MANAGEMENT OF THE MODERATELY DILATED SINUS OF VALSALVA: TO CUT OR NOT TO CUT?

Reply to the Editor:

We are grateful to Gerosa and colleagues for their interest and input regarding our recent report.¹ They describe a more aggressive resection of the noncoronary sinus segment in patients with bicuspid aortic valve (BAV) syndrome. They advocate a technique of noncoronary sinus replacement with an extension of the ascending aortic Dacron polyester fabric graft to remove aneurysmal tissue placed at risk by shear forces on the sinus segment as a result of valve morphology.² They achieved good outcomes in a series of 21 patients with BAV at a mean follow-up of 15 ± 19 months, and they propose “empiric” resection of the noncoronary sinus in patients with BAV.

BAV and trileaflet aortic valve (TAV) aortopathies represent a heterogeneous disease population. A long-standing quandary concerning the retention versus replacement of the sinus has provoked many clinical discussions. Historically, replacement of mild to moderately dilated roots was advocated, with the goal of removing all “at-risk” aorta; however, recent clinical, cell biology, flow dynamics, and embryologic studies have brought this approach into question. Embryologic fate map studies have shown the vascular smooth muscle cells of the sinus segment in both BAV and TAV aortas are from the secondary heart field, and not of neural crest origin.³ The presumed defect of the vascular smooth muscle cells in the ascending aorta may not be applicable in the root. Resection of the sinus segment on the basis of ascending aortopathy and valve morphology (BAV vs TAV) thus may not be necessary. In our study of 428 patients, root preservation with aortic valve replacement and

FIGURE 1. Repeated-measure mixed effects model for longitudinal echocardiographic assessment of sinus of Valsalva (SOV), stratified by preoperative sinus of Valsalva dimensions, demonstrating long-term follow-up of sinus of Valsalva dimensions in patients with bicuspid aortic valve and tricuspid aortic valve disease with ascending aneurysm undergoing root preservation with aortic valve replacement with supracoronary ascending aorta replacement. TAVAI, Tricuspid aortic valve with aortic insufficiency; TAVAS, tricuspid aortic valve with aortic stenosis; BAVAI, bicuspid aortic valve with aortic insufficiency; BAVAS, bicuspid aortic valve with aortic stenosis; CI, confidence interval. Reprinted from Milewski and colleagues.¹

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supracoronary ascending aorta replacement produced an initial decrease in the sinus segment, which then remained stable throughout the postoperative follow-up of 10 years (Figure 1).¹ This has been validated by others as well who have shown slow sinus growth and estimated 29.1 years for the sinus of Valsalva to become dilated to a value that necessitates root replacement.⁴ Other studies have shown similar findings.^{4,5} For mild to moderately dilated roots, the simple supracoronary tube graft thus may provide long-term sinus of Valsalva stability.^{1,4,5}

The important question here is therefore, should we empirically cut the noncoronary sinus in patients with BAV solely on the basis of histologic differences between them and patients with TAV? Histologic differences do not necessarily translate to clinically relevant differences. We do not empirically resect all BAVs because they are histologically and geometrically different from TAVs, so then why should we empirically selectively resect the mild to moderately dilated sinus segment in patients with BAV? The results of our investigation in patients both with BAV and with TAV argue against such empiric sinus segment resection in patients with BAV. As Albert Einstein's observation on scientific models has been pithily paraphrased, "Everything should be made as simple as possible, but no simpler." To this effect, we believe that the supracoronary Dacron polyester fabric tube graft is the simplest solution to the aneurysmal ascending aorta meeting surgical resection criteria. In our opinion, cutting more into the mild to moderately dilated, nonaneurysmal, aortic root with no long-term evidence for adverse clinical events in the retained sinus segment may complicate the surgical procedure without rendering any additional clinical benefit to the patient.

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PARTIAL ROOT REPAIR: PATHS TO A MIDDLE GROUND

Reply to the Editor:

In their Letter to the Editor, Pradegan and colleagues¹ from the University of Padua make the case that patients with bicuspid aortic valves (BAVs) who are undergoing replacement of the ascending aorta should also have replacement of the noncoronary (NC) sinus. We agree with the authors that partial root repair with replacement of the NC sinus is an extremely useful technique. In fact, we use it quite liberally in patients with asymmetric root dilatation, particularly those whose age and root morphology/dimensions do not justify a total root replacement. If the NC sinus is dilated or thin walled, but the coronary ostia are not displaced cephalad (as is often the case in patients with BAV), then partial root repair with an NC sinus patch is a safe and viable alternative. This technique avoids the risk of coronary manipulation, facilitating both the index operation and the reoperative intervention. We do not think it is a suitable technique for patients with heritable aortopathies who often have annuloaortic ectasia and should have complete replacement of their aortic root with stabilization of the aortic annulus.

There is a growing body of literature describing the relatively benign natural history of the aortic root in patients undergoing replacement of the ascending aorta with a bicuspid or tricuspid aortic valve.²⁻⁴ These data indicate that if the root is not frankly aneurysmal (>45 mm) at the time of surgery, the risk of enlargement or dissection over time is minimal, thus negating the need for prophylactic root replacement. Pradegan and colleagues¹ argue that the presence of a BAV alone is sufficient to warrant a partial root repair in everyone presenting for replacement of the ascending aorta. They contend that BAV is associated with an abnormal histologic phenotype, involving first the NC sinus, which they state is the most common site of intimal disruption and dissection. We would argue that the literature supporting this assertion remains sparse, with minimal clinical evidence of root dissections or aneurysmal