

## Peer Review File

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### Review Comments:

#### Reviewer A:

I congratulate the authors for their successful experience with MICS CABG. Following are my comments and questions.

Comment 1) Did the authors consider propensity score matching analysis?

**Reply1:** Dear Professor, first of all, thank you for sparing your time to review this manuscript and give us a lot of valuable comments. We read your comments carefully, we learned your rigorous spirit of scientific research from your comments. We carefully revised the manuscript according to your comments, and give our explanation one by one. China has always been a developing country, there is still a gap of medical level and surgical techniques between China and western countries. We will continue to work hard to improve our clinical level, hoping to provide better medical services in the future. Maybe there are some problems we don't fully explain, or we don't give satisfactory explanations according to your comments. We sincerely look forward to your understanding and further comments to improve our research.

Dear Professor, we agree with you and have applied propensity score matching to analyze the data.

**Changes in the text:** We add the matched results in Statistical analysis, Tables, and Results.

Comment 2) Please add a more detailed description of graft configuration. Did most cases have LITA-LAD and SVG graft? How many cases did the authors use BITA?

**Reply2:** Dear Professor, most patients use LIMA and SVG. In this study, bilateral internal mammary arteries were not used, there were concerns about the increased risk of sternal nonunion during median thoracotomy and the increased difficulty and risk during MICS

**Changes in the text:** we add these in the Discussion, paragraph 4.

Comment 3) In Table 1, the values of LVEF are lacking in both MICS and CABG groups.

**Reply 3:** Dear Professor, we agree with you, the patient's ejection fraction is a numerical variable with a non normal distribution. We use the Mann Whitney Wilcox nonparametric tests test method.

Comment 4) In Table 2, the number of proximal aortic anastomosis in the MICS group is lacking.

**Reply 4:** Dear Professor, we didn't make it clear that the proximal aortic anastomat is a device for perforating the proximal part of the ascending aorta. Due to the small operation

space, the patients with MICS used side wall forceps instead of the proximal stapler: **Heartstring**, a device for perforating the ascending aorta. We will use this device when there is calcification in the ascending aorta during routine thoracotomy. We want to count the usage of this device.

**Changes in the text:** We added the description of these definitions in the **Study definitions**



Comment 5) Table 2, Proximal aortic “anastomat” should be “anastomosis.”

**Reply5:** Dear Professor, we didn't make it clear that the proximal aortic anastomat is a device for perforating the proximal part of the ascending aorta.

**Changes in the text:** We added the description of these definitions in the **Study definitions**

Comment 6) What was the number of patients who underwent MICS single CABG (LITA-LAD)?

**Reply6:** Dear Professor, there were 80 patients with MICS single CABG (LITA-LAD)

Comment 7) In table 2, why was the use of LIMA in the CABG group low (69.3%)?

**Reply 7:** Dear Professor, for patients in the MICS group, we will use the LIMA as much as possible to reduce the number of proximal anastomosis of ascending aorta and reduce the difficulty of operation. Therefore, for patients with lesions in LIMA, our intention to do MICS will be low. At the same time, we will be more careful to obtain LIMA to avoid abandonment of LIMA due to surgical factors. Therefore, the utilization rate of LIMA in the MICS group will be high. The low use rate of LIMA in the routine group is related to the disease of LIMA, surgical factors and the tendency of the surgeon.

Comment 8) What was the early or late graft patency?

**Reply 8:** Dear Professor, as for the graft patency rate, actually we are considering to do this research. We want to use coronary artery CTA to evaluate the graft patency of these patients. However, in the process of implementation, due to China's current covid-19 Pneumonia Control policy, it is difficult to collect data also due to economic reasons, patient compliance and convenience. However, we are advancing this research.

Comment 9) line 4 in the results section of the abstract, “waws” should be “was.”

**Reply 9:** Dear Professor, this spelling mistake has been modified.

**Changes in the text:** we correct this word in Abstract.

**Reviewer B:**

This is an important issue today an a nice study.

Some issues needs to be discussed:

Comment 1 Introduction: MICS was compared with CABG however the data (Table 2) showed 93.7% OFF-PUMP in the CABG group means these were OBCAB Patients?

**Reply1:** Dear Professor, first of all, thank you for sparing your time to review this manuscript and give us a lot of valuable comments. We read your comments carefully, we learned your rigorous spirit of scientific research from your comments. We carefully revised the manuscript according to your comments, and give our explanation one by one. China has always been a developing country, there is still a gap of medical level and surgical techniques between China and western countries. We will continue to work hard to improve our clinical level, hoping to provide better medical services in the future. Maybe there are some problems we don't fully explain, or we don't give satisfactory explanations according to your comments. We sincerely look forward to your understanding and further comments to improve our research.

Dear Professor, we didn't make it clear that CABG in this study means traditional regular thoracotomy, including on-pump or off-pump. In the CABG group, 93.7% of patients do off-pump CABG.

**Changes in the text:** We added the description of these definitions in the **Study definitions**

Comment 2 Method: The authors should demonstrate both techniques used for patients. What was with RCA in both groups.

**Reply2:** Dear Professor, we have added the description of surgical techniques in the manuscript. During MICS, we can achieve multiple bypass grafts with apical and pericardial fixator, including RCA through fifth intercostal incision. Techniques during MICS and conventional CABG are the same for RCA treatment.

**Changes in the text:** we add these in **Surgical techniques**

Comment 3 The patient populations were not similar and therefore difficult to compare. Why the authors didn't do a matching between both groups with identical baseline characteristics. The CABG/OBCAB group was more sever diseased compared to the MICS. (Table1)

**Reply3:** Dear Professor, we agree with you and have applied propensity score matching to analyze the data.

**Changes in the text:** we add the matched results in Statistical analysis, Tables, and Results.

Comment 4 What about LIMA use in both groups. Sign. difference due to less LAD disease in CABG?

Average number of dist. anast. different? Were in MICS RCA diseases and could they be bypassed? What about the radial artery? What about arterial revs. in both groups?

**Reply 4:** Dear Professor, the rate of LIMA use was different between the two groups, for patients in the MICS group, we will use the LIMA as much as possible to reduce the number of proximal anastomosis of ascending aorta and reduce the difficulty of operation. Therefore, for patients with lesions in LIMA, our intention to do MICS will be low. At the same time, we will be more careful to obtain LIMA to avoid abandonment of LIMA due to surgical factors. Therefore, the utilization rate of LIMA in the MICS group will be very high. The low use rate of LIMA in the routine group is related to the disease of LIMA, surgical factors and the tendency of the surgeon.

During MICS, RCA can be treated. We will open the chest through the left fifth intercostal and apply the apical and pericardial fixator. This position can well expose RCA area, including distal RCA, PDA, PLA. It is convenient for us to anastomose the vascular lesion of RCA area, however, it is difficult to deal with the proximal and middle segments of RCA trunk

Chinese people usually choose surgery only when they have no choice. Actually, patients usually travel to many hospitals and try PCI, resulting in the injury of radial artery in many patients. In addition, when communicating with patients about surgical plan, many patients are unwilling to leave scars or limited function on their hands. Therefore, in the graft selection, we give priority to LIMA and SVG. The rate of radial artery graft or total arterial graft in patients is relatively low. In addition, in the graft selection, MICS generally does not use the radial artery. Actually, It is difficult to anastomose the proximal ascending aorta of graft through the left fifth intercostal space, especially the radial artery anastomosis, which increases the operation difficulty and risk, so the radial artery graft is rarely used.

Comment 5 Table 3 has no units.

Reply5: Dear Professor, we have added units

**Changes in the text:** we add these in **Table 3**

Comment 6 What about catecholamine? Dosis? in both groups etc.

Reply6: Dear Professor , we didn't explain clearly. We only counted the patients with cardiovascular active drugs use, including dopamine, adrenaline and norepinephrine, but didn't count the specific dose of these drugs. We have modified the expression in the table

**Changes in the text:** we add these in **Table 3**

Comment 7 second thoracotomy should be resternotomy in CABG Group

Reply7: Dear Professor, we have corrected it.

**Changes in the text:** we correct it in **Table 3**

Discussion on these topics should be extended

Reply8: Dear Professor, we have extended the discussion part accordingly.

**Changes in the text:** we add it in **Discussion**

minor:

Comment 8 there are some spelling errors (e.g. waws should be was in abstract)

Reply8: Dear Professor, we have corrected it.

**Changes in the text:** we correct it in **Abstract**.

**Reviewer C:**

Liang et al. performed a single-institution retrospective study comparing the immediate and early operative outcomes of patients undergoing coronary artery bypass grafting via median sternotomy compared to thoracotomy. The authors should be congratulated on their excellent outcomes via a both approaches – clearly this is a safe approach in their hands for the selected patients.

Comment 1 Major comments:

1. To this reviewer there appears to be a very significant selection bias for the thoracotomy approach in healthier patients with less complex coronary artery disease (Table 1). This is not surprising, and though the authors attempted to address this using a multivariable regression, this reviewer does not believe that their methodology is sufficient given the magnitude of the apparent bias. The authors should strongly consider matching their treatment populations – I would suggest IPWT matching in this case. Moving down from the conceptual level, this reviewer believes the specification, tuning, and reporting of their regression model falls short in several ways:

a. There are numerous better ways to select variables to include than using a p-value cut-off of  $<0.05$  from a univariate analysis. For instance, forward or backward selection procedures could have been used to specify a more parsimonious model without adding much complexity. These can be easily paired with re-sampling technique such as bootstrapping to provide more robust estimates.

b. There is lack of transparency regarding which variables were included in each model, as the authors included variables specified in other publications that were not associated with a  $P < 0.05$  in their Table 1. The reader does not know which these are.

c. There is no information regarding the performance of their model for the different outcomes.

Reply1: Dear Professor, first of all, thank you for sparing your time to review this manuscript and give us a lot of valuable comments. We read your comments carefully, we learned your rigorous spirit of scientific research from your comments. We carefully revised the manuscript according to your comments, and give our explanation one by one. China has always been a developing country, there is still a gap of medical level and surgical techniques between China and western countries. We will continue to work hard to improve our clinical level, hoping to provide better medical services in the future. Maybe there are some problems we don't fully explain, or we don't give satisfactory explanations according to your comments. We sincerely look forward to your understanding and further comments to improve our research.

Dear Professor, we agree with you and have applied propensity score matching to analyze the data. We also use the method you recommend when selecting variables to be included in the regression model analysis.

**Changes in the text:** we add the matched results in Statistical analysis, Tables, and Results.

Comment 2. Please provide more comment about how patients who chosen for a thoracotomy versus a sternotomy approach.

Reply2: Dear Professor, we have added more comments for excluding MICS patients

**Changes in the text:** we add more comments in Discussion paragraph 2.

Comment 3. In Table 4, the component events do not sum appropriately to composite of MACCE. This is no further comment in the results or in the discussion.

Reply3: Dear Professor, during follow-up, we found that some patients had two or three follow-up events, such as myocardial infarction and stroke, or death after stroke, or death after myocardial infarction. The final statistics are based on the number of patients, so the cumulative number of events is inconsistent with the number of MACCE events. We have added the discussion of follow-up events in the Discussion.

**Changes in the text:** we add more comments in Discussion paragraph 6.

Comment 4. There are innumerable grammatical and formatting errors which detract from the readability of the manuscript.

Reply4: Dear Professor, due to the poor English level of Chinese people, we have found native English experts to polish the language and make corresponding modifications after writing the article. When I think of these, I think of my painful experience of learning English for more than 20 years, China lacks an English environment. How I wish COVID-19 could finish early and go to study in English speaking countries for some time. If there are still mistakes or inappropriate places, we will ask native language experts to polish them again, but it will take a lot of time.

Comment 5. The authors repeatedly state (including in the title) that they are comparing “minimally invasive coronary artery bypass surgery” to “coronary artery bypass grafting”. In this reviewer’s opinion, this is incorrect. The authors are in fact comparing two different approaches to coronary artery bypass grafting (sternotomy vs. thoracotomy). The language needs to be altered throughout.

Reply5: Dear Professor, we agree with you. This is indeed one study that compares the two surgical approaches. However, as for the definition of CABG, it is generally recognized internationally that the intercostal CABG is defined as MICS and the sternotomy is traditional CABG. We have explained it in the Definition.

**Changes in the text:** we add these in Definition

Comment 6. K-M estimates should be truncated prior to 5 individuals remaining at risk and should have 95% confidence intervals plotted and stated.

Reply 6: Dear Professor, we agree with your opinion, but when drawing 95% confidence intervals, because the incidence of follow-up events in this study is relatively low, the graph is very unsightly. After discussion, we want to use the current display method without affecting

the expression effect. From your comments, we can realize that you must be an expert in the field of statistics. Thank you very much for your valuable suggestions. We are ready to apply the methods you recommend in the subsequent research. Thank you very much.

Minor comments:

Comment 1. How many surgeon(s) performed each approach?

Reply1: Dear Professor, MICS usually requires two cardiac surgeons while conventional CABG

requires three. We have explained it in the surgical technique.

**Changes in the text:** we add these in Surgical techniques

Comment 2. Sentence 53-55 is run-on

Reply2: Dear Professor, we have made changes. But we are not sure whether the change is correct

Comment 3. Line 97. What does “previously stable” mean?

Reply3: Dear Professor, we have made changes.

**Changes in the text:** we modify this in Definition

Comment 4. Why only include revascularization after discharge?

Reply4: Dear Professor, we have made changes.

**Changes in the text:** we modify this in Definition

Comment 5. Line 199-200. Left 4th AND 5th intercostal incisions?

Reply5: Dear Professor, we have made changes.

**Changes in the text:** we modify this in Discussion

Comment 6. Line 230-231. These methods cannot “eliminate bias”

Reply6: Dear Professor, we have made changes.

**Changes in the text:** we modify this in Discussion