Infective endocarditis (IE) is a lethal complication in patients with congenital heart disease. Early diagnosis and prompt treatment are crucial for preventing disease progression and death.1,2) Here we report a case of IE in a patient with tetralogy of Fallot (TOF) undergoing surgery and transcatheter pulmonary valve implantation (TPVI). She was successfully managed with a course of antibiotic therapy without significant pulmonary valve regurgitation.

Case Report

A 49-year-old female presented with recurrent respiratory tract infections, effort dyspnea, and chest distress for one year. The NYHA Functional Classification of heart was II-III. She underwent previous surgery for TOF with transannular patching of the right ventricular outflow tract (RVOT) when she was 18 years old. Echocardiography showed chronic moderate to severe pulmonary regurgitation (PR) with right heart enlargement, which was confirmed on a subsequent cardiac magnetic resonance imaging with indexed right ventricular (RV) end diastolic volume of 156.9 mL/m² and RV ejection fraction of 47%.

To release pulmonary insufficiency, she underwent TPVI with a 26 mm Venus-P valve (Venus Medtech, Shanghai, China) (Figure 1). The post procedure and one-month follow-up echocardiograms did not reveal any significant regurgitation or stenosis of the Venusvalve. However, two months after implantation, she presented with recurrent chills and febrile (temperature 38.5°C) for one week. She also complained of a toothache with dental caries several days before the fever, but never accepted any medical therapy.

Upon admission, the patient was evaluated with transthoracic echocardiography (TTE), which showed the vegetation was loosely attached to the pulmonary valve with floating, sized 9 × 3 mm; and the other mass was stuck on the stent below the valve, sized 12 × 6 mm. No signs of destruction with trivial PR were found under the leaflets. Progressive dysfunction of the transcatheter pulmonary valve (TPV) was identified with an increase in the peak systolic gradient to 35 mmHg (Figure 2). Enhanced CT scanning showed irregular filling defects inside the valve stent (Figure 3). Blood culture showed immediate growth of streptococcus viridians, and she was given penicillin and gentamycin, covered for 24 hours, according to the antibiotic susceptibility test. Moreover, the anticoagulant was increased, simultaneously combined with aspirin, to prevent pulmonary embolism. Thus, definitive TPV-related IE was diagnosed.

Due to achieving bacterial clearance, the patient did not show clinical deterioration. Her temperature returned to normal and blood cultures remained negative. She developed clinical signs of disseminated intravascular coagulopathy with INR of 2.1. She was reevaluated with echo every two weeks, which showed vegetation reduction, as

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well as the obviously decreased RVOT gradient (peak gradient of 13 mmHg) (Figure 4). Six weeks later, she was discharged with stable clinical status. During this period, she was recommended to manage the dental caries. Increased surveillance and guarded follow-up for endocarditis were also warranted for the patient. She was well at 12 months follow-up. TTE showed the vegetation completely disappeared and the valve functioned normally.
Discussion

TPVI, an alternative to open-heart surgery for RVOT valve implantation, was first described in 2000 by Bonhoeffer, et al. Venus-P valve is a unique, self-expandable, nitinol multilevel support frame with a tri-leaflet porcine pericardial tissue compared to other balloon-expandable valves such as the Melody valve (Medtronic Inc, Minneapolis, Minnesota, USA), which is the option for dilated patched RVOT. As is well known, TPVI has a higher incidence of IE than surgical homograft (7.5% versus 1.8%). Early onset of IE (defined as endocarditis within one year of implantation) is more frequent in the TPVI patients.

Risk factors of TPV-related IE included heterograft porcine pericardial tissue, like implanted valve, which was a potentially important substrate for such high susceptibility to endocarditis. Other factors, including sterile conditions of the cath lab, contaminated product, compression of the leaflets during valve preparation and loading, higher tropism for bacteria, higher thrombogenicity, lower rate of endothelialization, residual gradient or turbulence in the RVOT, onset of coagulation and thrombus formation, were conditions to early procedure-related IE.

Echocardiography is a vital part of the diagnosis and evaluation of IE. TTE is recommended as the initial imaging modality for all suspected TPV IE cases, and could detect more TPV involvement when combined with transesophageal echocardiography. The important characteristics in TTE are floating or fixed vegetation and leaflet thickening or redundancy. Moderate or severe TPV stenosis or obstruction with increased systolic gradient is usually presented, while significant regurgitation or pure regurgitation is uncommon.

It was reported the most frequent microorganisms were streptococcus and staphylococcus species, especially the former. It has a low risk of leaflet impairment or multiorgan abscesses and provided us more options for aggressive antibiotic therapy. Indications for acute surgery include heart failure (secondary to progressive RVOT obstruction), uncontrolled sepsis with septic shock, and persistent infection in the urgent cases. This case illustrates that patient with RV-PA (Pulmonary Artery) conduit endocarditis could be successfully managed with medication alone.

The case highlights increased surveillance and suspicion for TPV IE should be emphasized. Antibiotic prophylaxis should be recommended for all patients after TPVI, at least during dental and invasive procedures, to potentially decrease the risk of endocarditis.

Disclosures

Conflicts of interest: None.

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