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Recurrent infective endocarditis in a patient after a second Melody valve placement

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Brief Report

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Abstract

A 16-year-old Caucasian male was diagnosed with recurrent infective endocarditis associated with his second Melody valve placed inside a previously treated infected Melody valve. The replacement of Melody valve after the first infective endocarditis episode might increase the risk of the second episode of infective endocarditis.

Introduction

The Melody valve (Medtronic Inc., Minneapolis, Minnesota) was the first used percutaneously in humans and received Food and Drug Administration approval in 2010.[1] Percutaneous pulmonary valve implantation with the Melody valve is associated with an increased risk of infective endocarditis.[2–5] The incidence of infective endocarditis in patients after Melody valve is reported to be 3.2–25.0%.[2] Meta-analysis showed higher incidence of infective endocarditis with the Melody valve than Sapien valve (Edwards SAPIEN pulmonic transcatheter heart valve, Edwards Lifesciences, Irvine, California) or surgery.[1,4–7] However, the management of restenosis of Melody valve with an history of treated infective endocarditis is not clear. This is a case report of a patient who had recurrent infective endocarditis of Melody valve in Melody valve with a new pathogen. He had second Melody valve in his conduit with the stenotic Melody valve after the first episode of fully treated infective endocarditis. Additional Melody valve placement might have contributed to the recurrent infective endocarditis.

Case report

A 16-year-old Caucasian male was diagnosed with recurrent infective endocarditis associated with his secondMelody valve. He was born with pulmonary valve atresia with a large ventricular septal defect and underwent a right modified Blalock–Taussig–Thomas shunt soon after birth, followed by definitive repair including placement of a homograft right ventricle-to-pulmonary artery 17 mm conduit with patch closure of the ventricular septal defect at approximately 1 year of age. At 10 years of age, the gradual incremental dilation of the conduit was performed for the stenotic conduit with free pulmonary regurgitation. However, he had unusual coronary arteries anatomy which raised concern for full expansion of the conduit. His right coronary artery was arising from near left sinus and running just underneath the conduit into right ventricular free wall. Therefore, a Maxi EV3 stent was placed, followed by an 18 mm Melody placement. Post procedure residual gradient over the conduit was 26 mmHg. He was started with aspirin 81 mg daily after the procedure. However, he stopped taking medication at 1-year follow-up. At 14 years of age, he was taken to catheterization lab because of concerns for severe stenosis across the conduit on follow-up echocardiogram (peak gradient of 55 mmHg). The catheterization demonstrated a gradient of 34 mmHg over the conduit with the valve stent measuring 12 mm in diameter. He received re-dilatation with 18 mm balloon to make the valve and conduit diameter of 17.2 mm. Post procedure residual gradient was 20 mmHg. He was prescribed with aspirin 81 mg daily again. However, the patient was not totally compliant with the medication.

Six months after the procedure, he had a first episode of infective endocarditis with *Streptococcus gordonii*. He was appropriately treated with 6 weeks of antibiotics. His peak pressure gradient across the conduit on echocardiogram was 40 mmHg at the time of completion of antibiotics. However, he presented progressively worsening refractory conduit stenosis, resulting in two cardiac catheterizations at 2 and 7 months after the first infective endocarditis episode. Pre-dilation of the conduit and first Melody valve was performed for four times in total, followed by an 18 mm Palmaz stent placement. However, optimal residual pressure gradient could not be achieved. Therefore, a 20 mm Melody valve was placed in the first Melody valve under periprocedual antibiotic prophylaxis at 7 months after the first endocarditis episode. Post Melody valve placement gradient across right ventricle-to-pulmonary artery conduit was approximately 20 mmHg.

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Four months after the second Melody valve placement, he presented with progressive exertional dyspnea, mild tachypnea, and generalized fatigue with progressive non-productive cough and tactile fever for 2 weeks. He did not have any dental caries or abnormal ear, nose, and throat findings on physical exam. He was taking aspirin following the second Melody valve placement. Multiple blood cultures were positive for *Streptococcus mutans*. The diagnosis of definitive infective endocarditis was made, using the modified Duke criteria. An echocardiogram revealed moderate stenosis which again increased in peak gradient 46 mmHg across the right ventricle-to-pulmonary artery conduit. The estimated right ventricular pressure is 85 mmHg. No definite vegetation was visualized within the right ventricle-to-pulmonary artery conduit. He improved clinically in 3–4 days, and all his repeat culture became negative on antibiotics. He was started with 6 weeks of antibiotics and discharged in stable condition. He is finishing his antibiotic and waiting for replacement of right ventricle-to-pulmonary artery conduit.

Discussion

The cumulative incidence of infective endocarditis after the Melody valve is reported to be from 3.2% to 25.0%.[2] Thirty-two percent of cases of infective endocarditis occur within 1 year after percutaneous pulmonary valve implantation, 27% occurs in the second year, 18 % occurs in the third year, and 23% occurs beyond 3 years after the procedure. Authors suggested this reflects the fact that the risk is likely not attributable only to surgical factors associated with implantation but also to the mere long-term presence of the protheses.[2] The risk of infective endocarditis after percutaneous pulmonary valve implantation with the Sapien valve seems to be lower than with the Melody valve.[4] However, the risk of recurrence of infective endocarditis in Melody valve placed inside a Melody valve is not clear and decision to place a second Melody valve after infective endocarditis of Melody valve is controversial.

This is the first case report of describing the clinical course of recurrent infective endocarditis in a patient whose stenotic infected but appropriately treated Melody valve was palliated with a new Melody valve. Transcatheter Melody valve-in-valve implantation has become an appealing alternative in high-risk patients who may require surgical intervention or at family discretion as in our patient. Two patients with the Melody valve have been reported to have recurrent infective endocarditis in a French national survey, although the clinical details are not well described.[8] Our patient had multiple risk factors for infective endocarditis, which include age, male sex, a history of infective endocarditis, balloon dilatation, stenting, and high pressure gradient across the Melody valve. In fact, McElhinney et al. reported that age $\leq$ 12 years at implant and immediate post-implant peak gradient $\geq$15 mmHg are associated with development of infective endocarditis.[9] However, it may be possible that Melody-in-Melody status had increased the chance of recurrent infective endocarditis.

Infective endocarditis is associated with high mortality and severe complications.[10,11] However, it is still unclear if recurrent infective endocarditis in patients with the Melody valve has increased mortality rate compared with single episodes of infective endocarditis. Increasing awareness of the risk of infective endocarditis is essential to perform a more careful surveillance. Among patients after percutaneous pulmonary valve implantation with Melody valve, fever is the most common presenting symptom (89%). New, significant, and/or progressive right ventricular outflow tract obstruction occurred in 79% of cases, and the pressure gradient increase averaged 17 ± 8 mmHg.[2] Our patient presented with non-specific symptoms. Positive blood culture results and acutely increased pressure gradient across the valve contributed to early diagnosis and treatment in this case. We suggest that we should monitor closely these patients with a history of infective endocarditis in the setting of Melody valve replacement, which potentially increase the chance of recurrent infective endocarditis. Increase in pressure gradient across the Melody valve on echocardiogram may help in the diagnosis of infective endocarditis.

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Conflicts of interest. None.

Authors' contribution. D.T.: writing the manuscript; all authors: critically reviewing the manuscript.

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