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Pulmonary valve endocarditis and healthy patent ductus arteriosus

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Abstract

We describe a case of Pulmonary Valve Endocarditis (PVE) that was associated with an infection-free Patent Ductus Arteriosus (PDA). This 21-year-old patient had abstained from heroin use for at least 4 months before the current presentation with negative urine drug screen for opioid-use and for other drugs of abuse, as recommended by the national institute on drug abuse, and with supervised drug rehabilitation therapy. This case suggests the role of the PDA as a precipitating factor for PVE and highlights the necessity for its closure when diagnosed in the adult population.

Keywords

pulmonary valve endocarditis; drug addiction; patent ductus arteriosus

Introduction

The incidence of endocarditis in the United States is less than one case per every 10 thousand persons but has been growing, perhaps because of an upsurge in intravenous drug abuse. Since it is usually discovered and treated during childhood, Patent Ductus Arteriosus (PDA) in the adult is not often encountered.

Among adults with PDA and before the era of routine use of antibiotics, the risk of infective endocarditis was reported to be 1% per year, and thirteen percent of all PDAs in adult patients are discovered between 20-29 years of age [1,2]. While still uncommon, persons who have a PDA are at an elevated risk of developing infectious endocarditis than are persons who have structurally normal hearts.

Furthermore, solitary pulmonary valve endocarditis in structurally normal hearts is an extremely rare event, representing only 1 to 2% of all endocarditis. In a case report and review of literature, between 1960 and 1999 only 36 cases of isolated pulmonary valve endocarditis were identified. [3]

Case Presentation

A 21-year-old female, known intravenous drug abuser (IVDA), was admitted for recurrent Pulmonary Valve Endocarditis (PVE), septicemia and multiple pulmonary septic emboli. Ten months earlier, she had received a diagnosis of PVE due to Methicillin-resistant Staphylococcus aureus infection. At that admission, the patient was managed medically with success and was discharged home after she completed an antibiotic course of Vancomycin, and later with Daptomycin.

The patient has been generally well on oral Suboxone and Methadone prescribed for her heroin addiction. Approximately one month before the current evaluation, the patient had been complaining of fatigue, fever, increased weakness, dyspnea, and experienced an unintended weight loss of approximately 7 pounds. She had abstained from heroin use for at least 4 months before the current presentation with negative urine drug screen for opioids as well as other drugs of abuse [4]. She had also undergone supervised drug rehabilitation therapy.

An echocardiogram revealed normal left ventricular function with an ejection fraction of 55-65%, dilated right ventricle and a normal tricuspid valve (Figure). The pulmonary valve was severely thickened with overlying vegetation measuring approximately 1.65 cm in size and causing significant pulmonary regurgitation. The pulmonary artery systolic pressure was estimated to be about 33 mmHg. Additional imaging with transthoracic echocardiography demonstrated the presence of a previously unrecognized healthy PDA with Qp/Qs ratio of 1.3.

The pulmonary valve replacement and the PDA ligation were performed through a median sternotomy with cardiopulmonary bypass on the 7th day of admission. The pulmonary valve which was completely involved with vegetation was replaced with a 27 size Carpentier-Edwards Magna bio-prosthesis (Edwards Lifesciences Corp, Irvine, CA) and the right ventricular outflow tract was reconstructed with a bovine pericardial patch. The PDA was identified and tested with a Doppler probe before and after it was suture ligated through an incision of the pulmonary artery that was extended distally to about 3 cm from the bifurcation and proximally about 2 cm into the right ventricular outflow tract. The blood culture grew Streptococcus Viridans. The pulmonary valve and the PDA tissue culture remained negative.

The patient had an excellent postoperative recovery and was discharged on the 14th hospital day to close supervision at home. Intravenous Penicillin G (2x106 U every 4 hr) was administered and completed for 6 week course post discharge via an intra-jugular subcutaneously tunneled catheter (Bard Peripheral Vascular, Inc. Tempe, AZ).

The patient had remained in early remission but her condition deteriorated rapidly. She died from recurrent sepsis, prosthetic valve endocarditis, and drug abuse recidivism about 3 months after her discharge from the hospital.

Discussion

Our case illustrates an uncommon complication of PDA and not so inconsistent scenario of relapsing illicit substance use with a fatal outcome among IVDA patients. It is difficult to know what role the original infection could have played in reactivation of previous endocarditis episode; however, the patient was free of any cardiac or pulmonary symptoms, and the urine tests were negative as per government guidelines for 10 months before the current admission. In recent years, age-related (young adults) heart valve infections have been on the rise, [5] and devices such as artificial heart valves can increase the risk of endocarditis.

This 21-year-old woman with illicit drug use is in an age group with a particularly major risk for reinfection for pulmonary valve endocarditis [6,7]. Therefore, in the young addicts, there is a justifiable cause for closing an arterial duct for the sole purpose of preventing infective endocarditis.[8]According to the most recent epidemiologic data, death rates increased significantly between 2015 and 2016 for age groups 15–24 (7.8%), [4] and persons who use drugs especially by injection, are at higher risk of dying from both acute and chronic diseases, many of which are related to their drug use, than persons who do not use these drugs [9].

In this clinical setting, prompt diagnosis with expeditious replacement of the pulmonary valve and closure of the PDA is recommended. Further, an extended period of antibiotics prophylaxis (6 months- class IIa recommendation) should be adopted after hospital discharge [10].

Should PDA be routinely left in situ? [8] In the context of IVDA, strict scrutiny should be an exception, and earlier ductus repair may be preferable secondary to the risk for future development of pulmonary valve endocarditis.

Since the majority of such patients reengage with increased impulsivity in substance use despite their desire to participate in treatment and to live, better methods of recognizing patients who are at particularly great risk of reoffending and to implement interventions to assist those patients. Fortuitously, recent research has advocated that such proclivity for behavioral addiction can be unlearned [11].

Figures

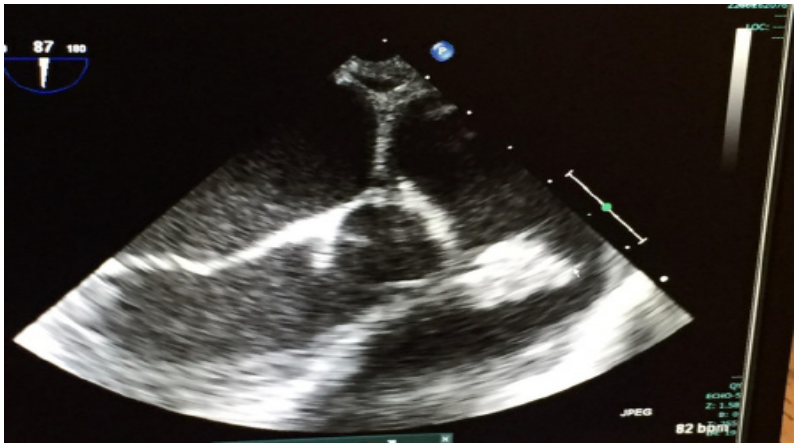

Figure 1: Large vegetation is demonstrated attached to the pulmonary valve.

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