

Peer review file

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Reviewer A

Comment 1: Please explain why the reference number 27 is not cited in the text.

Reply 1: Thank you sincerely for your constructive suggestions. We made a mistake of the reference number 27. We have cited the reference and rearranged the reference number 27 as number 21 in the text.

Changes in the text: We have cited the reference as number 21 in the article (Page 8, Line 7. Page 8, Line10. Page 10, Line 2. Page15, Line12-14)

Comment 2: Please cite the reference number 27 in the text and comment the differences with your study.

Reply 2: Thank you sincerely for your insightful comments. There were 30 explanted porcine valves including 22 Hancock II and 8 C-E valves in the study of Naqvi et al. (reference number has changed to 21). There are several differences between the study of Naqi et al, and ours: the structure failure at stent posts (including cusp tears and commissural dehiscence) in our study (91.67%) was much higher than the study of Naqvi et al. (42%). In our study, the average first surgery age was younger than the study of Naqvi et al. (45.09 ± 21.52 years vs. 58.53 ± 12.4 years) and the rate of severe calcification was higher than the study of Naqvi et al. (27.27% vs 10%). We have cited “number 27” as “number21” in the article.

Changes in the text: We have analyzed the difference between our study and the study of Naqvi et al. and cited “number 27” as “number21” in the article (Page 8, Line 7.

Page 8, Line10. Page 10, Line 2. Page15, Line12-14)

Comment 3: Page 4, line 12: please express the times in years, not in months.

Reply 3: Thanks very much for your suggestion. The changes have been made.

Changes in the text: We have changed years to months (see Page 6, Line22-23).

Comment 4: Page 7, line 4: please complete the text with the number of the cited figure.

Reply 4: Thanks for your suggestion. We completed the text with the number of the cited figure

Changes in the text: We added this data on the result (see Page10, Line20)

Comment 5: I would suggest to improve the discussion with more comparisons with bovine prosthesis from the literature.

Reply 5: Thank you sincerely for your insightful comments. We have improved the discussion with more comparisons with bovine prosthesis. The localized stress concentration at the stent position occurred in both porcine and bovine pericardial valves. However, the rate of cusp tears was lower among bovine pericardial valves. In a study of bovine pericardial valves, leaflet tears in the stent post area constituted a low proportion of the explanted valves (17.36%). It has been indicated that porcine valves have thinner leaflets and lower mechanical properties than bovine pericardial valves. Bovine pericardial valves can bear higher levels of stress due to the material properties of the stent posts; however, porcine valves are more susceptible to leaflet tears.

Changes in the text: We added this data on the discussion (see Page8, Line24-25. Page9, Line1-7)

Comment 6: How many patients took warfarin before the explantation?

Reply 6: Four (33.33%) patients took warfarin before the explantation due to atrial fibrillation.

Changes in the text: Thank you sincerely for your insightful comments. We added this data on the result (see Page6, Line21-22)

Reviewer B

Comment: The authors studied failure mechanism of porcine valves, Hancock, and Carpentier-Edwards Supraannular, in mitral position. The study result was interest. However, I could not understand what was the original point of the study. As authors have already pointed out, several similar studies have been done. And the result of the current study was almost the same as previous studies. The authors should emphasize the original point of the current study compare with other studies.

Reply: Thank you sincerely for your comments. Our study showed type I cusp tears and commissural dehiscence occurred near the stent post position in 91.67% of explanted valves which was the main mode of failure. The damage rate near the stent posts was higher than that reported by Naqvi et al. (91.67% vs. 42%). We believe this may related with our patients who undergo the first surgery at younger age and higher prevalence rate of rheumatic heart disease. The patient's average age at first surgery was lower than that reported by Naqvi et al. (45.42 ± 19.58 vs. 58.53 ± 12.4 years). In young patients, energetic physical activity may be an important reason of valve tear. In our study, 66.67% (n=8) patients underwent mitral valve replacement due to rheumatic heart disease which accounts for a major portion of valvular disease in China. We found that the cusp tear was the only failure reason of explants from rheumatic heart disease

patients, while the failure modes of explants from other patients who without rheumatic heart disease were usually tears caused by calcification. The rheumatic disease may affect the strength of collagenous fibers of leaflets, result in cusp tears.

Changes in the text: We added this data on the discussion (see Page8, Line4-18)

Reviewer C

Comment: I would recommend to carve out the relationship of patients age, length of implantation and valve damage (calcification) a little bit more. (Like Results/line 27, 28). Then you could examine the severity of valve damage in younger and older patients.

Reply: Thanks sincerely for your comments. Our study showed type I cusp tears and commissural dehiscence occurred near the stent post position in 91.67% of explanted valves which was the main mode of failure. The damage rate near the stent posts was higher than that reported by Naqvi et al. (91.67% vs. 42%). We believe this may related with our patients who undergo the first surgery at younger age and higher prevalence rate of rheumatic heart disease. The patient's average age at first surgery was lower than that reported by Naqvi et al. (45.42 ± 19.58 vs. 58.53 ± 12.4 years). In young patients, energetic physical activity may be an important reason of valve tear. In our study, 66.67% (n=8) patients underwent mitral valve replacement due to rheumatic heart disease which accounts for a major portion of valvular disease in China. We found that the cusp tear was the only failure reason of explants from rheumatic heart disease patients, while the failure modes of explants from other patients who without rheumatic heart disease were usually tears caused by calcification. The rheumatic disease may affect the strength of collagenous fibers of leaflets, result in cusp tears.

Changes in the text : We added this data on the discussion (see Page8, Line4-18)

Reviewer D

Comment: Authors fail to make a comprehensive discussion about the causes of the deterioration. The vast majority of sentences and arguments cannot be understood. For example, "Furthermore, due to the asymmetric structure of porcine native aortic valve, HAN and CE-SAV porcine valves which were made from porcine native aortic valves would lead to changes in stress distribution and blood flow pattern and then consequently affect the long-term durability of porcine valves"

or: "Although bovine pericardial valve can reduce the stress at the stent posts through the design of valve leaflet and suture method, the HAN and CE-SAV porcine valve cannot reduce the stress concentration at the stent posts due to change the leaflet configuration and suture."

In conclusion, interesting issue, but discussion is really poor and hard to read. English writing very poor, not ordered, or structured.

Reply: Thanks sincerely for your comments. We have modified most sentences and arguments. This article has been checked by a native English-speaking expert. The above two sentences have changed. "Furthermore, due to the asymmetry of porcine native aortic valve leaflets, the structure of porcine valves would affect the stress distribution and blood flow pattern, and consequently affect the long-term durability of porcine valves". "Bovine pericardial valves can bear higher levels of stress due to the material properties of the stent posts; however, porcine valves are more susceptible to leaflet tears".

Changes in the text: We have changed some sentences and arguments. (see Page7, Line25. Page8, Line1-3. Page 9, line5-7.)

