Scientific Foundation SPIROSKI, Skopje, Republic of Macedonia
South East European Journal of Cardiology. 2022 Nov 30; 3(1):1-3.
https://doi.org/10.3889/seejca.2022.6028
eISSN: 1857-9361
Category: *Case Report*
Section: *General Cardiology*

OPEN ACCESS

Paravalvular Abscess of the Mechanical Prosthetic Aortic Valve: A Case Report

Denis Mackic, Faruk Custovic, Edin Begic*

General Hospital "Prim. Dr Abdulah Nakaš", Sarajevo, Bosnia and Herzegovina

Edited by: Igor Spiroski
Citation: Mackic D, Custovic F, Begic E. Paravalvular Abscess of the Mechanical Prosthetic Aortic Valve: A Case Report. SEE J Cardiol. 2022 Nov 30; 3(1):1-3. https://doi.org/10.3889/seejca.2022.6028
Keywords: Paravalvular abscess; Mechanical prosthetic aortic valve; Endocarditis; Case report
***Correspondence:** Edin Begic, General Hospital "Prim. Dr Abdulah Nakaš", Sarajevo, Bosnia and Herzegovina. E-mail: edinbegic90@gmail.com
Received: 06-Feb-2022
Revised: 20-Mar-2022
Accepted: 11-Jun-2022

Funding: This research did not receive any financial support
Competing Interests: The authors have declared that no competing interests exist

Abstract

BACKGROUND: Prosthetic mechanical valve endocarditis (PVE) can be manifested as early PVE (acquired perioperatively) and late PVE (resulting from infections unrelated to the valve operation). Causes of both are similar but are late PVE are more prone to less virulent microbes. PVE resulting with paravalvular abscess is confirmed through echocardiography (transthoracic or transesophageal), it results with a high mortality rate especially if it is not early recognized. The aim of article was to present a patient with heart failure symptoms caused by PVE.

CASE PRESENTATION: Male patient, 44 years old, was admitted because of dyspnea and swelling of lower extremities. The patient is a long-standing heroin addict who had aortic valve replacement done 8 years ago due to endocarditis. The implanted valve was a mechanical aortic valve – Edwards MIRA bi-leaflet valve No 32 (Edwards Lifesciences; Irvine, California). He also was already diagnosed with hepatitis C years before. In multiple occasions were hospitalized on the Department of cardiology due to signs and symptoms of heart failure. On transthoracic echocardiography, dilatation of all heart chambers was found. The left ventricular systolic function was moderately reduced with an ejection fraction of left ventricle of 42% according to Simpson with restrictive filling pattern. Hypoechoic mass along the right side of the mechanical aortic valve was noted measuring 3.57 × 1.03 cm.

CONCLUSION: Paravalvular abscess of mechanical heart valves is a very serious complication with a high mortality rate. It is essential to recognize this type of pathology as early as possible, so aggressive parenteral antibiotic therapy could be started, while in many cases, surgical reoperation is needed.

Introduction

The aim of article was to present a patient with heart failure symptoms caused by prosthetic mechanical valve endocarditis (PVE). PVE can be manifested as early PVE (acquired perioperatively) and late PVE (resulting from infections unrelated to the valve operation) [1]. Causes of both are similar, but are late PVE are more prone to less virulent microbes. PVE resulting with paravalvular abscess is confirmed through echocardiography (transthoracic or transesophageal), it results with a high mortality rate especially if itis not early recognized. It is essential start aggressive parenteral antibiotic therapy as early as possible, while in many cases, surgical reoperation is needed.

Case Report

Male patient, 44 years old, was admitted because of dyspnea and swelling of lower extremities. The patient is a long-standing heroin addict who had an aortic valve replacement done 8 years ago due to endocarditis. The implanted valve was a mechanical aortic valve – Edwards MIRA bi-leaflet valve No 32 (Edwards Lifesciences; Irvine, California). He also was already diagnosed with hepatitis C years before. In multiple occasions were hospitalized on the Department of cardiology due to signs and symptoms of heart failure.

At admission, the patient had heart failure signs with sinus tachycardia on the electrocardiogram. During physical examination, a metallical clic of the mechanical aortic valve was heard on stethoscope along with a diastolic murmur on the precordium with a p.m. above the aortic valve. Large pretibial edemas on both legs were present also. In laboratory findings non-specific inflammatory parameters were increased: leukocytes 21.0 × 10^9 g/L (ref. range 3.2–9.8 × 10^9/L) and C-reactive protein 177.3 mg/L (ref. range. under 10 mg/L) along with sings of high grade microcytic anemia: Hematocrit 0.23 (ref. range 0.41–0.51); hemoglobin 73 g/L (ref. range 120–160 g/L); and mean corpuscular volume 81.2 fL (ref. range 80–95 fL). On transthoracic echocardiography, dilatation of all heart chambers was found. The left ventricular systolic function was moderately reduced with an ejection fraction of left ventricle of 42% according to Simpson with restrictive filling pattern. Hypoechoic mass along the right side of the mechanical aortic valve was noted

measuring 3.57 × 1.03 cm (Figure 1). On the artificial aortic valve, a high degree – severe aortic regurgitation was verified with pressure half time 133 ms (Figure 2). Findings on the mitral valve showed a moderate degree of regurgitation. Severe regurgitation was found across the tricuspid valve with a systolic pressure in the pulmonary artery of 34 mmHg. Blood cultures were examined and showed no significant bacterial growth. At admission, dual parenteral antibiotic therapy was ordered. On the 7th day of hospitalization, the patient becomes hypotensive with signs of acute renal failure. Despite of the therapeutically measures that were taken, patients clinical worsening progressed and lethal outcome was declared.

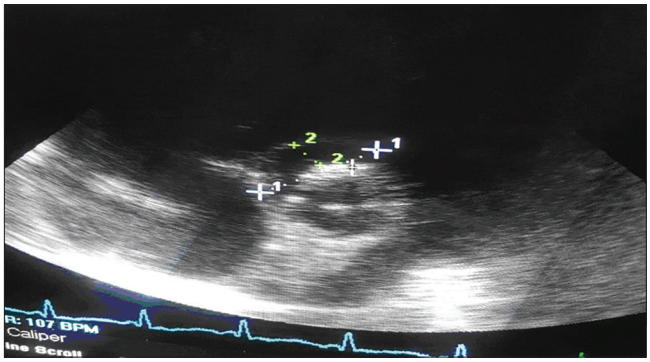

Figure 1: Paravalvular abscess on the mechanical aortic valve

Discussion

Mechanical valves have a fairly higher rate of early endocarditis incidence (1%) in comparison to biological valves [4]. Early aggressive antibiotic therapy is sometimes sufficient and there so no need to reoperate the patient [5]. Causes of late artificial valve endocarditis are similar to those in early endocarditis, but are more prone to less virulent microbes like *Staphylococcus epidermidis* [6]. The most common cause between intravenous drug addicts is *Staphylococcus aureus* which causes 70% of endocarditis cases [7], [8]. In intravenous drug addicts, artificial valve endocarditis can be caused by Gram-negative bacteria such as *Pseudomonas aeruginosa*, *Candida albicans*, enterococci, *Serratia marcescens*, and *Streptococcus viridans* [1], [8], [9]. Patients usually have high fever that lasts for several days, while high fever that lasts more than 10 days should be suspected for infective endocarditis specially in patients who have heart issues and/or implanted artificial valves, in known drug addicts and in patients that went through a medical intervention [2], [3]. Paravalvular abscess is revealed by transthoracic or transesophageal echocardiography [10]. On echocardiography, the paravalvular abscess is shown as a hypoechoic area that forms around the valvular ring and usually causes a severe valve dysfunction manifested as massive regurgitation [1], [10]. Usually in laboratory findings, non-specific inflammatory parameters are increased, but blood cultures are negative. The cause of negative blood cultures can be the administration of antibiotics before taking blood examples for the culture itself [11]. A special issue in diagnosis and treatment is recurring infective endocarditis in both native and artificial valves. It represents a high threat for patients life and it requires intensive treatment that includes reoperation [12]. Paravalvular abscesses are a serious complications of infective endocarditis that can be recognized in echocardiography as a “empty space” [1], [13]. Thickening of the aortic root above 9 mm and aneurism of the valsalva sinus in patients with infective endocarditis are present as a consequence of the forming abscess in the surrounding tissue [13]. The treatment principles are the same as for other types of endocarditis. Parenteral antibiotic therapy is administered (4–6 weeks) alongside with antipyretics and other supportive therapy [14]. In this case, even though aggressive parenteral antibiotic therapy was started, lethal outcome came due to several concomitant reasons – severe aortic valve dysfunction together with previously reduced left ventricular systolic function and development of acute renal failure. In conclusion,

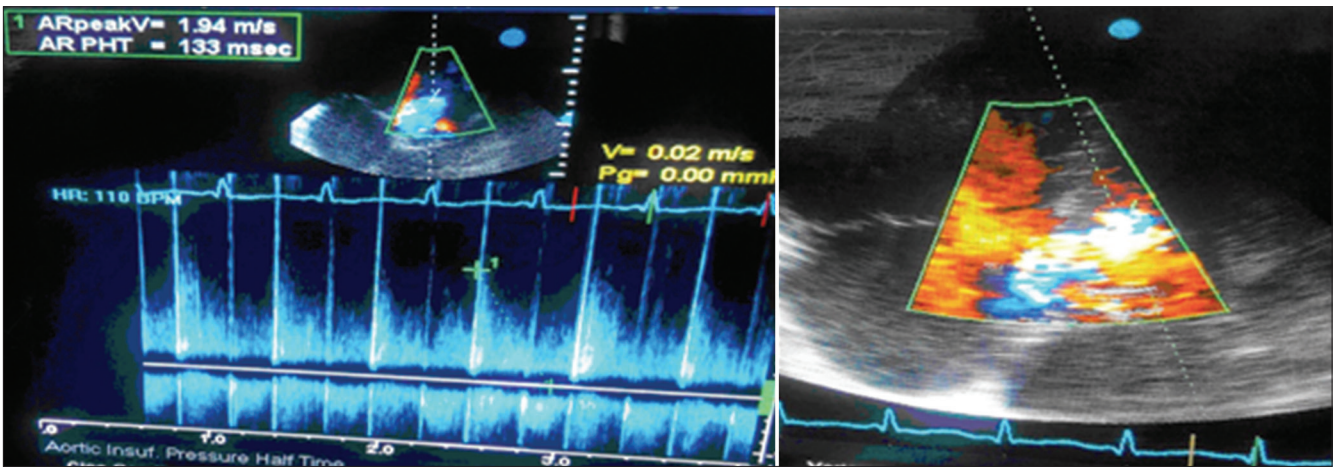

Figure 2: Severe aortic regurgitation

paravalvular abscess of mechanical heart valves is a very serious complication with a high mortality rate. It is essential to recognize this type of pathology as early as possible, so aggressive parenteral antibiotic therapy could be started, while in many cases, surgical reoperation is needed.

Informed Consent

Written informed consent was obtained from the family of patient for the publication of the case report and the accompanying images.

Authorship Contributions

Concept: D.M. and E.F.; Design: F.C. and E.B.; Supervision: D.M. and E.F.; Data collection: F.C. and E.B.; Literature search: F.C. and E.B.; and Writing: D.M., E.F., F.C., and E.B.

References

1. Tornos P. Management of prosthetic valve endocarditis: A clinical challenge. Heart. 2003;89(3):245-6. https://doi.org/10.1136/heart.89.3.245
   PMid:12591815
2. Ashley EA, Niebauer J. Infective endocarditis. In: Cardiology Explained. Ch. 10. London: Remedica; 2004. Available from: https://www.ncbi.nlm.nih.gov/books/NBK2208 [Last accessed on 2022 Jan 21].
3. Ramos Tuarez FJ, Yelamanchili VS, Law MA. Cardiac Abscess. In: StatPearls. Treasure Island, FL: StatPearls Publishing; 2020. Available from: https://www.ncbi.nlm.nih.gov/books/NBK459132 [Last accessed on 2020 Jul 17].
4. Netzer RO, Altwegg SC, Zollinger E, Täuber M, Carrel T, Seiler C. Infective endocarditis: Determinants of long term outcome. Heart. 2002;88(1):61-6. https://doi.org/10.1136/heart.88.1.61
   PMid:12067947
5. Rekik S, Trabelsi I, Znazen A, Maaloul I, Hentati M, Frikha I, *et al*. Prosthetic valve endocarditis: Management strategies and prognosis: A ten-year analysis in a tertiary care Centre in Tunisia. Neth Heart J. 2009;17(2):56-60. https://doi.org/10.1007/BF03086218
   PMid:19247467
6. Senining RC, Ahmad H, Shahzad R, Stahl-Avicolli A, Lamoste TJ, Soto NE, *et al*. Late prosthetic valve endocarditis caused by *Staphylococcus hemolyticus*. Clin Infect Dis. 2001;32(6):E100-1. https://doi.org/10.1086/319354
   PMid:11247730
7. Moss R, Munt B. Injection drug use and right sided endocarditis. Heart. 2003;89(5):577-81. https://doi.org/10.1136/heart.89.5.577
   PMid:12695478
8. Gürtler N, Osthoff M, Rueter F, Wüthrich D, Zimmerli L, Egli A, *et al*. Prosthetic valve endocarditis caused by *Pseudomonas aeruginosa* with variable antibacterial resistance profiles: A diagnostic challenge. BMC Infect Dis. 2019;19(1):530. https://doi.org/10.1186/s12879-019-4164-3
   PMid:31208366
9. Leung DY, Cranney GB, Hopkins AP, Walsh WF. Role of transoesophageal echocardiography in the diagnosis and management of aortic root abscess. Br Heart J. 1994;72(2):175-81. https://doi.org/10.1136/hrt.72.2.175
   PMid:7917692
10. Westphal N, Plicht B, Naber C. Infective endocarditis-prophylaxis, diagnostic criteria, and treatment. Dtsch Arztebl Int. 2009;106(28-29):481-9. https://doi.org/10.3238/arztebl.2009.0481
    PMid:19730718
11. O'Gara PT**.** Infective endocarditis 2006: Indications for surgery. Trans Am Clin Climatol Assoc 2007**;**118**:**187-98.
12. Shafran SD**.** Infective endocarditis and perivalvular abscess: A dangerous duo. CMAJ 2002**;**167(1)**:**38-9.
13. Ikeda A, Nakajima T, Konishi T, Matsuzaki K, Sugano A, Fumikura Y, *et al*. Infective endocarditis of an aorto-right atrial fistula caused by asymptomatic rupture of a sinus of Valsalva aneurysm: A case report. Surg Case Rep. 2016;3(1):43. https://doi.org/10.1186/s40792-016-0171-4
    PMid:27180251
14. Thuny F, Grisoli D, Cautela J, Riberi A, Raoult D, Habib G. Infective endocarditis: Prevention, diagnosis, and management. Can J Cardiol. 2014;30(9):1046-57. https://doi.org/10.1016/j.cjca.2014.03.042
    PMid:25151287