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CASE REPORT

BIOLOGICAL VALVE PROSTHESIS THROMBOSIS: A CASE REPORT

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ABSTRACT

Valve bioprosthesis thrombosis is a possible complication inherent in cardiac valve replacement surgery. It is a delicate condition that often requires a new surgical intervention. Although little recognized in the literature, biological valve prosthesis thrombosis has been increasing, especially with the advent of transcatheter valve implantation. Despite this, research on the subject remains scarce, which makes the actual number of cases of this event underestimated, with a slow and inadequate treatment response. The present study aims to expose, from a case report, the thrombosis of a biological prosthesis implanted in the mitral position.

KEYWORDS: THROMBOSIS; BIOPROSTHESIS; MITRAL VALVE

INTRODUCTION

Heart valve diseases affect a large part of the world's population, being responsible for a considerable portion of interventions, in order to correct them. With the progress of the various prostheses currently available on the market, there has been a considerable improvement in terms of both hemodynamic characteristics and durability. Despite this, some complications inherent to the procedures can still be seen, valve thrombosis being one of them.[1]

Heart valve replacement for a prosthesis brings with it the risk of developing a dysfunction of it and consequently may lead to the need for a new intervention. Among the main causes the literature gives us the structural deterioration, which can be caused by a Pannus; non-structural deterioration; thrombosis; and endocarditis, and such complications can occur alone or simultaneously. Thrombosis, for example, is often seen associated with prosthetic degeneration or endocarditis.[2]

The replacement of a diseased valve, nowadays, can be performed in two ways: by conventional surgery, in which both mechanical valves (MV) and biological valves (BV) are used, depending on the indication of each patient; and through the percutaneous implant, which only uses BV.[3]

Although less thrombogenic than mechanical prostheses, thrombosis of bioprostheses has been increasingly seen as a cause of dysfunction, mainly due to the growth in the practice of catheter insertion. In a study by Hansson and his collaborators on transcatheter aortic valve implantation (TAVI), the presence of a thrombogenic component was evidenced in 7% of the cases studied, demonstrating the remarkable incidence and clinical relevance of this topic.[2]

Furthermore, bioprosthesis thrombosis (BT) has high morbidity and mortality, classically presenting as an acute heart failure, most often associated with inadequate anticoagulation.[4]

Based on this assumption, and in view of the increased use of BV both in conventional surgery and via catheter, the present work aims to expose, through a case report.

CASE REPORT

A 43-year-old female patient sought the health service for presenting with abdominal distension and pain in the right hypochondrium region, inappetence, gastric fullness and constipation that had started 15 days before treatment. She denied fever and/or chills, fecal acholia, jaundice or choluria.

As a previous history, she said she had fibromyalgia and denied smoking, alcohol consumption, family history of coronary heart disease or other comorbidities. She also said that, in 2012, she was diagnosed with mitral stenosis of rheumatic origin, requiring balloon mitral valvuloplasty, in the same year. Despite this, in 2019 she required mitral valve replacement surgery (MTS) with placement of a biological prosthesis, which was successfully performed.

In November 2020, she had a first episode of pulmonary thromboembolism (PTE), followed by another in April 2021, both treated with antithrombotics. In August 2021, she had mild COVID-19, conducted as a symptomatic patient at home.

On physical examination, the patient was in a regular general condition, hydrated, ruddy, acyanotic, anicteric, afebrile, Glasgow 15. Physiological vesicular murmur with fine bibas-

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al rales, regular heart rhythm, normophonetic sounds, in two stages, with diastolic murmur in mitral focus with irradiation to aortic and axillary focus. Hepatojugular regurgitation present.

On admission, computed tomography (CT) of the abdomen and ultrasound (USG) of the abdomen were performed, which respectively showed gallbladder with thickened and delaminated walls associated with densification of adjacent adipose planes, suggesting acute cholecystitis; and ultrasound signs of acute cholecystitis with positive Murphy. Inferior vena cava showing increased caliber.

In addition, the patient underwent an electrocardiogram (ECG) that showed sinus rhythm, with a heart rate of 64 bpm, a low amplitude QRS complex in the frontal plane, with a right bundle branch conduction disorder, as well as diffuse changes in ventricular repolarization (Figure 1).

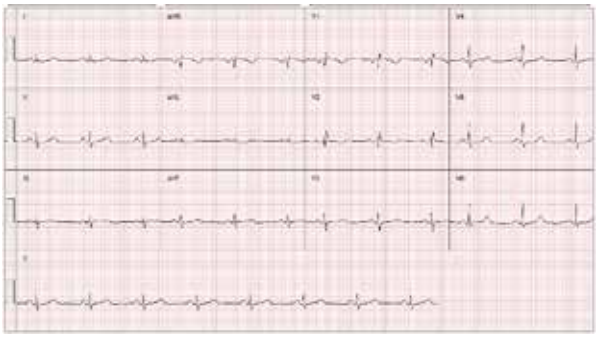

Figure 1. Electrocardiogram image on admission.

She was then referred for transesophageal echocardiogram (TEE) to investigate cardiac injury, the latter having demonstrated a significant increase in the right ventricle (RV), with a heterogeneous mass of wide mobility measuring 16.6 mm x 6.7 mm adhered to a of the mitral valve leaflets, causing significant stenosis-like dysfunction with a mean gradient of 11 mmHg and a peak gradient of 16 mmHg. A tricuspid valve with significant mitral regurgitation (MR) was also visualized. Other examination findings were within the normal range (Figure 2).

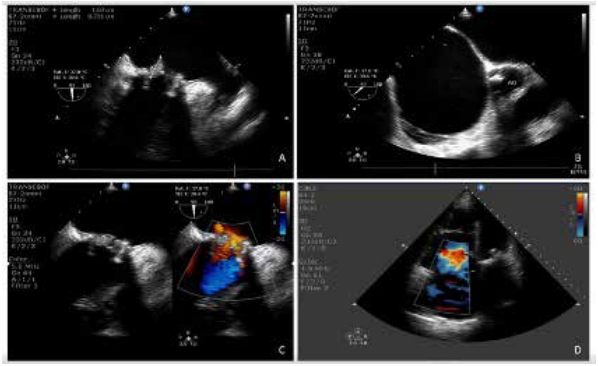

Figure 2. Perioperative transesophageal echocardiogram A) Thickening of the mitral valve leaflets. B) Right ventricular enlargement. C) Mitral stenosis demonstrating regurgitation by Collor. D) Tricuspid insufficiency.

Based on these findings, due to the hemodynamic repercussions presented by the patient, and after discussion with the Heart Team, a new surgical approach for MVR was chosen, proving its involvement intraoperatively (Figure 3). Long-term BV implant #29 (Medtronic-Hancock II®) was performed in the mitral position, closure of the left atrium and tricuspid valve repair with a semi-rigid #32 ring. Subsequently, she was referred to the cardiology ICU, where she remained for monitoring and postoperative recovery (PR).

Figure 3. Intraoperatively removed thrombosed prosthetic valve A) Biological valve removed from the mitral position, demonstrating involvement of its leaflets. B) Removed thrombus or biological valve side

The patient was discharged on the sixth postoperative day, after transthoracic echocardiogram (TTE) (Figure 4) proving good functionality of the implanted prosthesis, in addition to significant clinical improvement of the patient, who continued to use Apixaban 5 mg twice a day. She returned on the 30th PO for outpatient follow-up, in which the presence of atrial flutter was found on the follow-up ECG (Figure 5), requiring a new hospitalization. During this, she underwent laboratory investigations, showing significant anemia, requiring blood transfusion. She was also referred to the hematology service for causal investigation. She decided to be discharged again after 48 hours, having received two bags of blood and in sinus rhythm, controlled with Amiodarone 200 mg/day.

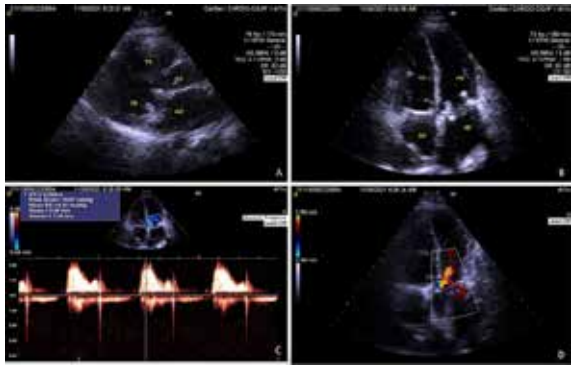

Figure 4. Postoperative transthoracic echocardiogram demonstrating good functionality of the new prosthesis

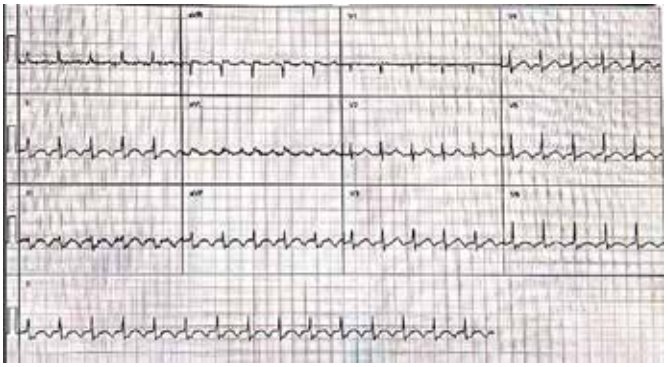

Figure 5. Admission ECG in the second hospitalization

DISCUSSION

In the above case, what stands out is the presence of a BPVT, in addition to multiple episodes of PTE, and its correlation with the therapeutic approach, both before and after the thromboembolic event occurred, and the diagnostic methods adopted for better resolution of the condition.

It is known that prosthetic heart valve thrombosis has a low incidence, with a percentage between 0.03% and 4.3% patients per year. Within this statistic, 0.5% occur on the left side of the heart, 0.1% of which are in the mitral position. In relation to biological valves, the occurrence of thrombosis is even more uncommon, which is why the main advantage of their use over mechanical valves. In addition, as it is not very thrombogenic, the long-term use of oral anticoagulants is unnecessary. Although rare, especially in the mitral position, there are few studies or reports evidenced in the literature, and when present, they are about MV. Because of this, the real prevalence of thrombosis in BV is unknown and may even be underestimated. [5]

In studies carried out with patients who underwent MVR with the use of biological prostheses, followed up for a period of five years, it was seen that in 10% of the evaluated cases there was the presence of thrombi in the prosthetic valve leaflets, a percentage that is similar to other reports found in the works. performed so far, which is a considerable statistic that should not be ignored.[6]

Most cases of biological prosthetic valve thrombosis (BPVT) are related to insufficient oral anticoagulation therapy. It is known that in the first year after surgery, there is a greater risk of having a valve thrombosis due to recently handled perivalvular tissue that has not yet been endothelialized, with a high thrombogenic potential. In addition, atrial fibrillation secondary to fibrosis that occurs at the expense of the procedure predisposes to thrombus formation. Thus, the institution of adequate anticoagulation is necessary. [5]

In addition, careful follow-up should be employed in both the immediate and late PO. In the present studies, BPVT, although uncommon, when it occurs, appears in the first months after the surgery, with a good response in relation to the use of vitamin K antagonists. However, this fact does not exclude the possibility of such an event occurring later. However, current guidelines only give us a restricted period of three to six months in relation to the use of this therapy. In the works carried out by Egbe and his collaborators, it was evidenced that BPVT has a prevalence of 11.6%, which is much higher than that reported at the present time, which denotes the importance of developing strategies for an early diagnosis, since that a TTE with the presence of three echocardiographic signs of a thrombus is highly sensitive and specific to confirm the diagnosis.[7]

Previously related only to the surgical procedure, today we see an exponential increase in transcatheter procedures, which use only biological valves. Thus, the ways of evaluating the consequences in relation to the growth in the use of biological prostheses should be expanded, considering that there is a possibility of subclinical thrombosis of the valve leaflets.

In a survey carried out by Chakravarty et al. between 2014 and 2017, the presence of changes in BV implanted by both means already known via tomographic images was found, and such changes are of great significance.8 Based on this assumption, in view of the scarcity of studies in relation to this specific topic , the view of the authors of the present case report remains that it is necessary to expand research regarding BPVT, as well as to optimize the therapies used after performing such procedures.

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