

Infective endocarditis complicated with left atrioventricular fistula in a 20-year-old patient. A case study

Andrzej Banyś¹, Witold Pawłowski², Sławomir Jander², Karol Bartczak², Marek Maciejewski³, Ryszard Jaszewski²

¹Department of Anaesthesiology and Intensive Cardiologic Care, 1st Chair of Cardiology and Cardiac Surgery, Medical University of Lodz, Poland

²Department of Cardiac Surgery, 1st Chair of Cardiology and Cardiac Surgery, Medical University of Lodz, Poland

³Department of Cardiology, 1st Chair of Cardiology and Cardiac Surgery, Medical University of Lodz, Poland

Submitted: 31 August 2010

Accepted: 31 October 2010

Arch Med Sci 2011; 7, 6: 1078-1081

DOI: 10.5114/AOMS.2011.26623

Copyright © 2011 Termedia & Banach

Corresponding author:

Andrzej Banyś MD, PhD
Department
of Anaesthesiology
and Intensive
Cardiologic Care
1st Chair of Cardiology
and Cardiac Surgery
Medical University of Lodz
1/3 Sterling
91-428 Lodz, Poland
E-mail:
andrzej.banys@umed.lodz.pl

Abstract

Intracardiac fistulas are rare complications of infective endocarditis. We report an unusual case of successful surgical repair of intracardiac fistula between the left ventricle and the left atrium in the course of infective endocarditis in a 20-year-old patient. According to this we conclude that timely diagnosis, proper antibiotic treatment, and early surgical intervention should improve the outcomes of infective endocarditis complications.

Key words: infective endocarditis, left ventriculo-atrial fistula, cardiac surgery.

Introduction

Prevalence of intracardiac fistulas in the course of infective endocarditis (IE) is unknown and it is estimated at 1-9% [1]. It appears in 6-9% of cases of IE on the aortic valve as a consequence of perivalvular abscess [2, 3]. Secondary involvement of the anterior leaflet of the mitral valve, with or without its perforation, may be a result of direct spreading of aortic valve infection. This process may lead to the formation of spurious aneurysm, mitral valve abscess, perforation of leaflet and creation of a connection between the left atrium and left ventricle [4].

The present report seems to be the first one to describe a case of surgical closure of a fistula between the left atrium and left ventricle localized next to the anterior mitral commissure, which developed as a result of IE but at the moment of operation was free from any features of active process.

Case report

A 20-year-old patient was admitted to the Department of Cardiac Surgery with a diagnosis of IE. He had a week long history of high fever, chest pain, fatigue and significantly impaired effort tolerance. The diagnosis was based on physical examination, additional tests and echocardiography.

Transoesophageal echocardiography (TEE) revealed presence of an emptied abscess with formation of a fistula connecting the left atrium and left

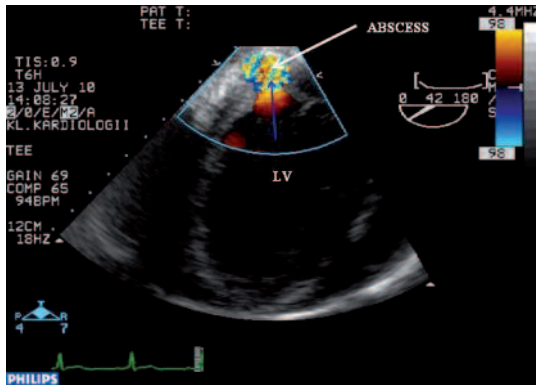


Figure 1. TEE revealed presence of an emptied abscess with foramen of fistula communicating with left atrium and left ventricle

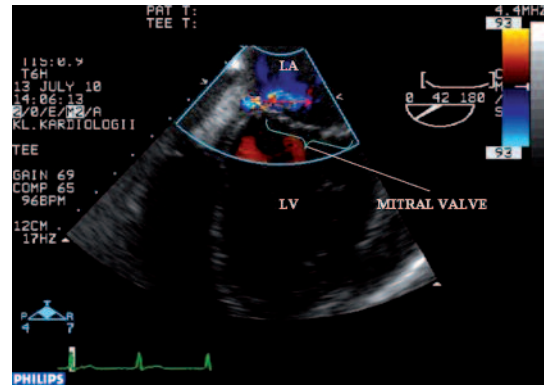


Figure 2. Fistula between left atrium and left ventricle

ventricle (Figures 1, 2), hydropericardium and bilateral pleural effusion rich in fibrin deposits. Tuberculosis and neoplasm were excluded. Blood cultures allowed meticillin-sensitive *Staphylococcus aureus* to be identified as the responsible pathogen.

The patient was treated with intravenous vancomycin (30 days), gentamicin (21 days), penicillin (18 days) and fluconazole (30 days) and gradual improvement of his clinical state and normalization of inflammation marker levels were observed.

The control echocardiography showed good systolic function of the left and right ventricle, aortic and mitral valves free from any features of active process, gradually enlarging spurious aneurysm (33 mm × 15 mm × 16 mm) localized just behind mitral and tricuspid annuli, and the fistula between the left atrium and left ventricle.

Additionally, gradual regress of inflammatory infiltration of perivalvular tissue and reduction of pericardial and pleural effusion were observed. The patient was qualified for cardiac surgery.

Course of surgical anesthesia and procedure (06.08.2010)

The course of anaesthesia was without any complications, with a well-accepted mid-operational circulatory system before and during the cardiopulmonary bypass (CPB) as well as post-surgery. The operation was performed on CPB in normothermia. No pathology was found in the aortic valve including features of infective endocarditis. A fistula between the left ventricle and the left atrium was located next to the anterior commissure of the mitral valve. The foramen was about 1 cm in diameter and was partially obturated by the posterior leaflet of the mitral valve (Figure 3). Its edges were fibrous and firm and there were no vegetations.

The fistula was closed using four interrupted prolene 4-0 sutures reinforced with velour pledgets (Figure 4). The needle was directed from behind the posterior mitral leaflet towards the left atrium involving the mitral annulus. The closure's tightness was checked with a probe. The aorta was closed

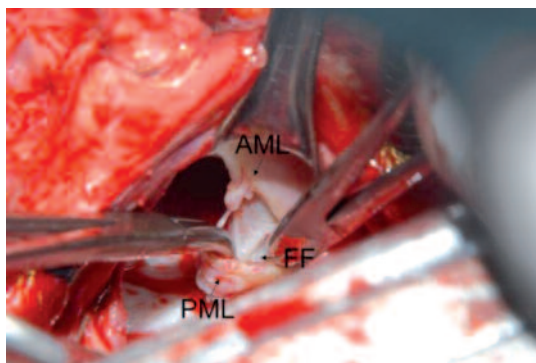


Figure 3. Fistula between left atrium and left ventricle: arterial mitral leaflet (AML), fistula foramen (FF), posterior mitral leaflet (PML). The FF was about 1 cm in diameter and was partially obturated by the PML

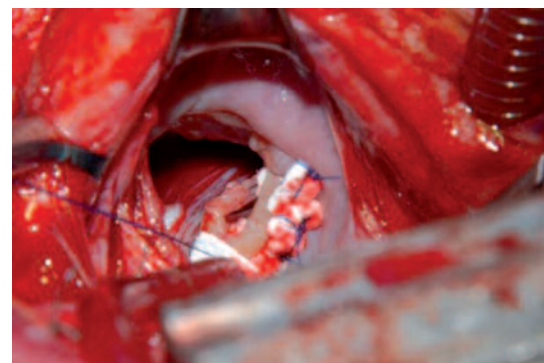


Figure 4. The fistula was closed using four interrupted prolene 4.0 sutures reinforced with velour pledgets

with double-layer continuous suture prolene 4-0 (mattress and over-and-over). The left atrium was closed with continuous over-and-over suture prolene 4-0. The heart was carefully de-aired through the left atriotomy and aortotomy, then the aortic clamp was removed. Sinus rhythm was restored by electric defibrillation. After 10 min of reperfusion the patient was safely weaned from CPB and the cannulas were removed. Protamine sulfate was given to reverse the action of heparin and restore proper coagulation.

The early post-operative period at the Intensive Therapy Unit (ITU) of the Anaesthesiology Clinic and Intensive Cardiologic Care was not complicated.

The patient was extubated in the 7th h after the surgery, respiratory competent, circulatory stable, without a temperature. No episodes of consciousness disorders were observed, no cardiac arrhythmia or circulatory insufficiency, either. On 08.08.2010 – in the second 24-h post-operation period – the patient was discharged from the ITU.

Discussion

Intracardiac fistulas between the left ventricle and the left atrium in the course of IE are rare [1, 5-7]. Baumgartner *et al.* [5] reported two cases of acute staphylococcal posterior mitral annular abscesses, resulting in transannular left ventriculoatrial fistulation. In both cases, repair of the mitral annulus, obliteration of the fistula, and preservation of the native valve were successful.

Gasparovic *et al.* [6] reported a case of successful surgical management of communication between the left ventricle and the left atrium via a paravalvular abscess in a 60-year-old man with a vegetation on the posterior mitral leaflet coupled with significant mitral insufficiency, caused by *Staphylococcus aureus*. The operative strategy of Gasparovic *et al.* entailed reconstruction of the mitral annulus, repair of the intracardiac fistula using a piece of bovine pericardium on both the LV and LA surfaces, and finally mitral mechanical valve replacement.

Kitamura *et al.* reported a case of surgical repair of a left ventriculo-atrial fistula in a 64-year-old patient with end-stage renal disease on haemodialysis, with IE of the mitral valve and coronary artery disease (CAD) [7]. Kitamura's patient developed a left ventricle to left atrium shunt via a mitral paravalvular abscess, during a course of antibiotic treatment. The patient underwent debridement of the abscess followed by reconstruction of the mitral annulus with a pericardial patch, mitral valve replacement using a mechanical prosthesis and left internal mammary artery graft to the left anterior descending artery.

Infective endocarditis in patients, when complicated by paravalvular abscess, intracardiac fistu-

las, cardiac pacemaker infection, and other comorbidities including coronary artery disease, and haemodialysis patients (HD), is still associated with very high mortality [7-9].

Age > 60 years, NYHA stage III/IV, pre-operative shock, prosthetic aortic valve endocarditis, paravalvular abscess, cerebral and pulmonary embolism, left ventricular ejection fraction (EF) less than 40%, recurrent endocarditis, *S. aureus* and enterococcal endocarditis, were independent predictors of operative mortality; there were 12-35.8% [2, 8-11].

Surgery is indicated in 25-30% of cases with native acute IE [9]. Opinions on the efficacy of surgical treatment in patients with perivalvular pathologies including intracardiac fistulas in the course of IE have been evolving [9]. Although early surgical intervention protects from development of heart failure and improves the prognosis in this subset of patients, the optimal timing for the operation has not been established. The mortality rate in patients operated urgently is much higher than in those who are operated electively [12].

Significant haemodynamic deterioration caused by IE has to be treated surgically and an effort must be made to perform surgery in a better condition [7], after proper antibiotic treatment [8]. Appropriate antibiotic therapy is the most important component in the treatment of patients with IE [13].

In conclusion, timely diagnosis, proper antibiotic treatment, and early surgical intervention should improve the outcome, as was demonstrated by our case. According to our knowledge, this is the first report which describes a case of surgical closure of a fistula between the left atrium and left ventricle localized next to the anterior mitral commissure, which developed as a result of IE but at the moment of operation was free from any features of active process on the aortic and mitral valve.

Acknowledgments

The authors declare that they have no competing interests. The authors would like to thank Mr Henryk Michalak for his help with intraoperative photography.

References

1. Anguera I, Quaglio G, Miro JM, et al. Aortocardiac fistulas complicating infective endocarditis. *Am J Cardiol* 2001; 87: 652-4.
2. Choussat R, Thomas D, Isnard R, et al. Perivalvular abscesses associated with endocarditis; clinical features and prognostic factors of overall survival in a series of 233 cases. *Perivalvular Abscesses French Multicentre Study. Eur Heart J* 1999; 20: 232-41.
3. San Roman JA, Vilacosta I, Sarria C, et al. Clinical course, microbiologic profile, and diagnosis of periannual complications in prosthetic valve endocarditis. *Am J Cardiol* 1999; 83: 1075-9.

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 Prevention, Diagnosis, and Treatment of Infective Endocarditis of the European Society of Cardiology (ESC). *Eur Heart J* 2009; 30: 2369-413.
5. Baumgartner F, Omari B, Milliken J. Repair of left ventriculo-atrial fistulas due to posterior mitral annular abscesses. *J Heart Valve Dis* 1997; 6: 550-2.
6. Gasparovic H, Smalcelj A, Brida M. Left ventricle to left atrium shunt via a paravalvular abscess. *Thorac Cardiovasc Surg* 2009; 57: 421-2.
7. Kitamura T, Edwards J, Khurana S, Stuklis RG. Mitral paravalvular absces with left ventriculo-atrial fistula in a patient on dialysis. *J Cardiothorac Surg* 2009; 4: 35-7.
8. Banyś A, Bartczak K, Maciejewski M, Jaszewski R. Surgical management of cardiac pacemaker infection with extracorporeal circulation – a case report [Polish]. *Anaesthesiol Resc Med* 2009; 3: 128-31.
9. David TE, Gavra G, Feindel CM, Regesta T, Armstrong S, Maganti MD. Surgical treatment of active endocarditis: a continued challenge. *J Thorac Cardiovasc Surg* 2007; 133: 144-9.
10. Anderson D, Murdoch DR, Sexton DJ, et al. Risk factors for infective endocarditis in patients with enterococcal bacteremia: a case-control study. *Infection* 2004; 32: 72-7.
11. Remadi JP, Habib G, Nadji G, et al. Predictors of death and impact of surgery in *Staphylococcus aureus* infective endocarditis. *Ann Thorac Surg* 2007; 83: 1295-302.
12. Yankah AC, Pasic M, Klose H, Siniawski H, Weng Y, Hetzer R. Homograft reconstruction of the aortic root for endocarditis with periannular abscess: a 17-year study. *Eur J Cardiothorac Surg* 2005; 28: 69-75.
13. Mylonakis E, Calderwood SB. Infective endocarditis in adults. *N Engl J Med* 2001; 345: 1318-30.