



Technical aspects of biportal video-assisted thoracoscopic right S7 segmentectomy of the lung

Alessandro Brunelli

Department of Thoracic Surgery, Leeds Teaching Hospitals NHS Trust, St. James's University Hospital, Leeds, UK

Correspondence to: Dr. Alessandro Brunelli, MD. Department of Thoracic Surgery, Leeds Teaching Hospitals NHS Trust, St. James's University Hospital, Leeds, UK. Email: brunellialex@gmail.com.

Abstract: The technical aspects of the biportal anterior approach for right anterior and medial basal segmentectomy are described with particular emphasis to meticulous dissection and exposure of the segmental hilar structures. The key step is the identification of the arterial branches to the anterior and medial basal segment (A7+8) and after their division of the respective segmental bronchus.

Keywords: Medial basal segmentectomy; video-assisted thoracoscopic surgery (VATS); S7 segmentectomy; lung resection

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General principles

As a rule, we perform video-assisted thoracoscopic surgery (VATS) anatomic segmentectomies through a biportal approach, including a 3–4-cm anterior utility incision and another 1.5 cm inferior port.

We utilize a 5 or 10 mm, 30-degree angled high definition video-thoracoscope.

The surgeon and the assistant are usually positioned on the anterior (abdominal) side of the patient. The surgeon can change position and place himself cranially or caudally with respect to the assistant depending on the different steps of the operation.

Initially, the anterior utility incision is made and the wound is protected by a plastic soft tissue retractor (wound protector) kept in place by a ring in the chest cavity and one outside the skin (Alexis Retractor, Applied Medical, USA). This incision is usually placed at the 4th–5th intercostal space between the tip of the scapula and the breast in the anterior axillary line.

A second 1.5-cm port is positioned more posteriorly at the level of the 7th intercostal space just anterior to a straight line down from the tip of the scapula and is performed under endoscopic guidance using the thoracoscope through the utility incision made previously.

Specific technical steps (video Brunelli RS7 after middle lobe)

For the S7 or S7+8 segmentectomy dissection of the inferior pulmonary vein is not always necessary. In the case presented in the video, however, the tumor, a typical carcinoid, was in close proximity of the vein and careful dissection was needed to rule out infiltration and ensure adequate resection margins.

If the vein needs to be dissected, the camera is placed in the inferior port. However, once the dissection of the inferior vein is completed, the camera is moved in the utility incision to allow a more direct vision of the hilar structures similar to the exposure obtained in open surgery or with single port operations. The inferior port is utilized to introduce a lung grasping instrument. The camera position however can be changed from one port to another if necessary particularly during specific steps of the operation (parenchymal division, lymphadenectomy, etc.).

As shown in the video (*Figure 1*), most of the hilar dissection can be performed bluntly. During this phase we generally use a thoracoscopic suction device, which also keeps the field dry during dissection, and a monopolar diathermy with a long-shielded tip or an energy device. We recommend use of the endoscopic forceps with axial handles



Figure 1 Technical aspects of biportal video-assisted thoracoscopic right S7 segmentectomy of the lung (1).

Available online: <http://www.asvide.com/article/view/25945>

to assist during this step.

As shown in the video, the fissure is opened anteriorly to expose the lower lobe pulmonary artery and its A7+8 segmental branches. The antero-medial basal segmental branch is dissected to expose the A7 branch running medially, which can be divided using vascular clips and energy device as shown in the video. Alternatively, endovascular stapler can also be used depending on the size of the vessel.

The dissecting instruments and energy device are introduced through the utility incision.

After division of the segmental artery the segmental bronchus (B7) is clearly exposed. To facilitate dissection and division of the bronchus sometime a small medial segmental vein (V7) needs division. The B7 bronchus is encircled and divided using an endoscopic stapler generally introduced through the utility incision. In case the angle is more favorable the endoscopic stapler can be introduced through the inferior port, moving the lung grasping instrument in the utility incision to give more space to the stapler device and reduce trauma to the intercostal nerve at this site. Before the bronchus is divided we generally ask the anesthetist to re-inflate the lung, while the segmental bronchus is clamped. This maneuver is performed to identify the intersegmental plane. In many cases, the use of stapling devices allows to perform an extended segmentectomy including part of the parenchyma of the adjacent segment in case of tumors close to the resection margins.

Once all segmental hilar structures are divided, the intersegmental plane is divided using endoscopic staplers along the inflation-deflation line. This step can be

accomplished by alternating the camera from the utility incision to the inferior port. This will depend upon the angle of exposure and the most convenient point of entry for the endoscopic stapler.

The specimen is finally extracted from the chest in a protective bag (this can be achieved with or without prior removal of the wound protector). Finally, a systematic lymph node dissection is performed.

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References

1. Brunelli A. Technical aspects of biportal video-assisted thoracoscopic right S7 segmentectomy of the lung. *Asvide*

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