

Peer Review File

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Reviewer A

[Major revision]

I would like to know more details about the degree of adhesion, which is the key point in this case. It would be easier for readers to understand if you could describe it in detail or present intraoperative pictures.

Reply: Thank you for your valuable suggestion. As pointed out, the important key point in this case is that the tumor was correctly identified and the operation was completed with wedge resection, despite the fact that all of the remaining lower lobe was adherent to the chest wall, mediastinum and diaphragm. Although its usefulness in patients with adhesions in the thoracic cavity has already been reported, the importance of achieving wedge resection using the RFID lung marking system was particularly high in this patient, who was a revision case. Therefore, I will try to explain the degree of adhesion in the thoracic cavity in more detail and emphasize key points.

We have added the below text to the "Abstract" and "Case Description" sections.

(Abstract) At surgery, there were findings of adhesions of the residual lower lobe to all the chest wall, diaphragm, mediastinum, and pericardium.

The revisions span from Line 34 to 35.

(Case description) The thoracic cavity showed full adhesions to all chest walls, diaphragm, mediastinum, and pericardium. Especially just under the wound used in the previous surgery, a strong adhesion was observed.

The revisions span from Line 76 to 78.

In addition, pictures (Figure 4) and videos (Video 1) of the surgery were attached to the report to make it easier for readers to understand.

[Minor revision]

Abstract

Please describe the degree of adhesion in more detail.

Reply: Thank you for giving the useful point.

We have added the below text to the "Abstract" section.

“At surgery, there were findings of adhesions of the residual lower lobe to all the chest wall, diaphragm, mediastinum, and pericardium.”

The revisions span from Line 34 to 35.

Introduction

Please add a reference regarding the CARE reporting checklist.

Reply: Thank you for pointing this out. We have added a reference to the CARE reporting checklist at the end of the "Introduction" and "Footnote" sections.

The revisions span from Line 57 and 164.

The word VAL-MAP appears several times thereafter. Please use the abbreviation.

Reply: Thank you for pointing this out. We have changed the word VAL -MAP to an abbreviation in the section after “Introduction”.

virtual-assisted lung mapping (VAL-MAP)

Case presentation

Case presentation should be written in the past tense.

Reply: Thank you for pointing this out. In the Case presentation, the sentence has been revised to be written in the past tense.

The revisions span from Line 59.

CT was abbreviated in Introduction. Please review the abbreviation properly.

Reply: Thank you for pointing this out. We have corrected the CT abbreviation used in Introduction. We have also reviewed the abbreviations for other words as well.

computed tomography (CT)

radiofrequency identification (RFID) lung marking system

Please present the full-spell of IC in "IC tag."

Reply: Thank you for pointing this out. We have used the term "IC tag" for the first time in the Case Description and have corrected it to "Integrated Circuit tag".

The revisions span from Line 68.

Please remove the parentheses before "Synapse Vincent."

Reply: Thank you for pointing this out. We have revised it as you indicated.

The revisions span from Line 70 to 71.

Please describe the degree of adhesion in detail.

Reply: Thank you for giving the useful point.

We have added the below text to the "Case description" section.

“The thoracic cavity showed full adhesions to all chest walls, diaphragm, mediastinum, and pericardium. Especially just under the wound used in the previous surgery, a strong adhesion was observed.”

The revisions span from Line 76 to 78.

"The IC tag was placed in the B8a bronchus and 7 mm mediastinum of the tumor." may not make sense.

Reply: Thank you for pointing this out. We have revised the text in the "Case Description" on page 4 as indicated below. “The IC tag was placed in B8a bronchus, 7 mm mediastinal side from the tumor.”

The revisions span from Line 73 to 74.

Three-dimensional is abbreviated twice. Please double check it carefully.

Reply: Thank you for pointing this out. We double-checked the "Case description" section to ensure proper use of abbreviations.

Discussion

The explanation of paper #5 by Suzuki K et al. is wordy. Please make it more simple.

Reply: Thank you for giving the useful point.

The explanation of paper #5 by Suzuki K et al. is now more simply stated.

The revisions span from Line 97 to 104.

Reviewer B

[Major comments]

Comment 1: Although I thought that this method was very useful for a case who had an undetectable tumor during surgery, I wondered if it was necessary to perform surgery because this case had a small nodule of less than 1.0cm with pure ground-glass nodule. Rather, I thought that it was not necessary to perform a surgery for this nodule.

Reply 1: Thank you for your valuable feedback. We appreciate your input and concerns regarding the necessity of surgery for this case. We acknowledge that this is an important point to consider.

In this case, pure ground-glass opacity appeared during follow-up and showed a tendency to increase over time. We carefully consulted with the patient about performing surgical therapy. As you pointed out, I think there is an opinion that we should still follow up the patient. However, this patient had undergone a right upper middle lobectomy, and we did not want to perform a segmentectomy or lobectomy of the remaining lower lobe. In such a case, we believe that it is important to aim for radical cure by wedge resection while the tumor is still small. This is an issue currently under investigation in the JCOG 1906 trial (a single-arm validation study of follow-up for early-stage lung cancer based on chest thin-section CT findings), and we consider those results to be important information as well.

As of now, we will decide whether surgery or observation should be performed after careful consideration of each case.

Comment 2: This technical method has been previously reported. I had therefore already known the usefulness of this method. Even if the authors reported a rare case who underwent surgery using this method, there were not any impacts in this case report.

Reply 2: Thank you for your valuable suggestion. As you pointed out, the usefulness of the RFID lung marking system has already been reported. In this case, the device was particularly useful because of the wide adhesions in the thoracic cavity and the fact that the patient had undergone a right upper middle lobe resection, which would have greatly benefited from a wedge resection. Furthermore, the RFID lung marking system was very useful in localizing the deep tumor and performing a wedge resection during reoperation, despite the fact that the anatomic localization of the remaining lower lobe within the thoracic cavity was highly variable due to the upper middle lobe resection.

Comment 3: The tumor characteristics were 1.0cm in size and pure ground-glass opacity. I didn't agree that the authors performed the surgery even if the patient requested the surgery. Rather, I think that the authors should recommend the follow-up of a clinical course of the

patient with such a lung nodule. What do the authors think about this problem?

Reply: Thank you for raising this important issue. We are currently observing many patients with pure ground-glass opacity. Especially in the case of a pure ground-glass opacity of less than 1 cm located deep in the lung, we often performed follow-up because we had no choice but to perform a segmentectomy or lobectomy. In this case, we chose to follow up the patient, but later, the tumor showed a tendency to increase in size, so we decided to perform surgery in consideration of curative and operative tolerance. We always hope to continue to perform surgery by fully selecting cases and considering the indications.

[Minor comments]

Comment 1: In line 76-77, although the authors described a following sentence “First, all adhesions were detached, and the tumor was palpated but was difficult to identify.” I couldn’t understand this meaning because we can identify the tumor if we can palpate the tumor during surgery.

Reply 1: Thank you for pointing this out. We have revised the text in the "Case Description" on page 5 as indicated below. “First, all adhesions were detached, and palpation of the tumor was tried, however, the tumor was difficult to palpate and identify, as expected preoperatively, because it was a deeply located small nodule and had been affected by adhesion dissection.”

The revisions span from Line 78 to 81.

Comment 2: I thought that the postoperative hospital stay was very long. What is the reason?

Reply: Thank you for pointing this out. The patient was discharged without postoperative complications. However, due to family pick-up circumstances, the patient's hospital stay was longer than planned. For this reason, we have not included it in the paper.

Reviewer C

Good revision and case cohort.

Reply: We thank the reviewer for the positive comment.

Reviewer D

I found this was a well written manuscript, reporting a case of wedge resection of a minute lung nodule.

Reply: We thank the reviewer for the positive comment.

Reviewer E

How do you think the indication of partial resection or segmentectomy? Are there any clear criteria? Do you consider the morphology of the lungs after partial resection, which may affect postoperative respiratory functions?

Reply: Thank you for your important comments. We consider wedge resection if the Consolidation/Tumor ratio (C/T ratio) is less than 0.25 for tumors less than 2 cm located in the outer third of the lung parenchyma based on the results of JCOG0802(#3 by Saji H et al.) and JCOG0804(#5 by Suzuki K et al.). On the other hand, if the C/T ratio is 0.25 or higher, a segmentectomy is considered as a reduction surgery. Wedge resection for tumors located in the outer third of the lung parenchyma is unlikely to significantly alter the morphology of the remaining lung.

Reviewer F

Comment 1: The first paragraph of the Discussion section is somewhat redundant in its discussion of the limited resection for small lung cancers. This report describes the usefulness of the RFID marking system, and the methods and shortcomings of this system should be discussed in more depth.

Figures that show the location of the tumor and the tag are needed. How long is the deep margin?

Reply 1: Thank you for your valuable suggestion. As you pointed out, the "Discussion" section is a bit too wordy in describing the approach to small pulmonary nodules. We have omitted unnecessary text.

And the following text was added in lines 120 to 125 regarding the methods about RFID marking system. "The IC tag is implanted in the bronchus traveling near the tumor using a bronchoscope under general anesthesia two days before surgery. During resection, the IC tag can be detected by the surgical antenna to determine the localization of the tag. The tag detection tone changes in 5 steps depending on the distance from the tag. If it is possible to place the tag on the deep side of the tumor, the certainty of securing a deep margin is increased."

We think that the shortcomings of the RFID lung marking system are important points that need to be

fully considered. Regarding the shortcomings of this method that you pointed out, it was actually been addressed in the main body of the paper, specifically in [Discussion, page8, line 144-155].

Unfortunately, we were unable to include a photo of the excised specimen showing the tag and the location of the tumor in the figure because we did not have one. Since the resection margin was 15 mm, this information has been added to the "Case Description" section.

The revisions span from Line 85 to 86.

Comment 2: Although the RFID marking system was certainly useful in this case, we cannot conclude whether it is useful in revision surgery based on the report of only one case.

Reply 2: Thank you very much for your suggestion. As you point out, it is difficult to conclude from this case report alone the usefulness of this procedure in revision surgery. It is hoped that this method will be widely used and that many cases will be accumulated.

We have added the below text in the "Conclusions" section.

"Although more cases need to be accumulated, the results suggest the usefulness of the RFID lung marking system in revision surgery cases."

The revisions span from Line 159 to 160.

As you pointed out, the effectiveness of RFID lung marking system for adhesion cases has been reported by Sato et al. (First clinical application of radiofrequency identification (RFID) marking system-Precise localization of a small lung nodule. JTCVS Tech. 2020 Sep 24;4:301-304.).

We believe this is especially useful in revision cases where extensive adhesions are expected. Compared to other marking methods, we believe its advantage is that it is not affected by the degree of adhesion or lung surface damage.