Folia Cardiologica 2022
vol. 17, no. 6, pages 356–358
DOI: 10.5603/FC.a2022.0054

ISSN 2353–7752
e-ISSN 2353–7760

The many faces of infective endocarditis

Wiele twarzy infekcyjnego zapalenia wsierdzia

Marcin Baranowski[1], Katarzyna Ptaszyńska[2], Klaudia Mickiewicz[2], Barbara Klimiuk-Tworkowska[2], Bożena Sobkowicz[2], Anna Lisowska[2]

[1]Medical University of Bialystok Clinical Hospital, Białystok, Poland
[2]Department of Cardiology, Medical University of Bialystok Clinical Hospital, Białystok, Poland

Abstract

This case report presents a history of a 55-year-old male with a history of an ascending aorta aneurysm and aortic regurgitation who underwent a David procedure, followed by implantation of a DDD pacemaker. The patient remained stable, until 4 years later he was admitted to the hospital with the suspicion of sepsis which spread to the bio-conduit and native aortic valve causing infective endocarditis. The treatment was complicated by haemorrhagic stroke and thromboembolic event. Once his condition was stabilized, he underwent yet another cardiac surgery. A few months later, he was hospitalized again and an echo revealed vegetation on the pacemaker's electrode. Ultimately the decision was made for the complete hardware removal.

Key words: infective endocarditis, cardiac device-related infective endocarditis, echocardiography, complications, HeartTeam, cardiac surgery

Folia Cardiologica 2022; 17, 6: 356–358

Introduction

Infective endocarditis (IE), while remaining a relatively uncommon disease, still poses a serious clinical challenge in modern medicine. The incidence is estimated to range between 1.5 and 11.6 cases per 100 000 people depending on the region of the world, however studies have shown it had doubled in the last two decades in Europe with a marked 4% yearly increase [1, 2]. Despite great advances made in recent times in diagnostics and treatment, the prognosis of IE remains poor with approximately 25% in-hospital and 41% 5-year mortality rate [3, 4]. Advanced age and presence of pre-existing valvulopathies primarily concerning aortic or mitral valve or intracardiac foreign material (pacemaker electrodes, vascular prostheses) are among many of the risk factors in IE development.

Case report

A 55-year-old male with a history of an ascending aorta aneurysm, aortic regurgitation and atrial fibrillation was admitted to the Department of Cardiac Surgery for elective surgery. He underwent a David procedure, during which on cardiopulmonary bypass the graft was sutured in place, the patient's native bicuspid aortic valve was re-implanted and coronary arteries were re-attached to the aortic graft. In the early postoperative course the patient required temporary epicardial pacing. Later, the decision was made to implant a permanent DDD pacemaker.

A month after the surgery the patient presented to the emergency room with chest pain lasting over 2 weeks, worsening with body movement. On admission, he was hemodynamically stable, afebrile, with a blood pressure of

Address for correspondence: Marcin Baranowski MD, Uniwersytecki Szpital Kliniczny w Białymstoku, ul. Marii Skłodowskiej-Curie 24A, 15–276 Białystok, Poland, e-mail: baranowski.cinek@gmail.com

158/93 mm Hg, with no audible murmur over the heart. Laboratory tests showed an increased serum concentration of N-terminal pro-B-type natriuretic peptide (1630 pg/mL) without elevation of the inflammatory markers. Echocardiography revealed an ejection fraction of 40% and proper functioning of the aortic conduit. Postpericardiotomy syndrome had been diagnosed and was effectively treated with ibuprofenum and colchicine.

The patient's condition remained stable, until four years later, he was admitted to the Department of Internal Medicine due to severe back pain unresponsive to medication, decreased effort tolerance and weight loss of 20 kilograms over the last 4 months. The physical examination was unremarkable. Laboratory tests revealed elevated inflammatory markers, N-terminal pro-B-type natriuretic peptide concentration, anaemia, and thrombocytopenia. Two separate blood cultures tested positive for *Streptococcus gallolyticus subspecies gallolyticus*. Vancomycin was added to the initial empirical antibiotic therapy. Suspicion of infective endocarditis was raised. Transthoracic echocardiography (TTE) showed ejection fraction of 55% and increased gradients through the aortic valve. Transoesophageal echocardiography (TOE) confirmed endocarditis, revealing oscillating masses, the biggest measuring 13 × 6mm, on the fused leaflet of the bicuspid aortic valve and significant aortic regurgitation. A few days later the patient started complaining of blurred vision in the right eye, right-sided hemianopia and dyspnoea. Head computed tomography (CT) revealed intracranial hematoma in the occipital area in the left hemisphere, indicative of a haemorrhagic stroke. Consulting neurosurgeon did not qualify the patient for surgical treatment. CT-angiography of the chest ruled out the possibility of pulmonary embolism, but showed pleural effusion. Clinically he manifested symptoms of pulmonary oedema. The patient was transferred to the Department of Cardiology for further treatment, where after a microbiology consult, vancomycin was swapped for ampicillin. His physical examination showed a systolic-diastolic murmur best heard over the aortic valve. Laboratory tests revealed elevated C-reactive protein concentration with low procalcitonin level and syderopenic anaemia. Blood and urine cultures were negative for bacterial growth. In the light of severe anaemia 2 units of red blood cells were transfused. The otolaryngologist and maxillofacial surgeon ruled out potential foci of inflammation. During the hospitalization the patient was discussed several times by the HeartTeam — cardiac surgery was postponed due to a recent haemorrhagic stroke. Given the emergence of pain in the left thigh, a Doppler ultrasound was performed, revealing patent big arterial vessels and no signs of deep vein thrombosis. Little hyperechogenic lesions obstructed a small arterial vessel within the vast lateralis muscle, which radiologists described as embolic material, most likely of valvular origin. Consulting vascular surgeon recommended further conservative treatment with acetylsalicylic acid and heparin. After another angio-CT of the head, the patient was once again discussed by the HeartTeam with the participation of a neurologist. acetylsalicylic acid and heparin were discontinued and this time the patient was finally qualified for the re-operation and referred to the Cardiac Surgery Clinic. He underwent implantation of a bio-conduit with re-implantation of the coronary vessels using the Cabrol method.

Nine months later the patient was admitted to the hospital with recurrent fever, chills, progressive weakness and severe back pain in the lumbar area. On physical examination a systolic murmur over the heart was detected. Blood tests revealed elevated inflammatory markers and signs of acute kidney injury. Blood cultures were taken and empirical antibiotic therapy was introduced. TOE showed vegetation on the pacemaker's electrode. *Enterococcus faecalis* was identified in blood samples and targeted treatment with ampicillin and ceftriaxone was implemented. Diagnosis of cardiac device-related infective endocarditis was made. Once negative blood cultures were obtained, the whole pacemaking system was removed and a temporary one was implanted. Two weeks later a permanent DDD pacemaker was re-implanted on the contralateral side. Since the source of infection had not been found, the decision was made to prescribe oral amoxicillin until the next control visit. Taking under consideration severe haemorrhagic complications in the past, no recent atrial fibrillation episodes and no thrombotic lesions in the left atrial appendage, the anticoagulation treatment was deferred until the check-up.

Discussion

To this day positive blood cultures, imaging and clinical symptoms continue to be the cornerstone of the diagnosis of infective endocarditis. The most common pathogens identified in blood cultures are staphylococci, followed by *streptococci* and *enterococci* [5]. Echocardiography remains the method of choice for diagnosis and TTE, as a non-invasive and widely available technique, should be performed immediately once IE is suspected. European Society of Cardiology recommends TOE in patients with high clinical suspicion of IE and a negative or poor-quality TTE or when a prosthetic valve or intracardiac foreign material is present [6]. TOE offers better image quality and shows higher sensitivity for the diagnosis of vegetations of approximately 85–90%, compared to 75% for TTE [6]. In cases of inconclusiveness of echocardiography additional imaging methods such as multislice CT, 18-fluorodeoxyglucose positron emission tomography/CT, and single-photon emission CT are recommended to confirm IE [7]. Despite a quick confirmation of the diagnosis and promptly administered antibiotic therapy, the patient experienced both haemorrhagic and thromboembolic complications of the disease.

His condition required several HeartTeam consults to decide the right choice of treatment. Patients with a previous history of infective endocarditis are more likely to develop another case of the disease. In such situations, the mortality rate and the incidence of serious complications are higher compared to patients with a single episode [8]. Thus, in high-risk patients certain non-specific prevention measures should be taken to minimize the probability of repeat infection. That includes frequent dental check-ups, strict cutaneous hygiene and disinfection of wounds, and rational use of antibiotics. Ultimately, the patient was diagnosed with a case of cardiac device-related infective endocarditis. Under such circumstances, by evidence-based medicine, the correct decision was made for a complete hardware removal in line with prolonged antibiotic therapy [9].

Conclusions

Infective endocarditis remains a disease with many faces, with a wide range of non-characteristic clinical manifestations and serious complications including heart failure, thromboembolic events, persisting infections, heart rhythm and conduction disorders and renal failure. Considering the benefits and risks of undertaken treatment, as well as an individual approach to the patient's status and comorbidities, are the key components of successful therapy.

Conflict of interest

The authors declare no conflict of interest.

Streszczenie

Opisany przypadek dotyczy 55-letniego mężczyzny z tętniakiem aorty wstępującej z towarzyszącą niedomykalnością zastawki aortalnej w wywiadzie. Pacjent był poddany operacji Davida z następczą implantacją stymulatora serca typu DDD. Cztery lata później rozpoznano u niego infekcyjne zapalenie wsierdzia (IZW) w obrębie wszczepionej protezy aortalnej oraz na natywnej zastawce aortalnej. Leczenie było powikłane udarem niedokrwiennym mózgu oraz epizodem zatorowo-zakrzepowym. Po stabilizacji stanu chorego, przeszedł on kolejną operację kardiochirurgiczną. Kilka miesięcy później został ponownie przyjęty do szpitala z objawami sepsy — stwierdzono obecność wegetacji na elektrodach stymulatora i rozpoznano odelektrodowe zapalenie wsierdzia. Ostatecznie podjęto decyzję o usunięciu całego układu stymulującego.

Słowa kluczowe: infekcyjne zapalenie wsierdzia, infekcyjne zapalenie wsierdzia związane z urządzeniami kardiologicznymi, echokardiografia, powikłania, HeartTeam, operacja kardiochirurgiczna

Folia Cardiologica 2022; 17, 6: 356–358

References

1. Bin Abdulhak AA, Baddour LM, Erwin PJ, et al. Global and regional burden of infective endocarditis, 1990-2010: a systematic review of the literature. Glob Heart. 2014; 9(1): 131–143, doi: 10.1016/j.gheart.2014.01.002, indexed in Pubmed: 25432123.
2. Talha KM, Baddour LM, Thornhill MH, et al. Escalating incidence of infective endocarditis in Europe in the 21st century. Open Heart. 2021; 8(2): e001846, doi: 10.1136/openhrt-2021-001846, indexed in Pubmed: 34670832.
3. Ambrosioni J, Hernandez-Meneses M, Téllez A, et al. Hospital Clinic Infective Endocarditis Investigators. The changing epidemiology of infective endocarditis in the twenty-first century. Curr Infect Dis Rep. 2017; 19(5): 21, doi: 10.1007/s11908-017-0574-9, indexed in Pubmed: 28401448.
4. Bannay A, Hoen B, Duval X, et al. AEPEI Study Group. The impact of valve surgery on short- and long-term mortality in left-sided infective endocarditis: do differences in methodological approaches explain previous conflicting results? Eur Heart J. 2011; 32(16): 2003–2015, doi: 10.1093/eurheartj/ehp008, indexed in Pubmed: 19208650.
5. Olmos C, Vilacosta I, Fernández-Pérez C, et al. The evolving nature of infective endocarditis in Spain. J Am Coll Cardiol. 2017; 70(22): 2795–2804, doi: 10.1016/j.jacc.2017.10.005, indexed in Pubmed: 29191329.
6. Habib G, Badano L, Tribouilloy C, et al. European Association of Echocardiography. Recommendations for the practice of echocardiography in infective endocarditis. Eur J Echocardiogr. 2010; 11(2): 202–219, doi: 10.1093/ejechocard/jeq004, indexed in Pubmed: 20223755.
7. Bruun NE, Habib G, Thuny F, et al. Cardiac imaging in infectious endocarditis. Eur Heart J. 2014; 35(10): 624–632, doi: 10.1093/eurheartj/eht274, indexed in Pubmed: 23900698.
8. Alagna L, Park LP, Nicholson BP, et al. Repeat endocarditis: analysis of risk factors based on the International Collaboration on Endocarditis — Prospective Cohort Study. Clin Microbiol Infect. 2014; 20(6): 566–575, doi: 10.1111/1469-0691.12395, indexed in Pubmed: 24102907.
9. Sohail MR, Uslan DZ, Khan AH, et al. Infective endocarditis complicating permanent pacemaker and implantable cardioverter-defibrillator infection. Mayo Clin Proc. 2008; 83(1): 46–53, doi: 10.4065/83.1.46, indexed in Pubmed: 18174000.