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VALVE-SPARING OPERATIONS IN PATIENTS WITH MARFAN SYNDROME: THERE IS A ROOM FOR IMPROVEMENT
To the Editor:

Results of aortic root replacement in patients with Marfan syndrome undergoing either valve-sparing root replacement in the form of aortic valve sparing reimplantation (AVS) or root replacement (AVR) have again come into the spotlight. The article by Cosselli and colleagues\(^1\) gathers data collected during 3 years of planned follow-ups of a prospective registry of 316 patients, primarily trileaflet, undergoing operation between 2005 and 2010. Survival was comparable during the median follow-up of 64 months (88.2\(\%\) vs 95.0\(\%\) in AVR and AVS, respectively). However, after propensity score-adjusted competing risk modeling, the authors found an association between AVS and cumulative incidence of moderate insufficiency (hazard ratio [HR], 48.28) and non structural valve deterioration + structural valve deterioration (HR, 12.95). Likewise, AV-related morbidity and major adverse valve related events were higher in the AVS group (HR, 3.54 and 2.34, respectively).

Considering the relevant rate of moderate (+) insufficiency in the AVS group, a closer examination of the underlying factors contributing to failure may yield valuable insights. In the context of recently published data, aortic regurgitation recurrence in AVS of patients with Marfan syndrome with durable leaflet repair could be an effect of nonideal annuloplasty during reimplantation.\(^2,3\) Findings show that despite deep root dissection and complete annuloplasty, the ventricle aortic junction and the polyethylene terephthalate prosthesis interference were inconsistent along the entire annular circumference. Moreover, annular dimensions increase after reimplantation as the aortic annulus becomes more ellipsoid, regaining its preoperative shape.\(^4,5\) Thus, stabilizing the virtual basal ring seems critical in securing repair.\(^6\) Furthermore, the approximation of both planes may determine the physiologic perpendicular flow direction during the cardiac cycle, as seen in the cardiac magnetic resonance reconstruction in Figure 1, A.\(^6\)

We should address 3 elements to improve postoperative anatomy and valve function. First, circumferential and complete virtual basal ring stabilization may be better achieved with complete internal annuloplasty in the form of a ring or full line of pledged sutures incorporated into valve-sparing root replacement because it may counteract the dilatation of the muscular annulus, which is responsible for annular enlargement, according to El-Khoury and colleagues.\(^7,9\) Second, circumferential and continuous annuloplasty of the fibrotic annulus may provide further stability,

\[\text{FIGURE 1. A, Cardiovascular magnetic resonance reconstruction after reimplantation tricuspid aortic valves with complete internal annuloplasty. B, Short-axis of aortic root with hybrid complete internal and external annuloplasty during reimplantation. CMR, Cardiac magnetic resonance; RL, right-left commissura; RN, right-non commissura; LN, left-none commissura.}\]
preventing dilatation due to annual-aortic ectasia, typically found in patients with Marfan syndrome. Lastly, re-establishing the physiological 3-dimensional shape of the functional aortic annulus and symmetrical commissural orientation of 120° is also essential. An elliptical annuloplasty ring may help bring leaflets together at the midline, increasing the coaptation surface, a technique shown to be applicable to root remodeling. The utilization of these techniques may be considered an adjunct to annuloplasty during either remodeling or reimplantation, as schematically illustrated in Figure 1, B.

We commend the authors for their outstanding effort in publishing these exciting data. Although some results favored AVR, we should remember that the follow-up is relatively short, and age-adjusted survival almost reached significance in favor of the AVS group. Ultimately, this presents a valuable opportunity to investigate the various aspects of AV repair and annuloplasty techniques. We must stay open-minded to changes because the real game-changers often lie in the details.

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