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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

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degeneration in patients with BAV after supracoronary graft repair.

In our opinion, replacing the NC sinus in every patient with BAV is not justified. One must be selective, and the data to guide these decisions continue to evolve. Careful reporting of the histopathology of resected aortic segments would improve our understanding of the aortic root structure in these patients. Furthermore, novel imaging markers, such as the metabolic or biomechanical properties of the aortic wall by 4-dimensional flow magnetic resonance imaging or positron emission tomography magnetic resonance, may aid in identifying those patients with a vulnerable aorta who may benefit from a prophylactic partial root repair. For now, the decision to replace none, part of, or the entirety of the aortic root remains part of the art and craft of aortic surgery.

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UNDERSTANDING WHY ARE WE DOING WHAT WE ARE DOING

Reply to the Editor:

I agree with Dr Pradegan and colleagues¹ that replacement of the non-coronary sinus at the time of separate valve and supracoronary ascending aortic replacement is a useful technique. We and others have used it

selectively for many years and would add that the tongue of graft into the noncoronary sinus is also particularly useful when implanting a bioprosthetic valve. Such a tongue of graft can simplify reoperation for structural valve deterioration by affording the surgeon the option of extending a standard “hockey stick” opening in the neo-aorta past the neo-sinotubular junction to improve access to explant the degenerate prosthesis without disrupting the proximal suture line.

But does it need to be done? The data from Milewski and colleagues² as well as our earlier study³ and that of as well as that of Peterss and colleagues⁴ referenced by Dr Pradegan indicate that progressive dilatation of the noncoronary sinus occurs extremely rarely, if at all. Dr Pradegan argues that “an isolated removal of NCS [noncoronary sinus]... reduces the need of late reoperation for aneurysmal recurrence.” Although surely such intervention must eliminate the potential for such dilatation, the clinical data indicate that the risk of aneurysmal recurrence is essentially zero regardless of whether the noncoronary sinus is replaced. How then can one say that the need has been reduced?

There is a logical fallacy here. Dacron cannot become aneurysmal. True. The noncoronary sinus can be replaced with Dacron. True. Therefore, dilatation of the noncoronary sinus can be prevented by replacing it with Dacron. True. So what’s the problem?

Prophylactic procedures are all about balancing the risk of the treatment and the risk of the disease. Inattention to the latter is, in my opinion, just what has led to an overly aggressive approach to ascending aortic replacement in the setting of bicuspid aortic valve “even in the presence of a seemingly normal aorta”⁵ with enormous clinical implications. Indeed, total pancreatectomy would eliminate the potential for developing pancreatic cancer—but this is not an argument for prophylactic Whipple operations. The validity of the statement that the risk can be reduced by intervention depends on the probability of the threat. In our study, replacement of the noncoronary sinus was performed in less than 10% of cases³ and in a subsequent review of more contemporary experience from the same institution in less than 5% of cases.⁶

I do not mean to trivialize the argument or present myself as a linguistic nit-picker, but our language influences our thinking. The way we frame questions impacts our conclusions. Let’s be sure we really understand why we are doing what we are doing and recognize the evidence base supporting it—or the lack thereof.

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