

Peer Review File

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Reviewer A

Your work will be a key point for (at least) segmental surgeries, solving some debates and meanwhile, raising some new questions in anatomic lung resections (of course!, what did you expect!...).

1. The main missing discussion, from my point of view, is that, in a missing fissure, a lobectomy should be extended to the adjacent lobe not only because of the possible arterial and venous variations, or STAS free going through the missing fissure parenchyma, but from the lymphatic point of view. The peripheral lymphatic network is common in both lung territories non-separated by the missing/ incomplete fissure. We perform lobectomy-type resection in cancer because of this subpleural lymphatic network, and we complete the lymphatic drainage resection by performing intrapulmonary, hilar, and mediastinal lymph node dissection. So, in the complete absence of the horizontal fissure, for example, should we perform a bilobectomy for cancer? I think this discussion should be added to your work.

Reply: We fully concur with you that the subpleural lymphatic network plays a crucial role in tumor spread. The complete resection of the tumor lymphatic drainage is necessary for optimal tumor clearance and accurate staging. From the lymphatic point of view, the right upper lobe and middle lobe should be removed as the left upper lobe for cases with the missing/ incomplete horizontal fissure. However, our study was unable to actually answer this question due to the lack of relevant data and analysis. In fact, this raises a new question: Can sublobar resection achieve comparable oncological efficacy to lobectomy? Lung segments are not separated by visceral pleura and the sublobar resection could not completely remove the lymphatic drainage of the lobe. Nevertheless, a growing body of evidence suggests that sublobar resection is not inferior to lobectomy for early-staged lung cancer. Therefore, we speculate that a bilobectomy may be unnecessary for this patient population. However, if the tumor is deeply located in pulmonary parenchyma and in proximity to an incomplete fissure, it may be prudent to consider extended lobectomy or lobectomy coupled with a partial resection of the adjacent lobe. This ensures a safe surgical margin.

Changes in the text: We have modified our text as advised (see Page 12, line 266).

2. The second addition to be made is the discussion of the arterial-bronchus approach in some segmentectomies versus arterial-bronchus-venous. My opinion is that a segmentectomy is not typical without a vein approach, but this discussion should be added to your article because there are divided opinions among thoracic surgeons worldwide.

Reply: We very much agree with your opinion. Veins traverse between segments, serving as the surgical boundary for segmentectomy. In our practice, a vein approach

is usually used when performing segmentectomy in the upper lobe. It is also very useful if you perform S10/S9+10 from the inferior pulmonary ligament. Intersegmental veins are always preserved during segmentectomy to protect the blood draining of adjacent segments. As highlighted in this study, the resection of translobar veins does indeed compromise the gas-exchanging function of preserved lobes. A vein approach is not only useful for segmentectomy, but is also adoptable for the right upper lobectomy in cases with the missing/ incomplete horizontal fissure.

Changes in the text: We have modified our text as advised (see Page 12, line 259-260).

Reviewer B

Nice study.

I found in this article several interesting information.

Reviewer C

This is an interesting technical article on the anatomical variations of translobar bronchi, arteries, and veins. It is well written in general (although some minor language problems exist), and the abbreviations make it slightly tricky to follow.

To begin with some general remarks regarding the paper as a whole.

- The text contains grammatical and syntax errors as well as many typos that need to be addressed and which somewhat influence the meaning.

I suggest a thorough spell-check before re-submission.

Some examples:

- Page 2, Line 33: Surgical results should be replaced with perioperative findings

Reply: Thank you very much for your comments. We thoroughly check the spelling and grammar of the text.

Changes in the text: We have modified our text as advised (see Page 2, line 32).

- Page 4, Line 77: surgical results should be defined

Reply: We have defined surgical results in the methods section of the article (see Page 7, line 116-118, *Analysis of surgical results*).

- Page 5, Line 84: upper oblique interlobar fissure

Reply: Thank you very much for your correction.

Changes in the text: We have modified our text as advised (see Page 6, line 100).

- Line 99, predominant and not predominate

Reply: Thank you very much for your correction.

Changes in the text: We have modified our text as advised (see Page 6, line 106).

- Page 5, Line 110; I would replace accidental injury with accidental transaction

Reply: Thank you very much for your advice.

Changes in the text: We have modified our text as advised (see Page 7, line 118).

- Page 7, Line 160: Please rephrase

Reply: Thank you very much for your advice.

Changes in the text: We have modified our text as advised (see Page 9, line 174-175).

- Page 7, Line 167-168: Please rephrase

Reply: Thank you very much for your advice.

Changes in the text: We have modified our text as advised (see Page 9, line 181-183).

The order of the figures in the text does not comply with the order of the figures themselves. A general remark regarding the figures is that although they are very interesting, the number makes them challenging to follow.

Reply: Thank you for your comment. You are correct that the order of **Figure 3C** does not comply with the order of the figures in the text. However, the **Figure 3A-B** and **Figure 3C** illustrate the same anatomical variation that the branch of V² crosses UOIF, descends along the posterior bronchus intermedius, and drains into IPV. Given this similarity and for the sake of visual aesthetics, we made the decision to position **Figure 3C** at the forefront of Figure 3.

Page 4, Line 82: where all patients that underwent thoracoscopic surgery or ONLY the lung resection cases included? Please clarify

Reply: Thank you for your correction. Only patients who underwent thoracoscopic lung resection cases were included.

Changes in the text: We have modified our text as advised (see Page 6, line 86).

Page 4, Line 91: Please report the medical product correctly.

Reply: Thank you for your correction.

Changes in the text: We have modified our text as advised (see Page 6, line 96).

In conclusion, this paper needs minor revisions to be considered for publication. Correct me if I am wrong, but the paper is very technical for the usual JTD articles. Maybe it should be considered for another journal of the same groups? Otherwise, the topic is very interesting and relevant for thoracic surgeons.

Reviewer D

Thank you for the opportunity to review this article. I congratulate the authors for the complex analysis of the CT scans of the patients enrolled in this study with 3D-CTBA. The analyzes performed demonstrate how it will be increasingly important to perform three-dimensional reconstructions to better plan the anatomical resection.

I only have two observations to make:

- in line 93 upper is missing in the definition of oblique interlobar fissure (UOIF)

Reply: Thank you very much for your correction.

Changes in the text: We have modified our text as advised (see Page 6, line 100).

- furthermore, atypical resections were also included in this study and it should be specified whether in all of them it was necessary to open the interlobar fissure.

Reply: Thank you for your comment. Do "atypical resections" refer to wedge resections? Whether or not to open the interlobar fissures depends on the tumor location. It is usually unnecessary to open the interlobar fissure during wedge resections. However, for nodules deeply located in the S³b of right upper lung and close to the mediastinum surface, wedge resection can be easier after opening the incomplete horizontal fissure.

- finally, it would be useful to perform a more accurate analysis of the perioperative results to better understand the implications of intersurgical bronchovascular structures

Reply: We quite agree with your opinion. It would be more powerful to explain the significance of translobar bronchovascular structures if we analyzed postoperative complications. However, probably due to the compensation of residual blood vessels, the transection of translobar vessels did not result in serious complications, such as severe pulmonary infarction or congestion. Nevertheless, there appears to be a slightly elevated incidence of postoperative blood sputum in patients with transected translobar vessels. In addition, mismatched information of postoperative complications could not lead to a reliable conclusion. Consequently, we cannot perform a more accurate analysis of the perioperative results. We acknowledge this limitation in the last paragraph of the article (refer to Page 12, lines 273-275).

Reviewer E

The authors evaluated the anatomical distribution of translobar bronchi, arteries, and veins hidden in the interlobar fissures (IFs) and investigated their clinical significance in pulmonary resection. They found that translobar bronchovascular structures exhibited a high incidence and were more commonly present in incomplete IFs. Moreover, 12.0% of translobar arteries and 75.0% of translobar veins were mistransected during anatomical pulmonary resection, resulting gas-exchanging dysfunction in the preserved territory. They suggested that surgeons should pay increased attention to these structures to prevent accidental injuries during anatomical pulmonary resection.

This paper is a very interesting study for pulmonary surgeons.
I have the following concerns.

Comment 1

The dotted lines in Figure 1b and c are marked HIF, but are these lines not OIF? Please confirm and correct.

Reply: Thank you very much for your correction.

Changes in the text: We have corrected the marks of Figure 1 as advised.

Comment 2

The dotted lines in Figure 2B and C are marked HIF, but are these lines not UOIF? Please confirm and correct.

Reply: Thank you very much for your correction.

Changes in the text: We have corrected the marks of Figure 2 as advised.

Comment 3

The authors stated that the mistaken transaction of the pulmonary vessels created an inflation-deflation line to the preserved lung (Line 233-232). With the collapse of the lungs, the small airways gradually closed and the residual gas could only be absorbed by blood circulation. The territory supplied by severed vessels could not deflate completely, while the area that had normal blood circulation could.

If this mechanism is correct, this phenomenon should occur in cases in which the PV was accidentally transected and not in cases in which the PA was accidentally transected. Did the same phenomenon actually occur in cases in which the PA was incorrectly transected?

Reply: It is a good question. Yes, this phenomenon actually occurs in cases in which the PA was incorrectly transected. The best evidence is that an inflation-deflation line can be formed during a single subsegmentectomy in which only the subsegmental artery and bronchus are cut off and no intersubsegmental vein is cut off. If the intersegmental/intersubsegmental vein is intentionally transected, the inflation-deflation line will be deviated to the preserved lung.

Also, is it possible that there was blood stasis in the area where the PV was incorrectly transected, just visible on the inflation-deflation line? I believe pulmonary blood stasis can be evaluated on early postoperative X-rays.

Reply: We agree with your opinion. The incorrect transection of translobar veins lead to the imbalance of ventilation/perfusion ratio (V/Q) in the preserved area, which would result in abnormal inflation and blood stasis after the inflation and deflation of the lung. As you said, pulmonary blood stasis can be evaluated on early postoperative X-rays.

Comment 4

In practice, surgeons often have no choice but to sacrifice vessels that should be preserved. I believe this paper also includes cases in which vessels were intentionally sacrificed. Please consider adding or modifying your comments in the Results or Discussion sections in this regard.

Reply: We quite agree with your opinion. In practice, we sometimes have no choice but to intentionally sacrifice vessels that should be preserved, such as the thin VX^{6a} or VX^{4a} that drained into the central vein. Nevertheless, in cases where the translobar vessels were relatively thick and there were no other significant compensatory vessels, preserving these vessels should be prioritized as much as possible.

Changes in the text: We have modified our text as advised (see Page 12, line 260-263).

Comment 5

Are there any cases of severe hypoxemia in cases of accidental vascular transection? In addition, please present any postoperative complications resulting from the incorrect vascular transection.

Reply: No severe hypoxemia occurred. It would be more powerful to explain the significance of translobar bronchovascular structures if we analyzed postoperative complications. However, probably due to the compensation of residual blood vessels, the transection of translobar vessels did not result in serious complications, such as severe pulmonary infarction or congestion. Nevertheless, there appears to be a slightly elevated incidence of postoperative blood sputum in patients with transected translobar vessels. (We have encountered a case of postoperative hemoptysis in a patient who had multiple primary lung cancers and underwent a combined S²+S³a segmentectomy of the right upper lobe. In this case, the V¹a drained into the central vein. However, the central vein was only 1cm from the nodule and it was transected to secure the safe surgical margin. Following the inflation-deflation method, S¹ was abnormally inflated, and the intersegmental interface could not be clearly defined. The postoperative CT examination showed obvious blood stasis in the residual right upper lobe.) In addition, mismatched information of postoperative complications could not lead to a reliable conclusion. Consequently, we cannot perform a more accurate analysis of the perioperative results. We acknowledge this limitation in the last paragraph of the article (refer to Page 12, lines 273-275).