

**Peer Review File**

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**Reviewer A**

**COMMENT 1** Why was the decision made in those patients to perform a common basal segmentectomy? Tumor size? PFTs?

**Reply 1** We thank you for the queries. It is an important part, but it is not properly explained in the text. Accordingly, we added it as below. ( Page 5, Line 6-8)

**COMMENT 2** The LOS seems very long for both lobectomy and segmentectomy. Can the authors explain this?

**Reply 2** We thank you for the query. Our findings showed; lobectomy, 6 days (5-8) and segmentectomy, 6 days (5-7), expressed in median values and IQR.

Generally, hospitalization in our institution lasts approximately for 6 days. Patients are admitted the day before or two days before surgery. In addition, two or three days after surgery, the chest tube is removed, and the next day or two, the patients are discharged from the hospital.

According to the data surveyed by the Health Insurance Review and Assessment Service (HIRA) (Republic of Korea) from January to April 22, the average LOS was reported to be 8.6 days. Therefore, compared with this, the LOS of our study is not long. Therefore, this seems to be long due to the differences in the medical system between countries.

**Reviewer B**

**COMMENT 1** The results are mainly based on CT measurements of lung volume, but by yourselves admission, the 3D reconstruction program used in this study required a certain percentage of subjectivity in identifying accurately the segments. Could this be skewing the results?

**Reply 1** We thank you for the query. As you pointed out and described in the study limitation, the subjective part of the volume assessment using the 3D recon program cannot be completely excluded.

However, unlike previous studies on similar topics that measured the volume of the lobe and segment level with a 3D recon program, we conducted total lung (ex. Right lung volume, Left. lung volume) level volume estimation to exclude subjective factors as much as possible. (Yoshimoto K, Nomori H, Mori T, et al. Postoperative change in pulmonary function of the ipsilateral preserved lung after segmentectomy versus lobectomy. *Eur J Cardiothorac Surg.* 2010;37(1):36-39. doi:10.1016/j.ejcts.2009.07.002) (Ueda K, Tanaka T, Hayashi M, et al. Compensation of pulmonary function after upper lobectomy versus lower lobectomy. *J Thorac Cardiovasc Surg.* 2011;142(4):762-767. doi:10.1016/j.jtcvs.2011.04.037)

In addition, since the volume calculation through the 3D recon program was conducted by a single researcher, we might suggest that the impact on the research results would have been minimized.

**COMMENT 2** regarding the functional results, only 34 patients had postoperative PFT analysis, which represents the most important data, considering that there is no direct correlation between lung volumes and respiratory function. Please, add a comment on this.

**Reply 2** We thank you for the comment. As described in discussion, we consider that the most important thing is that there is no research that can properly explain the changes in the lung volume and function after surgery.

While lung volume can be hyperinflated under various conditions, we suggest that lung function does not improve just by increasing volume.

In small units, the number and condition of alveoli that perform gas-exchanges can affect lung function, and in larger units, changes in the configuration of bronchus due to pulmonary resection also affect lung function.

In addition, we suggest that the lung regeneration hypothesis could influence the difference between lung volume and lung function.

**COMMENT 3** The first results are 6 months after surgery. We know from the literature that any functional difference between segmentectomy and lobectomy tend to disappear over a certain period of time. However, short-term functional outcomes are important because they correlate with the patient postoperative recovery. Please add a comment on this.

**Reply 3** We thank you for the suggestion. We also thank you for the good point. As you pointed out, the functional difference caused by surgery between the lobectomy and segmentectomy groups could disappear over time after surgery. Therefore, we agree that the comparison could be a more meaningful study as confirmed in a shorter period of time than now. However, since the results of the lung function test without recovery after surgery may not be accurately measured due to pain, we recommend that a careful approach to interpretation is needed.

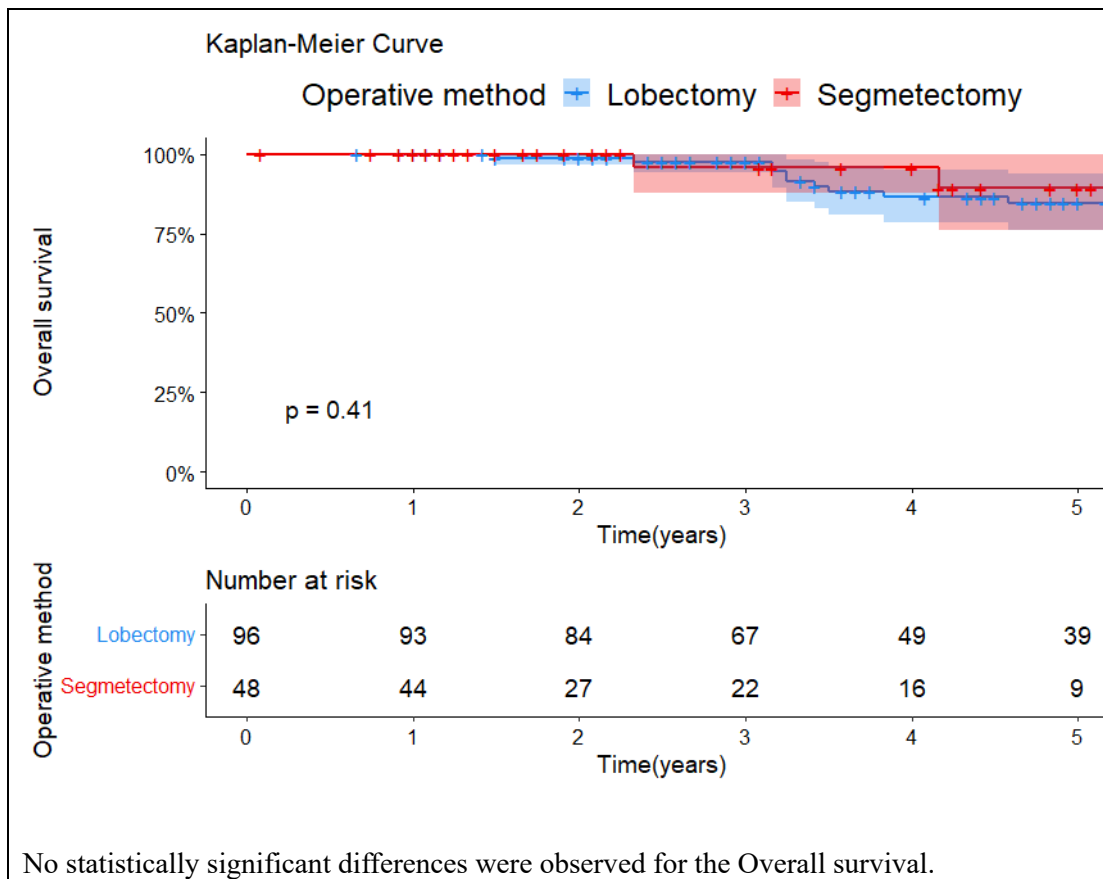
### Reviewer C

**COMMENT 1** In the results section, it would be interesting to also have the EFR in mL, which would give some readers a better idea of the loss of lung function.

**Reply 1** We thank you for the comment. We added the contents you pointed out to Table 4.

**COMMENT 2** As the median follow up time is 43 months, it would also be interesting if authors could provide data on long term survival.

**Reply 2** We thank you for the comment. This study did not study survival. Therefore, it was not added to the manuscript. However, the overall survival of the two groups was as follows.



**COMMENT 3** Have the authors considered performing a subgroup analysis and comparing lung volumes and functions according to the intersegmental plane dissection technique?

**Reply 3** We thank you for the query. We also agree that the intersegment plane division method may be related to lung volume and lung function changes. Patients undergoing surgeries by different surgeons were included in the study. However, since most of the intersegmental plane division was conducted with a stapler device. This is not expected to have a meaningful effect on the results because there were few patients regarding using energy devices. The manuscript was modified to convey the content more efficiently. (Page: 5, Lines: 9-11)

**COMMENT 4** It is not clear what the authors recommend after this study. Do they recommend lower lobectomy if less than common basal segmentectomy is not possible? Do they recommend performing a segmentectomy within the basal segments if this is oncologically feasible instead of a whole common basal segmentectomy? This should be made clearer in the text.

**Reply 4** We thank you for the insightful suggestion. The key point in this study is that the functional role of the reserved superior segment has not been sufficiently studied. In addition, through our study, it was confirmed that the preserved superior segment may not have a benefit in terms of lung function or lung volume. Regarding the sub-segmentectomy of common basal segment you excellently mentioned, research on it should be preceded. However, we recommend it if the sub-segmentectomy,

such as S10 or S9, is in a patient with oncologically sufficient safety margin.  
In this case, we suggest that there will be a benefit due to the larger sized preserved lung segment rather than the small sized preserved superior segment.

#### Reviewer D

**COMMENT 1** What was the difference in operative time between segmentectomy and lobectomy in your study?

**Reply 1** We thank you for the query. As it is generally known, surgery takes much longer in the segmentectomy group than in the lobectomy group. The key finding of this study is that the operation time and anesthesia time were longer. Therefore, this can be used as a meaningful item to support our research. However, we did not include this because we thought that a simple comparison between operation times would be bias to explain the difficulty in surgery because the participants in this study included patients who were evaluated by the frozen pathology report after wedge resection and underwent additional lobectomy. In addition, as a simple segmentectomy that requires only one intersegment plane division, there was no significant difference in surgical time between the two groups. (Suzuki K, Saji H, Aokage K, et al. Comparison of pulmonary segmentectomy and lobectomy: Safety results of a randomized trial. *J Thorac Cardiovasc Surg.* 2019;158(3):895-907. doi:10.1016/j.jtcvs.2019.03.090) . (Hwang Y, Kang CH, Kim HS, Jeon JH, Park IK, Kim YT. Comparison of thoracoscopic segmentectomy and thoracoscopic lobectomy on the patients with non-small cell lung cancer: a propensity score matching study. *Eur J Cardiothorac Surg.* 2015;48(2):273-278. doi:10.1093/ejcts/ezu422)

**COMMENT 2** What percentage of procedures were performed open, VATS and/or robotic-assisted?

**Reply 2** We thank you for the comment. All patient groups included in this study were those managed with VATS. This was mentioned more clearly in the manuscript (Page: 5, Lines: 15-16)

#### Reviewer E

**COMMENT 1** Your main outcome is lung volumes determined by CT. I think in many places in the paper it should be more clear that these are volumes measured by CT (paragraphs in the text, figure legends, tables). I think this could be done by just adding “volume determined by CT” or “CT-measured volume” or something like that. The more common way of measuring lung volume is spirometry, so I think you need to be more explicit that you are doing something different.

**Reply 1** We thank you for the comment. As you pointed out, we changed the expression to CT-measured lung volume for parts that need to be revised throughout the paper.

**COMMENT 2** My major issue is that you provide little description or justification for using this less common outcome. Since this is the focus of your study, I think you need to introduce

it, with some background about reproducibility, correlation with clinically important outcomes (functional capacity of the patient), your reasons for choosing this focus. You need to describe how this was measured. Finally, you need to discuss the use of this parameter in the discussion. Why should we care about this, especially when broken down into ipsi and contralateral?

**Reply 2** We thank you for the query. At the beginning of this paper we mentioned the fact that the changes in lung volume and function after surgery have not yet fully understood. In addition, we became interested in how much the common basal segmentectomy, which leaves a relatively small volume, could contribute to postoperative lung volume and lung function. We know based on clinical experience that the contralateral lung was hyperinflated after surgery and the thorax cavity on the ipsilateral side was reduced. However, there are not many studies on this. Therefore, we aimed to measure and clarify the CT-measured lung volume. Our findings suggest that further research is needed because lung resection reduced lung volume on the ipsilateral side and increased lung volume on the contralateral side, which could be determined not only according to the volume of the resected lung, but also various factors, as mentioned in the discussion.

**COMMENT 3** Because the CT-determined lung volume is not that commonly used, I think that correlation with more conventional assessments is important. I think the actual measured FEV1 is a very important part of your paper. although there was some missing data, it was obtained on most patients. I think this strengthens the confidence in your results based on CT-determined volumes. I would emphasize this part of your study a bit more

**Reply 3** We thank you for the suggestion. As you pointed out, table 4 was added to emphasize the actual measured lung function test results

**COMMENT 4** I think that more emphasis should be given to propensity matching in most papers, including yours. A prerequisite for PM is that all known or suspected confounders are included, or that arguments can be made that those not included are unlikely to be important in this context. This principle is almost universally ignored. I always start by thinking carefully about which factors I would expect to be the major confounders. Then I compare this with what was actually included. I also assess the believability of a paper by whether the authors actually discuss factors not accounted for and assess whether these are likely to make a difference. In your case, I think a reasonable argument can be made that you probably have addressed the major confounders. One could ask for things like the incidence of COPD or emphysema on the CT, but I think that is largely rendered unlikely to be a significant missed factor given the preop FEV1 results. I think your study would be strengthened by some sentences that show that you have critically selected the factors to include and thought about the impact of ones that you did not. I recognize that this is missing in practically every paper of PM, but I think it makes us prone to misleading ourselves when we ignore the prerequisite for the use of PM. Since this only strengthens your study (and perhaps raises awareness), I think you should consider including some text addressing this.

**Reply 4** We thank you for the suggestion. Accordingly, we added a sentence on applying PSM matching to the limitation. (Page: 10, Lines: 23-24)

**COMMENT 5**

## Abstract

It is awkward to flip the way you are expressing things: “the reduced percentage of the total lung volume of segmentectomy group was significantly higher than that of the lobectomy group (-16.2% vs. -6.5%; p=0.004)” then followed by “reduced percentage of total lung volume of the segmentectomy group remained lower than that of the lobectomy group (-13.0% vs. -3.0%; p=0.01).” Maybe instead of the confusing higher and lower say “there was a larger reduction in the percentage of total lung volume after segmentectomy compared with lobectomy...”

In general, when you start a sentence with “compared with lobectomy” it becomes less clear whether the first value you are subsequently reporting in the sentence is the segmentectomy group or the lobectomy group (i.e. does it follow the order in which they are mentioned, or is the comparator always second despite being mentioned first?).

**Reply 5** We thank you for the comment. As you pointed out, we changed the expressions to "larger" and "smaller" instead of "higher" and "lower". The unclear expression was also modified as follows. The expression "Compared with lobectomy" was also modified. “The segmentectomy group exhibited a statistically significantly worse preoperative FEV1 (p=0.009), and more comorbidity (p=0.046) than in lobectomy group.” (Page: 7, Lines: 7-9)

**COMMENT 6**

## Highlight box

It is awkward to have a key finding that preserving the Sup seg has no beneficial effect, but under implications state that benefits are uncertain. Also, the statement that “Common basal segmentectomy should be careful” is not quite grammatically correct, but is also very opaque. Maybe something like: “In general, preserving the superior segment in order to preserve lung function is not supported by actual data”, or “considering preservation of the sup segment should take into account the fact that this does not appear to result in better postoperative lung function compared with lower lobectomy.”

**Reply 6** We thank you for the comment. Accordingly, we revised the contents as you pointed out (Page: 3, Line: 2)

**COMMENT 7** Intro

Moreover used twice in consecutive sentences

**Reply 7** We thank you for pointing this out. Accordingly, we replaced moreover with ‘furthermore’

**COMMENT 8** Results

You start by reporting some data on all patients in the study – you certainly need to do this. Then it seems that you shift to only reporting results for the PM cohorts. I think you need to make this more clear that the subsequent sections of the results part of the paper are specifically focusing on the PM patients.

**Reply 8** We thank you for the comment. Accordingly, we added the expression “In the matched population” .

**COMMENT 9** Table 2

I find it awkward to report postoperative FEV1 in this table. The way I understand it, this is an observed outcome, and not a patient characteristic that was matched for in selecting the propensity matched cohorts. If it is the latter (something you matched for), it undermines the validity of your observations regarding lung volumes.

**Reply 9** We thank you for the comment. We also thought about it when creating the table. However, you thankfully highlighted this. Therefore, we revised it as per your comment.

**COMMENT 10**

Figure 1

The font size of the numbers in the vertical axes is so small I struggled to read it even with a magnifying glass. The same comment applies to several other figures.

I think the figure would benefit from subtitles (ipsilateral volume, contralateral volume, total lung volume). It takes extra effort for the reader to look at the figure, then try to figure out from the legend what is depicted, then go back to the figure to understand it. When you make readers do this extra work you risk losing their attention and interest in understanding your paper.

**Reply 10** We thank you for the comment. As you pointed out, we modified all figures

**COMMENT 11**

Figure 2

What do the wavy lines in the lower part of the figure depict? It is not explained in the legend

**Reply 11** We thank you for the comment. We deleted wavy line and changed the y-axis scale because we thought it was inappropriate for the general paper's feature expression method.

**COMMENT 12** Details

How are you measuring comorbidity?

I would like some detail about when the initial postoperative CT scans were performed. For PFTs, studies have shown that it takes 4-6 months for the initial perioperative impairment to have resolved (shorted for VATS, 6 months for thoracotomy). I am not aware whether there is such data regarding measurement of lung volumes by CT. You provide a median, but I would love to have a bit more detail (range, IQR?) to be able to interpret better.

**Reply 12**

- 1) Based on the Charlson Comorbidity Index, comorbidity was evaluated using factors such as DM, MI, Respiratory disease, hepatic disease, renal disease, and prior malignancy Hx(Dindo D, Demartines N, Clavien PA. Classification of surgical complications: a new proposal with evaluation in a cohort of 6336 patients and results of a survey. *Ann Surg.* 2004;240(2):205-213.

doi:10.1097/01.sla.0000133083.54934.ae)

- 2) Since the retrospective analysis of CT was performed for the purpose of surveillance for postoperative recurrence, the first CT f/u was performed between 3-6 months as described in the text, and then regular f/u was performed every 6 months. As you pointed out, regarding the changes in volume after surgery, we suggest that CT should have been performed at shorter intervals to measure changes in volume through prospective research. In this study, the short term CT f/u interval was median: 6 range: 1-26, IQR (4-6), and the last follow-up duration was median: 42 months, range: 5-145, IQR (30-66).

## Reviewer F

**COMMENT 1** Insufficient clinical and histopathological information about lung cancer. Important factors such as disease stage, treatment outcomes, and recurrence rates are lacking, which are crucial for interpreting the findings.

**Reply 1** We thank you for the comment. First of all, the focus of this study was not to compare oncological outcomes according to surgical extents. We aimed to compare between common basal segmentectomy and lower lobectomy, which were not included in recent large-scale RCTs in terms of lung volume and lung function. Therefore, we did not include the disease stage, treatment outcomes, or recurrence rate.

**COMMENT 2** Overall low complication rates, particularly in the segmentectomy group. Minor complications are commonly associated with segmentectomy procedures. It would be helpful to provide details on actual cases and reconsider the definition of complications.

**Reply 2** We thank you for the comment. In general, it is known that more complication could occur in the segmentectomy group. We might suggest that there are two reasons why our research results have the opposite result as below.

- 1) Simple segmentectomy, such as common basal segmentectomy, would not have significantly affected complications because only one intersegment plane division was added compared with lobectomy (Suzuki K, Saji H, Aokage K, et al. Comparison of pulmonary segmentectomy and lobectomy: Safety results of a randomized trial. *J Thorac Cardiovasc Surg.* 2019;158(3):895-907. doi:10.1016/j.jtcvs.2019.03.090)
- 2) Some studies have shown that the incidence of complications in the segmentectomy group was lower than that in the lobectomy group, even if segmentectomy was not divided into simple and complex. (Hwang Y, Kang CH, Kim HS, Jeon JH, Park IK, Kim YT. Comparison of thoracoscopic segmentectomy and thoracoscopic lobectomy on the patients with non-small cell lung cancer: a propensity score matching study. *Eur J Cardiothorac Surg.* 2015;48(2):273-278. doi:10.1093/ejcts/ezu422). There were also similar findings in patients with early stage lung cancer similar to our research. (Altorki NK, Wang X, Wigle D, et al. Perioperative mortality and morbidity after sublobar versus lobar resection for early-stage non-small-cell lung cancer: post-hoc analysis of an international, randomised, phase 3 trial (CALGB/Alliance 140503). *Lancet Respir Med.*



**COMMENT 3** The preoperative assessment solely focuses on simple pulmonary function tests, without discussing detailed data related to diffusing capacity. Examining the outcomes of segmentectomy in patients with compromised lung function, who are the primary candidates for such procedures, is essential. Additionally, the description of surgical technique selection is unclear.

**Reply 3** We thank you for the comment. Accordingly, we added the contents of DLCO to table 4. The criteria for lobectomy and segmentectomy are added to the text (Page: 5, Lines: 6-8)

## Reviewer G

**COMMENT 1** The contralateral lung volume increased by 8.9% in the lobectomy group but decreased by 0.7% in the segmentectomy group. This means that the lower lobectomy is more likely to result in greater mediastinal deviation and consequent hyperinflation of the contralateral lung. Do the authors consider mediastinal deviation and hyperinflation of the contralateral lung a good thing? This could rather affect cardiac function, have the authors evaluated this?

**Reply 1** We thank you for the comment. Searching for existing studies, there was no such topic. Therefore, we recommend furthering research on this topic will be a very interesting. In our opinion, for example, cardiac compression index in patients with pectus excavatum does not have a close relationship on actual cardiac function. Similarly, if it does not proceed acutely, in the case of mediastinal deviation by hyperinflation on the opposite side, it is not thought that the effect on cardiac function will be significant. ( Liu C, Wen Y. Research progress in the effects of pectus excavatum on cardiac functions. World J Pediatr Surg. 2020;3(2):e000142. Published 2020 May 29. doi:10.1136/wjps-2020-000142) (Jayaramakrishnan K, Wotton R, Bradley A, Naidu B. Does repair of pectus excavatum improve cardiopulmonary function?. Interact Cardiovasc Thorac Surg. 2013;16(6):865-870)

**COMMENT 2** Postoperative lung function and residual lung expansion are greatly influenced by the original lung condition (e.g., emphysema or interstitial pneumonia). They should be described.

**Reply 2** We thank you for the comment. As you pointed out, we thought that the condition of the lung before surgery could affect the lung function and volume after surgery. Therefore, we attempted to include it in the matching factor. As a result, we suggest that we might have reduced the bias, including Charlson Comorbidity Index and pre operative FEV1 as matching factor.

**COMMENT 3** If the residual lungs expand compensatory after pulmonary resection, it may be necessary to evaluate diffusion capacity to see if lung function has really improved.

**Reply 3** We thank you for the comment. Additional analysis of DLCO was conducted, and this was added in Table 4. There was no statistical difference in the changes in DLCO

between the two groups.

**COMMENT 4** If the method of intersegmental dissection is different (stapler, energy devices, or a combination of the two), the expansion of the residual lung will change.

**Reply 4** We thank you for the comment. We also agree that the intersegment plane division method may be related to lung volume and lung function changes. Patients undergoing surgery by different surgeons were included in the study. However, since most of the intersegmental plane division was conducted with a stapler device. It is not expected to have a meaningful effect on the results because there were few patients wherein energy devices were used. The manuscript was modified to convey the content more efficiently. (Page: 5, Lines: 9-11)

**COMMENT 5** There was no significant difference between the two groups regarding postoperative complications. In general, segmentectomy is also performed as a limited surgery in frail cases with complications. However, in Conclusions, the authors described that common basal segmentectomy should be carefully considered in patients at a high risk of complications. What is the meaning of this?

**Reply 5** We thank you for the comment. In general, segmentectomy is known to have more complications compared with lobectomy. However, recent studies have shown that there was no difference in surgical complications between segmentectomy and lobectomy. (Hwang Y, Kang CH, Kim HS, Jeon JH, Park IK, Kim YT. Comparison of thoracoscopic segmentectomy and thoracoscopic lobectomy on the patients with non-small cell lung cancer: a propensity score matching study. Eur J Cardiothorac Surg. 2015;48(2):273-278. doi:10.1093/ejcts/ezu422) . (Altorki NK, Wang X, Wigle D, et al. Perioperative mortality and morbidity after sublobar versus lobar resection for early-stage non-small-cell lung cancer: post-hoc analysis of an international, randomised, phase 3 trial (CALGB/Alliance 140503). Lancet Respir Med. 2018;6(12):915-924. doi:10.1016/S2213-2600(18)30411-9)

However, as you pointed out, we thought it was an expression that could cause confusion, so I revised it as below. (Page 11 , Line 12-13)

**COMMENT 6** When evaluating segmentectomy, factors other than pulmonary function (performance status, exercise capacity, weight change, etc.) should be considered.

**Reply 6** We totally agree with you regarding this comment. We suggest that it is also necessary to consider the patient's performance status or exercise capacity.

## Reviewer H

**COMMENT 1** The only thing I would point out is the manuscript title, which sounds like an editorial or a review article. I prefer a title simply representing the findings; for example, Basal segmentectomy showing no benefit over lower lobectomy in preservation of

pulmonary function or lung volume. Of course, it is up to the authors.

**Reply 1** We thank you for the comment. We considered using the mentioned title, but as a result of discussion among the authors, there was an opinion that it was too cautious to use conclusive expressions. Therefore, we could not revise it

## Reviewer I

COMMENT 1 In my mind, common basal segmentectomies should always be avoided and the message in your study is quite clear for that. Even if the patient has very poor PFT, I don't think that a residual S6 segment could help to improve post operative lung function. I would not name it segmentectomy but always a quadri-segmentectomy (so it is bigger than some lobe).

A1. We thank you for your comment in supporting our research

COMMENT 2 There is no more complication after segmentectomy and lobectomy, and even not more air leak. I think it's an interesting result that deserve to be highlighted (a lot of people still consider that segmentectomy are at high-risk of postoperative air leak)

A2. We thank you for your comment. In this study, the fact that the proportion of complications was not large in the common basal segmentectomy group compared with the lobectomy group because the common basal segmentectomy is a simple segmentectomy that requires only one intersegment plane division Therefore, we suggest that there was no significant difference in the incidence of complications compared with lobectomy.

COMMENT 3 I would also recommend to authors to acknowledge that torsion risk exist for segments but of course also for lobectomies.

A3. We thank you for your comment. We deleted the sentence following your opinion.

COMMENT 4 I think it is really important to acknowledge that lung volume is not the more adequate way to estimate lung function. Some exams, like SPECT-CT, that allow to evaluate perfusional lung function are probably more accurate.

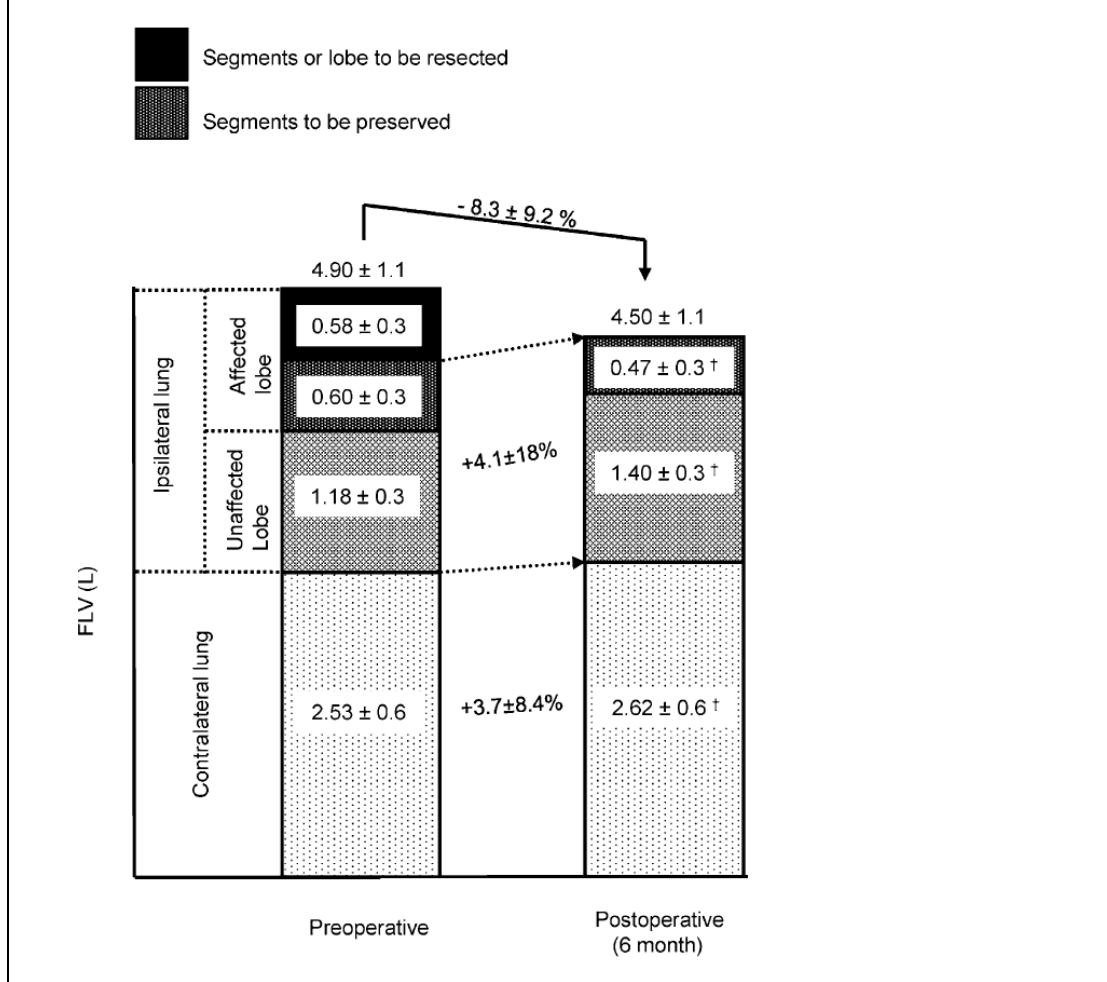
A4. We thank you for your comment. We agree with you regarding this comment. In a clinical environment where exams such as SPECT-CT could be more commonly used, more accurate lung function prediction may be possible, but this study based on lung function tests that are more commonly used than SPECT-CT is also meaningful.

COMMENT 5 -Line 180: this sentence is not really clear to me and would deserve to be change.

In another study, compared with the preoperative value, the lung volume of the segments preserved by segmentectomy decreased significantly.

A5 We thank you for your comment. In a study by Ueda et al., it was said that the lung volume of the residual segment remaining after segmentectomy decreased after surgery, as shown in the figure below (reproduced with permission from Oxford University Press). We

understood that this was due to the shrinkage of lung while dividing the intersegmental plane. We modified the expression in manuscript (Page 8, Line27 ; Page 9 , Line 1) (Kazuhiro Ueda, Toshiki Tanaka, Masataro Hayashi et al. Computed tomography-defined functional lung volume after segmentectomy versus lobectomy, European Journal of Cardio-Thoracic Surgery, Volume 37, Issue 6, June 2010, Pages 1433–1437)



**Reviewer J**

**COMMENT 1** The number of basal segmentectomy is too small to conclude that basal segmentectomy is inferior to lower lobectomy in terms of postoperative lung volume and lung function in this study. Moreover, there is not enough evidence to explain the paradoxical results shown in this study; lobectomy, which loses more volume of lung parenchyma, resulted in a larger residual lung volume than basal segmentectomy, which should result in a larger residual lung. Basal segmentectomy is one of the most widely performed typical segmentectomies in the world, therefore the author should be cautious about giving a negative impression of basal segmentectomy from a small sample. Considering the sample size of this study, I suggest authors to use the sentence “Preserved superior segment may not be beneficial effect on ~” instead of “Preserved superior segment had no beneficial effect on ~” throughout the text.

**Reply 1** We thank you for your comment. We were fully aware of the small sample size and

revealed it in the limitation. However, we apologize that it did not seem to be clearly delivered. All expressions were modified in the form recommended by you. Recently, research results that favor segmentectomy have been published. Therefore, we expect a larger sample size study to be conducted in the future, and this study is also meaningful in that it can give such ideas to subsequent researchers.

**COMMENT 2** When calculating the short-term and long-term changes in postoperative lung volume, authors need to define a certain postoperative period for each CT performed, e.g. short-term change of lung volume was calculated using CT performed 6 months ( $\pm$  2months) postoperatively. Since postoperative lung volumes and their function depend on the postoperative period, the authors should align the postoperative periods in which CT was performed in the lower lobectomy group and the basal segmentectomy group.

**Reply 2** We thank you for your comment. We understand that it is a similar question to Q10. <Within 6 months after surgery>

|               | Lobectomy(n=55)  | Segmentectomy(n=29) | <i>P</i> value |
|---------------|------------------|---------------------|----------------|
| Ipsilateral   | -28.6 $\pm$ 14.4 | -31.3 $\pm$ 11.8    | 0.39           |
| Contralateral | 8.4 $\pm$ 15.0   | 0.0 $\pm$ 17.8      | 0.025          |
| Total         | -5.0 $\pm$ 24.9  | 15.6 $\pm$ 14.1     | 0.016          |

<Within 3 months after surgery>

|      | Lobectomy(n=39)  | Segmentectomy(n=13) | <i>P</i> value |
|------|------------------|---------------------|----------------|
| FEV1 | -10.6 $\pm$ 13.1 | -6.2 $\pm$ 13.0     | 0.37           |

**COMMENT 3** Throughout the text, sentences such as “Reduce percentage of ... was significantly higher or lower” is confusing for readers. You may either say larger or smaller when comparing two reduction percentages.

**Reply 3** We thank you for your comment. As you pointed out, we changed all these expressions

**COMMENT 4** In the Introduction, I think authors need to describe in detail what is known about basal segmentectomy and what is a problem of basal segmentectomy in clinical practice.

**Reply 4** We thank you for your comment. As you pointed out, we added the contents to the introduction (Page: 4, Lines: 9-12)

**COMMENT 5** The “Methods” section should describe the indications for segmentectomy and lobectomy for stage IA lung cancer.

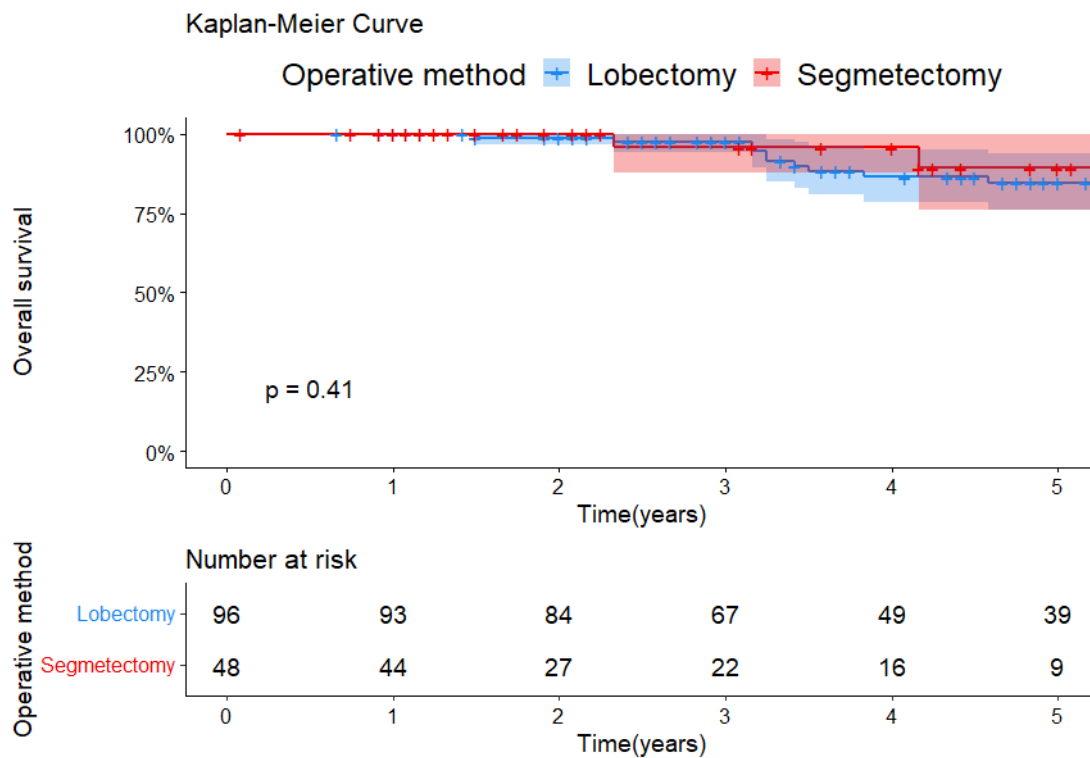
**Reply 5** We thank you for your comment. We added the contents to the methods (Page 5, Lines 6-8)

**COMMENT 6** I think authors should include details of the thoracoscopic approach in the Method section. Are mini-thoracotomy cases included in this study?

**Reply 6** We thank you for your comment. To study lung volume and lung function after surgery, the surgical method was controlled because the patient's post-op rehabilitation could have an important effect. Therefore, only patients who have undergone thoracoscopic surgery are included, except for those who have undergone mini thoracotomy or thoracotomy conversion. (Page 5, Line 15-16)

**COMMENT 7** Are patients who recur after surgery included in this study? If so, is there a difference in the number of patients who recurred or received radiation therapy after recurrence between the basal segmentectomy and the lower lobectomy groups after the propensity matching?

**Reply 7** We thank you for your comment. this study did not analyze the overall survival and recurrence rates as outcomes because it did not aim to compare the oncological outcome between segmentectomy and lobectomy.



No statistically significant differences were observed for the Overall survival.

**COMMENT 8** Is there a difference in the number of patients with interstitial pneumonia or emphysema in the lower lobectomy and common segment resection groups before and after the propensity matching analysis?

**Reply 8** We thank you for your query. There was no statistically significant difference.

|  | Lobectomy | Segmentectomy | <i>p</i> value |
|--|-----------|---------------|----------------|
|--|-----------|---------------|----------------|

|           |          |          |      |
|-----------|----------|----------|------|
| Unmatched | 45(6.8%) | 6(12.5%) | 0.15 |
| Matched   | 7(7.3%)  | 6(12.5%) | 0.36 |

**COMMENT 9** Table 2 should contain the standardized differences for each variable after propensity score matching.

**Reply 9** We thank you for your comment. Accordingly, we modified Table 2

**COMMENT 10** In the “Result” section, authors should describe the postoperative period in which the PFT was performed. Similar with postoperative lung volume, postoperative lung function depends on postoperative period. I think the postoperative period for PFT should be aligned for the lower lobectomy and the basal segmentectomy groups.

**Reply 10** We thank you for your comment. As you pointed out, we agree that postoperative lung function should be matched because the degree of recovery may vary depending on the postoperative period. However, as shown in the table below, there was no significant difference in the results even when the periods were the same. Therefore, I suggest that the results of our current data can be trusted.

<Within 6 months after surgery>

|               | Lobectomy(n=55) | Segmentectomy(n=29) | <i>P</i> value |
|---------------|-----------------|---------------------|----------------|
| Ipsilateral   | -28.6±14.4      | -31.3±11.8          | 0.39           |
| Contralateral | 8.4±15.0        | 0.0±17.8            | 0.025          |
| Total         | -5.0±24.9       | 15.6±14.1           | 0.016          |

<Within 3 months after surgery>

|      | Lobectomy(n=39) | Segmentectomy(n=13) | <i>P</i> value |
|------|-----------------|---------------------|----------------|
| FEV1 | -10.6±13.1      | -6.2±13.0           | 0.37           |

**COMMENT 11** As author mention in the limitation, the preoperative lung volume was slightly higher in the segmentectomy group even after the propensity matching (3851 ml in the lobectomy group and 4184 ml in the segmentectomy group,  $p=0.1$ ). I suggest that a propensity score matching analysis should be performed including preoperative lung volume as a variable.

**Reply 11** We thank you for your comment. We agree with your opinion. However, the number of patients undergoing lower lobectomy was relatively too large to calculate all preoperative volumes. Therefore, it was practically impossible to proceed. This was revealed to the limitation because further research was considered necessary.

**COMMENT 12** In line 174, the authors stated that their study is first to focus on the superior segment or basal segmentectomy, however, Bongiolatti S et al. (Interdiscip Cardiovasc Thorac Surg. 2023 Feb 6;36(2)) recently published similar study. They reach the opposite conclusion from this study. I recommend including their study in the manuscript and discussing the findings.

**Reply 12** We thank you for your comment. the expression "first study" was deleted, and the results of the study you introduced were additionally described in Discussion (Page 9, Lines 23-27; Page 10, Lines 1-5)

**COMMENT 13** In Supplemental Figure 1, "Histology" needs to be corrected to "histology" in the section describing the propensity score matching variables.

**Reply 13** We thank you for your comment. Accordingly, we revised it as you pointed out.

**COMMENT 14** How many cases of atelectasis have occurred during postoperative follow-up in the basal segmentectomy group?

**Reply 14** We thank you for your comment. In this study, postoperative atelectasis was strictly defined as a case requiring bronchoscopy. Therefore, there were two patients in the lobectomy group alone in the entire patient group.