Case Report

Successful Surgical Repair of Mitral Valve Prolapse Endocarditis: A Case Report and Review of the Current Literature

Pavlos N. Stougiannos[1], Dimitrios Z. Mytas[1], Lamprini K. Kosma[2], Loukas K. Pappas[1], Vlassios N. Pyrgakis[1], Fotios A. Mitropoulos[3]

[1]Department of Cardiology, Korinthos General Hospital, Korinthos, [2]Radiology Department, A. Fleming General Hospital, [3]Athens Medical Centre, Athens, Greece

Key words: **Mitral valve prolapse, endocarditis, surgical repair.**

We present the case of a 42-year-old man with mitral valve prolapse (MVP) and infective endocarditis. He was referred to our hospital by his family physician for the evaluation of a cardiac murmur. A detailed medical history revealed that he had been feeling fatigue with occasional episodes of slight fever during the last two months. Echocardiography revealed MVP with a sizeable vegetation and severe mitral insufficiency. Serial blood cultures were positive for *Streptococcus viridans*, highly penicillin susceptible. He was put on appropriate antimicrobial therapy, but both the vegetation and the concomitant mitral insufficiency persisted after otherwise successful medical therapy. Thus, the patient underwent surgical vegetectomy with mitral valve repair. He had an uneventful postoperative course and remains free of disease at the 12-month follow up. Our case report reinforces the value of early diagnosis in the presence of a high clinical suspicion of MVP endocarditis. An extended clinical workup, including serial detailed echocardiography studies, is mandatory in such a patient. Medical treatment of infective endocarditis in the setting of MVP is often successful. However, cardiac surgical intervention plays an important role in the treatment of intracardiac complications. Mitral valve repair in the context of a healed and stable infective endocarditis is the treatment of choice.

Manuscript received:
September 12, 2009;
Accepted:
February 9, 2010.

Address:
Dimitrios Z. Mytas

105 Marathonodromon St.
151 25 Marousi, Athens, Greece
e-mail:
dimitris_mytas@hotmail.com, dmytas@yahoo.gr

Mitral valve prolapse (MVP) is one of the most prevalent cardiac valvular abnormalities, occurring in almost 2.4 percent of the population.[1] Although the incidence of infective endocarditis in persons with known MVP is quite rare, MVP is the most common cardiac condition predisposing to infective endocarditis.[2,3] This is probably due to the high frequency of this lesion in the general population.

Medical treatment of infective endocarditis in the setting of MVP is often successful. However, there are cases where surgical intervention is mandatory and, when feasible, mitral valve repair is preferable.

We present the case of a 42-year-old man with MVP and infective endocarditis accompanied by a sizeable vegetation and severe mitral insufficiency, which persisted after otherwise successful medical therapy. The patient underwent surgical vegetectomy with mitral valve repair. He had an uneventful postoperative course and remains free of disease at 12-month follow up.

Case presentation

A 42-year-old man was referred to our outpatient clinic by his family physician for the evaluation of a cardiac murmur. On clinical examination, he was afebrile, his blood pressure was 120/80 mmHg and his pulse was 90 beats/min and regular.

Auscultation revealed a harsh 3/6 holosystolic murmur, best heard at the cardiac apex, radiating to the sternum. He had no other remarkable physical findings except for a noticeable clubbing of his fingers.

The patient recalled that from his early adolescence a mild cardiac murmur had been diagnosed, which was attributed to a mild valvular insufficiency. He had been asymptomatic in his daily life, with excellent functional capacity until recently. However, during the past two months he had begun to feel considerable fatigue, with occasional episodes of slight fever and sweating, while he noticed a gradual swelling of his digits.

The electrocardiogram was unremarkable. Echocardiography showed mild dilatation of the left ventricle (end-diastolic diameter 60 mm, end-systolic diameter 40 mm) with marginally normal systolic function (ejection fraction 60%) and an enlarged left atrium (48 mm). The mitral valve leaflets were remarkably redundant, while a sizeable echogenic mass (10 × 11 mm) seemed to be attached to the posterior leaflet, prolapsing to the left atrium during systole (Figure 1). Colour Doppler revealed a large eccentric mitral regurgitant jet radiating to the posterior aortic wall (Figure 2). Quantitative Doppler parameters were consistent with severe mitral regurgitation: *vena contracta* 0.84 cm, regurgitant volume 72 ml, regurgitant fraction 58%, and effective regurgitant orifice area 0.45 cm^2.

Considering the clinical presentation in association with the echocardiographic findings, the diagnosis of infective endocarditis superimposed on a redundant proptotic mitral valve seemed very likely. Multiple blood cultures were positive for *Streptococcus viridans*, highly penicillin susceptible, which made the diagnosis definite. Regarding the other blood tests, there was mild anaemia, increased erythrocyte sedimentation rate (90 mm) and C-reactive protein (71

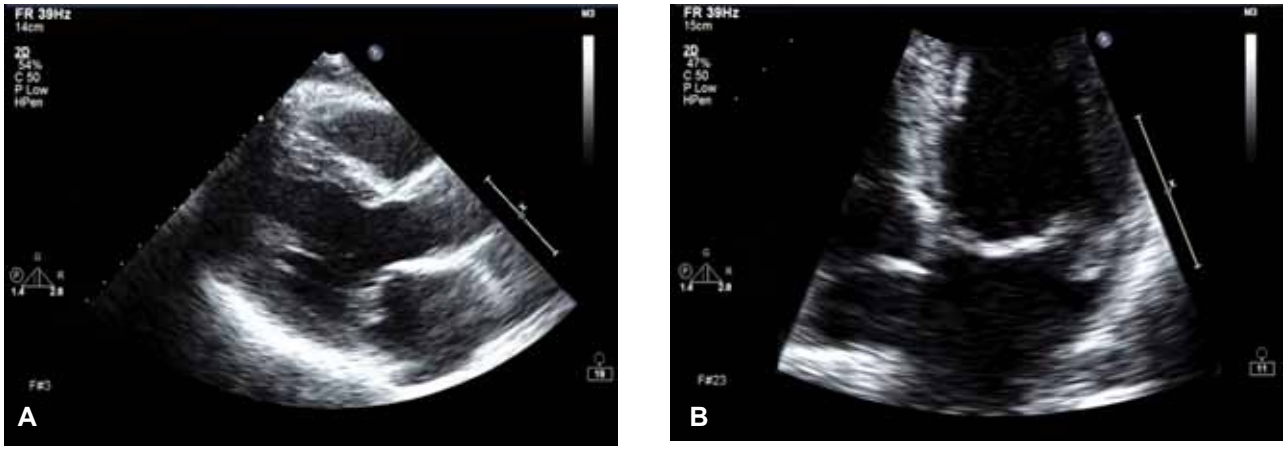

Figure 1. Parasternal long axis (A) and four-chamber (B) views depict the thickened and redundant mitral valve leaflets as well as a mass attached to the posterior leaflet, prolapsing to the left atrium during systole.

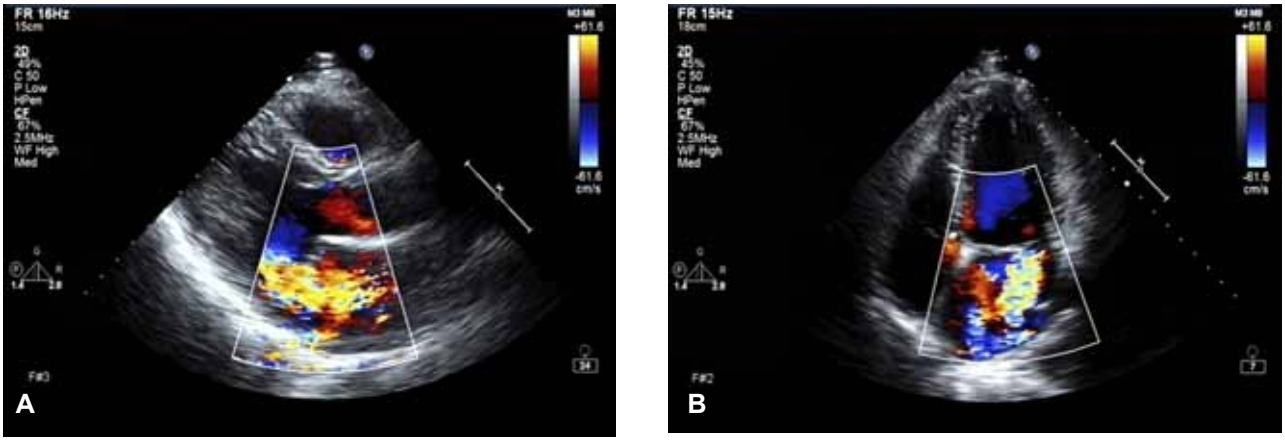

Figure 2. Parasternal long-axis (A) and four-chamber (B) views demonstrate the regurgitant jet of severe mitral insufficiency.

mg/dl), normal renal function and mildly impaired liver biochemistry. The patient was put on appropriate anti-microbial treatment with ceftriaxone iv for 4 weeks. He remained hospitalised for two weeks, while he continued his treatment on an outpatient basis for the remaining time interval. He had an uncomplicated course. However, there was great concern about the fact that the mass attached to the posterior mitral leaflet (possibly a vegetation), as well as the degree of mitral valve regurgitation, had remained unchanged. Considering both the size of the vegetation, its hypermobility and the associated systemic embolic risk, as well as the significance of the valve insufficiency, further surgical intervention was judged mandatory. Preoperative cardiac catheterisation revealed normal coronary arteries and moderate to severe mitral regurgitation ($3\text{-}4^{+}/4^{+}$) with marginal left ventricular systolic function.

The operating procedure comprised the trapezoid resection of the P2 scallop of the posterior mitral valve leaflet with the attached vegetation, sharing superficial resection of the vegetation from the A2 of the anterior leaflet, and mitral annuloplasty with insertion of a Medtronic C-G No 32 ring. The perioperative and recovery period were uneventful. The patient was discharged on the 7th postoperative day in a stable, satisfactory clinical condition. The culture of the vegetation was negative.

At 12-month follow up the patient remains in good clinical condition, afebrile, totally asymptomatic, with excellent functional capacity. Moreover, finger clubbing has been almost entirely resolved. Repetitive blood cultures during this period have been negative, while blood examinations and markers of inflammation are normal. On echocardiography, left ventricular dimensions are within normal range, the left atrium is still enlarged but somewhat smaller than in the baseline study (45 mm). The mitral valve apparatus is well repaired and there are no signs of mitral regurgitation (Figure 3).

Discussion

MVP is one of the most prevalent cardiac valvular abnormalities. Using rigorous echocardiographic criteria, a community-based recent study showed that MVP syndrome occurs in 2.4 percent of the population.[1] The syndrome is twice as common in women as in men. However, serious mitral regurgitation occurs more frequently in older men (>50 years) with MVP than in young women with this disorder.

MVP is the most common cause of isolated mitral regurgitation requiring surgical treatment in the United States and the most common cardiac condition predisposing patients to infective endocarditis.[2] Risk factors for infective endocarditis in patients with MVP include the presence of mitral regurgitation or thickened mitral leaflets.

The microbiology of infective endocarditis engrafted on MVP is similar to native valve endocarditis that is not associated with drug abuse. Nowadays, *Staphylococcus aureus* has surpassed *viridans* group streptococci as the leading cause of infective endocarditis.[4]

Antimicrobial therapy in endocarditis is guided by identification of the causative organism and its susceptibility to various antimicrobial agents. Prolonged parenteral administration of a bactericidal antimicro-

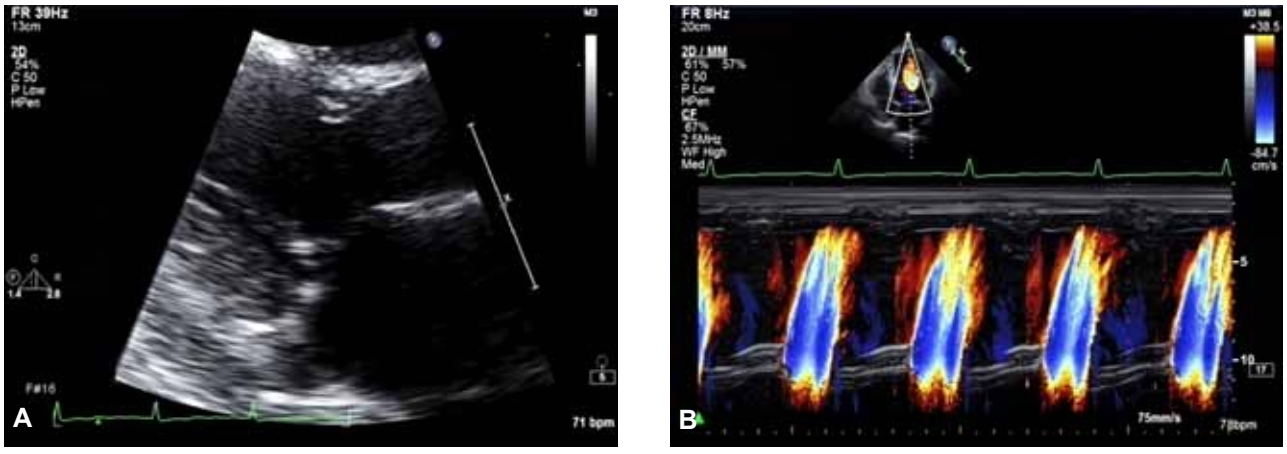

Figure 3. Echo examination at 6-month follow up. Long-axis view (A) reveals a well repaired mitral valve and transmitral flow (B) shows no sign of mitral regurgitation during systole.

bial agent or combination of agents is currently recommended. Patients with penicillin-susceptible *S. viridans* endocarditis who are haemodynamically stable, compliant, and capable of managing the technical aspects of outpatient therapy may be candidates for a single daily-dose regimen of ceftriaxone.[4]

Cardiac surgical intervention has an increasingly important role in the treatment of intracardiac complications of endocarditis. Severe mitral valve insufficiency often results in inexorable heart failure and ultimately requires surgical intervention. Doppler echocardiography and colour flow mapping indicating significant valvular regurgitation during the initial week of endocarditis treatment do not reliably predict the patients who require valve replacement during active endocarditis. Alternatively, despite the absence of significant valvular regurgitation on early echocardiography, marked congestive heart failure may still develop. Thus, decisions about surgical intervention should be made by integrating clinical data and echocardiographic findings obtained during careful serial monitoring. On occasion, very large vegetations on the mitral valve result in significant valve dysfunction and require surgery.

Moreover, large vegetations on the mitral valve, especially on the anterior leaflet, are associated with a higher risk of embolism than vegetations of similar size elsewhere.[5,6] Although it was not demonstrated in all studies, in pooled data and meta-analysis systemic embolisation was increased in patients with vegetations greater than 10 mm versus those with smaller or no detectable vegetations (33-37 percent versus 19 percent).[7] An increase in the size of vegetations that is detected by echocardiography during the course of therapy may identify a subgroup of patients with a higher rate of complications. However, there is no size or location threshold that suitably predicts increased mortality associated with embolisation in such a way that the risk-to-benefit ratio of surgery for the prevention of embolisation can be calculated. Also, the persistence of vegetations, as determined by echocardiography, is common after successful medical treatment of infective endocarditis and is not necessarily associated with late complications.[7] The characteristics of the vegetations alone rarely justify surgical intervention; rather, data on vegetations should be weighed in the context of the overall clinical picture to assess the benefits of surgery. Because the frequency of embolisation decreases rapidly with effective antimicrobial therapy, the benefit of surgery in preventing further emboli is greatest if it is performed early in the course of infective endocarditis.

According to recent data, mitral valve repair offers excellent early and late results and is the preferable treatment option in the surgical therapy of native infective endocarditis.[8] Considering surgical techniques, in the context of healed infective endocarditis mitral regurgitation is treated with mitral valve repair, which produces long-term results similar to those seen for treatment of degenerative mitral regurgitation.[9] Mitral valve repair should also be considered for patients with mitral regurgitation due to active infective endocarditis. Superficial infection without valve destruction is the best candidate for valve repair. Discrete vegetations on the valve leaflets are excised along with underlying leaflet tissue (vegetectomy). Although valve lesions can be repaired by standard techniques, particular care (e.g. reinforcement with a pericardial patch) should be taken to avoid excess tension on the suture line. The feasibility of valve repair depends on the extent of tissue destruction. Large defects of the anterior leaflet, due to transmural infection or lesions that encompass more than one third of the entire posterior leaflet with annular abscess, are not amenable to repair. Also, the involvement of the aortic valve frequently necessitates valve replacement. Furthermore, unstable preoperative haemodynamics lead to the decision to perform valve replacement rather than valve repair in an attempt to avoid a prolonged operation time. In the context of the feasibility of valve repair, timely surgical intervention and precise repair technique are essential. In conclusion, mitral valve repair in the context of healed and stable infective endocarditis is the treatment of choice.

References

1. Freed LA, Benjamin EJ, Levy D, et al. Mitral valve prolapse in the general population: the benign nature of echocardiographic features in the Framingham Heart Study. J Am Coll Cardiol. 2002; 40: 1298-1304.
2. Mylonakis E, Calderwood SB. Infective endocarditis in adults. N Engl J Med. 2001; 345: 1318-1330.
3. Nishimura RA, McGoon MD. Perspectives on mitral-valve prolapse. N Engl J Med. 1999; 341: 48-50.
4. Habib G, Hoen B, Tornos P, et al. Guidelines on the prevention, diagnosis, and treatment of infective endocarditis (new version 2009): The Task Force on the Prevention, Diagnosis, and Treatment of Infective Endocarditis of the European Society of Cardiology (ESC). Eur Heart J. 2009; 30: 2369-2413. Available from: http://www.escardio.org/guidelines-surveys/esc-guidelines/ GuidelinesDocuments/guidelines-IE-FT.pdf.
5. Steckelberg JM, Murphy JG, Ballard D, et al. Emboli in infective endocarditis: the prognostic value of echocardiography. Ann Intern Med. 1991; 114: 635-640.

6. Durante Mangoni E, Adinolfi LE, Tripodi M-F, et al. Risk factors for "major" embolic events in hospitalized patients with infective endocarditis. Am Heart J. 2003; 146: 311-316.
7. Tischler MD, Vaitkus PT. The ability of vegetation size on echocardiography to predict clinical complications: a meta-analysis. J Am Soc Echocardiogr. 1997; 10: 562-568.
8. Ruttmann E, Legit C, Poelzl G, et al. Mitral valve repair provides improved outcome over replacement in active infective endocarditis. J Thorac Cardiovasc Surg. 2005; 130: 765-771.
9. Yamaguchi H, Eishi K. Surgical treatment of active infective mitral valve endocarditis. Ann Thorac Cardiovasc Surg. 2007; 13: 150-155.