

Closed Mitral Commissurotomy Following Pericardial Strip Posterior Mitral Annuloplasty

Anto Sahayaraj Ramayyan, MS, Krishnan, MCh, Vasundaran Srinivasagam, MCh, and Rajaguru Thangaiah, MCh

We report a case of rheumatic multivalvular heart disease for whom closed mitral commissurotomy (CMC) was done four years after pericardial strip posterior mitral annuloplasty and aortic valve replacement (AVR). An 18-year-old male who presented initially with rheumatic mitral regurgitation and aortic regurgitation was treated with AVR and pericardial strip posterior mitral annuloplasty in 1997. One year postoperatively he presented with moderate to severe mitral regurgitation. On further follow-up, the patient developed mitral stenosis and as a redo procedure, CMC has been successfully done for the same. (Ann Thorac Cardiovasc Surg 2003; 9: 406–8)

Key words: closed mitral commissurotomy (CMC), redo, pericardial strip mitral annuloplasty

Introduction

For rheumatic valvular disease, surgery being palliative, preference has always been on conservation of the native valvular apparatus as far as technically feasible by appropriate repair procedures. Though significant advances have occurred in the design and biocompatibility of artificial valves, native valve preservation is emphasized because of the inherent disadvantages of artificial valves like thromboembolic complications, structural failure, prosthetic endocarditis, life-long anticoagulation therapy, and so on. Pericardial strip posterior mitral annuloplasty is a technically sound, easily reproducible, low cost and anticoagulant sparing mitral valve repair procedure with better results, which avoids the replacement of the mitral valve with a prosthetic one.

Case Report

An 18-year-old male was referred to our institution for complaints of breathlessness (class III) and chest pain in January 1997. The patient had a history of rheumatic fever

From Department of Cardiothoracic Surgery, Government Stanley Medical College Hospital, Chennai, India

Received November 1, 2002; accepted for publication March 9, 2003.

Address reprint requests to Thangaiah Rajaguru, MCh: Shanti Apartments, 25, Vyasara Street, T. Nagar, Chennai 600017, India.

at the age of 15. He had been on penicillin prophylaxis. Physical examination of the patient revealed a regular pulse of 130/min and a blood pressure of 140/20 mmHg. The first heart sound was loud with a holosystolic murmur (grade IV) in the mitral area and an early diastolic murmur (grade III) was present in the second aortic area. Chest X-ray showed cardiomegaly (cardio-thoracic ratio, 0.72) with increased bronchovascular markings and no pleural effusion. Echocardiographic evaluation showed mitral regurgitation (MR) (severe), aortic regurgitation (AR) (severe), pulmonary hypertension (moderate), aortic annulus, 22 mm; mitral annulus, 32 mm; left ventricular end diastolic dimension, 64 mm; left ventricular end systolic dimension, 40 mm; and ejection fraction (EF), 75%. The patient was adequately medically managed with a plan for aortic valve replacement (AVR)/mitral valve repair or replacement (MVR). Intraoperatively the patient was found to have a dilated aorta/dilated left atrium/dilated right ventricle/pulmonary arterial pressure of about 60 mmHg. The aortic valvular cusps were found thickened, shortened and deficient. The mitral valve was regurgitant with annular dilatation, no calcification, no commissural fusion and no subvalvular pathology. The mitral valvular apparatus was repaired by pericardial strip posterior annuloplasty using 2-0 prolene-interrupted sutures. The aortic valve was replaced with a 21-size Sorin tilting disc valve. Postoperative echocardiography showed MR (trivial)/no mitral stenosis (MS)/prosthetic aortic valve

in position with a gradient of 15 mmHg. The patient was put on oral anticoagulation adjusted according to international normalized ratio and on penicillin prophylaxis for rheumatic fever.

The patient was followed up regularly and one year later he developed breathlessness (class II). On evaluation he was found to have MR (moderate) due to subvalvular fusion, thickened cusps and no annular dilatation and no AR. Reoperation (MVR) was contemplated. Meanwhile, the patient developed upper gastrointestinal bleeding and the dosage of anticoagulant was reduced and finally stopped in May 1998. The penicillin prophylaxis was continued and the patient was closely followed up for thromboembolic complications. MVR was deferred, as the patient was hesitant for a second operation.

In February 2001, on echocardiographic evaluation, the patient was found to have developed severe MS due to commissural fusion and no MR with severe pulmonary arterial hypertension. The mitral valvular leaflets were found to be thickened without calcification. The patient was prepared for closed mitral commissurotomy (CMC) with a pump on stand-by with a plan to switch-over to an open heart procedure if need be. The heart was approached through a left anterolateral thoracotomy in the 5th intercostal space. The mitral valve, on digital assessment, was found to be tightly stenosed with thickened cusps and commissural fusion and without calcification. The prolene suture stumps of the posterior annuloplasty were felt in situ with no disruption of the annuloplasty. Transventricular CMC was done using Tubbs' dilator. After the split, there was no MR and the annuloplasty was intact. The postoperative period was uneventful. Echo evaluation revealed a mitral valvular area of 3 cm² with no MR and a normally functioning prosthetic aortic valve. The patient was discharged in good condition.

Discussion

Closed mitral commissurotomy (CMC) is a routinely performed surgery in our institution, for all age groups. If properly done, it is as good as open mitral commissurotomy (OMV). Sometimes the results are even better, since we assess the incompetence of the valve digitally, on a beating heart. This way, we are able to pick up even trivial regurgitation. It is very cost-effective and the postoperative hospital stay is relatively shorter.

The main indication for CMC in our center is pure MS

without any regurgitation (with or without pliable cusps). Relative indication for CMC is MS with mild to moderate calcification over cusps, but not involving the commissures. We have not encountered embolization of fragments of calcium, following split of a calcified valve in our center, so far.

Absolute contraindications for CMC are 1) MS with regurgitation, 2) MS with LA thrombus, 3) MS with calcification involving the commissures.

Now, the sequence of events in this patient, originally MR due to annular dilatation followed by MS due to interchordal and commissural fusion is clear evidence of the progression of rheumatic heart disease despite the penicillin prophylaxis the patient was under. This is in accordance with various studies that have cast doubts over the efficacy of penicillin prophylaxis in arresting the progression of rheumatic activity.

Pericardial strip posterior mitral annuloplasty has not been preferred in many centers because of reports that as fibrosis sets in the pericardial strip used, it becomes weaker. However, in this case even after four years the pericardial annuloplasty was found intact.

In this patient though OMV/MVR would seem the logical and preferred procedure in the setting of MS following mitral annuloplasty, CMC was the procedure of choice because of the known advantages of CMC such as being more economical, less traumatizing, less morbid¹⁾ and so on, and the disadvantages of open heart procedures such as cardiac ischemia, reactions to and complications of cardiopulmonary bypass²⁾ and the higher incidence of reaction to protamine administration³⁾ seen in patients with pulmonary arterial hypertension. CMC was preferred to percutaneous balloon mitral valvuloplasty (PBMV), as many studies have shown that CMC was more efficient at producing better short-term and long-term results.^{4,5)} Furthermore, in this case, CMC being a 'less blind' procedure has allowed the digital assessment of the annuloplasty before and after commissurotomy. It is also possible for the balloon to get damaged by the non-absorbable suture stumps popping out at the annuloplasty site. The balloon being compressible and lacking the rigidity of the metallic Tubbs' dilator would not have produced an adequate split.⁶⁾ The interatrial shunt caused by ante grade PBMV is also avoided.^{7,8)}

In conclusion, CMC though an age-old procedure, is still not outdated⁹⁾ and has a definite role in the management of MS, as testified by this case in whom CMC has given good results even in a post-annuloplasty setting.

Acknowledgments

The authors thank the cardiologists of Government Stanley Medical College Hospital for their cooperation and help rendered.

References

1. John S, Bashi VV, Jairaj PS, et al. Closed mitral valvulotomy: early results and long-term follow-up of 3,723 consecutive patients. *Circulation* 1983; **68**: 891–6.
2. Taylor KM. Brain damage during cardiopulmonary bypass. *Ann Thorac Surg* 1998; **65**: 520–6.
3. Engelman DT, Adams DH, Byrne JG, et al. Impact of body mass or morbidity and mortality after cardiac surgery. *J Thorac Cardiovasc Surg* 1999; **118**: 866–73.
4. Turi ZG, Reyes VP, Raju BS, et al. Percutaneous balloon versus surgical closed commissurotomy for mitral stenosis: a prospective randomized trial. *Circulation* 1991; **83**: 1179–85.
5. Tokmakoglu H, Vural KM, Ozatik MA, Cehreli S, Sener E, Tasdemir O. Closed mitral commissurotomy versus balloon valvuloplasty for rheumatic mitral stenosis. *J Heart Valve Dis* 2001; **10**: 281–7.
6. Arora R, Kalra GS, Singh S, et al. Non-surgical mitral commissurotomy using metallic commissurotomy. *Indian Heart J* 1998; **50**: 91–5.
7. National Heart, Lung and Blood Institute Balloon Valvuloplasty Registry Participants. Complications and mortality of percutaneous balloon mitral commissurotomy. A report. *Circulation* 1992; **85**: 2014–24.
8. Bahl VK, Chandra S, Jhamb DK, et al. Balloon mitral valvotomy: comparison between antegrade Inoue and retrograde non-transeptal techniques. *Eur Heart J* 1997; **18**: 1765–70.
9. Detter C, Fischlein T, Fildmeier, Nollert G, Reichenspürhen H, Reichart B. Mitral commissurotomy, a technique outdated? Long-term follow-up over a period of 35 years. *Ann Thorac Surg* 1999; **68**: 2112–9.