ANGIOPLASTY USING ROTATIONAL ATHERECTOMY IN A PATIENT WITH SEVERE AORTIC STENOSIS FOLLOWED BY PERCUTANEOUS AORTIC VALVE IMPLANTATION

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ABSTRACT

The percutaneous transcatheter implantation of the aortic valve (TAVI) is an option in cases of severe aortic stenosis. There are many situations that can hinder the TAVI procedure, such as the presence of adjacent coronary artery disease (CAD). CAD may present with calcifications, which makes the hemodynamics team's approach even more difficult. We describe a case of a previously hypertensive, diabetic octogenarian patient with a prostate cancer with urethral stenosis, chronic non-dialysis kidney disease, paroxysmal atrial fibrillation, heart failure and multivessel CAD with calcifications. Due to the significant surgical risk, it was decided, after a decision by the Heart Team, to perform coronary angioplasty followed by TAVI, and all procedures were successful.

KEYWORDS: HEART VALVE PROSTHESIS; HEART VALVE PROSTHESIS IMPLANTATION; HEMODYNAMICS.

INTRODUCTION

Coronary artery disease (CAD) and aortic valve stenosis (AS) are often coexisting in elderly patients. Both diseases share many common risk factors, such as age, sex, hypercholesterolemia, hypertension and diabetes mellitus. The fact that both diseases also occur independently of each other suggests that additional parameters, such as unfavorable genetics, may play a considerable role in the pathogenesis [1].

There is a consensus of experts that patients with primary indication for aortic valve surgery and concomitant stenosis of the coronary artery diameter ≥50% to 70% should be considered for additional myocardial revascularization graft at the time of surgical aortic valve replacement (SAVR). However, combined SAVR and myocardial revascularization present a greater risk than isolated SAVR. Vice versa, late SAVR after myocardial revascularization is also associated with a significantly increased risk, so it is a common consensus to treat both diseases simultaneously to avoid repeated sternotomy [1].

In order to avoid such risks, the discussion in the Heart Team about the possibility of percutaneous approach of coronary lesions and AS by transcatheter aortic valve implantation (TAVI) can be an option, in complex and significant risk cases, this being the objective of the present report.

CASE REPORT

Clinical history: Male patient, 86 years old, hypertensive, suffering from prostate cancer with urethral stenosis, chronic non-dialysis kidney disease, paroxysmal atrial fibrillation with CHADSVASC 3 and HAS-BLED 3, heart failure with reduced ejection fraction and major aortic stenosis, was admitted to the hospital with dyspnea at minimal effort, functional class New York Heart Association (NYHA) III. The anatomy was evaluated by angiotomography of coronary, aorta and iliac arteries, which showed a calcified aortic valve with a calcium score of 4810 (figures 1A and 1B), with favorable anatomy, without significant intraluminal reduction in the aortoiliac path. Preoperative cinecoronariography was performed, which presented important CAD and with a multivessel pattern (figure 2A, 2B, 2C). After discussing the case with the Heart Team, angioplasty was chosen followed by TAVI. This case report was approved by the Research Ethics Committee of the Hospital de Urgências de Goiânia, linked to Plataforma Brasil, under CAAE: 94882318.7.0000.0033.

Angiographies: Cinecoronarioangiography was performed on 02/21/19, which showed a right coronary artery (RCA) with a 95% lesion in the proximal third involving the lateral branch (bifurcation), and another 95% in the distal third (figure 2C). Moderately important poste-

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rior descending artery (PD) forks early and presents a localized lesion of 90% at the origin. Left coronary trunk (LCT) with calcifications. Anterior descending artery bypasses the cardiac apex and irrigates the distal third of the posterior interventricular septum, with calcifications and a 60% lesion in the proximal to the middle third (figure 2B). First diagonal branch of great importance presents calcifications and 90% lesion at the origin. First left marginal branch with calcifications and 95% lesion in the proximal third. Left posterior ventricular branch of moderate importance, with an 80% lesion in the proximal third (Figure 2A). Other arteries without significant lesions. Calcified aortic valve. Left ventricular aorta gradient of 40 mmHg.

Interventions: The first attempt of angioplasty on 03/01/19 was unsuccessful because balloons were unable to pass due to the injury. The first stage of angioplasty was then programmed and performed on 03/06/19 via the right femoral artery, being submitted to rotational atherectomy - Rotablator® (figure 3A) followed by right coronary angioplasty, posterior descending and right posterior ventricular implant with three drug-eluting stents (figure 3B), 120mL of contrast was used in this step. During the procedure, he presented significant bleeding at the puncture site contained by means of a compressive dressing. In the second stage, on 04/03/19, lesions in the left posterior ventricle, circumflex and first left marginal branch were treated with the implantation of three drug-eluting stents (figure 3C), without vascular or hemorrhagic complications. On 07/02/2019, he underwent TAVI with a 26 mm Sapien S3 prosthesis implant, without clinical or angiographic complications (figure 4A). After implantation, a single post-dilation was performed, with absence of valve leak (figure 4B). TAVI procedure was performed with sedation (with the aid of the Bispectral Index - BIS) and local anesthesia, 2 ProGlides for hemostasis were used, and in total about 100mL of contrast was used. After the procedure, it was decided to keep a transvenous pacemaker due to bradycardia, which was removed after 24 hours of the procedure with heart rate normalization. Final gradients of 6 mmHg peak and 3 mmHg medium.

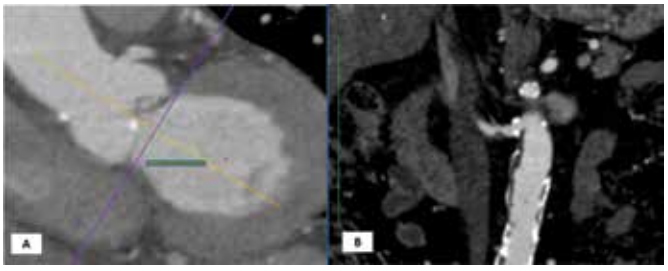

Figure 1. Angiotomography. A: evaluation of the anatomy of the aortic valve (calcified) and coronary arteries by coronary angiotomography; B: angiotomography of the aorta and iliac arteries.

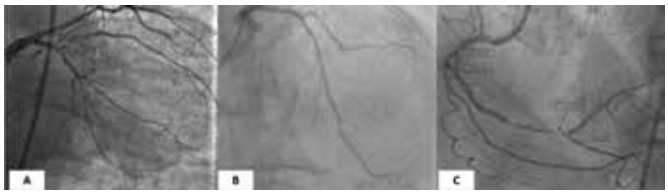

Figure 2. Cinecoronarioangiographies. A: First left marginal branch with calcifications and 95% lesion in the proximal third. Left posterior ventricular branch of moderate importance, with an 80% lesion in the proximal third; B: Anterior descending artery around the cardiac apex and irrigating the distal third of the posterior interventricular septum, with calcifications and a 60% lesion in the proximal to the middle third; C: Right coronary artery (RCA) with a 95% lesion in the proximal third involving the lateral branch (bifurcation), and another 95% in the distal third.

Figure 3. Coronary angioplasty. A: Right femoral angioplasty with the aid of rotational atherectomy; B: Right coronary angioplasty, posterior descending and right posterior ventricular with implantation of three drug-eluting stents; C: approach of lesions in the left posterior ventricular arteries, circumflex and first left marginal branches with the implantation of three drug-eluting stents.

Figure 4. TAVI procedure. A: Sapien S3 26 mm prosthesis implant; B: Absence of valve leak.

DISCUSSION

The main signs and symptoms of AS are syncope, angina and heart failure, the latter being the criteria that most relates to the severity of the case, giving survival of less than two years in 50% of patients. The main indication for valve intervention is the presence of any of the symptoms described above and when deciding the best approach, factors such as age, frailty indexes, risk scores (STS score) and patient's desire must be considered [2, 3].

As for quantitative criteria, the patient has all AS definers according to the Brazilian Cardiology Directive in its last valvulopathies update, that is to say, it had a valve

area less than 1 cm^2, a jet velocity greater than 4 cm/s and a medium gradient between aorta and left ventricle greater than 40 mmHg, in addition to these, it had an ejection fraction of less than 50%, considered an aggravating factor [2, 3].

The aforementioned patient had class IA indication for conventional cardiac surgery due to surgical risk calculated by the intermediate STS score (5.98%) and presence of coronary lesion with a multivessel pattern. In discussion with the Heart Team, percutaneous coronary treatment and TAVI were proposed considering criteria such as senility, high EUROSCORE II (8.68%) and the patient's desire. Noteworthy, the isolated indication for TAVI would be class IIA, however, considering the coronary lesions, we did not find clear indications foreseen in the literature (combined approaches) [2].

The consideration of TAVI as a proposed treatment was listed after discussing the case with the patient and in light of the new studies in intermediate-risk patients, which demonstrated non-inferiority in relation to surgery in this population [4,5]. During the discussion of the case, the coronary treatment was listed and the hemodynamics team suggested treatment of the coronary lesions prior to the performance of the valve intervention due to factors such as procedure time, amount of contrast used and complexity of the coronary anatomy [1].

The initial schedule consisted of two coronary approaches spaced 20 to 30 days apart, followed by a third approach to perform TAVI. Between these periods, the patient would be discharged from hospital depending on the clinical possibility. During the first angioplasty, the procedure was considered unsuccessful due to the difficulty of interposing the lesion using usual techniques. Due to the fact, the hemodynamics team proposed the maintenance of two coronary interventions, however, using Rotablator® as a preparation for coronary angioplasties. The two approaches with such programming were successful as shown in figure 3.

During the first approach, the patient presented moderate bleeding from the puncture site as a complication and after discussion by the team, it was decided to maintain only double anti-aggregation despite the knowledge of paroxysmal atrial fibrillation and formal indication for anticoagulation [6]. After the therapeutic modification, there were no further hemorrhagic complications.

In the third stage, the patient underwent TAVI without intra-procedure complications; however, in the postoperative period he developed sinus bradycardia and dependence on a temporary pacemaker for about 24 hours. He was discharged in functional class II according to NYHA, without vascular, hemorrhagic or renal complications after four days of hospitalization. After completion of the procedures, it was decided to return to anticoagulation with rivaroxaban and mono anti-aggregation with clopidogrel without reports of bleeding after four months of follow-up.

CONCLUSION

According to the case presented here, percutaneous coronary treatment associated with TAVI may be a viable strategy in the treatment of selected patients, even in the presence of unfavorable coronary anatomy.

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