Reviewer’s report

Title: Degenerative processes in bioprosthetic mitral valves in juvenile pigs

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Reviewer: Muralidhar Padala

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Honge et al. in this paper titled “Degenerative Processes in Bioprosthetic Mitral Valves in Juvenile Pigs”, investigate the suitability of porcine model for evaluating bioprosthetic heart valves and to investigate the presence of calcification in Carpentier-Edwards valves 6 months after implantation. The primary outcomes of this study were establishing the viability of a swine model to study bioprosthetic heart valves, comparable changes in implanted bioprosthetic valves to studies in human and sheep. This is a good study that comes from a respected group in heart valve research and the results corroborate with previous studies in other species. But few issues need to be clarified –

MAJOR COMPULSORY REVISIONS:

[1] How is the model proposed here different from the one published by the same group in September 2010 issue of the Journal of Heart Valve disease? In that paper, the authors indicate that development of the juvenile swine model is challenging for various valid reasons and report 53% mortality. In this paper, the mortality was lower at 37% but with the same protocol. Could the authors comment on these differences and possible steps taken to improve survival in comparison to their previous paper? It would help the readers wishing to develop their own models in juvenile pigs. Details regarding the drug regimen, bypass time etc, presence of arrhythmias, hemodynamics observed immediately after surgery and acute post op will be useful for the readers.

[2] How different is the body mass of the animals from the beginning to the end of the experiments? Are there differences in the pressures, heart rate or ventricular contraction? Additionally the use of 27mm prosthesis seems quite larger compared to 21mm and 23mm prosthesis in adolescent sheep, can the authors justify their size selection? What human age/BMI do the 27mm valve sizes correspond to?

[3] Can the authors comment on the differences in the extent of calcification of the commissures between each animal? Is it potentially due to the differences in the growth of the mitral annulus and surrounding cardiac structures at a different rate in each animal, and can the authors extract the annular dimensions, body mass and other relevant data and compare to the differences in the calcification observed? This data may be quite interesting, assuming rest of the blood borne parameters remain the same between animals.

[4] The paper shows degeneration of the aortic valves in most of the pigs, but could the authors discuss the reasons for calcification in more detail? I think the
current discussion, focused significantly on the porcine model, does not really justify the title of the paper or the nice results presented. Considering the experience of this group in this area, I think the readers will benefit from their insights.

[5] A major setback of this paper seems to be the inability to bring out the novelty or the relevance of this study to existing literature. They already published their porcine model, so in this paper they should address any improvement in relevance to their JHVD paper and focus more on the mechanisms of degenerations.

[6] No quantitative assessment of degeneration or hemodynamics during the follow up period is provided. I think it is necessary to derive useful information from this report.

MINOR REVISIONS:
[7] The authors should check the paper for minor editorial errors. Mostly it’s a well written paper.

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
None