AVRec, especially in the absence of long-term data. A well-executed Ross procedure would be much more indicated here. Other settings in which a Ross or Ross-Konno procedure seems to be better suited would be the subsets of cases in which additional aortic annular enlargement (n = 8) or aortic sinus enlargement (n = 20) was required. The added geometric complexity will make the procedure less reproducible, and my guess is less reliable, in the long term.

In conclusion, this is an important spearhead series. Busy, high-volume centers should perform it, refine it, and report on it. Until we see midterm results at least, however, one cannot advocate for the wide generalization of the AVRec in pediatric cardiac surgery.

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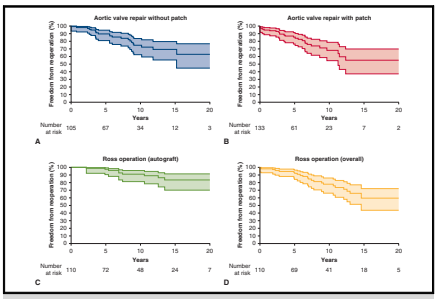
See Article page 1567.

Commentary: Ozaki valve reconstruction in children: Is it still a valve replacement?

Igor E. Konstantinov, MD, PhD, FRACS,[a,b,c,d] Phillip S. Naimo, MD,[a,b,c] and Edward Buratto, MBBS, PhD[a,b,c]



Freedom from reoperation after aortic valve repair or Ross operation in children > 1 year.

CENTRAL MESSAGE

It is unknown whether the Ozaki technique for aortic valve reconstruction in children and young adults will provide outcomes similar to those of aortic valve repair or the Ross operation.

An interesting article in the current issue of the *Journal* by Baird and colleagues[1] describes their short-term results with aortic valve reconstruction with neocuspidization (Ozaki technique) in children and young adults. They reported freedom from moderate or greater aortic valve regurgitation of 88% at 2 years, freedom from moderate or greater aortic stenosis of 88% at 2 years, and freedom from reoperation of 91% at 1.5 years, although the number of patients at each time point is unknown. There were no operative deaths and 2 late deaths after discharge. It seems important to emphasize a few points to put this fascinating article into a proper perspective. Because it is always difficult to speculate on whether others would or would not be willing to apply the Ozaki technique to children and young adults, we choose to view the results of Ozaki technique in these patients through the prism of objectivity reflecting on our current practice in Melbourne.

First, it should be noted that all but 1 of their 57 patients were aged more than 1 year. It also should be emphasized

From the [a]Department of Cardiac Surgery, Royal Children's Hospital, Melbourne, Australia; [b]Department of Paediatrics, University of Melbourne, Melbourne, Australia; [c]Heart Research Group, Murdoch Children's Research Institute, Melbourne, Australia; and [d]Melbourne Centre for Cardiovascular Genomics and Regenerative Medicine, Melbourne, Australia.

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Address for reprints: Igor E. Konstantinov, MD, PhD, FRACS, Royal Children's Hospital, Flemington Rd, Parkville, VIC 3052, Australia (E-mail: igor.konstantinov@rch.org.au).

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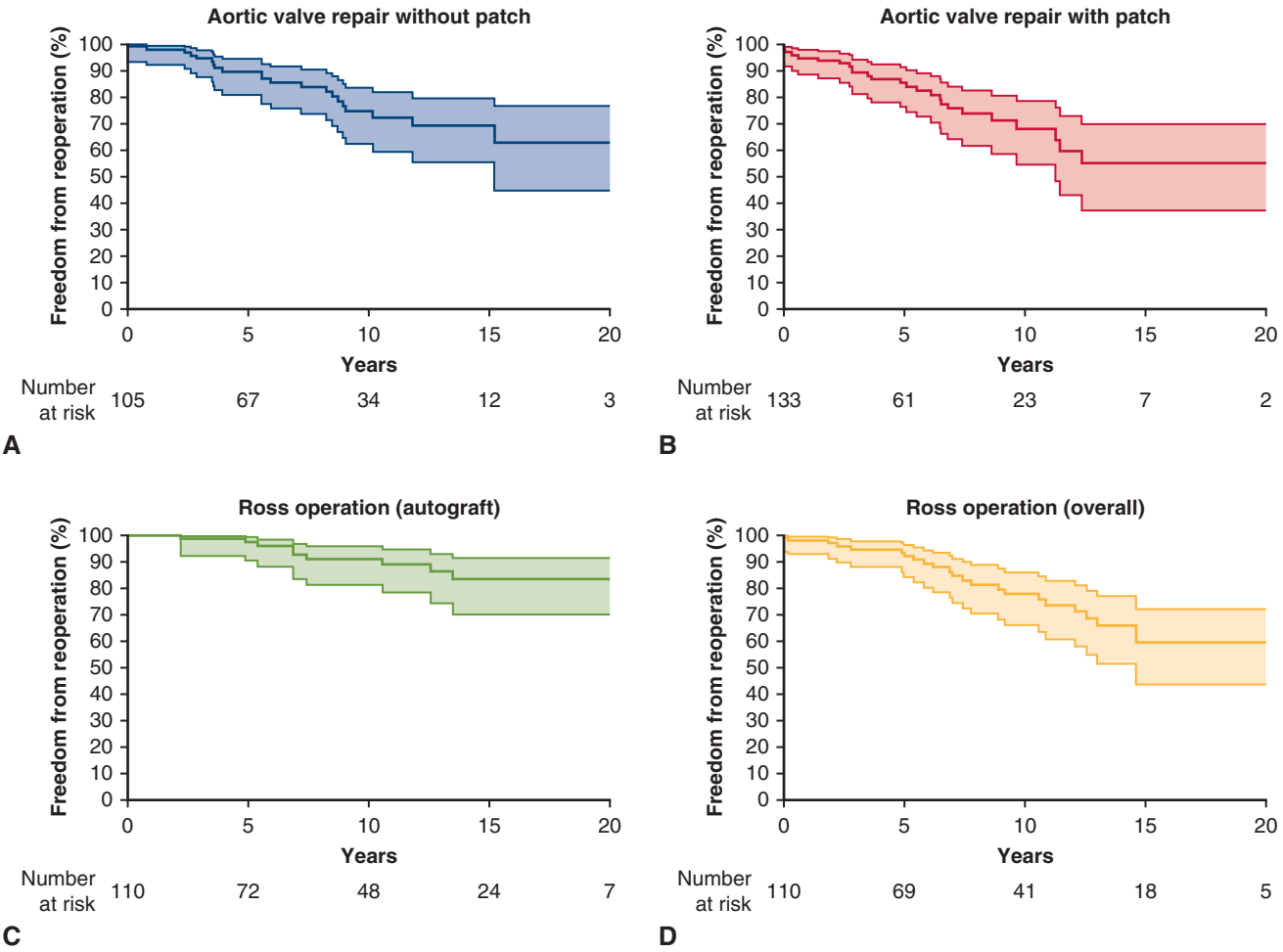

FIGURE 1. Freedom from reoperation after aortic valve repair or Ross operation performed in children aged more than 1 year at The Royal Children's Hospital in Melbourne. A, Freedom from aortic valve reoperation after aortic valve repair without the use of a patch. B, Freedom from aortic valve reoperation after aortic valve repair with a patch. C, Freedom from autograft reoperation after Ross operation. D, Overall freedom from reoperation after Ross operation (autograft and homograft). *Shaded area* represents 95% confidence interval.

that children aged more than 1 year are naturally selected to have an aortic valve morphology best suited for repair. In Melbourne, we aim to repair the aortic valve as our first priority. In children aged more than 1 year, freedom from aortic valve reoperation is 90% at 5 years and 74% at 10 years when the valve is of sufficient quality to be repaired without any patch material (Figure 1, *A*). In children aged more than 1 year, freedom from aortic valve reoperation is 85% at 5 years and 68% at 10 years, when the valve had to be repaired with patch material (Figure 1, *B*). Additionally, operative mortality for aortic valve repair combined (with and without a patch) was 0.4% (1/238). When the valve is deemed not repairable, in children aged more than 1 year, we perform the Ross operation with a freedom from autograft reoperation of 98% at 5 years and 91% at 10 years (Figure 1, *C*), and freedom from all reoperations of 92% at 5 years and 78% at 10 years (Figure 1, *D*), notably, with 0% operative mortality. Thus, would we be inclined to use the Ozaki reconstruction in all our patients aged more than 1 year? Not yet. At this point in time, it is difficult to imagine that the Ozaki reconstruction would provide better results in a *growing* child.

Second, 16% (9/57) were young adults and 30% (17/57) were adolescents aged 13 to 17 years. With 26% (15/57) of patients weighing more than 60 kg, the outcomes in approximately one-quarter of their patients would be expected to be similar to the results achieved in adults and reported by Ozaki and colleagues.[2,3] Ozaki and colleagues[2] recently reported their midterm results in 850 patients who underwent Ozaki aortic valve reconstruction with a mean follow-up time of 53 months. With 15 patients reaching 9 years of follow-up, Ozaki and colleagues[2] reported an overall survival of 85%, a cumulative incidence of reoperation of 4.2%, and a cumulative incidence of moderate or greater aortic regurgitation of 7.3%. Likewise, Wiggins and colleagues[4] used the Ozaki reconstruction in

58 young adults and children with aortic valve disease with a median age of 14.8 years and median follow-up of 14 months. They reported 1 late death.[4] One-quarter of their patients had greater than moderate aortic regurgitation, and 12% of patients required aortic valve reoperation at 3 years.[4] Thus, would we be inclined to use Ozaki reconstruction in *fully grown* adolescents and young adults? No, definitely not at this stage. It would be prudent to await longer-term outcomes, particularly because it must be remembered that the long-term outcomes of the Ross operation in adults are superb.[5,6] In Melbourne, survival after the Ross operation in 392 adults was 98% at 10 years and 95% at 20 years,[5] and the freedom from autograft reoperation was 96% at 18 years.[6]

Third, 7% (4/57) of their patients had truncus arteriosus and 3.5% (2/57) had quadricuspid valve. Clearly, the Ross operation is not feasible in patients with truncus arteriosus. The durability of the truncal valve repair has been poor.[5] We have previously shown that most patients with moderate or greater truncal valve insufficiency and a quadricuspid valve are likely to require truncal valve surgery.[7-9] However, often the diameter of the truncal valve annulus is large, which provides an excellent substrate for tricuspidization of the truncal valve and reduction of the annulus.[7,8] We have recently reported freedom from truncal valve reoperation of 64% at 10 years after tricuspidization of the quadricuspid truncal valve.[10] In fact, freedom from truncal valve reoperation after tricuspidization was superior to truncal valve replacement in children aged less than 6 years, in whom an adult-sized mechanical prosthesis may not be feasible.[8,10] Thus, would we be inclined to use Ozaki reconstruction in children who require truncal valve repair? Perhaps we would, provided that the long-term results of Ozaki reconstruction in children with truncus arteriosus will be better than those after truncal valve replacement.

Finally, bovine pericardium was used in 65% (37/57), and autologous pericardium treated with glutaraldehyde was used in 35% (20/57). Thus, the Ozaki reconstruction is still a valve replacement, although with autologous tissue in some patients, with no growth capacity. Therefore, one would not expect that Ozaki valve replacement would give better results compared with other biological tissue valve replacements in a growing child.

We must remain pragmatic when approaching the aortic or truncal valve repair. It is fascinating and somewhat bewildering to think that autologous tissue with the ability to regenerate may become available in the future.[11] If Ozaki valve replacement could be modified using autologous tissue with preserved growth capacity and preserved regenerative ability to ensure resistance to calcification, it may prove to be an extremely valuable technique in selected patients. Until then, it will remain a valve replacement with the expected outcomes similar to those of biological prostheses or homografts.

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