

Peer Review File

Article information: <https://dx.doi.org/10.21037/jovs-21-49>

Reviewer A

Congratulations to the authors on accomplishing the subxiphoid VATS S9+10 bisegmentectomy with the assistance of 3D-CT, 4K thoracoscope, and ICG.

Thank you

Despite it is a successful treatment experience, but to some extent, it is quite challenging to reproduce the similar surgical process for most of the thoracic surgeons without the sufficient technique, not to mention the high-tech equipment.

Yet, it was not a robotic surgery and the patient was discharged on POD1 for both right and left surgeries, which is rather cost efficient?

The authors should still be commended on accomplishing this complex surgery, but I have some questions that be addressed in the following:

First, since you emphasize the ERAS program has been employing in your daily surgical practice, can you report the details such as the chest drain size, strategy of pain control, and the involvement of anesthesiologist? Based on the establishment and development of the ERAS, a near perfect ERAS program could not be completed without the aforementioned roles.

Yes, corrections line 149-157:

“A 24 Fr subxiphoid chest tube was then placed.

Postoperative course

The patient was extubated in operating room and integrated in an enhanced recovery after surgery (ERAS) programme combining early physiotherapy, feeding and mobilization and opioid-free analgesia limited to an association of non steroid anti inflammatory drugs and paracetamol. He was discharged on postoperative day-1 after early chest tube removal (11) with an uneventful postoperative course.”

Second, since the patient have 3 suspected metastatic lung nodules and his lung function is quite tolerated.

In lieu of the policy of ERAS and the concern of medical expenditures, do you consider simultaneous (one-stage) bilateral lung partial resection? Which means that you can use subxiphoid approach (through the common utility port of subxiphoid incision) with additional bilateral 1 or 2 thoracic incisions to sequentially resect the three nodules on one anesthesia. Maybe in the future, you can perform such procedure in appropriate-selected patients to achieve the maximal ERAS

benefit and gaining the benefit of reduced medical expenditures.

We agree and we already manage bilateral metastatic disease through a synchronous subxiphoid bilateral approach for bilateral wedge resection or simple segmentectomy and contralateral wedge. However, we prefer, for the moment, a metachronous approach in cases of such complex segmentectomy. Indeed, with a growing experience, one-stage bilateral complex segmentectomy could be an interesting ERAS option in the future.

We made the choice not to extend the discussion to this specific topics of bilateral subxiphoid resection.

Reviewer B

This is a well-written article with good graphic documentation. 3D image analysis is particularly interesting.

Thank you

I recommend (in addition to the video) that authors share a picture of the approach where describe in what space and what measures the accessory port has, as it is a multiportal subxiphoid approach, I think this will help the reader less familiar with this type of approach.

Ok, figure 5 seems to be a good illustration?

On the other hand, it is noteworthy that the histological suspicion was of metastasis, and this is also confirmed by frozen section, so the lymphadenectomy performed was avoidable. Moreover the authors speak about "radical lymphadenectomy", when there is only footage of a subcarinal sampling and in territory 11, in no case is a systematic dissection and resection of territories 10, 4R, 2R and interlobars performed, so I think it is incorrect to use the term radical lymphadenectomy. This, precisely, is one of the major drawbacks encountered by surgeons who have used this type of approach, the impossibility of performing an optimal radical lymphadenectomy as in the conventional VATS (uni or multiportal) approach.

We agree: "radical lymphadenectomy" is not correct. It was a lobe-specific lymphadenectomy. We emphasize however that subcarinal node resection was not a sampling but a complete en-bloc lymphadenectomy (Subcarinal area looks totally dissected on the video)

We are also able to perform complete lymphadenectomy in latero tracheal and upper hilar areas: that's why we decided to maintain a "multiportal" subxiphoid approach. We agree that complete lymphadenectomy is highly difficult and often not oncologically satisfying through "uniportal" subxiphoid approach.

Correction: (line 109-110)

“The patient was then rolled anteriorly and the lower lobe also flipped anteriorly, giving access to subcarinal area for a **lobe-specific** LN dissection of station 7, 8 and 9, after inferior pulmonary ligament section and **sampling** of station 11 of the second carina.”

Reviewer C

1. The whole steps are written in detailed with excellent surgical skills.

Thank you

2. (Page 3 line 67) Is the left side surgery also done in subxiphoid approach? One of the advantages of the subxiphoid approach is that you can approach the lung lesions on both sides from the same utility incision. Could author perform S9+10 segmentectomy via midline subxyphoid approach for bilateral lesions?

Yes, the left side surgery was done in multiportal subxiphoid approach. I give the same answer as for Reviewer A: we already manage bilateral metastatic disease through a synchronous subxiphoid bilateral approach for bilateral wedge resection or simple segmentectomy and contralateral wedge. However, we prefer, for the moment, a metachronous approach in cases of such complex segmentectomy. Indeed, with a growing experience, one-stage bilateral complex segmentectomy could be an interesting ERAS strategy in the future.

We made the choice not to extend the discussion to this specific topics of bilateral subxiphoid resection.

3. (Page 6 line 127) ICG dose is "0,3" mg/kg. Do you miswrite the decimal point as a comma?

Correction: line 128

“0.3 mg/kg”

4. Why author used 2 cm halo ball for margin detection? We could calculate the distance between the intersegmental plane and tumor by Synapse software. By using the halo ball, the distance between tumor and intersegmental plane would be mislead, especially for metastectomy, one centimeter resection margin is enough. From the image, it looked like the S7a was more close to the tumor than S7b. Why author resected S7b instead of s7a?

We appreciate to take a large safety margin even for metastatic lesions, to ensure the parenchymal margin. That is why we used a 2 cm halo. In this case, the nodule was quite central and equidistant from S7b and S7a with sufficient margin. S7 was unusually voluminous with S7b protruding over S10 and A7b and B7b rising posteriorly between V6 and basal vein. So We had to take S7b and a

very small part of S7a with S10, to avoid venous congestion and to facilitate next ISP division step. The idea was here to divide S7b and S7a from bottom to top as an “open book”, before basal complementary ISP division between S9 and S8.

5. Please show the tumor in the chest CT scan. Then we could understand the requirement of extension of resection.

OK

Correction: figure 1

6. Please condense the figures once you add the CT scan result of this patient.

OK

Correction:

- Figure 2 condensing arterial, venous and bronchial reconstruction (old figures 1/2/3)
- Figure 7 condensing ISP stapling steps figure with final stapling view figure
- Figure 9 added for CT scan result

Reviewer D

This report was very interesting, it has few limitations although I addressed a few comments below.

Thank you

Major comments

1. This manuscript was well written about the difficult characteristics during thoracoscopic S9+10 segmentectomy. I could agree with authors' opinions about the problems of thoracoscopic S9+10 segmentectomy and learn a lot of technical approaches by reading this manuscript.
2. I agreed with the S7b subsegment resection in this procedure. How did the authors identify the intersegmental plane between S7a and S7b during the division of the parenchyma?

Good question. This first ISP division (ISP1) had to be done before A7b clip, so we were not able to use fluorescence for S7b/S7a split. Therefore, this division had to be a little approximative, we agree. We respected V7a and B7a on the right and followed inferior pulmonary ligament axis giving us the right direction.

Correction: line 119-120

“It started with a first inferior stapling (ISP¹) dividing S^{7a} and S^{7b}, respecting V^{7a} and B^{7a} and guided by inferior pulmonary ligament axis.”

3. Although I think that the indocyanine green method is very useful in thoracoscopic segmentectomy, the method has a time limit for identifying the intersegmental plane. How long did the authors take for this operation? And, how many times the authors inject the indocyanine green?

ICG was used only once, after A9+10 stapling. After ICG intravenous injection, we have then 3 to 5 minutes to cauterize the demarcation line between S⁹⁺¹⁰ and adjacent still vascularized segments, before it spreads through the line.

Correction: line 128

“single injection of ICG”

Minor comments

In line 43, can the describing of ‘intersegmental plane’ be ‘IPS’ because the authors used the abbreviation of IPS?

OK