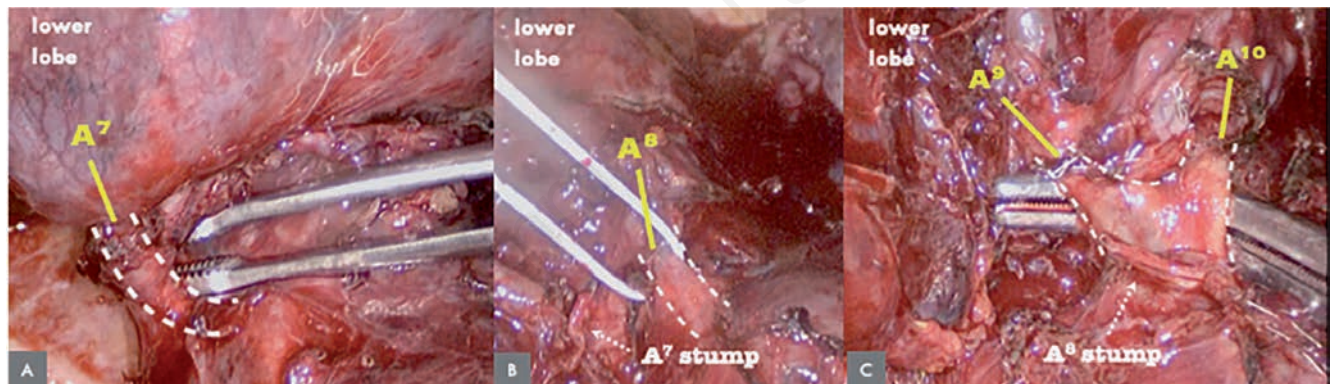


Figure 2. Intraoperative view of basal segmental arteries of the right lower lobe individually dissected. A7, medial basal segmental artery; A8, anterior basal segmental artery; A9, lateral basal segmental artery; A10, posterior basal segmental artery.

bronchopleural fistula, even if there is currently no report of such complications resulting from simultaneous stapling of hilum. However, some authors, for prevention of hemorrhagic complications during simultaneous stapling of bronchovascular structures, suggest selecting the appropriate type of stapler and to clamp the target at the thinnest part, proceeding with more caution in the presence of hilar lesions or calcified hilar lymph nodes [4]. The question of the bronchopleural or bronchovascular fistula remains unresolved and very controversial. Some authors argue that such complication may be increased, compared to the individual dissection of bronchovascular structures, firing an infected bronchus and pulmonary artery together by simultaneous stapling of hilum [3]. On the other hand, cases of arteriobronchial fistula have been reported in the literature even after VATS lobectomy performed by individual division of hilar structures [5,6] and despite various

techniques have been reported to reinforce the bronchial stump after lobectomy, such as use of pleural, pericardial and muscle flaps, the method yielding the best results still remains unclear [7]. Our case, through the individual dissection and closure of segmental arteries, shows how to avoid simultaneous bronchovascular stapling or conversion to thoracotomy when severe fibrous adhesions are encountered between the pulmonary artery and bronchus during VATS lobectomy.

References

1. Pischik VG. Technical difficulties and extending the indications for VATS lobectomy. *J Thorac Dis* 2004;6:S623-30.

2. Murakami J, Ueda K, Hayashi M, et al. Simultaneous stapling of the lobar bronchus and pulmonary artery: is it actually dangerous? *Interact Cardiovasc Thorac Surg* 2016;22:671-3.
3. Qiang G, Nakajima J. Simultaneous stapling of pulmonary vein and bronchus in video-assisted thoracic surgery lobectomy. *Ann Thorac Cardiovasc Surg* 2015;21:78-80.
4. Kamiyoshihara M, Igai H, Ibe T, et al. Pulmonary lobar root clamping and stapling technique: return of the “en masse lobectomy”. *Gen Thorac Cardiovasc Surg* 2013;61:280-91.
5. Marjanski T, Sternau A, Dziedzic R. Arteriobronchial fistula complicating right upper lobectomy. *Ann Thorac Surg* 2013; 96:e95-6.
6. Abe J, Hasumi T, Takahashi S, et al. Fatal broncho-pulmonary artery fistula after lobectomy for lung cancer. *J Surg Case Rep* 2015;9:1-2.
7. Matsuoka K, Imanishi N, Yamada T, et al. Clinical results of bronchial stump coverage using free pericardial fat pad. *Interact Cardiovasc Thorac Surg* 2016;23:553-9.

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