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Case report

Late infective endocarditis of an Amplatzer atrial septal device twelve years after implantation – a case report

Tomáš Toporcer *, *Adrián Kolesár*, *Martin Ledecký*, *František Sabol*

Department of Cardiac Surgery, Faculty of Medicine, Pavol Jozef Šafárik University in Košice, Slovakia

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ABSTRACT

Infective endocarditis was initially defined as a disease of patients with pre-existing valvular abnormalities. In contemporary medicine a valvular prosthesis and implanted medical devices are the most common risk factors for infective endocarditis.

A case report is presented regarding an 18-year-old female with a medical history of a 12-year implanted Amplatzer occluder. Echocardiography showed an endocarditis focus in the right atrium communicating to the left atrium and destruction of the non-coronary leaflet of the aortic valve, with aortic valve insufficiency. Blood culture was positive for multi-resistant *Staphylococcus aureus*. The aortic valve, the Amplatzer device and part of the anterior leaflet of the mitral valve were excised. Pericardium was used for reconstruction of the anterior leaflet of the mitral valve, the interatrial septum and the wall of the left atrium. A mechanical prosthesis of the aortic valve was implanted. Control echocardiography was done four months after surgery. The evaluation did not show any recurrence of endocarditis.

The published literature shows, in correlation with the presented case report, the occurrence of endocarditis late in the course of Amplatzer implantation highlights the need for vigilance in the population of patients with the device.

Introduction

The incidence of congenital heart malformations varies from 4 to 14 per 1000 live births, and the incidence of atrial septal defect (ASD) is 3.78 per 10,000 newborns, corresponding to 5.9% of all cases of diagnosed congenital heart defects [1,2]. Thus, ASD is among the most commonly recognized congenital cardiac abnormalities presenting in adulthood, with an incidence of 25–30% [3,4]. The *ostium secundum* type of atrial septal defect is the fourth most common congenital heart malformation. Percutaneous coronary intervention (PCI) was put into practice in 1977 in Zurich by Andreas Gruentzig [5]. The first application of ASD percutaneous closure was done in 1974 by Jim Lock and was published in 1976 [6]. Radiologist Kurt Amplatz introduced the Amplatzer septal occluder in 1997 in Minnesota [7]. Complications of occluders include thrombosis and embolism, dislocation, cardiac perforation and rarely,

* *Corresponding author at*: Department of Cardiac Surgery, VUSCH Ltd., Ondavská 8, 04001 Košice, Slovakia.
E-mail address: topyto@gmail.com (T. Toporcer).
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infection [8]. Despite the Amplatzer occluder's benefits, including the avoidance of open heart surgery, almost every complication requires surgical intervention of the heart [2]. Stollberger et al. stated that only six reports of occluder-related infection had been presented in the literature by 2011, and Aruni et al. stated that only two cases of late-occluder device infection had been reported in the literature by 2013 [8,9]. An additional complication of occluder implantation is heart transmission disorder, with an incidence of 5.2–6.1% [10,11].

In the 19th century, William Osler defined endocarditis (IE) as possible to treat, and now in the 21st century, this disease is clinically definable and treatable [12]. On the other hand, Rajamannan (2013) presented that despite improvements in diagnostics and therapy, the fatality rate of IE has not significantly decreased during the last 40 years [12]. In today's medicine, valvular prosthesis and implanted medical devices are the most commonly affected [13]. The incidence of cardiac-device IE between 1993 and 2008 showed a 210% increase [14]. However, progress in IE treatment has been recorded, though the in-hospital mortality of IE is still about 20% [15]. Review articles state that the percentage of *Staphylococcus aureus* IE has nearly doubled in the last 50 years [15]. Athan et al. focused their studies on IE of cardiac implanted devices and noted an increase of *S. aureus* as well as coagulasa-negative staphylococci infections [14]. Bedeir et al. showed an increase in IE caused by *S. aureus* over two decades, from 2% (1990) to 25% (2009) [16]. Case reports on IE of occluder devices presented fungal endocarditis in two cases, while another seven case reports showed bacterial origin of IE [8,9,17–23]. Three works presented positive blood cultivation of *S. aureus*, and Jha et al. found *Streptococcus pyogenes* as the agent of occluder IE in a child [9,21–23]. Another work demonstrated the concomitant positive blood cultivation of *S. aureus* and *Pseudomonas aeruginosa* [8].

Case report

An 18-year-old female with a history of intermittent palpitation was admitted to the department of cardiology due to three days of persistent steno-cardia, dyspnoea and fever. The patient underwent Amplatzer implantation 12 years ago because of an atrial septal defect. There was a suspicion of endocarditis in the peripheral hospital immediately before hospitalization. The patient was hospitalized three years ago because of fever and para-inflammation coxopathy, and she was hospitalized again one month ago for a urinary tract infection. Ultrasonography of the abdomen did not show any inflammation. Echocardiography (ECHO) evaluation showed suspected endocarditis (IE) in the left ventricle outflow tract (LVOT) of 20 × 11 mm in diameter. There was no aortal valve regurgitation and only minimal mitral valve regurgitation and tricuspid valve regurgitation. There was no sign of endocarditis in the left and right atria. Antimicrobial therapy was started. The serum level of C reactive protein was 125 mg/L, and procalcitonin was 0.205 ug/L. Blood culture was positive for multi-resistant *S. aureus* (MRSA). Antibiotics therapy was admitted. Four days later the patient showed aggravated clinical status, and haemodynamic instability began. Control ECHO evaluation showed a focus of endocarditis in the right

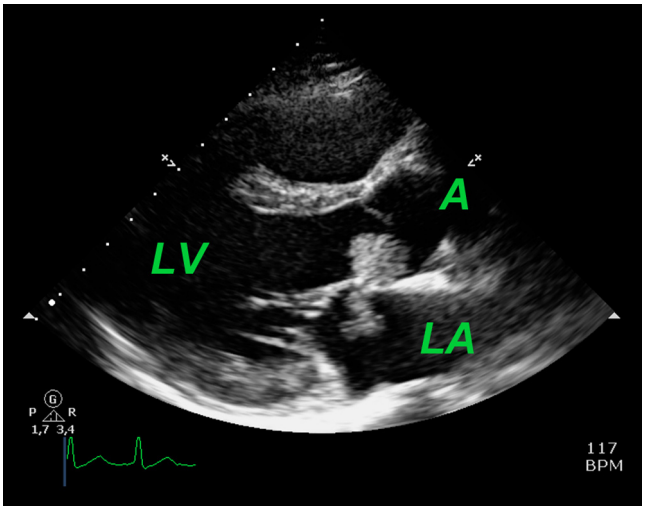

Fig. 1 – Echocardiographic picture of endocarditis – the focus of endocarditis in the left atrium and left ventricle (A – ascending aorta; LA – left atrium; LV – left ventricle).

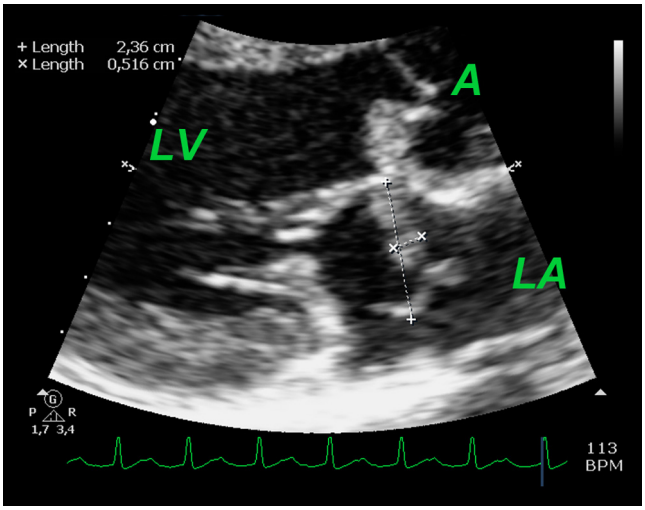

Fig. 2 – Echocardiographic picture of endocarditis in the left atrium (A – ascending aorta; LA – left atrium; LV – left ventricle).

atrium communicating to the left atrium. Destruction of the noncoronary leaflet of the aortic valve with aortic valve insufficiency was recorded, and kissing of the endocarditis focus on the mitral valve and mitral valve insufficiency was suspected (Figs. 1–3). According to the ECHO findings, the endocarditis focus had the potential to embolize, and thus surgery was indicated.

Standard midline sternotomy was performed. Afterwards, a cardiopulmonary bypass was established in the standard fashion, and the heart was arrested using anterograde cardioplegia. The right atrium of the heart and the ascending aorta were opened. Destroyed noncoronary and right coronary leaflets of the aortic valve were noted (Figs. 4 and 5). The endocarditis focus was present on both sides of the Amplatzer device (Fig. 6). In the left atrium the endocarditis focus

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