

Dacron Patch Closure of Ventricular Septal Defect with Concomitant Aortic Valve Replacement using a Mechanical Prosthesis: A Video Presentation

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Abstract

We performed Dacron patch closure of ventricular septal defect with concomitant aortic valve replacement using a St. Jude Medical mechanical aortic prosthesis for a patient with ventricular septal defect and severely deformed and irreparable aortic valve. We highlight the technical details of the procedure to prevent paravalvular aortic leakage and residual ventricular septal defect.

Keywords

- ▶ concomitant aortic valve replacement
- ▶ Dacron patch closure
- ▶ mechanical prosthesis
- ▶ ventricular septal defect

Introduction

Ventricular septal defect and aortic regurgitation syndrome includes hearts in which aortic regurgitation is of congenital origin, although rarely present at birth, caused by cusp prolapse or a bicuspid aortic valve. The ventricular septal defect is either doubly committed sub-arterial or perimembranous with outlet extension. At the time of repair, the aortic regurgitation is mild to moderate in about half of patients and severe is about half.¹⁻⁵

In patients in whom aortic regurgitation is trivial or absent, only the ventricular septal defect is repaired. When the aortic regurgitation is mild or moderate, the aortic valve is reconstructed. The aortic valve is usually replaced in adults with moderate or severe aortic regurgitation.²⁻⁵

We present here-in a 22-year-old male patient with perimembranous outlet ventricular septal defect and severe aortic regurgitation undergoing Dacron patch closure of ventricular septal defect and aortic valve replacement using a 21 mm St. Jude mechanical prosthesis (SJM™ Master Series, St. Jude Medical, St. Paul MN, USA). The aortic valve was severely deformed and deemed irreparable. Postoperative recovery was uneventful.

Surgical Technique

1. Following median sternotomy, the thymus is subtotally excised, taking care not to expose the brachiocephalic vein.
2. The pericardium is incised in the midline in between stay sutures.



3. After aortobicaval cannulation, the fat pad between the aorta and pulmonary artery is incised for later selective aortic cross clamping.
4. The left pleural cavity is opened electively to dislocate the enlarged ventricle in order to facilitate exposure of the ventricular septal defect.
5. The left ventricle is vented through the right superior pulmonary vein prior to aortic cross-clamp on a partially filled heart, stopping ventilation to prevent inadvertent air suction.
6. The aorta is cross-clamped using an atraumatic aortic vascular clamp and a transverse aortotomy is carried out in between stay sutures.
7. Myocardial protection is achieved by intermittent, selective ostial cardioplegia, and topical cardiac cooling using iced saline every 30 minutes.
8. The ventricular septal defect is closed using an appropriately sized Dacron polyester patch (Bard Savage filamentous knitted polyester fabric, Bard Peripheral Vascular Inc., Tempe, AZ, USA) and pledgeted 5–0 polypropylene sutures (Johnson and Johnson Ltd., Ethicon, LLC, San Lorenzo, USA).
9. The tricuspid valve is checked for competence by injecting cold saline through the tricuspid valve into the right ventricle.
10. The aortic valve exposure is facilitated by three commissural stay sutures. One 6–0 polypropylene stay suture is passed across the tubercle of Arantius on all the three aortic cusps, and the aortic valve is checked for feasibility of aortic valve repair. The valve was deemed irreparable. The aortic valve is excised and sized using an aortic valve sizer.
11. The aortic valve is replaced using a 21 mm St. Jude mechanical aortic prosthesis and simple, interrupted, non-pledgeted 2–0 Ticron-coated braided polyester sutures (M/s Covidien, Santo Domingo, Dominican Republic, United States).
12. The aortotomy is closed in two layers: horizontal mattress and over using 4–0 polypropylene suture.
13. The right atrium is closed in two layers: horizontal mattress and over suture using 5–0 polypropylene.
14. The chest is closed in layers. Postoperatively, patient had stable hemodynamics. Intraoperatively, transesophageal echocardiography revealed good biventricular function, with no residual ventricular septal defect and paravalvular leak (►Video. 1).

Video 1

Dacron patch closure of ventricular septal defect with concomitant aortic valve replacement using a mechanical prosthesis. Online content including video sequences available at: <https://www.thieme-connect.com/products/ejournals/html/10.1055/s-0040-1709271>.

References

- 1 Nadas AS, Thilenius OG, Lafarge CG, Hauck AJ. Ventricular septal defect with aortic regurgitation: medical and pathologic aspects. *Circulation* 1964;29:862–873
- 2 Trusler GA, Williams WG, Smallhorn JF, Freedom RM. Late results after repair of aortic insufficiency associated with ventricular septal defect. *J Thorac Cardiovasc Surg* 1992; 103(2):276–281
- 3 Carpentier A. Cardiac valve surgery—the “French correction” *J Thorac Cardiovasc Surg* 1983;86(3):323–337
- 4 Chauvaud S, Serraf A, Mihaileanu S, et al. Ventricular septal defect associated with aortic valve incompetence: results of two surgical managements. *Ann Thorac Surg* 1990;49(6):875–880
- 5 Yacoub MH, Radley-Smith R, De Gasperi C. [Primary repair of large ventricular septal defects in the first year of life (author’s transl)]. *G Ital Cardiol* 1978;8(8):827–831