

Peer Review File

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Reviewer A

1. Lack of Critical Information:

The dataset from XXX Hospital lacks crucial details regarding the types and sizes of drains used for postoperative drainage, the drainage devices (Traditional suction device or Digital device like Thopaz), and the settings for suction pressure. This information is vital for the reliability of the leak prediction model.

Response: Thank you for your insightful observation regarding the omission of specific details concerning the types and sizes of drains used and the drainage devices and settings for suction pressure. We recognize the importance of these factors in influencing the outcomes and reliability of our air leak prediction model. We have supplemented the “Surgical procedures and perioperative management” section with the missing details about the drainage method used in postoperative management by using a red text color in lines 118-122.

2. Unclear Intraoperative Standards:

It is essential to clarify whether staplers are commonly used in clinical practice in sample cases at XXX Hospital (with percentage), and whether a water seal test or ventilatory test is conducted at the end of surgery. Additionally, the criteria and rates for covering high-risk cases and the usage rate of fibrin glue should be specified.

Response: Thank you for your valuable feedback regarding the need for more precise descriptions of the intraoperative standards used in our study. We have clarified that surgical staplers are utilized in 100% of cases at our medical center, a detail now highlighted in red text in the "Surgical procedures and perioperative management" section in lines 111-112. We have also provided comprehensive descriptions of the routine water test and ventilatory pressure test conducted at the conclusion of surgeries to assess for air leaks, details of which are highlighted in lines 116-117. If a significant air leak was detected, the case would be excluded, and appropriate interventions would be implemented (lines 117-118). Additionally, we have emphasized that fibrin glue is not commonly used in our practice, with this clarification marked in lines 117-118.

Our research is grounded in the philosophy of minimally invasive thoracic surgery, reflecting the current focus on day surgeries in thoracic procedures. Most patients undergoing thoracoscopic pulmonary wedge resections are candidates for day surgery. Our study specifically aims to identify those at high risk of air leaks, even after passing intraoperative tests like the water test. These patients may not be suitable for day surgery. To underscore the relevance and timeliness of our research, we have highlighted this contextual framework in red text in the discussion section of our manuscript, specifically in lines 272-276.

3. Handling of Factors:

In aiming for a tubeless approach to leak prediction, preoperative and intraoperative factors should be distinctly treated. Including factors that can only be identified postoperatively is inappropriate. Was the benignity/malignancy confirmed for all cases during surgery? If not, this prediction model would be of little use for intraoperative decision-making.

Response: Thank you for your critical observation regarding the treatment of preoperative and intraoperative factors in our study, particularly in the context of developing a model for predicting air leaks in a tubeless approach. Your comment has prompted a thorough reevaluation of how we categorize and utilize these factors. Concerning the confirmation of benignity or malignancy, which is pivotal in our model, we have clarified that preliminary determinations of nodule characteristics are typically confirmed intraoperatively via rapid frozen section analysis in red text in the "Surgical procedures and perioperative management" section on lines 113-115. In our center, routine intraoperative frozen section analysis is conducted during wedge resections, with the accuracy of diagnosing benignity or malignancy nearing 100%. This high level of precision allows us to use intraoperative frozen section analysis as a substitute for postoperative pathology in real-time application of the predictive model, which has also been detailed in the discussion section on lines 244-249.

4. Reason for Exclusion in Multivariate Analysis:

The reason for excluding the "History of thoracic surgery" from the multivariate analysis needs to be explained.

Response: Thank you for your comments. While "History of thoracic surgery" did show statistical significance in our univariate analysis, we chose not to include it in the multivariate analysis for several reasons. Firstly, previous thoracic surgeries could cause structural changes to the chest, such as scarring of lung tissue and pleural adhesions, which complicate subsequent surgeries and potentially bias the study's outcomes. Secondly, the number of patients in our dataset with a history of thoracic surgery was relatively small—only 21 cases, representing 1.05% of our sample. This small subset could potentially skew the results and reduce the generalizability of our findings. Focusing on factors affecting a larger portion of the patient population, our model aims to provide more reliable and universally applicable predictions. We have highlighted this explanation in red text in the discussion section of our manuscript, specifically on lines 252-259.

5. Details of Validation:

In Table 4, the results of the validation are presented very briefly. It is advisable to provide additional data regarding the validation cohorts from the two hospitals, including the number of patients and their characteristics, as well as whether validity was observed when applied to each hospital.

Response: Thank you for your comments. We agree that a more detailed exposition could enhance the understanding and credibility of our findings. Due to the relatively small sample sizes at the two external validation centers, we merged the data from both centers for a consolidated external validation. This approach was chosen to enhance the statistical power and reliability of the validation

outcomes. In response to the reviewer's comment, we have introduced a new Table 4, as outlined in the "Development and validation of the predictive nomogram" section (lines 197-199). This table provides comprehensive data on the validation cohorts from both hospitals, including patient counts and detailed characteristics, thereby enhancing the transparency of our findings. Consequently, the previous Table 4 has been renumbered to Table 5.

6. Duplicate References:

References 20 and 21 are identical; it is recommended to unify them into one citation.

Response: Thank you for pointing out the duplication in our references. We appreciate your attentiveness to detail, which aids in maintaining the integrity and accuracy of our manuscript. Reviewing the references, we found that references 20 and 21 cited the same source. We have corrected this error by consolidating these two references into one citation. The manuscript and citation within the text have been updated accordingly to reflect this change.

Reviewer B

Major comments.

1. Page 3 line 67. "The inclusion criteria were ... (5) no significant AL on the water test after wedge resection."

Please describe the frequency of cases excluded due to a positive AL on the sealing test. The reviewer believes that this information helps the reader recognize the frequency of cases with AL before and after the intraoperative repair, although this slightly deviates from main point of the manuscript.

Response: Thank you for highlighting the necessity of disclosing the frequency of cases excluded due to a positive air leak on the intraoperative water test. We acknowledge that this information is critical for readers to fully understand our study findings. In response to your comment, we have updated lines 160-163 of the "Patient characteristics" section to clarify that nearly 3% of the cases (n=62) were excluded from the study due to significant air leaks detected during the water test following wedge resection.

2. Page 4 line 5. "with any leaks being addressed through electrical coagulation or suturing."

Did the authors use fibrin glue or any reinforcement material such as PGA or oxidized sheet for AL repair? Please describe this point.

Response: Thank you for your comments. In response to your question, we have updated lines 117-118 of the "Surgical procedures and perioperative management" section to clearly state that we did not use fibrin glue or any reinforcement materials such as PGA or oxidized sheets for air leak repair. Our approach exclusively involved electrical coagulation or suturing as the methods for addressing any leaks detected during surgery.

Minor Comments

3. Page 6 line 150. Misspelled. “tfive” should be corrected.

Response: Thank you for your comments. We have corrected the misspelling of “tfive” to “five” on Page 8, Line 188, as you indicated.

4. Page 11 line 296. Ref. 20 and 21 were overlapped. Please check them.

Response: Thank you for your comments. As previously mentioned in our response to another reviewer, we have addressed this issue by consolidating references 20 and 21 into a single citation.

5. Figure 2. The X and Y axes are usually scaled from 0-100. Please check the figure.

Response: Thank you for observing the scaling of the X and Y axes in Figure 2 of our manuscript. Ensuring that figures are correctly scaled is crucial for clear and accurate data representation. We have reviewed Figure 2 and adjusted the scales of the X and Y axes to range from 0 to 100.