Technical aspects of biportal video-assisted thoracoscopic fissureless right S1+2 segmentectomy of the lung

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Abstract: The technical aspects of the biportal anterior approach for right apical and posterior segmentectomy are described. The approach is a fissure-less one. The first step is the division of the apical vein anteriorly, followed by the dissection and division of the apical artery. This step will expose the apical B1 segmental bronchus, which is divided. Following this division, the ascending posterior segmental branch of the pulmonary artery (rec A2) is exposed and divided. The next step is the division of the B2 segmental bronchus. The fissure is not violated in any of the steps presented in this technique. Finally the intersegmental plane between the two segments and the anterior segment is completed along the inflation-deflation line.

Keywords: Apical and posterior segmentectomy; video-assisted thoracoscopic (VATS); S1 segmentectomy; S2 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*)

In case of right S1+2 segmentectomy, the initial approach is similar to that of a right upper lobectomy with dissection of the right upper lobe hilum. For most of the operation the camera is placed through the utility incision similar to a single port approach and the inferior port is used to introduce a lung grasping instrument. The apical vein (V1) is dissected first and divided using endovascular stapler. Subsequently, the superior truncus of the pulmonary artery is dissected to isolate the apical branch (A1), which is encircled with a right-angled dissector and divided using endovascular stapler.

As shown in the video, 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 an energy device. A monopolar

Figure 1 Technical aspects of biportal video-assisted thoracoscopic fissureless right S1+2 segmentectomy of the lung (1). Available online: http://www.asvide.com/article/view/25710

diathermy with a long shielded tip is also used as a dissecting instrument.

After division of the A1 segmental artery the segmental bronchus for the apical segment (B1) is dissected, isolated and divided using endoscopic stapler, which is introduced through the utility incision. If the angle is more favorable the stapler can be introduced through the inferior port after moving the lung holding instrument (ring forcep) in the utility incision.

The division of the B1 bronchus exposes the ascending posterior segmental branch of the pulmonary artery (rec A2). This branch is carefully dissected and divided using endovascular stapler. Alternatively, endovascular clips and energy device can be used depending on the size of the vessel.

The last step of the operation consists in the division of the posterior segmental bronchus (B2). For this phase, like in right upper lobectomies, the camera is temporarily moved in the inferior port to have a better vision of the posterior hilum. Station 7 lymphadenectomy is performed and the RUL bronchus is dissected posteriorly.

When the posterior dissection is completed, the camera is moved back to the utility incision and the lung is retracted posteriorly with a grasping forceps introduced through the inferior port. At this stage the B2 is dissected by using a Debekey or a Harken clamp and divided using an endoscopic stapler.

We usually clamp the segmental bronchus before its division and ask the anesthesiologist to reinflate the lung to identify the intersegmental plane.

The final step of the right apico-posterior segmentectomy is the division of the parenchymal intersegmental plane, which is accomplished through the use of successive endoscopic staplers along the inflation-deflation line.

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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