Author's response to reviews

Title: Right anterolateral thoracotomy: an attractive alternative to repeat sternotomy for high-risk patients undergoing reoperative mitral and tricuspid valve surgery

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Response to the reviewers’ comments and suggestions on JCTS-D-17-00105 submitted to Journal of Cardiothoracic Surgery by Cao et al.:

We would like to thank the editors and the reviewer for their comments, and we hope the following response is adequate.

Reviewer 1
1. I would call this article "Right anterolateral thoracotomy: an attractive alternative to repeat sternotomy for high risk patients undergoing reoperative mitral and tricuspid valve surgery", and not "valve surgery". Authors are not discussing aortic valve operations.

Response: Thanks for reviewer’s valuable suggestion. We revised it in our revision.

2. I cases when the dissection around the aorta for clamping is difficult, one can consider endobaloon.

Response: It is indeed a very good idea, although we did not have such a device in China. We are planning to design such a device and hoping to put them into production as soon as possible to help these patients.
3. For mitral surgery one femoral vein cannula placed through the left atrium into the superior caval vein is usually enough.

Response: Yes! Isolated mitral valve surgery can use one femoral vein cannula placed through the right atrium into the superior caval vein. However, on the one hand, we had no negative pressure device, so the both cannula of right femoral vein and superior vena cava can improve the venous drainage. On the other hand, we only had 3 patients undergoing isolated mitral valve surgery. In order to improve myocardial protection, we still did the right atrial incision for using retrograde perfusion.

4. I think that discussion about timing for tricuspid surgery, what valve to put is not for this article.

Response: It is hard to control the timing for tricuspid surgery. It depends on the patient's symptoms and economic conditions in China. Such patients are mostly poor people, but most of the cost has to be paid by their own, resulting to be dragged to such a serious condition for surgery. We used Medtronic Hancock II or Carpentier-Edwards Perimount for all patients.

Reviewer 2

1. the title is somehow disturbing since only the AV valves (primarily the tricuspid valve) are addressed, not aortic or pulmonary valve. Authors should precise title accordingly.

Response: Thanks for reviewer’s meticulous suggestion. We revised it in our revision.

2. though the results are good, the described method is already known and there is no additional or new information for the surgical community. Beside that, nowadays there are more minimally invasive techniques described, with smaller incisions (12.6+/-2.3cm vs 5cm (Kiziltan, Journal of Cardiothoracic Surgery, 2015)

Response: Indeed, there were some reports using this incision for cardiac valve reoperation. Even some studies like the report of Kiziltan et al. 1 could be more minimally invasive. However, patients’ conditions were not the same among different groups. Most patients in this study were patients with severe tricuspid regurgitation and right heart failure although our mortality rate was low. Isolated reoperative tricuspid valve surgery is considered to be associated with high operative risk. Although the operation may not be technically complicated, the increased risk is usually due to the fact that patients are referred for surgery late in their disease process. Such patients often have evidence of right heart failure and associated complications. It is unknown whether poor postoperative outcome is related to the severity of tricuspid regurgitation itself or to the poor overall status of such patients. It was convincing that prevention of dissection of the right ventricle, is additionally protective against dilatation of the right ventricle after surgery that would result in poor right heart function. Our policy is to use bioprosthetic valves(Medtronic Hancock II or Carpentier-Edwards Perimount) for tricuspid valve replacement in all patients to avoid excessive anticoagulation, regardless of patient age or
presence of a previously implanted mechanical prosthesis in the aortic and/or mitral position. Therefore, it is not suitable to evaluate the clinical value of this study merely using the size of incision. We believe the more important thing is to explore the unique values of one certain incision in a certain group.

3. why is the reconstruction rate so low (MV: 1 reconstruction vs. 4 replacements, TV 2 reconstructions vs. 19 replacements). Is that due to technical issues: view, approach of valves via ant.-lat. access?

Response: We know reviewer’s consideration. First, we performed mitral valve replacement for patients who had the history of mitral valve repair. Second, the patients with the history of tricuspid valve repair but now serious tricuspid regurgitation along with serious heart failure and expansion of right heart, were received tricuspid valve replacement for avoiding the poor effect of repair. In addition, such patients are mostly poor people, but most of the cost has to be paid by their own. They can not accept short-term surgical effects. They do not allow the failure of surgeon's repair surgery. Of course, it does not rule out our repair technology is not as good as Western surgeon.

4. please comment on definition of high-risk patients:

(2) cardioplegia wash-out via patent and not clamped bypasses during operation

Response: Indeed, it is very difficult to perform effective myocardial protection in these patients. There were 3 patients with location of patent bypass grafts. One patient only had venous grafts. Dissection of the ascending aorta was successful, so myocardial protection had no problem. Another 2 patients with the internal mammary artery grafts were cooled to 24°C and induced ventricular fibrillation and continued retrograde perfusion via coronary sinus during intracardiac operation.

5. define proximity of ascending aorta to sternum

Response: Proximity of ascending aorta to the sternum is less than 5mm.

6. how are "dense" retrosternal adhesions defined, how detected?

Response: Thanks for reviewer’s valuable suggestion. The fourth point “Dense retrosternal adhesion” in “Definition of high-risk patients” included the fifth and seventh points. So we deleted it in revision.

7. why did the authors include patients with severe pulmonary dysfunction (2 patients). This is known as risk factor in antero-lateral thoracotomy.
Response: Such patients with severe pulmonary dysfunction were not due to the problem of the lungs themselves, but for the serious heart failure. So it is only a risk factor of the anterolateral thoracotony. In addition, several early cases we done were still in the developing stage. We did not recognize the anterolateral thoracotomy increasing the risk of surgery. So severe pulmonary dysfunction does not appear in the exclusion criteria. Accordingly, we discussed it in the Discussion to suggest avoiding to use the anterolateral thoracotomy in such patients.

8. how was cannulation of superior v. cava accomplished? Via jugular vein or two stage femoral cannula?

Response: After the superior vena cava were dissected, we performed the cannula of superior vena cava in the surgical field of view but not via jugular vein.

9. describe body temperature, type of cardioplegia, type of aortic clamp

Response: Yes! We have added it in ”Operation technique” according to reviewer’s suggustion.

10. which 2 patients had to be operated on the fibrillating heart? were it the re-re-operations? Indication?

Response: The 2 patients were failure to dissect the ascending aorta for conventional cross-clamping. One patients received the re-re-operation, while another received the re-operation within 6 months after the previous surgery. Therefore, the adhesion was particularly serious in this 2 persons.

11. why is cardiothoracic ratio good to know (69%)? Are there limits?

Response: We measured the cardiothoracic ratio on Chest anteroposterior X-ray. It is easy without any limit.

12. describe course of postoperative hemoglobin.

Response: The hemoglobin during CPB remained at about 80g/l. Postoperative hemoglobin in our patients mostly remained at lest 90 g/l. If patients’ postoperative hemoglobin is below 90 g/l, we would infuse some red blood cells.

13. why had 8/24 patients been ventilated longer than 24h? Was it due to intraoperative lung injury?
Response: Yes, we think so. They were almost at the early stage of our work by using a single lumen intubation. It was caused by excessively compressing lung during dissecting adhesions of right atrium and ascending aorta. After that, we used a double lumen endotracheal tube to avoid excessive lung injury.

14. how many surgeons were operating?

Response: Professor Dongjin Wang did all the operations.

15. why did 2 patients die for low output syndrome? Mean ejection fraction was preoperatively 47.5%; did these patients suffer from myocardial infarction?

Response: One patient suffered from myocardial infarction, another suffered from poor myocardial protection.

16. did the authors replace/repair a mitral valve in patients with previous AVR? It would be interesting for the readers to know, whether view/approach of MV is more/less convenient via ant.-lat. approach.

Response: Yes! We had 7 patients with history of aortic valve replacement. Usually, exposure can be limited in patients who have had prior aortic valve replacement. The right anterolateral approach offered excellent visualization of the mitral valve structures due to a direct-line view. So it is much easier to perform mitral valve surgery via the right anterolateral approach than via redo-sternotomy.

17. what was neurological outcome like?

Response: There was no neurological complication in our patients.

18. how was postoperative pain addressed?

Response: We used oral gabapentin capsule and local application of Voltaren Gel to relieve postoperative pain.

References
