FIGURE 1. A unicuspid dysmorphic aortic valve with severe aortic stenosis (A) was repaired by removal of excessive fibrous tissue, commissurotomy, and 2 trigonal cusp extensions of autologous glutaraldehyde-treated pericardial patches (B). Recurrent overgrowths of the fibrous tissue occurred on the aortic cusps, and the balloon valvuloplasty resulted in tear of the larger cusp, with severe aortic insufficiency (C). The tear was repaired with an autologous glutaraldehyde-treated pericardial patch (D). LCA, Left coronary artery; RCA, right coronary artery.

relative to Ross procedures during recent years.⁵ With the exception of exceedingly rare cases of severe aortic valve endocarditis, *all* aortic valves can be repaired in neonates and infants. Neonates and infants with left ventricular outflow tract obstruction who are considered for the Ross-Konno procedure are often better suited to univentricular repair. Most importantly, severe aortic insufficiency after failed balloon dilatation is not an absolute indication for the Ross procedure. The following case report illustrates this point. A 3-day-old girl (3.3 kg, aortic valve annulus 4.7 mm) with critical aortic stenosis and severely reduced left ventricular function underwent aortic valve repair (Figure 1, A and B). She was discharged with normal left ventricular function and was seen for aortic balloon dilatation at 5 months of age (6 kg, aortic valve annulus 8 mm) with mean gradient of 60 mm Hg and normal left ventricular function. Aortic balloon dilatation resulted in severe aortic insufficiency and cardiac fibrillation. The patient underwent emergency extracorporeal membrane oxygenation support through the neck vessels, and emergency reoperative aortic valve repair was performed (Figure 1, C and D). After the operation, extracorporeal membrane oxygenation was discontinued,

and the neck vessels were repaired. The patient is doing well at 1 year of age (9 kg, aortic valve annulus 9 mm), with no aortic insufficiency and mild stenosis.

We believe that Ross procedures should be postponed beyond infancy, ideally into adulthood if feasible.

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References

1. Brancaccio G, Polito A, Hoxha S, Gandolfo F, Giannico S, Amodeo A, et al. The Ross procedure in patients aged less than 18 years: the midterm results. *J Thorac Cardiovasc Surg.* 2014;147:383-8.
2. Tan Tanny SP, Yong MS, d'Udekem Y, Kowalski R, Wheaton G, D'Orsogna L, et al. Ross procedure in children: 17-year experience at a single institution. *J Am Heart Assoc.* 2013;2:e000153.
3. Siddiqui J, Brizard CP, Galati JC, Iyengar AJ, Hutchinson D, Konstantinov IE, et al. Surgical valvotomy and repair for neonatal and infant congenital aortic stenosis achieves better results than interventional catheterization. *J Am Coll Cardiol.* 2013;62:2134-40.
4. Siddiqui J, Brizard CP, Konstantinov IE, Galati J, Wheaton G, Cheung M, et al. Outcomes after operation for bicuspid aortic valve disease in the pediatric population. *Ann Thorac Surg.* 2013;96:2175-83.
5. d'Udekem Y, Siddiqui J, Seaman CS, Konstantinov IE, Galati JC, Cheung MM, et al. Long-term results of a strategy of aortic valve

repair in the pediatric population. *J Thorac Cardiovasc Surg.* 2013;145:461-7; discussion 467-9.

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Reply to the Editor:

We appreciate the huge experience recently published by Tan Tanny and colleagues¹ regarding the Ross operation in 100 patients in a pediatric population, confirming our results in which greater mortality was observed in neonates and infants.

For this reason, they have been trying to switch the treatment from the Ross procedure to aortic valve repair in neonates and infants. We believe that this could be a very good strategy to follow, with 2 main observations.

First, the real benefit of aortic valve conservative surgery can be evaluated in depth only after 2 decades of follow-up. Second, aortic repair at a low patient weight will be a very technically demanding operation requiring a long learning curve.

Considering that the Melbourne Centre is a leading institution in such a field worldwide, we sincerely appreciate their results.² However, a word of caution must be given, because their numbers are not so easily reproducible in most centers without a specific commitment.

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References

1. Tan Tanny SP, Yong MS, d'Udekem Y, Kowalski R, Wheaton G, D'Orsogna L, et al. Ross procedure in children: 17-year experience at a single institution. *J Am Heart Assoc.* 2013;2:e000153.
2. d'Udekem Y, Siddiqui J, Seaman CS, Konstantinov IE, Galati JC, Cheung MM, et al. Long-term results of a strategy of aortic valve repair in pediatric population. *J Thorac Cardiovasc Surg.* 2013;145:461-7.

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SUTURELESS VALVES IN AORTIC STENOSIS

To the Editor:

We read with interest the article by Santarpino and colleagues¹ in which they compared minimally invasive aortic valve replacement with sutureless valves with transcatheter aortic valve implantation in a propensity-matched cohort of 37 patients in each group. They concluded that the advantages of sutureless valves are shorter procedural times (crossclamp time of 38.9 ± 13.7 minutes and cardiopulmonary bypass time of 68.9 ± 20.2 minutes) and less paravalvular leak relative to transcatheter aortic valve implantation. They reported a high incidence of permanent pacemaker implantation (10.8%). The incidence of paravalvular leak with sutureless valves in the literature varies from 2% to 15%.^{2,3} Santarpino and colleagues attributed their low paravalvular leak to "moderate decalcification."

To produce superior results to transcatheter aortic valve implantation in high-risk patients, first, zero paravalvular leak with fairly large prosthesis size and effective orifice area and low pacemaker implantation rate are required. These conditions will not be met by

moderate or even less decalcification of the annulus. Second, cardiopulmonary bypass is the key contraindication to surgery for elderly patients, particularly those with pulmonary dysfunction, not the duration of bypass and clamp time. The bypass and clamp times achieved by Santarpino and colleagues¹ with sutureless valves are not too different from our own propensity-matched series⁴ of 205 patients (crossclamp time of 49 minutes with a range of 42-63 minutes and cardiopulmonary bypass time of 71 minutes with a range of 59-94 minutes) in which we used minimally invasive incision but with valve sutures. Even in reoperative minimal access aortic valve replacement (with or without concomitant procedures) with standard suturing techniques, fairly short cross-clamp times can be achieved.⁵

Very good applications of sutureless valves would be for a patient with a failing homograft with a severely calcified annulus and also for difficult reoperations when the annulus has been destroyed.

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References

1. Santarpino G, Pfeiffer S, Jessl J, Dell'Aquila AM, Pollari F, Pauschinger M, et al. Sutureless replacement versus transcatheter valve implantation in aortic valve stenosis: a propensity-matched analysis of 2 strategies in high-risk patients. *J Thorac Cardiovasc Surg.* 2014;147:561-7.
2. D'Onofrio A, Messina A, Lorusso R, Alfieri OR, Fusari M, Rubino P, et al. Sutureless aortic valve replacement as an alternative treatment for patients belonging to the "gray zone" between transcatheter aortic valve implantation and conventional surgery: a propensity-matched, multi-center analysis. *J Thorac Cardiovasc Surg.* 2012; 144:1010-6.
3. Martens S, Sadowski J, Eckstein FS, Bartus K, Kapelak B, Sievers HH, et al. Clinical experience with the ATS 3f Enable(R) Sutureless Bioprosthesis. *Eur J Cardiothorac Surg.* 2011;40: 749-55.
4. Soppa G, Viviano A, Smelt J, Yates MT, van Besouw JP, Jahangiri M. High volume minimally

invasive aortic valve replacement reduces morbidity compared to conventional aortic valve replacement. SCTS Annual Meeting and Cardiothoracic Forum, Presented at Society for Cardiothoracic Surgery of Great Britain & Ireland. 2014 March 10-12; Edinburgh, United Kingdom.

5. Tabata M, Khalpey Z, Shekar PS, Cohn LH. Reoperative minimal access aortic valve surgery: minimal mediastinal dissection and minimal injury risk. *J Thorac Cardiovasc Surg.* 2008;136: 1564-8.

<http://dx.doi.org/10.1016/j.jtcvs.2014.03.005>

SUTURELESS VERSUS TRANSCATHETER AORTIC VALVE IMPLANTATION: AN UNRESOLVED DILEMMA

To the Editor:

We wish to thank Dr Soppa for his comments on our study published in the February issue of the Journal.¹ His contribution helps to keep alive the debate on the most appropriate treatment strategy for high-risk patients with severe aortic stenosis.

We acknowledge that our study had several limitations, as was stated in the discussion, including a lack of randomization and failure to consider relevant factors such as patient frailty.

The main advantage of sutureless aortic valve replacement versus transcatheter aortic valve implantation is the lower or nil rate of paravalvular leak, which has also been confirmed by other investigators,² and not a shorter cardiopulmonary bypass time, such as suggested by Dr Soppa. This finding is of particular relevance given the well-recognized correlation between even mild paravalvular leakage and increased mortality during follow-up.³ We congratulate Soppa and colleagues for the results they presented at the last Society for Cardiothoracic Surgery Congress showing similar aortic crossclamp times in minimally invasive surgery using a stented prosthesis. Recently, we demonstrated that in patients undergoing isolated aortic valve replacement, the aortic crossclamp times were reduced by 40% when a minimally invasive approach was