EDITORIAL COMMENT

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Ross surgery - but why not?

It´s been 53 years since the first description of Ross surgery by Sir Donald Ross[1]. Different times, when cardiac surgery was still an heroic endeavor reserved to very hardy patients and very very VERY hardy surgeons. The autologous pulmonary graft surgery developed when mechanical valves were appearing, biological valves were in its infancy, and patients with aortic valve pathology (a class of cardiac patients for whom, contrary to mitral stenosis patients, effective surgery was really lacking and medical therapeutic except diuretics was basically non-existant), suffered from high mortality and morbidity whether or not they underwent surgery.

Enter Sir Donald Ross, who cleverly developed a risky but effective surgery for these patients, albeit with a very significant homograft failure in the long term. Initial result were steadily improved, and by the late 1970´s Ross surgery was considered a very significant counterpart in the aortic valve surgical realm, allowing at least results as good as the ones obtained with ball-in-cage, disc-in-cage, and single leaflet mechanical aortic valves, while avoiding anticoagulation, having less endocarditis, and allowing homograft growth in young patients, with no limitation in physical exertion. Biological valves were hardly an option in younger patients, since early generations had a prohibitively high structural valve deterioration (SVD) rate under 60 years old.

In the nineties, Ross surgery expanded, due to the continued divulgation of this surgery worldwide. Known intraoperatory pitfalls were the lesion of the first septal artery during pulmonary autograft harvesting, which severely compromised hospital outcomes, and later known caveats were graft dilation, with subsequent neoaortic or neopulmonary insuficciency, risking the function of two valves for one. The technical complexity, coupled with later need for re-operation, and an increasingly better performance of standard aortic valves (mechanical or biological), cooled down the enthusiasm for this surgery worldwide, after technical modifications apparently improved the results and a significant experience was already obtained.

Current guidelines reserve Ross surgery for young patients in whom a very active lifestyle is desired, in whom anticoagulation is contra-indicated, and in woman who desire pregnancy.[2]

Simultaneously, mechanical valves now allow lower regimens of oral anticoagulation, and biological valves are promising a much more extended freedom from SVD, coupled with the possibility (absolutely not a theoretical one) of later valve-in-valve TAVI if such SVD occurs. Add also the current performance in aortic valvuloplasty (normally offered in aortic insufficiency), which is better than 10 years ago, and the best solution for many young patients with aortic valve dysfunction may be a lot of possible solutions.

Due to the promises and problems of Ross surgery, patients receiving this procedure were followed extensively, and in the last 10 years we have seen several centers publishing their isolated experiences. Some have abandoned it despite good results, some have kept it as an alternative, and some perform it whenever it is possible. [3]

In this issue of Portuguese Journal of Cardiac Thoracic and Vascular Surgery, one of the larger Portuguese centers publishes their long-term results with Ross Surgery. Rodrigues et al [2] have obtained a sample of 23 patients operated from 1999 to 2016, which averages little over one patient per year, with a mean follow-up of 15 years. Their patients were young (mean age 10.7 years, with the oldest patient having 20 years), and aortic stenosis was the most common indication for surgery. The authors present a long-term survival of 91%, and a mean follow-up of 15 years, with no reoperations noted and 100% of survivors in NYHA Class I or II. These results, mostly in children, are very good, and reflect a known objective of Santa Marta Hospital´s Cardiac Surgery department in having this surgical resource for these complex growing patients, which previous publications have documented [4].

We have another recent Portuguese publication,

from the Hospital de Santa Cruz group[5], which also concerns long-term results of Ross surgery. In it, Guerreiro et al present their experience with 56 adults who received Ross surgery, mostly due to aortic stenosis; mean age at surgery was 44 years, and median follow-up was 20 years. The long-term results were very good, with very good survival and 80% freedom from reoperation, despite about 43% of patients developing moderate homo or autograft dysfunction. The authors concluded that this procedure, despite having long-term valve dysfunction in a significant portion of patients, is a good option for middle-aged patients with aortic stenosis, and offers survival similar to the general population[5].

So, Ross procedure works and is effective in the long term; it also allows children to grow (contrary to prosthetic valves). Why isn´t it used more above 18 years old?

We have seen from previously published experiences that Ross surgery offers to patients a survival similar to the general population; it has the same valve reinterventions as a mechanical prosthesis in young patients, and obviates most valve related bleeding or stroke.[6-9] On the other hand, STS registry analysis from 2014 shows that operative mortality from Ross surgery far exceeds the one associated with aortic valve replacement in young adults (2.3% vs. 0.9%). [10]

Contrary to interventional cardiologists, surgeons are normally conservative when adopting new procedures, especially if they are technically more complex, and a recent emphasis on cardiac surgery results monitoring and public reporting has exacerbated this characteristic.

So the outlook for Ross surgery, in which results seem very dependent on experience, (about 100 cases are deemed necessary to attain proficiency[9]), will probably be similar to other niche operations in cardiac surgery - reserved for some patients, some surgeons and some centers, like cardiac transplant or complex aortic arch and descending thoracoabdominal procedures. While we believe that it definitely is not the answer to every aortic valve disease in young patients, it also isn´t going to disappear, because despite its technical difficulty and early and late attrition rate, it still is the best option for selected patients.

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