



Technical aspects of biportal video-assisted thoracoscopic S10 segmentectomy of the lung: fissureless posterior approach

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Abstract: The technical aspects of the biportal approach for postero-basal segmentectomy are described. The approach is a fissure-less one. The first and most important step is the identification and division of the postero-basal segmental vein in the posterior hilum of the lung. The division of the segmental vein is essential to expose the segmental bronchus, which is divided next. The segmental bronchus is in close relationship with the A10 segmental artery, which is divided next. The fissure is not violated in any of the steps presented in this technique. Finally the intersegmental plane is completed along the inflation-deflation line using endostaplers.

Keywords: Postero-basal segmentectomy; video-assisted thoracoscopic (VATS); fissureless; S10 segmentectomy; lung resection

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General principles

As a rule we perform video-assisted thoracoscopic (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 HD 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 (Figure 1)

For the S10 segmentectomy, I prefer a posterior approach to the hilar structures of the segment as shown in the video. In this approach the camera is almost always kept in the inferior port, similar to what is done for lower lobectomies. This allows a more direct visualization of the inferior pulmonary vein (IPV) and the posterior aspect of the hilum. The entire posterior mediastinal pleura are opened. Station 7 lymphadenectomy is usually performed at this stage and often facilitate further dissection of the hilar structures of the lung. The hilar dissection is generally performed using a combination of thoracoscopic suction device, which also keeps the field dry during dissection, and a monopolar diathermy with a long shielded tip or an energy device.

The IPV is carefully dissected to expose its segmental branches. The most important point is to identify the superior segmental vein that must be preserved. Caudal



Figure 1 Technical aspects of biportal video-assisted thoroscopic S10 segmentectomy of the lung: fissureless posterior approach (1).

Available online: <http://www.asvide.com/article/view/25766>



Figure 3 Division of segmental bronchus B10 (3).

Available online: <http://www.asvide.com/article/view/25768>



Figure 2 Division of segmental vein V10 (2).

Available online: <http://www.asvide.com/article/view/25767>



Figure 4 Division of segmental artery A10 (4).

Available online: <http://www.asvide.com/article/view/25769>

to the superior segmental vein (V6), is the V10, which is dissected and divided using a vascular endoscopic stapler. Alternatively, if the size of the vessel is relatively small (<6 mm), vascular endoclips and energy device can be used to divide the vessel. This step of the operation is crucial as it allows the identification of the segmental bronchus, which lies immediately anterior to the vein (*Figure 2*, S10). Once identified, the B10 is carefully dissected, encircled and divided using endoscopic stapler passed usually from the utility incision (*Figure 3*, S10).

As shown in the video, the next step is the identification of the A10 segmental artery, which is situated in close proximity of the segmental bronchus usually in a more anterior and cranial position. The A10 is carefully dissected and divided using endoscopic vascular stapler. This step

is facilitated by the partial fissureless division of the parenchyma between the superior and posterior segments using a tunnel technique (*Figure 4*, S10).

The final step after the division of the segmental artery is the division of the intersegmental parenchymal plane. We usually identify the segmental plane re-inflating the lung and after clamping the segmental bronchus. However, especially for the basilar segments of the lower lobes this step is often challenging as the plane that needs division is tridimensional (i.e., pyramidal).

The intersegmental plane is divided successive application of 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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accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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