

Bioprosthetic Aortic Valve Durability: New Data about Tavi, Waiting for Facing the Next Challenges

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DESCRIPTION

After the recently published trials about percutaneous Transaortic Valve Implantation (TAVI) in low-risk patients, the durability of the bioprosthetic aortic valve is one of the main issue in structural cardiology. Low-risk patients can be younger than the "TAVI-like patient" as we have considered until now, so the need for a new intervention for the failure of the bioprosthesis could be a problem when the life expectancy is twenty years or more. For these reasons we need for managing our patients along with their entire valve life, programming a sort of pathway.

Recently, our group published a prospective observational study from a real-world registry about 182 TAVI patients in whom a CoreValve or EvolutR Medtronic self-expandable bioprosthetic valve were implanted from January 2009 to July 2017 [1]. The median follow-up time was 1,026 days. All-cause and cardiovascular mortality rates were 61% and 32.7% respectively. Interestingly, in patients with a follow-up beyond 5 years, the cumulative incidence of Bioprosthetic Valve Failure (BVF) and Structural Valve Deterioration (SVD) were 2.9% and 9.3%. The authors followed the recommended European consensus statement criteria for the definition of BVF and SVD [2].

These results are encouraging, and others data about TAVI durability are emerging demonstrating good performances. The 2019 NOTION trial [3], is a randomized study comparing TAVI and Surgical Aortic Valve Replacement (SAVR) durability. At 6 years follow-up, the results showed that the rate of BVF was similar between the group of TAVI patients and the group of SAVR ones (7.5% vs. 6.7%; p=0.89). The most interesting results are about the SVD incidence: SAVR patients experienced moderate/severe deterioration in 24% of the cases against 4% in the TAVI group (p<0.001). Moreover, authors took into account the observation that small surgical bioprosthetic valves can show a mean gradient of 20 mmHg or more already after the procedure. For this reason, they applied a modified definition of SVD considering an increase of the mean gradient \geq 10 mmHg other than a mean gradient \geq 20 mmHg: Using these criteria the

cumulative incidence was 12.4% for SAVR patients and 1.4% for TAVI ones (p<0.001).

The latter results could suggest a more frequent presence of patient/valve mismatch among surgical patients, predisposing them to a higher incidence of SVD. So, can be the more precise measurement of annulus diameter/perimeter another factor to consider in order archiving a better procedure results for our patient?

About durability, these data are very important for a better planning in a young and low-risk patient affected by severe aortic stenosis. Yerasi, et al. [4], proposed three different scenario of patient life-time management regarding young (65 years-old) ones, considering the need for three valve replacements through 20 years life expectancy. The first one is a SAVR-TAVI-TAVI approach, that is the most followed strategy nowadays. The second scenario is the "TAVI first" approach (TAVI-SAVR-TAVI), where the most important issue is TAVI durability. In this case a percutaneous approach in a young patient could appear brave or even imprudent, but in the authors opinion this strategy presents the best benefit/risk ratio. The third and latest approach is an only percutaneous approach, TAVI-TAVI-TAVI, and it is considered the worst one.

Our group published durability results that are in line with literature and their encouraging data are essential, mostly speaking about young patients affected by severe aortic stenosis. To compare valve durability between TAVI and SAVR patients is not so easy, because data about surgical aortic valve did not follow the standardized definition criteria of BVF and SVD. In Rodriguez-Gabella, et al. review about bioprosthetic aortic valve durability [5], SVD of surgical valve is not usual ($\leq 15\%$) considering the first ten years after the procedure, but during the following years its incidence progressively increases. However, the authors warned about the different definitions and time used to evaluate SVD in the twelve considered studies. In this scenario, the NOTION trial sheds some light on this argument, showing a good performance of percutaneous implanted valve, even compared with the surgical valves.

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Received: 13-Jan-2022, Manuscript No. JCEC-22-709; Editor assigned: 15-Jan-2022, PreQC No. JCEC-22-709 (PQ); Reviewed: 31-Jan-2022, QC No. JCEC-22-709; Revised: 02-Feb-2022, Manuscript No. JCEC-22-709 (R); Published: 09-Feb-2022, DOI:10.35248/2155-9880.22.13.709.

Citation: Virgili G, Carrabba N (2022) Bioprosthetic Aortic Valve Durability: New Data about Tavi, Waiting for Facing the Next Challenges. J Clin Exp Cardio log. 13:709

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In the near future, with the life expectancy growing up thank to the most efficient cardiac active therapy, we have to face another kind of patient needing for a new aortic valve. In fact thousands of surgical aortic valve patients will be affected by BVF, and according the most recent data, they could be feasible for percutaneous valve-in-valve procedure. It is very likely that we could have to manage the first scenario proposed by Yerasi, et al. exploring new situations and facing new and old problems such as percutaneous transaortic valve-in-valve durability and the coronary access in the presence of two or more bioprosthetic aortic valves.

Nowadays it is not more possible a standard approach for our patients. We are passing from "one-size fit all" to a personalised medicine, with every patient needing for a tailored life-time management based on his/her clinical and anatomical features. In this scenario the 3D-printing model will be another means to reach that goal: We will be able to print and validate, using a fluid-dynamic model before the implantation, the right valve for the right patient, taking into account all the variables [6].

REFERENCES

 Carrabba N, Migliorini A, Fumagalli C, Taborchi G, Vannini M, Marchionni N, et al. Long-term durability of transcatheter aortic valve implantation with self-expandable valve system (from a Real-World Registry). Am J Cardiol. 2021;143:104-110.

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- 2. Capodanno D, Petronio AS, Prendergast B, Eltchaninoff H, Vahanian A, Modine T, et al. Standardized definitions of structural deterioration and valve failure in assessing long-term durability of transcatheter and surgical aortic bioprosthetic valves: A consensus statement from the European Association of Percutaneous Cardiovascular Interventions (EAPCI) endorsed by the European Society of Cardiology (ESC) and the European Association for Cardio-Thoraci Surgery (EACTS). Eur J Cardio-Thorac Surg Off J Eur Assoc Cardio-Thorac Surg. 2017;52:408-417.
- Søndergaard L, Ihlemann N, Capodanno D, Jørgensen TH, Nissen H, Kjeldsen BJ, et al. Durability of transcatheter and surgical bioprosthetic aortic valves in patients at lower surgical risk. J Am Coll Cardio. 2019;73:546-553.
- Yerasi C, Rogers T, Forrestal BJ, Case BC, Khan JM, Ben-Dor I, et al. Transcatheter versus surgical aortic valve replacement in young, lowrisk patients with severe aortic stenosis. JACC Cardiovasc Interv 2021;14:1169-1180.
- Rodriguez-Gabella T, Voisine P, Puri R, Pibarot P, Rodés-Cabau J. Aortic bioprosthetic valve durability: Incidence, mechanisms, predictors, and management of surgical and transcatheter valve degeneration. J Am Coll Cardiol. 2017;70:1013-1028.
- Wang DD, Qian Z, Vukicevic M, Engelhardt S, Kheradvar A, Zhang C, et al. 3D Printing, computational modeling, and artificial intelligence for structural heart disease imaging for best outcomes in structural heart interventions special issue. J Am Coll Cardiol Img. 2021;(1):41-60.