

APPENDIX. CONFERENCE DISCUSSION

Dr E. Beckmann (Hannover, Germany): My first question is about the two groups and the indication for surgery in the root replacement group. What was the indication for the root procedure in this group and were the native roots of the root sparing group completely native or were they dissected and glued?

Dr Peters: The indication for root replacement at Yale, and also in Innsbruck, was 45 mm and above. This was certainly an indication to replace the root. In younger patients (e.g. younger than 50 years), and in patients with affected coronary arteries, we tend to replace the aortic root: natural history after root-sparing ascending replacement and its surgical implication in non-syndromic patients: under consideration.

Dr Peters: Patients with noted root repair by glue or similar techniques were excluded from this study. However, we don’t have complete data about the concomitant application, but our institutional policy at Yale is to use Bio Glue between layers.

Dr Beckmann: I think it is important to make a difference between native roots that are completely untouched and those that have been repaired due to dissection or dilation. So I am not sure whether it is fair to compare those two groups because basically there was an indication for root repair in the Bentall/ David group but not in the other group. Can you comment on this?

Dr Peters: You are absolutely right. The problem with the comparability arises from the retrospective character of this study. But as the previous speaker mentioned, a propensity score matching analysis will end up with a lower number of patients and in our case it was about 20 pairs. These propensity matched patients did not reflect the results of the total population, because these showed a much lower mortality and a much better outcome. That is the reason, why we just compared overall groups. A selection bias, or better stated, treatment bias affected most published studies. A prospective study which randomizes patients to root replacement and no root replacement is, to the best to my knowledge, not available in the literature so far. Such study might have the potential to answer the question whether to replace the root or not. Or, if you include large group populations into a study, a propensity matched score analysis will show statistically strong results. But finally, the more clinical relevant data you implement in the propensity score matching analysis, the lower your number of pairs and the weaker is your statistical analysis in the end and thus the results.

Dr F. Emrich (Leipzig, Germany): The increased hospital stay, do you think that’s really only related to the longer cross-clamp and bypass times, or were the patients sicker?

Dr Peters: I think in the end it’s multifactorial. We have a higher incidence of preoperative resuscitation in the patients with a root replacement; we have a need for longer CPB time and a more prolonged need for catecholamine support. We also have a slightly increased incidence of stroke and a proportionately increased increase of haemofiltration in this group. This reflects the multifactorial causes for hospital stay. But, as you’ve said, extended coronary bypass time caused by the root replacement itself is an important factor.

Dr Emrich: Another question. You excluded the syndromes. What about BAVs; did you look into those, whether they behaved differently?

Dr Peters: We had about 5% of BAVs included in the study. These numbers are too low to do a separate analysis by tricuspid versus bicuspid morphologies. We know from the aneurysm patients—in total 102 analysed patients and who hopefully will be published soon—that there is no difference in the growth rate between tricuspid versus bicuspid valve morphologies in untouched roots after root-sparing procedures. Does this also apply for dissection? Honestly, I don’t know, but it is highly expectable.

To replace or not to replace: that is the question

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Whether or not to the aortic root should be replaced during the emergency surgery in Type A dissection patients is a question as old as the surgical treatment of this acute aortic syndrome itself. Peters et al. [1] published in this journal issue the results of


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surgical repair of acute type A aortic dissection in 338 patients operated on in the USA and Austria in two centres. Their report is instructive to aortic surgeons from several different standpoints.

Firstly, this series confirms the observation that the majority (almost 75% in this group) of patients with dissection involving the ascending aorta undergo root-sparing supracoronary ascending replacement. Not touching the aortic root reduced cardiopulmonary bypass time by 75 min and cross-clamp time by 61 min on average. The surgically simple end-to-end aorta-graft anastomosis instead of technically complex aortic root replacement led to two times less bleeding requiring re-exploration, two times less low cardiac output and two times less postoperative sepsis or severe inflammatory response.

Secondly, they report notably low in-hospital mortality of 16%—among the better results reported for acute type A aortic dissection [2–4]. It is unlikely that these very good results are due to the exclusion of Marfan patients since perioperative outcome in this subgroup is astonishingly better than in those without connective tissue disease [5], but is multifactorial and encouraging. Possible reasons for the improvement in results after Type A dissection surgery in the last 20 years include progress in surgical technique and equipment, e.g. more haemostatic grafts, hybrid prostheses for complex aortic arch pathologies and increasing familiarity with the end-organ protection methods during circulatory arrest.

Thirdly, and perhaps most importantly, there is no difference in in-hospital mortality between patients undergoing supracoronal ascending versus aortic root replacement. The fact that the patients in the root-sparing group were significantly older (on average 6 years), had more comorbidities (coronary artery disease, hypertension etc.), and less surgery at the proximal aortic portion in this somehow higher risk group contributed positively to the overall perioperative risks resulting in in-hospital mortality of as low as 15%.

Fourthly, the unreplaced aortic root grows in reported series slowly, on average 0.4 mm/year, resembling the growth rate in non-dissected aneurysmally diseased aortas. It grows slower than the dissected aorta in other segments probably since the aortic root is stabilized by the aortic valve anulus at the proximal and root-prosthesis anastomosis at the distal site. Since most Type A dissection patients had a non-dilated, slowly growing aortic root, mathematically speaking, most of them would have had to undergo root replacement due to aortic root aneurysm (>5.5 cm) more than 40 years after primary surgery. Subsequently, as the average age in this group was 62 years, most will not achieve 5.5 cm during their lifetime. Furthermore, possible new aortic valve regurgitation at follow-up, i.e. due to progressing aortic root dilatation, may be approached by transcatheter techniques.

Lastly, 3% of patients with supracoronal ascending replacement required proximal reoperation. However, not all of those were due to the surgical technique applied during Type A dissection repair. Freedom from root events after 1 and 5 years was 99 and 97%, respectively. Overall survival did not differ between groups even though root-sparing patients were significantly older on the operation. Furthermore, we should keep in mind that, although not observed in this series, aortic root replacement does not eliminate the risk of later pathologies requiring complex true aortic root redo surgery, such as suture aneurysm at the coronary buttons or at the aortic annulus–graft connection (and infective endocarditis, which is more likely in the presence of a prosthetic than a native valve).

These results reveal that both supracoronal ascending and aortic root replacement can be performed with excellent early and late results. An unreplaced, previously dissected aortic root grows slowly. Since acute dissection very rarely occurs in patients with aortic dilatation [6, 7], the vast majority of patients will not experience secondary root aneurysm before they die from another cause. Techniques exist, such as placing the Teflon felt between the dissected aortic root layers (‘neo-media’ concept), to provide additional root stabilization, minimizing the risk of later dilatation [8]. Aortic root replacement is the appropriate surgery for patients with a large aortic root, patients with connective tissue disease and those with intimal tear extending into the sinus segment. Sparing the aortic root in the emergency setting of acute type A dissection can be pursued in all other patients.

Conflict of interest: none declared.

REFERENCES


