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STARR-EDWARDS VALVE PROSTHESIS – HALF A CENTURY OF DURABILITY

PRÓTESE VALVAR STARR-EDWARDS – MEIO SÉCULO DE DURABILIDADE

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ABSTRACT

In 1960, the Starr-Edwards prosthesis became the first mechanical valve to be implanted, worldwide. Roughly 200,000 patients benefited from this model. However, it has now fallen out of use due to its frequent complications, such as hemolysis, anemia and thromboembolisms, despite its noteworthy durability. In this article, we present a case of a patient with the longest durability with maintenance of functionality of the S-E prosthesis reported in the literature. The patient had correctly followed the cardiological follow-up, including adequate use of anti-coagulant medications. The patient presented dysfunction in other valves, but the S-E prosthesis remained stable and functional. The patient even required mitral valve replacement surgery, but not for the S-E prosthesis in the aortic position. This report was based on patient's clinical history and a survey of the literature data on valve prostheses and their durability. There are reports of prostheses remaining stable for approximately 30 to 40 years, but none that came close to this one, which had lasted for 49 years The importance of postoperative care, the correct use of anti-coagulant medicines, and clinical follow-up to minimize the possible complications of the prosthesis, were shown in this article through this case report.

Keywords: Heart Valve Prothesis Implantation; Aortic Valve; Aortic Valve Stenosis; Surgery.

RESUMO

A prótese de Star-Edwards foi a primeira válvula mecânica a ser implantada no mundo, no ano de 1960. Cerca de 200.000 pacientes foram beneficiados com esse modelo, porém, caiu em desuso por suas frequentes complicações como hemólise, anemia e tromboembolismos, apesar de sua notável durabilidade. Neste artigo apresentamos um caso de paciente com a maior durabilidade com manutenção da funcionalidade da prótese S-E, já relatado na literatura. O paciente fez o seguimento cardiológico corretamente, bem como usou a anticoagulação adequada. Apresentou disfunção de outras valvas, porém a prótese S-E manteve-se estável e funcional. Inclusive, necessitou de cirurgia para troca valvar mitral, mas não da prótese de S-E em posição aórtica. Este relato foi realizado através da história clínica do paciente e do levantamento de dados da literatura sobre próteses valvares e sua durabilidade. Existem relatos de durabilidade de próteses valvares com aproximadamente 30 a 40 anos, mas nenhum relato próximo ou igual a este com 49 anos de durabilidade. A importância dos cuidados pós-operatórios, uso correto dos anticoagulantes e o seguimento clínico para controle das possíveis complicações da prótese, foi mostrada neste artigo através do relato desse caso.

Descritores: *Implante de Prótese de Val Cardíaca; Próteses Valvulares Cardíacas; Valva Aórtica, Cirurgia; Estenose da Valva Aórtica, Cirurgia.*

INTRODUCTION

The Starr-Edwards (S-E) valve prosthesis was the first mechanical valve to be implanted in the world, in 1960, and with increasing use by 1966, represented a great revolution in cardiac surgery. The S-E valve was used in about 200,000 patients worldwide, until its extinction in favor of more modern models with fewer complications, such as thromboembolism and hemolytic anemia, which ensued due to its unfavorable mechanics.[1] However, one of the most notable features of the S-E valve is its durability. In this article, we present the case of a patient who underwent aortic valve replacement 49 years ago, and whose S-E prosthesis continues to perform adequately without signs of dysfunction. This is the longest period of continued functioning of an S-E prosthesis ever reported in the literature.

DESCRIPTION

A 77-year-old male patient underwent aortic valve replacement with an S-E prosthesis in 1967, at 28 years of age, due to significant symptomatic aortic stenosis secondary to rheumatic

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fever. He remained asymptomatic for the next 47 years of postoperative follow-up, only going to routine consultations for clinical evaluation and adjustment of anticoagulation. Two years ago, he had symptoms of dyspnea, orthopnea, and edema of the lower limbs. Echocardiography showed increased left chambers and left ventricular systolic dysfunction due to diffuse hypokinesia with an ejection fraction (EF) of 37%. The S-E valve showed no signs of dysfunction except for slight regurgitation. Moreover, there was moderate mitral valve insufficiency with commissural fusion compatible with rheumatic heart disease. At this point, treatment for congestive heart failure was initiated. He returned after one year, with progression of symptoms and worsening of the functional class. A new echocardiogram showed worsening of systolic dysfunction (EF: 32%) and mitral regurgitation, now defined as anatomically significant. Moreover, there were still no signs of dysfunction of the prosthesis, and surgical treatment for mitral valve insufficiency was indicated.

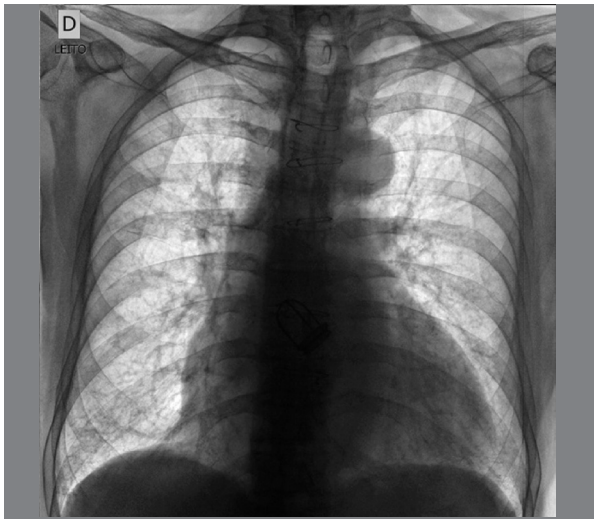

Figure 2. Patient's exams (medical record - Incor) images.

DISCUSSION

First used in the clinical field in the 1960s, the S-E valve represented an important improvement in surgical outcomes for valve diseases.[2] Although the S-E valve is durable, it provides unfavorable hemodynamics compared to other mechanical prostheses. The design of the S-E valve allows only a lateral flow, ensuring high transvalvular gradients with significant hemolysis and associated complications.[3,4] Although hemolytic anemia and thromboembolism are well known complications that may be associated with the wear of S-E valves, tissue wear is difficult to diagnose by echocardiography due to artifacts created by the stainless steel cage.[5,6] There are no reports of durability greater than 40 years of a VALVAR S-E prosthesis in the literature."

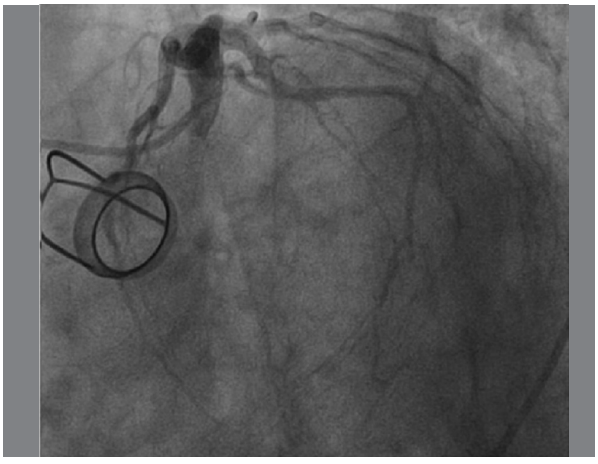
Figure 1. Patient's exams (medical record - Incor) images.

CONCLUSION

The excellent durability of S-E prostheses has been recognized in the literature for a long time, despite its possible and frequent mechanical and systemic complications such as thromboembolism, and chronic hemolysis due to cage wear and ball cracking. There are many reports of S-E prostheses continuing to function after 30 years and rare reports of prostheses lasting for over 40 years. With 49 years of use, this case represents the longest period of functioning of an SE prosthesis ever reported in the literature. The patient remained under oral anticoagulation and attended for regular medical consultations during the 49 years of postoperative follow-up. This compliance with medication and systematic surveillance probably played an important role in preventing complications and dysfunction of the valve prosthesis.

CONFLICTS OF INTEREST

The author declares that he has no conflicts of interest in this work.

AUTHORS' CONTRIBUTIONS: Each author contributed individually and significantly to the development of this study. SRD and FT were the main contributors to the preparation of the manuscript. SRD, RPB, LLC followed-up the patient, gathered clinical data, and conducted a literature search. JRCF, TADA, VEER, ASSAL reviewed the manuscript and contributed to the intellectual concept of the study.

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