In the last decade, the aortic root has been receiving increasing attention with the aim of preserving as much as possible a proper function of the natural aortic valve on one hand, and to stabilise its diameter to avoid any further progressive root dilatation on the other hand.

In this issue of the journal, two aspects have been raised over the optimal treatment of the pathology of the aortic root [1,2]. The first one [1] concerns the possibility of widening the indication for valve-sparing procedure and, more specifically, offering a valve-sparing operation also to patients with a severe aortic regurgitation (AR) or to patients with a bicuspid aortic valve (BAV). The second one [2], given for granted the sparing of a BAV, explores the optimal surgical approach to stabilise the aortic root. These are, indeed, two faces of the same coin: can we somehow standardise our approach to a valve-sparing procedure for various anatomical situations, and make it available to a larger number of patients with more advanced or complex pathologies? It is probably possible, but it will doubtless require increased skill and, at the same time, will expose the surgeon to an increased number of failures and disappointments.

In fact, in the case of a functioning or less than severely incompetent tricuspid aortic valve (TAV), it is well established that a valve-sparing operation can guarantee stable and long-term results [3]. This has been proved especially true in the case of the reimplantation type of valve-sparing procedure where the issue of annulus stabilisation is well addressed [3–5]. Nonetheless, a remodelling procedure that is, by definition, a more physiological anatomical reconstruction, might probably work well when the annulus is not dilated. However, whether the presence of non-compliant Dacron graft could induce a progressive annular dilatation even in a non-dilated annulus is still a matter of debate. It is, therefore, obvious that if we begin with a normally functioning tricuspid valve and the surgical procedure is only aimed at the root pathology, the results are more predictable and will better hold the test of time. Early or late failure in terms of re-operation or residual aortic valve regurgitation could probably be ascribed only to an intra-operative alteration of leaflet geometry resulting in suboptimal leaflet co-aptation or prolapse.

The situation is completely different in the case of a severely regurgitant tricuspid valve or in the case of a bicuspid (often severely insufficient) valve. In the first case, this is often due to the long-lasting presence of root aneurysm (usually larger than 5 cm) and a consequent regurgitant jet causing a progressive but often rapid deterioration of the intrinsic leaflet structure with loss of ‘tonicity’, prolapse and elongation of the leaflet-free margin. One or more leaflets can be affected and this is probably dependent on the direction of the regurgitant jet. In this case, both root reconstruction and leaflet prolapse need to be addressed. It is usually best first to re-establish the root geometry and then treat the leaflet prolapse. The prolapse of two or more leaflets makes the procedure much more complex and difficult because it requires a somehow tri-dimensional view of the whole root to achieve the optimal leaflet co-aptation. In this regard, the treatment of the bicuspid valve might appear simpler because its geometry makes it often easier to obtain a larger leaflet co-aptation and its tissues are usually stronger and better to manipulate. Nevertheless, in both cases, of either a severely regurgitant tricuspid or bicuspid valve, we should be speaking not only of a valve-sparing procedure but a valve-sparing + valve repair procedure. We need to bear in mind that this valve sparing + repair procedure will carry the correspondent risk of failure usually associated with both procedures. It is not a case that in the group of Badiu and colleagues [1], five out of six reoperations were needed in patients with a severe preoperative AR or that the freedom from residual AR greater than mild at 5 years was 57% and 47% for TAV patient with preoperative severe AR and bicuspid valve, respectively, while it was 88% in TAV patients with less than severe AR. Given the natural history of a regurgitant aortic valve, it is possible that, in the next 5 years, most of these patients will require a re-operation. In our recent evaluation of the long-term result of a reimplantation procedure [5], the presence of an associated leaflet plasty was the only independent risk factor for residual aortic valve regurgitation needing a re-operation.
While the total root replacement with either a reimplantation or a remodelling procedure is a well-established procedure in case of root aneurysm and a tricuspid valve, there are fewer consensuses over the best way of stabilising the root in the presence of a bicuspid valve. Doss and colleagues [2] correctly chose the reimplantation technique depending on the presence of annular dilatation while they proposed a reduction aortoplasty in the other cases. However, from the description of their technique (longitudinal incision from the transverse aortotomy up to the aortic clamp), it seems that the concomitant aortic dilatation was only confined to the ascending aorta and barely involved the root. This is present in some of the cases but cannot be considered as a rule. In fact, in a certain number of the cases, at least one sinus is severely enlarged (usually the non-coronary, with the raphe between the left and right cusp being the most frequent with an incidence as high as 70%; type I, L/R of Sievers) [6]. In these cases, the sole replacement of the dilated sinus is an easy and good way to stabilise the root and prevent further dilatation. This can be elegantly carried out either using a Dacron patch [7] or by appropriately tailoring the Dacron graft needed for the ascending aorta [8]. Whenever a second sinus is also dilated, a standard valve-sparing procedure is obviously recommended.

Offering a valve-sparing procedure to an increasing number of patients is attractive and indicates an increased knowledge of the various root pathologies. For the time being, this approach appears best suited for a young population, while is still debatable for those patients where a Bentall procedure with a biological valve is a valid form of treatment.

References


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