

Late outcome of mitral valve replacement with the Cross-Jones prosthesis 36 years after initial surgery

Bogdan Jegier¹, Ryszard Jaszewski¹, Małgorzata Lelonek²

¹Department of Cardiac Surgery, Medical University of Lodz, Poland

²Department of Cardiology, Medical University of Lodz, Poland

Abstract

A 60 year-old woman with rheumatic mitral stenosis underwent re-replacement of Cross-Jones caged lens mitral valve prosthesis, 36 years after valve implantation. In 1968, she underwent mitral commissurotomy. In 1992, she had a stroke, and in July 2009 echocardiography revealed the malfunction of the prosthesis with pannus and reduced mitral prosthetic area < 1.0 cm² with the elevated transprosthetic gradient of 30 mm Hg. To begin with, she did not approve of the reoperation. Finally, she consented to this therapeutic option. In October 2009 Medtronic prosthesis Advantage 27 was re-implanted. We report the longest period of working Cross-Jones mitral valve in the literature. (Cardiol J 2011; 18, 6: 698–700)

Key words: Cross-Jones mitral valve prosthesis, malfunction

Introduction

The Cross-Jones prosthesis was implanted by Cross, its constructor, early in 1965 for the first time. It heralded an era of low profile prostheses implanted in the mitral position, something preferable in patients with narrow left ventricle output [1]. In the 1970s, following reports of fatal malfunctions of this type of prosthesis, an elective replacement was recommended in patients who still had their functioning artificial valve [1].

Case report

We report a 60 year-old woman with rheumatic mitral stenosis, who underwent re-replacement of mitral valve prosthesis 36 years after valve implantation. She had a Cross-Jones caged-lens prosthesis implanted in 1973. In 1968, she underwent the first valve operation, mitral commissurotomy. After that, she became pregnant and delivered a healthy

boy. In 1979 and 1980, fatal malfunctions of Cross-Jones caged-lens prostheses were reported [2, 3], but the patient in question was well and nobody proposed she should be re-operated. She used an anticoagulant drug (acenokumarol) with not well controlling International Normalized Ratio (INR). She had a long-term history of atrial fibrillation, arterial hypertension and smoking.

In 1992, she had a stroke with left-sided paresis and senso-motoric aphasia. It is unknown if echocardiography was performed after this incident. Between 2006 and 2008 she was hospitalized four times for pulmonary oedema. Until 2009 she had been under the care of her General Practitioner. In 2009, she was admitted to hospital twice: for the first time in July with signs of bad care of anticoagulation status (INR > 10), haematuria and bleeding from peptic ulcer. She obtained 4 U of red cells and omeprazol i.v. Gastroscopy confirmed a peptic ulcer in the duodenum. Echocardiography revealed malfunction of the prosthesis with pannus and mi-

Address for correspondence: Bogdan Jegier, MD, PhD, Department of Cardiac Surgery, ul. Sterlinga 1/3, 91–425 Łódź, Poland, tel: +48 42 633 15 58, fax: +48 42 664 43 40, e-mail: bjegier@op.pl

Received: 7.06.2010

Accepted: 9.07.2010

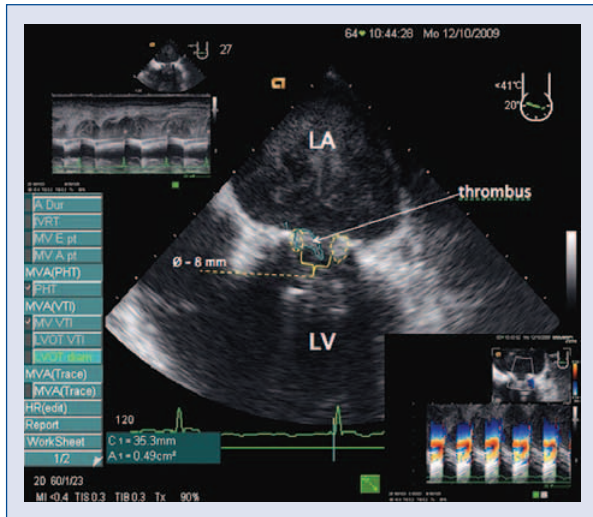


Figure 1. Preoperative transoesophageal echocardiogram with thrombus on the Cross-Jones prosthesis in mitral position and irregular transvalvular flow; LA — left atrial; LV — left ventricle.

tral prosthetic area $< 1.0\text{ cm}^2$. The pannus formation occurred on the atrial and ventricle side of the prosthesis. The transvalvular leak was periodically recorded. The left atrium was enlarged ($7 \times 5.8\text{ cm}$). Left and right ventricular function was impeded (EF = 60%, TAM 24 mm). Systolic pulmonary pressure was elevated to about 44 mm Hg and mild tricuspid regurgitation was observed. In this time she was referred for re-operation but she refused.

Two months later, she was admitted with signs of decompensation in NYHA class IV. A transoesophageal echocardiogram recorded a further malfunction of the prosthesis (Fig. 1) with the elevated transprosthetic gradient of 30 mm Hg, its abnormal movement and periodical out of the transvalvular flow. Additionally mobile thrombi 10–12 mm

occurred on the atrial side of the prosthesis. Finally, she consented to a surgical operation. Moreover, she underwent the extraction of teeth using antibiotic prophylaxis for infective endocarditis and coronary arteriography without narrowing of coronary arteries.

In October 2009, she underwent cardiopulmonary bypass surgery. Cardiac arrest was achieved with antegrade crystalloid cold cardioplegia. From the atrial side, the Cross-Jones prosthesis was nearly totally obscured by the pannus formation and thrombi (Fig. 2A). After removal of the prosthesis, it was revealed that thrombi from the ventricular side restricted the movement of the disc in the prosthetic cage (Fig. 2B). Furthermore, the silicone disc had an irregular rim and was damaged (Fig. 2C). The pannus was maximally excised and the Medtronic prosthesis Advantage 27 was implanted. We used 2–0 interrupted pledgetted sutures, which were introduced from the atrial side towards the ventricle in an inverted ‘U’ fashion. The early post-operative period was without complication. She left hospital on the 21st day after her operation without any signs of decompensation.

Discussion

We describe the 36 years of working of a mitral Cross-Jones caged disc prosthesis implanted in the mitral position in 1973. The Cross-Jones prosthesis was one of the first with a low profile cage. The silicone disc was elastic, as all silicone details were. This was the cause of many malfunctions of implanted prostheses, so this type of valve was replaced by new one-tilting disc valves. In 1967, the Björk-Shiley valve started the era of tilting disc prostheses [1]. As we know, the history of cardiac valve prostheses began in 1952 with Hufnagel

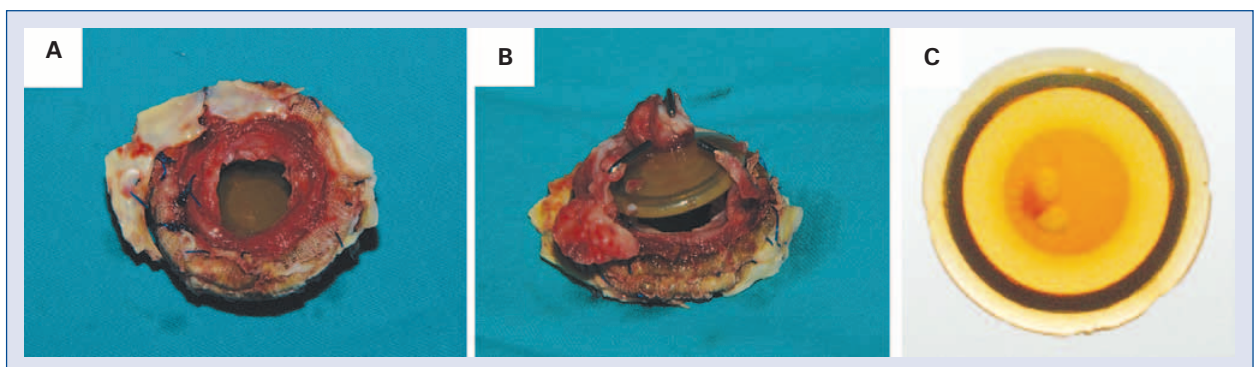


Figure 2. View of thrombotic encapsulation of Cross-Jones prosthesis in mitral position: **A.** From the atrial side; **B.** From the ventricular side; **C.** The damaged disc with irregular rim.

[4, 5]. Still today, there are many working mechanisms. More than 70 were patented in the US, but less than ten types were actually implanted in the US and Europe [5].

To the best of our knowledge, there are few reports in the literature about the Cross-Jones mitral valve prosthesis. An early fatal malfunction of a Cross-Jones mitral valve prosthesis, 20 months after surgery where the disc escaped into the left atrium, was described by Lucács and Lónyai in 1980 [2]. A fatal retrograde dislodgement of a Cross-Jones valve lenticular disc seven years after surgery was observed by Schachner et al. in 1979 [3]. A late outcome 23 years after surgery of a Cross-Jones in the mitral position was published by Gosh et al. [6]. The largest study of Cross-Jones prostheses was reported by Kovacs et al. [7], with 121 patients and 145 implanted valves between 1967 and 1973 in Hungary, followed-up for more than 20 years. They observed no mechanical failures of the valve in the aortic position 24 years after surgery. In seven patients, the disc escaped from the mitral position, causing death. In mitral patients, the overall incidence of thromboembolism was 23.4%/patient per year.

We do not know either how long is the history of malfunction of the prosthesis in our patient (from the first pulmonary oedema?) or if it was dependent solely on the construction and material of the valve, or also on poorly controlled anticoagulation

therapy. It seems that both the above described mechanisms were in this case important.

In summary, we report the longest period of a working Cross-Jones mitral valve, not only in our department but also in the literature.

Acknowledgements

The authors do not report any conflict of interest regarding this work.

We thank Marek Maciejewski, MD, PhD for supplying us with the echocardiography view and Witold Pawłowski, MD, PhD for his contribution.

References

1. DeWall RA, Quasim N, Carr L. Evolution of mechanical heart valves. *Ann Thorac Surg*, 2000; 69: 1612–1621.
2. Lucács L, Lónyai T. A unique malfunction of Cross-Jones mitral valve prosthesis. *J Cardiovasc Surg*, 1980; 21: 95–98.
3. Schachner A, Vidne B, Levy MJ. Retrograde (atrial) dislodgement of a Cross-Jones mitral valve occluder. *Scand Cardiovasc J*, 1979; 13: 263–265.
4. Edmunds LH Jr. Is prosthetic valve thrombogenicity related to design or material? *Tex Heart I J*, 1996; 23: 24–27.
5. Gott VL, Alejo DE, Cameron DE. Mechanical heart valves: 50 years of evolution. *Ann Thorac Surg*, 2003; 76: S2230–S2239.
6. Gosh PK, Tager S, Raanani E, Levy MJ. Late outcome of valve replacement with the Cross-Jones caged-lens prosthesis. *J Heart Valve Dis*, 1993; 2: 485–486.
7. Kovacs GS, Felkai B, Toszegi AM. Lessons from the past: Twenty-five years experience with the Cross-Jones caged disc prosthesis. *J Heart Valve Dis*, 1993; 2: 671–678.