Author's response to reviews

Title: Sutureless Aortic Valve Replacement in a Calcified Homograft Combined With Mitral Valve Replacement

Authors:

Ferdi Akca (ferdi.akca@catharinaziekenhuis.nl)

Kayan Lam (kayan.lam@catharinaziekenhuis.nl)

Ibrahim Ozdemir (ibrahim.ozdemir@catharinaziekenhuis.nl)

Erwin Tan (erwin.tan@catharinaziekenhuis.nl)

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Author’s response to reviews:

Reviewer 1

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* As much as double valve replacement with a Perceval is of label, it has been carried out on numerous occasions and has been published a few times.

- Indeed the reviewer is correct that double valve replacement with a Perceval valve has been described in more and more reports. However, the use of a Perceval for redo surgery in patient with an aortic homograft and concomitant mitral valve replacement has never been described before. Furthermore, we used the Perceval as a last resort option during very challenging surgery. We believe the Perceval valve is great for routine aortic valve replacement and our case demonstrates is can be life-saving during a surgical impasse.

* I advise checking on definitions of severe AS. More than 40mmHg is severe and a velocity of >200ms is severe.

We thank the reviewer for this comment and he is absolutely right. In the revised manuscript is has been changed to moderate AS and severe AR.

- The use of a St Jude mechanical prosthesis in concomitant AVR with Perceval is ideal as the valve is a low profile valve and will not interfere with the Perceval prosthesis.

The reviewer made a good comment that the St Jude mechanical valve is ideal with regard to interference with the Perceval prosthesis. Therefore, we implanted this into the discussion of the revised manuscript.
* The result of a mean gradient of 29mmHg with a Perceval is unacceptably high. The net result of getting the patient home is commendable but the reduction of mean gradient from 38 to 29 mmHg is not good.

- We agree with the reviewer that the decrease in mean aortic valve gradient in this patient is unsatisfactory as we described in the discussion of the paper. However, it is known that the Perceval has a very favorable effective orifice area compared to stented bioprostheses, which would probably have led to even higher gradients. This has been clarified in the revision. Indeed, we agree with the reviewer that there is a moderate patient-prosthesis mismatch with an indexed EOA of 0.72. This has been implemented in the revision too.

The aim of this paper was to illustrate that the Perceval can serve as a bail out strategy, indeed with the primary aim of survival. Therefore we believe that similar patients should be treated in hospitals where sutureless valve prosthesis are available to offer a solution in case implantation of a conventional (e.g. mechanical) AVR fails.

* A redo homograft case is an ideal indication for a suture less AVR.

- We fully agree with the reviewer and implemented this statement in the conclusion of the revision.

Reviewer 2

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* Akca et al have described an interesting case of redo surgery for an calcified homograft. Overall the report is of good quality and highlights all the pertinent points. There is now a growing understanding that the Perceval valve is a good option for the calcified homograft and significantly shortens the procedure. A few key issues regarding the use of Perceval is worth discussing. First it is to do with the sizing as the remaining homograft annulus is usually not round and very calcified.

- Indeed, we fully agree with the reviewer that sizing of the remaining homograft annulus could be very challenging. Due to the circumferential calcification and the extensive degree of the decalcification we (luckily) ended up with a quite round annulus and sizing could be done as usual. We described the implantation process in more detail in the revision, as requested by the other comments of the reviewer below.

* The second is with method of deployment as not always is it possible to pass any sutures through the annulus due to the calcification. I believe this was the issue in this case.

- The reviewer is correct that the conventional pledged valve sutures could not be placed due to the extensive calcification of the homograft. For implantation of the Perceval valve it is recommended to place three subannular guiding sutures, as we usually perform with three 4-0 prolene sutures. During this procedure we were able to place these three guiding sutures slightly
below the recommended height from the annular hinge point. We recognized the higher change of AV-conduction disorders, but this did not occur postoperatively. We believe that the reviewer raised a significant issue and this has been addressed in the revision.

* Akca et al describe this case as a bale out option which would account for the long operative time. There is no mention of the intraoperative gradient as the post operative one performed during follow-up is rather high and should be explained. This is likely to be the case if a valve is oversized (not properly expanded) or that there is mismatch. Whatever the cause is in this case it should be discussed. More information is required prior to publication.

- We thank the reviewer for the comment. Indeed the etiology for the postoperative gradient is important. The absolute maximum annulus diameter of the homograft corresponded with a Small sized Perceval valve. Despite a high gradient, a larger valve would not have been technically possible. We do not believe that oversizing is the cause of the gradient, since the valve could be well deployed and we did not observe any (peri)valvular regurgitation. In this patient the cause of the high gradient is due to patient-prosthesis mismatch (PPM). The calculated indexed EOA was 0.72 cm²/m² which is classified as a moderate PPM. The reviewer raised a very significant point and therefore we implanted the results of the indexed EOA and the etiology of the high gradient in the revision.