Title: Aortic wrapping for mild to moderate ascending aorta dilatation is associated with early favourable aortic remodelling

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Reviewer: Ramesh Patel

Reviewer's report:

Aortic wrapping for mild to moderate ascending aorta dilatation is associated with early favourable aortic remodelling

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Research article

When assessing the work, I have considered the following points:

1. Is the question posed by the authors new and well defined?
   The question posed by the authors is new and not well defined

2. Are the methods appropriate and well described, and are sufficient details provided to replicate the work?
   The procedure is described well. What is not clear is on what basis was the size of the Dacron graft chosen (2.5 – 3.5cm). Was this on the BSA, % reduction, size of the “normal aorta” as determined from the CT scan or other method? In addition was the tube graft stretched or left crimped. Three patients had CABG - were these all IMA grafts or SVG. If SVG how were the proximal anastamosis undertaken? The type of aorototomy undertaken (traverse vs hock-stick), is not mentioned.

- Major Compulsory Revisions

3. Are the data sound and well controlled?
   The data is not controlled. How can we be certain that the reverse remodelling that took place, in areas other than that was not wrapped, was not from correcting the aortic valve pathology by replacement of the valve? Is there any data for these measurements by the authours where the patients have undergone AVR in isolation? The authors could have addressed this by CT measurements in those patients in whom the wrap was not undertaken and had AsAo in their upper limits. No mention this as weakness/limitations of their study is made anywhere in their manuscript.

It is of no surprise that the ascending aorta diameter is significantly reduced in size because it was wrapped! (Physically constricted!) One should expect this
without question.

The importance is the reduction in the STJ where there is reduction but with weak statistical significance. The possible explanation could be that weak reduction in STJ could be as a result of aortotomy closure and again from the wrap constricting the region. In the method, the wrap is described to start from the STJ.

The important question also arises is the reduction in the coronary sinus measurements, where there is reduction again with weak statistical significance. Could this have been from the correction of the aortic valve pathology? Only 3/14 patients had what seems an appreciable reduction in the sinuses dimension (Figure 1). Were these in whom AR was the isolated manifestation? The sinusus as well as AsAo and the arch is often noted to expansile in severe AR (wide pulse pressure) and could this be the reason for the discrepancy in the measurements pre to post AVR where post op there is no AR?

The question also arises is the reduction in the aortic arch measurements, where there is reduction again with weak statistical significance. Again could this have been from the correction of the aortic valve pathology? 6/14 patients had what seems an appreciable reduction in the sinuses dimension (Figure 1). Were these in whom again AR was the isolated manifestation?

There is uncertainty on the statistical testing. Surely the variables of dimensions were not normally distributed. Though mentioned - “Continuous variable that were normally distributed were presented as mean ± SD, and differences between groups were compared using paired t-tests”. The only data is the measurements It would seem that the authors have applied parametric testing for a discontinuous variable looking for a p value of <0.05!

What was the blood pressure control in these patients at the time of their repeat CT measurements?

In the period of time were any patients turned down from having the wrap?

- Major Compulsory Revisions

4. Does the manuscript adhere to the relevant standards for reporting and data deposition?

There is lack of information on the characteristics of patients operated upon.

- Minor Essential Revisions

5. Are the discussion and conclusions well balanced and adequately supported by the data?

Line 4, page 7: The procedure can be performed within 5-10 minutes. This is an exaggerated statement for the reasons provided;

1) The ascending aorta along with the STJ and the arch to its some extent has to be freed from the PA and pericardia reflections

2) Any bleeders have to be ensured haemostatic.

3) Some form of measurements have to be performed
4) Correct graft size has to be opened and slit open
5) The correct length of the Dacron wrap has to be detrained
6) This has to be passed around the AsAo without crimping and placed snugly around the aorta
7) A vertical suture to approximate the split end is necessary.

The safety element is not tested in this report
Line 3 page 7: All the patients in this study had their aortas opened.
To undertake this procedure in 14 patients and conclude there are no complications and to use the word “significance” is not at all scientific.
No the discussion and conclusions are not balanced and do not adequately support the data.
Line 9 page 7: “benefit seen as early in all areas within 2 weeks after surgery”
What were the timings of the post op CT. There is no data on early or late CT measurements.
Line 13 page 7: The word remodelling is incorrect. if any did take place, this has to be termed reverse remodelling.
Line 14 page 7: Is it again due to correction of AV pathology or is it due to wrapping cannot be concluded.
Line 14 page 7: Are the authors advocating the “wrapping” where there is no AV disfunction?
Last 2 lines page 7: Statements without admissions of data for scrutiny should not be made.
- Major Compulsory Revisions

6. Do the title and abstract accurately convey what has been found?
NO. The title should include patients undergoing aortic valve replacement with associated aortic dilatation
The aorta has to be reserve remodelled. The aorta has dilated as a result of remodelling process due to the in this case aortic valve pathology. The authors should be refrained from confusing the terminology.
- Minor Essential Revisions

7. Is the writing acceptable?
The grammar is correct.
However the authors are misinterpreting the law of Laplace. The law is a relationship of cavity dimension and wall stress.
In this case we could postulate:
Pressure in the aorta (P) = 2 X aortic wall tension (T) / aortic luminal radius (R)
And from this we could postulate that the wall tension is increased as the
dimension increases. It has no baring to the adverse flow turbulence as mentioned in the manuscript (page 3 line 6). That is perhaps an entire different entity.

- Minor Essential Revisions

In conclusion It is my view that major compulsory revisions has to be made which the author must respond to before a decision on publication can be reached.

Confidential comments to editors

Comments that relate to ethical
This analysis though undertaken in retrospect had not sought for ethical approval. Concerns are that
1 Patients were subjected to experimental procedure without due ethical approval.
2 The consent process is not well described.
3 CT scans were performed pre, and more importantly post operatively with this procedure without mention in the manuscript of consent or ethical approval.
4 Is it the practice of the department to CT all aortas for AVR pre and post op and that as early as 2 weeks?
5 Was the procedure explained to patient that in future any reoperations would be faced with difficulties?
6 The prosthetic material may get infected, induce inflammatory response produce fibrosis.

This is my assessment of the manuscript and my advise should be that I am unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

Level of interest
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I found the article interesting but lacked scientific rigour:
- An article of importance in its field

Quality of written English
- Acceptable

Statistical review
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Is it essential that this manuscript is seen by an expert statistician? If so, please give your reasons in your report.
- Yes, and I have assessed the statistics in my report.
Declaration of competing interests
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Please complete a declaration of competing interests, considering the following questions:

- Have you in the past five years received reimbursements, fees, funding, or salary from an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future? NO
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'I declare that I have no competing interests'

**Level of interest:** An article of limited interest

**Quality of written English:** Acceptable

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

**Declaration of competing interests:**

None