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**NARROWING OF THE LARGE AORTIC ANNULUS: A WORD OF CAUTION**

To the Editor:

We read with great interest the paper by Patlolla and colleagues about long-term results after valve-sparing root repair (VSRR) performed in their center. Throughout the paper, the authors use the adjectives “large” and “dilated” as synonyms when referring to the aortic annulus (AA). It is not only confusing, but even inappropriate, because the term “dilated annulus” can suggest that it is progressively enlarged and should be surgically narrowed.

Yet, a progressive dilatation of the AA as a primary cause of the development of aortic insufficiency (AI) has, to the best of our knowledge, never been described. Moreover, the AA is the most stable part of the aortic valve apparatus not only in a healthy population, but also in patients with a large or dilated root.

However, there are 2 ways to improve cusp coaptation and to abolish AI: by enlarging the cusps or by narrowing the root (including the annulus) to bring the cusps closer together. Yet, we know from the Ross procedure and from other studies with the use of different annuloplasty techniques for narrowing the AA that the narrowed annulus has a strong tendency to return to its previous size—and this is not a primary AA dilatation but a postprocedural dilatation. In contrast, in a considerable number of patients undergoing a VSRR, the indication for surgery is not an AI (In the paper by Patlolla and colleagues, 65% of patients had no or mild AI) but the size of the aortic root. Many such patients present with an ideally functioning aortic valve (Figure 1) and develop significant AI shortly after a change of the anatomophysiological root geometry by excessive narrowing of the complete root with a smaller tube (Figures 2 and 3). We have repeatedly referred to this iatrogenic form of AI which, as demonstrated in some multicenter studies, is not just anecdotal.

Even if Patlolla and colleagues do not provide the grade of the narrowing of the AA, eg, by determination of the diameter of the used aortic tubes, they described the technique of AA narrowing in their “Methods,” which was used in 90% of their patients. In contrast to other large series published recently, the authors identified a large AA as a risk factor for reoperation. They speculate in their “Discussion” that the AA size can be “...a marker for greater cusp mechanical stress...” after the cusp structural deterioration was identified in most patients necessitating reoperation. Yet, and especially because the grade of preoperative AI was not associated with the need of reoperation, it could be very interesting to build a statistical model adjusting the AA diameter not only with age, sex, and concomitant cusp repair, but also with the grade of preoperative AI.

Patlolla and colleagues should be congratulated for their reported results, which clearly demonstrate that a VSRR can be performed with an excellent outcome. However, we would encourage the authors to continue searching for risk factors of VSRR failures, which can help in optimizing the VSRR techniques.

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**FIGURE 1.** Echocardiogram of 32-year-old patient with Marfan syndrome with physiological proportions between the structures of aortic valve apparatus and an ideally functioning aortic valve despite the large sizes of the annulus (29 mm) and the root (49 mm).
FIGURE 2. Angio-CT of a female patient with Marfan syndrome demonstrating an aortic root of 4.6 cm (A). Angio-CT of the same patient performed postoperatively because of the development of severe aortic insufficiency (shown in Figure 3e) shortly after the David procedure with a 26-cm tube. Notice the twisting of the cusps in the narrowed root (B). During reoperation, a cusp prolapse (despite free-margin plication) and twisting of severely deteriorated cusps were found (C, D).

FIGURE 3. Echocardiography of the patient presented in Figure 2e (with no aortic insufficiency before surgery) demonstrating severe aortic insufficiency that developed shortly after the David procedure.
**DOES MATTER!**

**Reply to the Editor:**

“It does not matter how slowly you go, as long as you do not stop.”

—Confucius

We welcome the perspectives shared by Urbanski and Irimie. \(^1\) We agree that the aortic annulus is relatively the most stable portion of the aortic root. It has been well demonstrated that the annulus does over time increase in size in patients with aortic regurgitation, although its rate of increase may not be as steep as sinusotubular junction and sinus of Valsalva dimensions. \(^2\)

In the series of patients with Marfan syndrome who received valve-sparing root replacement, the annulus and neosinus dimensions increased in one-half of the patients who underwent the remodeling technique, including in those who had normal annulus dimensions at the time of surgery. This increase in annulus dimensions by approximately 10% was seen both in patients who received and did not receive an annuloplasty. \(^3\) This suggests that although the annulus is relatively the most stable part of the root, it is still susceptible to late dilation or further increase in dimensions, even while it may remain within “normal” values, leading to annuloaortic ectasia. This late dilation has been found to be one of the reasons behind the recurrence of aortic regurgitation after the remodeling technique in patients without concomitant annuloplasty. \(^4\)

As Urbanski and Irimie suggest, in our own report, we did explore associations between grade of preoperative aortic regurgitation and the risk for late aortic valve replacement. However, it was not found to be significant, and after adjusting for factors that were significant, such as age, sex, and concomitant cusp repair, we found larger annular diameters to be predictive of late aortic valve replacement (hazard ratio, 1.10; 95% confidence interval, 1.02-1.19; \(P = .01\)). \(^5\)

We also completely agree that further and more extensive studies are needed to identify and clearly delineate risk factors that would predict late failure of valve-sparing surgery. We do believe that our study did help clarify the relative importance of annulus dimensions in this regard, especially since it’s the only part of the root that remains besides the spared cusps of the aortic valve.

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