

Answering Reviewers

Reviewer #1: I read with great interest the article about "Individualized risk estimation for postoperative pulmonary complications after hepatectomy based on perioperative variables". I find it quite innovative and interesting, however some major concerns arise: -the introduction must be shortened, and I think that liver surgery is not so recent and less developed as the author say. That part should be removed. -what the author mean in the inclusion criteria when they write "perioperative patients"? please explain -did you analyze also the impact of minimally invasive approach and the impact of tumor position? Do you think that resecting 2 segments (that is the cut off you choose for analysis) of the left lobe (i.e. laparoscopic LLS) is equal of a resection of segment 6-7 or 7-8, in terms of pulmonary complications? Considering the retraction of costal bones for right liver, the possibility of diaphragm involvement and so on? -validation cohort was it internal or external? If internal, why you didn't use an external validation that is more reliable? -laparoscopic liver surgery has been showed to give less postoperative pulmonary complications. You should mention it. -the limitations of the study should be listed in the discussion

Reply : (1) The introduction has been shortened and the inaccurate description of the development of liver surgery has been deleted. (2) Tumor location is also a candidate factor for this study. Because there are too many candidate factors, they are not listed one by one. After statistical analysis, the tumor location was not a significant risk factor, so it did not appear in the results. All the operations in this article are open operations, so laparoscopic and other minimally invasive operations are not included in the scope of this study. (3) The volume of the left lobe of the liver is smaller than that of the right lobe. Consequently, resection of the two segments of the left lobe is not equivalent to resection of segments 6-7 or 7-8. There are also differences in the

surgical difficulty and scope of resection. In this study, considering the complexity of liver anatomy and the possible infiltration of liver tumors into adjacent organs, three indicators (lesion size, number of liver segments removed, and presence of adjacent organ infiltration) were used to evaluate the scope of liver resection. Even with all of these considerations taken into account, the results of this study showed that the removal of >2 liver segments was an independent risk factor for pulmonary complications. (4) Due to the limited number of cases with pulmonary complications, only internal validation was used in this study. (5) This study has some limitations. Before the beginning of this study, considering that open liver surgery had more pulmonary complications than laparoscopic liver surgery, it was of great practical significance to study open liver surgery. Therefore, only cases of open liver surgery were included in the present study. At present, with the rapid growth in the number of cases of laparoscopic liver surgeries performed, the significance of studying the risk factors for complications of laparoscopic liver surgery is more prominent, and we plan to study this in future. In the discussion, the limitations of this study were listed.

Reviewer #2: In the Ms. authors suggests the liver operation pulmonary complication scoring system (LOPCSS), to assess the risk of pulmonary complications after liver resections. Congratulations to the authors on their efforts. However, I have some objections: the methodology is not clear enough especially when it comes to determining the score. If the calculation is almost complicated, I'm afraid, that surgeons don't like to calculate. On the other hand, what do you think is the practical value of the score you suggest, since preventive measures to reduce postop pulmonary complications are standard in perioperative care of these patients?

Reply : (1) Logistic regression was used to form the liver operation pulmonary complication scoring system (LOPCSS) for the prediction of postoperative pulmonary complications. All factors significantly correlated

with postoperative adverse results were included in the multivariate logistic regression analysis. A scoring system was introduced based on the OR values for these factors, which were rounded to be clinically usable(The risk index was assigned according to the nearest integer for clinical application). The sum of the risk scores of all risk factors for a single patient was the total risk score of the complication of the patient. Cut off value was used to determine the critical point of complications. (2) The scoring system has only five parameters, and the values are all integers (0-4); therefore, the calculation is simple to perform. (3) If the patient's score is higher than the cut-off value, the lung function of the patient should be fully adjusted before surgery to achieve the optimum conditions; if the lung function is poor and surgery is necessary, the surgical method should be adjusted to shorten the operation time as much as possible and reduce trauma to the patient.

Reviewer #3: This is a very interesting study. A valid score with clinical relevance was established. Nowadays, it is becoming more and more possible to predict certain postoperative developments. However, clinical relevance should always arise from these predictions. I still miss that in this manuscript.

Reply: Thank you for your encouragement and support.