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EDITORIAL COMMENT

Medical and surgical cardiology: Reflections on the current treatment of severe aortic stenosis☆

Cardiologia médico-cirúrgica: reflexões a propósito do tratamento atual da estenose aórtica grave

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Until the recent development of transcatheter aortic valve implantation (TAVI), surgical valve replacement was the only possible treatment option for aortic stenosis. The natural history of isolated, non-rheumatic aortic stenosis was well known to cardiologists from descriptions in classic textbooks. Diagnosis was based on clinical criteria (typical auscultation) and symptoms, particularly exercise-related angina or syncope, together with data from electrocardiography (left ventricular hypertrophy with systolic overload) and chest X-ray (ascending aorta dilatation), and the cardiologist would discuss the possible need for surgery, usually elective, with the patient. Transthoracic echocardiography, particularly with Doppler study, improved quantification of the transvalvular gradient and valve area, providing more accurate assessment of the severity of stenosis and enabling prospective analysis of changes in left ventricular function. Surgery was indicated when symptoms affected quality of life and were accompanied by signs of worsening valve stenosis and/or ventricular function.

A cardiologist in a non-hospital environment could decide on the need for surgery, but this involved various steps, including: (1) confirming that the symptoms were in fact attributable to aortic valve stenosis, which often required coronary angiography to exclude the presence of or association with coronary artery disease in doubtful cases; 2) deciding on the appropriate timing of surgery and its objective – improved quality of life or longer survival; 3) assessing patients' and their families' attitude to surgical intervention, explaining that it may only be palliative and not necessarily a definitive treatment; 4) assessing and controlling comorbidities in order to minimize surgical risk; 5) selecting the surgical center (or surgeon) to which to refer the patient; and 6) discussing the type of prosthesis (mechanical or biological) to be used and the implications, taking account of the patient's preferences.

However, rather than the cardiologist acting as the intermediary between the patient and the surgeon or reference center, most patients were referred to the cardiology department of a hospital with cardiac surgery for assessment of the severity of stenosis and the timing of surgery. After various diagnostic exams and stratification of surgical risk, the case was presented for medical and surgical evaluation and the patient was then informed of the decision, at times without any formal contact between the cardiologist or surgeon and the patient.

In both these scenarios, a number of patients remained to be treated, either because they were older and/or high risk and were not referred to hospitals or because they were refused surgery on medical-surgical evaluation. TAVI has brought new possibilities and hope for these patients.

The advent of TAVI also popularized the idea of the 'heart team', which in international guidelines is seen as essential. Having worked with cardiac surgery departments for over 30 years and seen the introduction of percutaneous coronary intervention (PCI), the concept of sharing responsibility in order to provide the best and safest treatment for

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the patient makes perfect sense to me; this should always be the case in a hospital environment. The main reason for focusing on the concept of the heart team is because of the difficulty of making decisions in what are still early days for an alternative to conventional surgical treatment for severe aortic stenosis. The situation is further complicated by the fact that TAVI is indicated in the guidelines for severe symptomatic aortic valve stenosis in patients who are not suitable for surgical aortic valve replacement (class I recommendation, level of evidence B) or at high surgical risk (class IIa recommendation, level of evidence B). In a hospital with cardiac surgery and a TAVI program, decisions on the type of intervention should be taken by the teams involved in the different approaches. The patients themselves are complex, being generally older and with more comorbidities. A heart team, unlike PCI, requires more members than merely structural interventional cardiologists and surgeons; it also needs anesthetists, vascular surgeons, radiologists trained in vascular computed tomography and magnetic resonance imaging, clinical cardiologists and others trained in transesophageal echocardiography, as well as possible input from neurologists and specialists in internal medicine, nephrology and pulmonology. Personally, as a general cardiologist referring such patients, I would also like the attending physician to be involved, to be informed of the medical-surgical evaluation and when there is a close physician-patient relationship, to play a part in the final decision. However, I am well aware that heart teams are difficult to implement in practice due to problems in bringing together everyone who should be involved. But efforts should be made to achieve this goal, because current candidates for TAVI are particularly complex and only later, as the technique develops and is extended to less complex patients as an alternative to conventional surgery, will it be possible to reduce the size of the heart team. Naturally, the decision process should be adapted to each institution and to each patient, who should always have the final word.

These brief reflections on medical and surgical cardiology in the context of current treatment of severe aortic stenosis were prompted by the article by Pereira et al. published in this issue of the *Journal*.[1] The authors set out to assess the impact of a TAVI program, introduced in their institution in 2007, on the profile and operative results of surgical aortic valve replacement, comparing patients operated in 2005 (n=103) with those operated in 2009 (n=111).

Eight more patients were operated in 2009 than in 2005; they were older (71.2 vs. 69.2 years) and a greater proportion were aged $\geq$77 years (42 or 37.8% vs. 19 or 18.4%). Comorbidities were also more frequent in those operated in 2009 (52.3% vs. 40.8%, p=0.061), including a higher percentage with chronic obstructive pulmonary disease (19.8% vs. 14.9%), cerebrovascular disease (8.1% vs. 6.9%) and previous coronary angioplasty (6.3% vs. 0.0%, p=0.01). However, with possible implications for prognosis, patients operated in 2009 less frequently had anemia (13.5% vs. 17.0%) or were in NYHA class III-IV (36.1% vs. 47.1%), had higher left ventricular ejection fraction (56.2% vs. 54.0%) and less often presented pulmonary hypertension on echocardiography (11.5% vs. 21.4%, p=0.043). The mean logistic EuroSCORE was similar for both patient groups (7.6% vs. 7.5%), and it therefore seems unlikely that patients operated in 2009 had a worse risk profile, except for the fact that they were older.

With regard to surgical outcomes, operative mortality was lower in patients treated in 2009 (1.8% vs. 3.9%), which is an excellent result. Only two patients died and since multivariate analysis showed that urgent surgery was the main predictor of this outcome, it is presumed, although this is only briefly mentioned in the Discussion section, that this was the case in these patients. One-year mortality was also good (4.5% vs. 10%). Post-operative morbidity was also lower in patients operated in 2009 (13.5% vs. 23.3%, p=0.047), of particular note being the reduction in need for prolonged mechanical ventilation (>24 hours) (6.3% vs. 24.5%, p<0.001); the situation was similar for one-year morbidity (9.9% vs. 20.4%, p=0.032), with fewer rehospitalizations for cardiac cause (9.0% vs. 19.8%, p=0.027). Other points worthy of mention are that only one patient suffered stroke in the immediate post-operative period and none during one-year follow-up, and that 11 patients required a pacemaker in the post-operative period.

Although the authors mention no limitations to their study, it would have been interesting to know how many patients were considered for surgical and/or percutaneous treatment in 2009, how many were unsuitable for surgery (and possibly both treatments), how many underwent urgent surgery, the type of prosthesis employed (mechanical or biological), why eight patients were reoperated in the immediate postoperative period and three during one-year follow-up, and the medication prescribed during follow-up, among other things.

Apart from the excellent operative results presented, which we hope will be maintained, the article warrants a few other comments. Assuming that there had been no changes in the surgical team or logistics of the surgical center, the improved results may not be due solely to greater operator experience over the four-year period, or to mere chance in that particular year. The authors acknowledge that the results are related to ''marked improvements in the care provided and to advances in medical and surgical technologies and in complementary exams''.

In my opinion, the study and its results reflect closer collaboration between medical and surgical cardiology in both patient assessment and referral for the most appropriate treatment. The introduction and growing availability of an alternative to surgical aortic valve replacement that is less aggressive and more suitable for older patients with more comorbidities, who are more likely to be considered unsuitable or high risk for surgery, has undoubtedly increased the number of patients being referred. This has resulted in greater responsibilities for the cardiology team throughout the process. Patients undergo more thorough evaluation, prompted by the demands of patient selection for a new alternative technique, in accordance with international guidelines. There are indirect benefits for surgeons and direct benefits for patients: surgeons may benefit from patients being more thoroughly assessed and possibly at lower risk (high-risk patients being referred for TAVI), but it is patients who benefit the most. Although only eight more patients were operated in 2009 (with better results than previously), a further 20 underwent TAVI that year, according to Ministry of Health data (not mentioned in the article), which

represents an overall increase of 27.2% in patients treated for severe aortic stenosis that year.

The study highlights the central importance of the heart team in treatment decisions for severe symptomatic aortic stenosis, as was seen in the treatment of complex coronary artery disease following the introduction, many years earlier, of PCI. It is a reminder of the importance of collaboration between medical and surgical cardiology, which should always exist but which may have been forgotten in some hospitals.

Conflicts of interest

The author has no conflicts of interest to declare.

Reference

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