Brief Report

Uniportal video-assisted right S9–10 anatomical segmentectomy: how to do it

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Abstract: Video-assisted thoracoscopic surgery (VATS) lung-sparing anatomical resections preserve healthy pulmonary parenchyma but also lead to good resection margins. Oncological outcomes are similar when compared with lobectomy for the treatment of early stage lung adenocarcinoma. VATS technique to perform classical anatomical segmentectomies is well defined and even in highly experienced teams, these procedures can be performed by uniportal VATS. However, the achievement of unusual central anatomical segmentectomies through Uniportal VATS remains a challenge. We describe a feasible and reproducible technique to perform uniportal VATS right lower lateral and posterior (S9–10) anatomical segmentectomy for the treatment of early stage lung cancer.

Keywords: Thoracoscopy; video-assisted thoracoscopic surgery (VATS); bronchial neoplasms; pulmonary surgical procedure

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Introduction

Video-assisted thoracoscopic surgery (VATS) anatomical segmentectomies allow to preserve healthy pulmonary parenchyma under minimal invasive conditions but also lead to good resection margin. For its development a deep knowledge of the intrapulmonary bronchovascular anatomy and all its variants is needed (1-3). Literature supports that oncological results in terms of recurrence and overall survival are similar when compared with lobectomy for the treatment of early stage non-small cell lung cancer (4-7). VATS technique to perform classical anatomical segmentectomies (culmen, lingual lobe, basal segments and superior segment of lower lobe) is well defined (1), even in highly experienced teams, these procedures can be performed by uniportal VATS (8). However, the achievement of unusual central anatomical segmentectomies through uniportal VATS remains a challenge. We present the case of a 70-year-old woman who received uniportal VATS right lower lateral and posterior (S9–10) anatomical segmentectomy with total preservation of segments 6, 7 and 8 (S6–8) for the treatment of early stage leipidic adenocarcinoma.

How to do it

A 60-year-old woman was diagnosed of a 1.2 cm leipidic adenocarcinoma located in the right lower lateral and posterior segments (S9–10) (*Figure 1*) through transthoracic needle biopsy. Due to histology, size and location a uniportal VATS right S9–10 anatomical segmentectomy was performed (*Figure 2*) with the aim of preserve S6–8 segments, obtain adequate margin of resection and achieve fasten recovery.

Through a 3 cm incision in the 5th intercostal space the major fissure was carefully dissected identifying all the arterial branches of the right lower lobe (*Figure 3A*). Then, the pulmonary ligament was dissected and all the venous branches of the right lower lobe were also clearly identified (*Figure 3B*). As S9–10 presents complete

Figure 1 Preoperative CT-scan.

Figure 2 Uniportal video-assisted thoracoscopic surgery right S9–10 anatomical segmentectomy (9).
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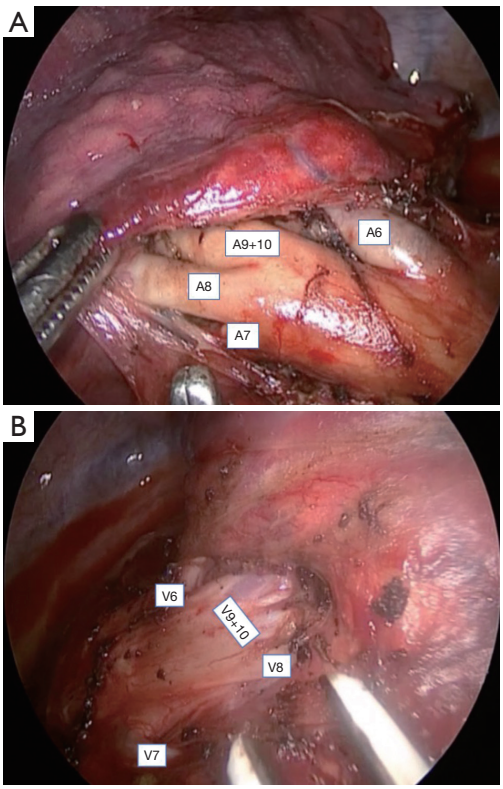

Figure 3 Segmentary identification of arterial branches (A) and venous branches (B) of the right lower lobe.

intralobar disposition, in order to control arterial branches for segments S9–10 (A9–10) it was necessary to previously control and pull back the arterial branch of segment 8 (A8), we call this manoeuvre the "loop technique" (*Figure 4A*). After safely achieve control of A9–10 we transected these branches by using endostapler. Likewise, to control the venous branches of S9–10 (V9–10) it was necessary to perform the loop technique on the venous branch of segment 8 (V8) (*Figure 4B*). After transect V9–10 the intralobar dissection was progressed (*Figure 5A*) allowing to configure the neofissures between S10 and S6, and between S8 and S9 (*Figure 5B*). This step let's get exposure of the bronchial branches for segments 9 and 10 for the later selective division by using endostaplers (*Figure 6*). Finally, the specimen was removed and full preservation of S6–8 was obtained. The resection margin was free at 4 cm. Radical lymphadenectomy was completed. Final pathological stage was T1bN0M0. The postoperative period was uneventful, and the patient was discharged home in postoperative day 2 with satisfactory chest X-ray (*Figure 7*). After 9 months of follow-up, the patient remains free of disease.

Discussion

The non-classical anatomical segmentectomies in the lower lobes are infrequent and involve great complexity due to the enormous anatomical variability. Its implementation is strictly limited to particular cases where the lesions are small and clearly located in these segments. In addition, performing an anatomical resection in the most central segments (S9 and S10), increases the difficulty since a deeper intrapulmonary dissection is necessary to ensure two appropriate neofissures (between S8 and S9 and between S10 and S6) in order to guarantee a good resection margin. In our case, by doing S9–10 anatomical segmentectomy we achieved the aim of preserving 60% of the right lower lobe which is very remarkable if comparing with total loss of right lower lobe (lobectomy) or with just one remaining segment (basal segmentectomy). In addition, uniportal

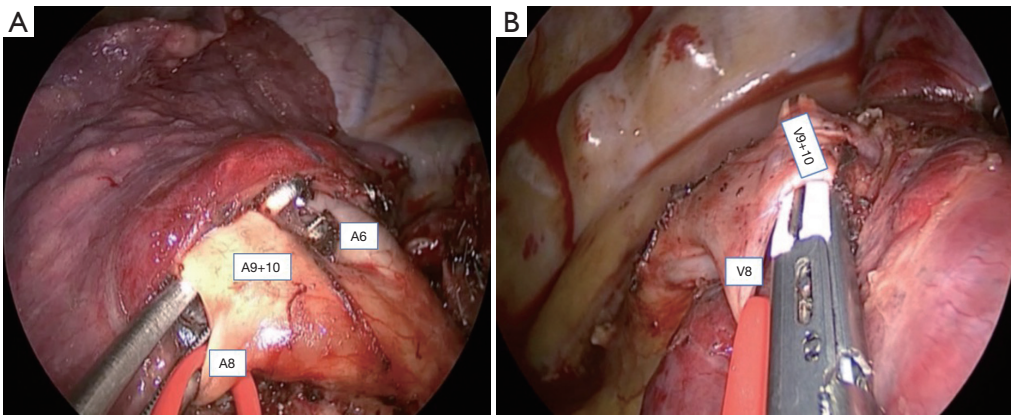

Figure 4 Loop technique for control of A9–10 (A) and V9–10 (B).

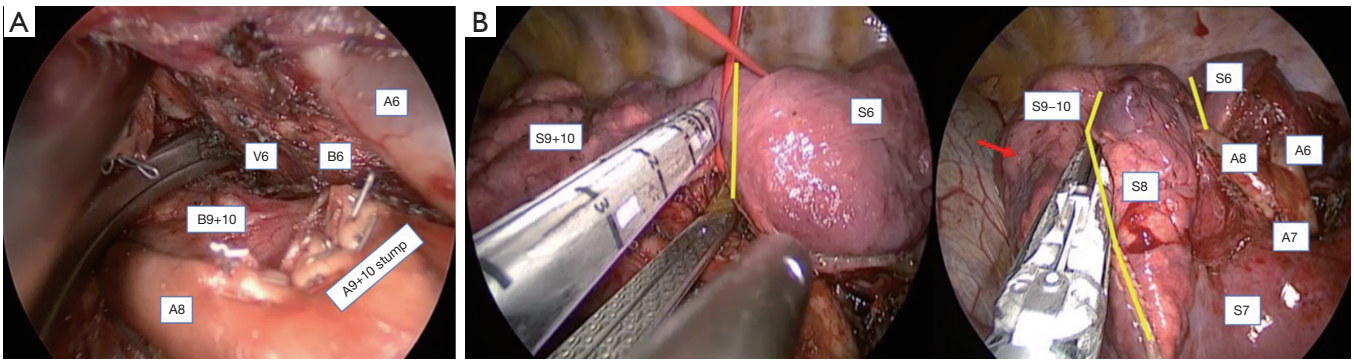

Figure 5 Intralobar dissection (A) in order to allow neofissures configuration (B). Note small localized lesion (red arrow) and the news intersegmentary fissures (yellow lines).

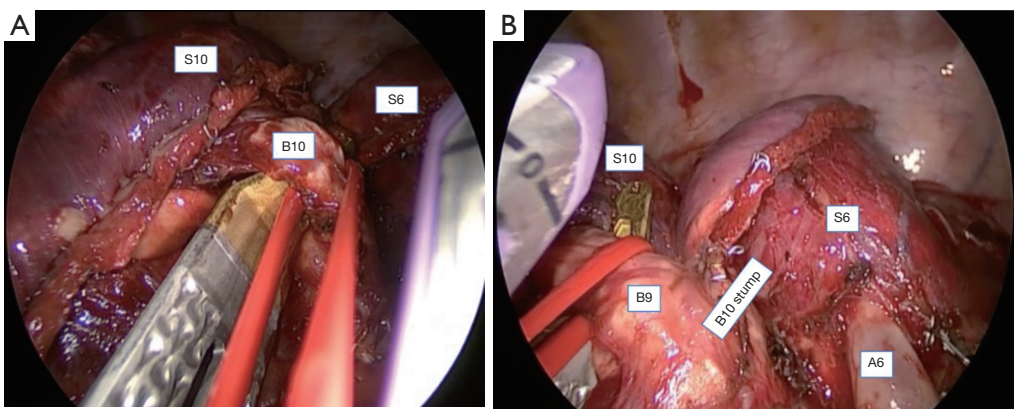

Figure 6 B10 (A) and B9 (B) control and section by endostapler.

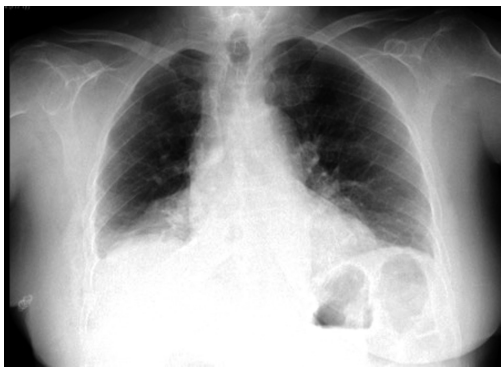

Figure 7 A 48 h postoperative Chest X-ray.

VATS decreased postoperative pain and fastens recovery. Absence of postoperative complications proves this approach is feasible and safe even for unusual central lung-sparing anatomical resections as in our case. Despite its high technical complexity, uniportal VATS unusual anatomical segmentectomies are safe and feasible in experienced teams and it is advisable to have previously overcome the uniportal vats learning curve in classical anatomical segmentectomies before performing these procedures.

Acknowledgments

None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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