

## EDITORIAL COMMENT

**Mid-term hemodynamic and clinical results after aortic valve replacement using  
Freedom Solo stentless bioprosthesis versus Carpentier Edwards Perimount:  
Interesting details but information about durability is more important**

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The authors of this paper have to be congratulated for providing us a comparison of the mid-term clinical and hemodynamic results following implantation of the Sorin Freedom Solo (SFS) stentless bioprosthesis and the Carpentier Edwards Perimount (CEP) stented tissue valve as a single-center retrospective study (1). Because there are only few papers focusing on hemodynamics of the Freedom Solo valve when compared to those reports on the Perimount valve.

I personally remember that in the middle 1990's, referring cardiologists insisted on implantation of stentless valves because they expected a better hemodynamic with postoperative transvalvular gradients similar to those of native valves. Lower transprosthetic gradients and more rapid regression of left ventricular hypertrophy than stented valves (2,3) and B) because the hemodynamic differences had no impact on the clinical outcome so far.

Of course, lower gradients may be of particular benefit for patients with preoperatively impaired LV function. Interestingly gradients at rest and during exercise, as well as the rise, are usually found to be lower in patients with stentless prostheses compared with stented valves, indicating that the stentless valve may perform better under physiological stress (4,5).

Although the information is interesting, there are several methodological weaknesses, in the present paper:

- The mean follow-up of 3.6 years is very short – compared with an expected durability of 18 to 20 years for such valves.
- The type of Perimount valve (the standard one or the Magna Ease) used in this institution is not specified.
- There is no information at all about the potentially different sizing method between stentless and stented valves
- Nothing is said about the suturing technique at implantation, especially for the Freedom Solo valve that can be fixed to the aortic root in a unique manner: one single running suture stitched above the annulus.
- In contrast to that, the Perimount valve was implanted in a supraannular position with everted sutures. This technique unfortunately narrows the aortic annulus by pushing the sewing cuff of the valve into the open annular area.
- The Solo stentless valve was implanted by the most experienced surgeons only while the Perimount valve was used by ten different surgeons.

- The Solo stentless valve was used less frequently during combined valve and CABG procedures compared to the Perimount valve.
- It is questionable to compare one overall gradient for the whole group of patients and in addition exclude those patients with the smallest and the largest valve size. It would have been much more accurate to compare the gradient within the same size of bioprostheses: 21 Freedom versus 21 Perimount, 23 versus 23 and so on.
- Another severe weakness of the methodology of this paper is the fact that the authors compared the duration of extracorporeal circulation time as well as cross-clamping time between the 2 groups of patients although these groups were absolutely not comparable: the Freedom was implanted by the two most experienced surgeons and there were more concomitant procedures in the Perimount group.

Finally there is not a single comment on the Solo Freedom valve that combines the single-suture, subcoronary implantation technique with the latest-generation bovine pericardial tissue and novel anticalcification treatment. The design allows imitation of the native healthy valve through unrestricted adaption to the patient's anatomy, reproducing a normal valve/root complex. However, despite hemodynamic performance superior to stented valves (6), our group has reported some interesting results while approaching a critical observation period as superior durability, freedom from structural valve deterioration, and nonstructural failure has not been proven as expected (7,8). Optimal performance and freedom from structural valve deterioration depend on correct sizing and perfect symmetric implantation, to ensure low leaflet stress. One particularity during implantation of the Solo valve is the fact that the 3 leaflets are of equal size while the native sinuses are rarely perfectly symmetric. Any over-tension can lead to tissue fatigue over time. Furthermore, the potential for better outcomes depends on optimal patient selection: this has not been described in the present paper neither the limitations for the use of a stentless valve at this institution. , The authors confirm this by the fact that only experienced surgeons were allowed to implant the Solo stentless valve: this emphasizes our experience that stentless valve implantation is less reproducible and standardized, and require surgeon-dependent experience and skills.

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