Words of Wisdom on Valve-Sparing Aortic Root Reimplantation When Leaflet Repair Is Necessary

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In this issue of Seminars, Dr. Svensson provides readers with a brief summary of his vast experience performing valve-sparing aortic root replacement (VSRR) utilizing the David reimplantation technique.[1] In addition to a number of technical pearls to assist us in the proper performance of this very technically demanding procedure, we are also given a brief overview of the Cleveland Clinic experience with aortic valve repair, both as a stand-alone procedure and as part of a VSRR operation. In summary, Dr. Svensson's keys to a successful and durable VSRR include:

1. Use a Hegar dilator to properly size the aortic annulus and prevent stenosis of the left ventricular outflow tract. Others espouse this technique as well,[2] although we and others have preferred to use larger Hegar dilators than what is prescribed in this manuscript. Regardless of whether one tries to index the annulus to body surface area as Dr. Svensson suggests or utilizes a more liberal downsizing of the annulus, stenting open the left ventricular outflow tract with a Hegar is strongly encouraged to avoid stenosis.
2. Use a straight tube graft when performing VSRR. While the Cleveland Clinic group advocates for the use of a straight tube graft in a David V configuration, others have achieved excellent short- and long-term results utilizing a Valsalva-type Dacron graft.[3] In a recent comparison of over 300 patients undergoing VSRR with either a straight tube graft (in a David I type repair) or a Valsalva graft, there was no difference in perioperative outcomes or intermediate-term aortic valve durability.[3] Greater than 93% of patients were without significant aortic insufficiency (AI) or the need for a reoperation at 10 years. Furthermore, 4-dimensional flow magnetic resonance imaging of these 2 types of VSRR repairs suggests a few potential advantages with the Valsalva graft. Both aortic root wall stress and downstream aortic wall stress appear to be less when neo-sinuses are present.[4] In addition, there may be some advantages to coronary blood flow as well. Clearly, further investigation into flow dynamics is warranted. However, the most important take home message here is that both grafts provide satisfactory short- and long-term results.
3. Use a remodeling technique when performing VSRR in a patient with a bicuspid aortic valve (BAV). In Dr. Svensson's experience, the use of this technique creates longitudinal tension on the leaflets of a BAV and may lead to increased leaflet durability. However, others have reported excellent outcomes when performing a reimplantation procedure in this same setting.[5] Longer term follow-up on Dr. David's BAV patients undergoing VSRR is in press but the punchline is that in his experience and that of others with extensive experience salvaging a BAV, there is no difference in either freedom from reoperation

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Central Message

Valve-sparing root replacement remains a very technically challenging procedure. Irrespective of which techniques are used for aneurysm and leaflet repair, outcomes are excellent in experienced hands.

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or more then moderate AI regardless of whether the valve is trileaflet (TAV) or a BAV.[6] Larger numbers of patients and longer and more complete echocardiogram follow-up will be necessary before we can say definitely that one technique is superior to another.

4. Consider a figure-of-8 suspension suture to repair aortic valve leaflets. In a recent publication, Dr. Svensson describes his methods and the intermediate-term results of this technique.[7] At 10 years, 21% had developed severe AI while an additional 26% had moderate AI when using this technique for both TAV and BAV. While a majority of those performing leaflet repair in the setting of VSRR limit leaflet repair to either free edge reinforcement with a Goretex suture or free edge plication, this newer technique showed improved results when performed in the setting of VSRR. Again, longer term follow-up will be necessary before one could apply this technique more liberally.

REFERENCES

1. Svensson L: Aortic root reimplantation with leaflet repair. Sem Thorac Cardiovasc Surg 31:153–154, 2019
2. Gaudino M, Lau C, Munjal M, et al: Contemporary outcomes of surgery for aortic root aneurysms: A propensity-matched comparison of valve-sparing and composite valve graft replacement. J Thorac Cardiovasc Surg 150:1120–1129, 2015
3. Gaudino M, Di Franco A, Ohmes LB, et al: The role of neo-sinus reconstruction in aortic valve-sparing surgery. J Card Surg: 328–333, 2017
4. Gaudino M, Piatti F, Lau C, et al: J Thorac Cardiovasc Surg 2018. https://doi.org/10.1016/j.jtcvs.2018.06.094. [Epub ahead of print]
5. David TE, David CM, Feindel CM, et al: Reimplantation of the aortic valve at 20 years. J Thorac Cardiovasc Surg 153:232–238, 2017
6. de Kerchove L, Boodhwani M, Glineur D, et al: Valve sparing root replacement with the reimplantation technique leads to increased durability of bicuspid aortic valve repair. J Thorac Cardiovasc Surg 142:1430–1438, 2011
7. Zeeshan A, Idrees JJ, Johnston DR, et al: Durability of aortic valve cusp repair with and without annular support. Ann Thorac Surg 105:739–748, 2018