Author's response to reviews

Title: Is Mitral Valve Repair Superior to Replacement for Chronic Ischemic Mitral Regurgitation with Left Ventricular dysfunction?

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Author's response to reviews: see over
Dear Prof. Zamvar

Thank you for your letter of October 1, enclosing the reviewers’ comments. We are grateful for such a detailed account of review to my manuscript (MS: 1110237170378449).

According to the reviewers’ comments, we had revised the de novo manuscript. Now I submit the revised manuscript to you, enclosing the point-to-point response to the reviewers’ concerns. I sincerely hope that you would be satisfied with the manuscript, and your advice would be honored.

I am looking forward to hearing from you soon. Should you have any further inquiries, please do not hesitate to contact me.

Yours faithfully,

Xin Chen, M.D. & Ph.D.
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Response to reviewer and Discussion

Dr Zhi-Gen Jiang 1. Unconventional use of English, grammar errors, a lot of abbreviations (many are undefined at the first appearance) and unclear description of some important points throughout the manuscript have made the reading very difficult and severely blurred the impact of important findings. For instance (Abstract, line 16), instead of “After logistic regression, independent predictors of survival was associated with age of 75 years or older and highly associated with preoperative renal insufficiency and LVEF < 30%.” I would rewrite as “Logistic regression analysis revealed that poor survival was associated with old age (#75), preoperative renal insufficiency and low left ventricular ejection fraction (< 30%).” I suggest the authors get help from English language expert and include a list of abbreviations.

2. Abstract line 10-11: “At discharge, Left ventricular end-systolic and end-diastolic diameter and left ventricular ejection fraction (LVEF) were more decreased in the MVP group versus that seen in the MVR group (P<0.05), …” is misleading. It should be “… were improved more in the MVP than MVR group (p<0.05), …”. If LVEF was decreased by the surgery, that’s too bad!

3. Abstract line 19-21: The last sentence sounds not very meaningful. You may change it to “Early results of MVP treatment seem to be satisfactory, but several lines of data indicate that mitral valve repair provided less long-term benefit than mitral valve replacement in the LVD patients.”

4. Conclusion in the abstract and body text should be rewritten since it does not match the aims of the study.

Dr Xin Chen Dr Jiang, thank you very much for your kind comments, and those are very important issues that you pointed out. We have revised and changed those sentences and grammar errors, which were highlighted with red colour text. Conclusion in the abstract and body text should keep consistency, we agree with you.

Dr Zhi-Gen Jiang It is expected that the surgical and non-surgical techniques, experience and the hospital facility were improving along the 8 years. Therefore, yearly distribution of patients of both types of MV surgery should be displayed and statistically analyzed in a graph so that the fairness of comparison can be better assessed.

Dr Xin Chen That is a good suggestion. So we have supplemented the distribution of patients by calendar year, which is shown in Figure 1.

Dr Zhi-Gen Jiang Discuss how could you substantially improve survival rate than that reported previously[11].

Dr Xin Chen That is a very good question. We actually have looked at that difference of survival rate. Indeed, survival is influenced more by traditional factors, including left ventricular dysfunction, LVEF, patient choice and other comorbidities. I am not sure that we improve survival rate than that reported previously. This is because we know that those who had relatively low survival rate had lower LVEF, and certainly lower LVEF is associated with poorer survival.

Dr Zhi-Gen Jiang Discuss patient selection feasibility for mitral valve repair versus replacement.

Dr Xin Chen As to the question, this related to our preconceived notions and beliefs about mitral valve repair that we hold dear. We still believe that mitral valve repair is the procedure of choice for ischemic disease with left ventricular dysfunction. Well, this is a single-institution retrospective review, a limitation to most of the literature comparing MV repair to replacement.
Fortunately, no statistical difference was found in base characteristics between the two groups, which keep the study feasibility.

Dr Zhi-Gen Jiang  Minor errors: 1. Some contents do not match the section headings. You need either to change the headings (e.g., change “Definitions” to “Patient Selection in the Study”, “Surgical Techniques” to “Surgical and Associated Procedures”) or to reorganize the contents (e.g., sections in Discussion). 2. Check carefully with typos (e.g., space between sentences, etc) and grammatical errors (e.g., “undergoing” at many places should be replaced by “undergone”). 3. What is “10 participating” in Acknowledgements? 4. Table. 1. Line 1: Number should be Total number of patients. Elaborate in footnote what is “left main disease” and what is 3-vessel disease. Include a reference for “Carpentier classification”. 5. Page 4: define and include a reference for “NYHA functional class”. Level of interest: An article of outstanding merit and interest in its field

Dr Xin Chen  We agree. Again, thank you very much for your kind comments, and those are very important issues that you pointed out. We have revised and changed those sentences and grammar errors and unclear description of some important points which were highlighted with red colour text.

Dr Ben Bidstrup  The authors have reported on their experience of mitral valve repair for ischemic mitral regurgitation. The authors have combined type I and IIIB MR in this report. The mechanisms of MR are quite different, and the repair procedures are thus quite different. I would ask the authors to make some changes to differentiate between these two groups. Need to add different types in pre-operative data as well as in the followup data.

Dr Xin Chen  I thank Dr Ben for his comments and questions. Ischemic mitral regurgitation (IMR) is a result of complex changes in left ventricular and annular geometry and function caused by myocardial infarction in the circumflex or right coronary artery distributions, producing a combination of systolic leaflet restriction (Carpentier type IIIb), and annular dilatation (Carpentier type I). Repair techniques for these two conditions differ. Papillary muscle rupture was repaired by papillary muscle reimplantation or occasionally by resection of a prolapsing portion of the posterior leaflet (Type IIIb). Papillary muscle infarction was repaired by papillary muscle shortening (Type IIIb). Functional ischemic mitral regurgitation was repaired by annuloplasty alone (Type I). So I agree with you, and we have supplemented different types in pre-operative data as well as in the followup data. No statistical difference was found between these two group.

Dr Ben Bidstrup  There is no mention of intra-operative TEE assessment of valves immediately prior to surgery, nor of the adequacy of the repairs when done.

Dr Xin Chen  In regard to Transesophageal echocardiography (TEE), it was routinely used to assess the valve function during intra-operative period. So we add the TEE assessment methods in the text.

Dr Ben Bidstrup  In the tables of preoperative data, some statistics have been done (? t test). These are summary stats and it is not appropriate to perform any statistical analysis.

Dr Xin Chen  Thank you, sir. As to the question, I do not know the answer for this. Much to my willingness, our statistician gave me some good suggestion. We have adjusted the statistical analysis to preoperative data in table 1.

Dr Ben Bidstrup  Are you able to provide some insight into the choice of repair vs replacement?
Was repair more frequent in the latter part of the reviewed period. Thus time of operation might be a variable to be looked at in your logistic regression analysis.

**Dr Xin Chen** Of course, as to the first question, the decision whether repair or replacement was done was made by surgeon, and this relates to the different type of valvular pathology. If the valve looks repairable, we repair it, whether there is bileaflet prolapse, or anterior leaflet prolapse. If we can repair valve, we do so. Therefore, it was an important part of analysis to adjust for the effective of the surgeon. I think a good replacement is better than a bad repair, and I would not accept a bad repair, especially in somebody who is elderly. Regarding the second question, we have supplemented the distribution of patients by calendar year, which is shown in Figure 1. Thanks!

**Dr Ben Bidstrup** Death certificates can be notoriously inaccurate. Has any work been done in China to validate the information on them?

**Dr Xin Chen** Sure, in china, any mortality data or death certificates are from updated National cause of Death Register or Public Hospital.

**Dr Ben Bidstrup** In the discussion, you have referred to preservation of the valve during replacement as giving better outcomes. Can you provide some evidence that applies to this technique in MV replacement for ischemic MR?

**Dr Xin Chen** That is a good question. In this cohort, virtually all of the patients undergoing replacement had preservation of the posterior leaflet and subvalvular apparatus, but preservation of the anterior leafet was less common. We are aware of beneficial results shown by Dr David and colleagues [1] for preservation of the subvalvular apparatus in mitral valve replacement, and our current practice is to preserve as much as possible of the subvalvular apparatus when we replace the valve. This information was not stated in some of the charts, however, and we elected not to analyze this aspect.

**Dr Ben Bidstrup** Ultimately, survival is related to the degree of impairment of LV. This may be the cause of the lack of difference in survival between repair and replacement.

**Dr Xin Chen** Yes, I agree with your comments.

**Reference**