

Letters to the Editor

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Selective replacement of the noncoronary sinus of Valsalva: Preserving the sinus geometry to spare the bicuspid aortic valve

To the Editor:

We have read with extreme interest the paper by Gerosa and coworkers¹ published in a recent issue, describing the authors' technique for selective replacement of the noncoronary sinus of Valsalva. Indeed, we adopted a similar approach in patients with bicuspid aortic valve and aneurysmal dilatation of the ascending aorta and aortic root since March 2003. In particular, when at surgical inspection the root dilatation appears to be confined to the noncoronary sinus, we replace it along with the ascending aorta in a way similar to that described by Gerosa and associates,¹ avoiding mobilization of the coronary sinus.

The only substantive difference between the Gerosa approach and ours consists in the fact that we replace the sinus with an isolated Dacron patch tailored on the removed aortic sinus, with the Dacron fabric corrugation oriented longitudinally

(Figure 1). This allows us to obtain a self-expanding neosinus, similar to the neosinuses that can be obtained with the "Valsalva" graft,² and to remodel the sinotubular junction. The potential advantages of the re-creation of the sinuses and of the sinotubular junction have been previously shown both in finite element studies³ and in vivo at echocardiography.⁴ They consist in the achievement of a smoother valve closure with a reduced stress on the valve leaflets, which is supposed to help to preserve the long-term valve function.

A possible drawback of our technique resides in the fact that it requires an additional, graft-to-graft suture. However, this suture is usually hemostatic and can be easily visualized and reinforced if necessary. In fact, this has never been a problem in our experience.

From March 2003 until now, 10 patients with dilatation of the noncoronary sinus and of the ascending aorta, and with a competent, well-functioning, bicuspid aortic valve, have undergone selective replacement of the noncoronary sinus at our

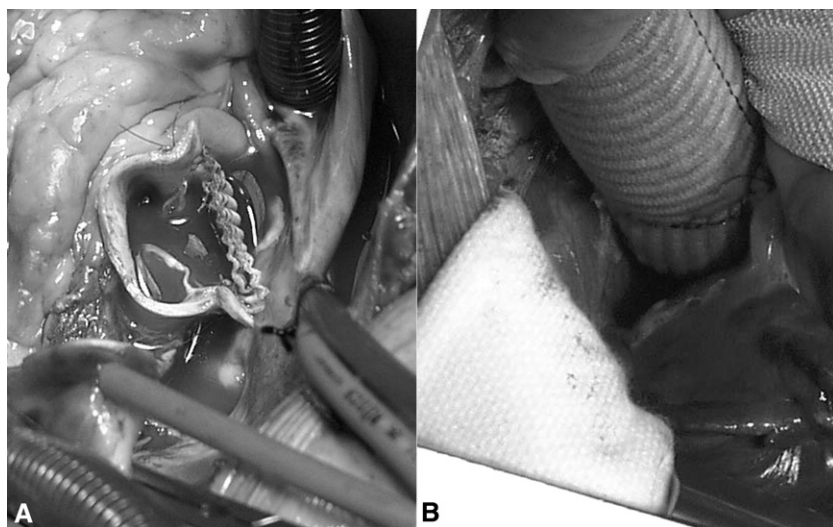


Figure 1. A, The noncoronary sinus has been replaced with an appropriate-sized, bullet-shaped Dacron patch, with longitudinally oriented corrugation. B, A gentle traction on the aorta and on the right atrial appendage helps to expose the neo-noncoronary sinus, the "bombé" shape of which is clearly evident.

institution. The in-hospital and short-term (up to 4 years) results have been excellent; all patients are alive and well, there has been no reoperation, and only 1 patient has residual aortic regurgitation that has been graded as mild at repeated echocardiographic examinations.

In conclusion, we share the conviction of Gerosa and colleagues that selective replacement of the dilated noncoronary sinus in association with replacement of the ascending aorta may be an excellent surgical option in patients with a well-functioning bicuspid aortic valve. We believe that the re-creation of sinuses and the remodeling of the sinotubular junction, by reducing the leaflet stress, may help to improve the long-term results of this approach.

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Reply to the Editor:

We read with interest the letter by Cerillo, Farneti, and Glauber, who propose a technique resembling our approach¹ for reconstruction of the ascending aorta in patients with normofunctioning bicuspid aortic valve (BAV).

The choice by Cerillo and colleagues to reconstruct the aortic root and the non-

coronary sinus with a hand-crafted Valsalva sinus graft composed of two separate segments of a Dacron prosthesis, perpendicularly oriented so as to mimic the conformation of the Gelweave Valsalva graft (Sulzer Vascutek, Renfrewshire, Scotland), is a smart idea, nevertheless recalling the custom-made Valsalva graft previously proposed by Robicsek and Thubrikar.²

The aim is to replace the native dilated noncoronary sinus with a self-expanding neosinus, favoring a more physiologic leaflet closure with reduced stress, ultimately resulting in long-lasting preservation of native valve function.

The technique suggested by Cerillo and colleagues requires an additional suture between the two Dacron segments (graft-to-graft suture), which, in their experience, was not associated with hemorrhagic complications. However, the complexity of surgery is undoubtedly increased and the potential advantage of recreating an expandable neosinus in the presence of a BAV, which intrinsically has an impaired hydrodynamic performance, has not been demonstrated yet. It is reasonable to hypothesize that the physiologic characteristics of the aortic root differ in the presence of a bicuspid compared with those in the presence of a tricuspid valve. In his theory for aortic valve closure, Bellhouse³ evidenced the paramount importance of the role of the sinuses, but also underlined that, in presence of a stenotic valve, the turbulent jet generated by the blood flow deceleration in end-systole is not captured by the sinuses, and no blood vortices can be evidenced in the sinuses either. More recently, Robicsek and colleagues⁴ investigated specifically the blood flow pattern through the BAV by a computer-assisted digitalized model, evidencing asymmetric and stenotic abnormalities even in normally functioning valves. These abnormalities are likely to create recirculation vortices, which cannot be confined into the sinuses, like in the trileaflet valve, but extend into the ascending aorta.

Nevertheless, the data reported by Cerillo, Farneti, and Glauber strengthen the favorable results of our experience, reinforcing our conviction about the opportunity to selectively replace the ascending aorta and noncoronary sinus in patients with BAV.

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Rescue versus regeneration

To the Editor:

We read with interest the article by Suzuki and colleagues,¹ in which they examined the effects of mechanical unloading on self-regeneration of the injured heart. The model they used is a very good example of how classic surgical techniques can help answer current basic research questions. There is no doubt as to the validity of the main finding, namely, that taking the hemodynamic load off an acutely ischemic and failing heart is beneficial. We² have followed this strategy in the clinical setting for some time now. The one problem that we see in the authors' conclusion is perhaps merely semantic, but still deserves consideration. Throughout the article, regeneration processes are discussed that are believed to involve intrinsic stem cells, stem cell migration from the periphery or mitotic cardiomyocyte replication. However, we believe that it is very important to distinguish between the biology of myocardial rescue and that of "true" regeneration. This may be difficult based on the data from Suzuki and colleagues' article, because they unloaded the hearts as early as 1 hour after the onset of infarction. Among many other things, removing the work load markedly reduces oxygen consumption of