

Recurrent infection and embolism following tricuspid valve repair for infective endocarditis in an intravenous drug user: A clinical dilemma

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Abstract

Management of infective endocarditis (IE) in intravenous drug users (IVDUs) can be challenging due to risk of reinfection following surgery. Although complex repair techniques that can be utilized to reconstruct the tricuspid valve after extensive debridement, treatment of active IVDU is incomplete without effective post-operative harm reduction intervention program.

Recurrent infection and embolism following tricuspid valve repair for infective endocarditis in an intravenous drug user: A clinical dilemma

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Key clinical message

Management of infective endocarditis (IE) in intravenous drug users (IVDUs) can be challenging due to risk of reinfection following surgery. Although complex repair techniques that can be utilized to reconstruct the tricuspid valve after extensive debridement, treatment of active IVDU is incomplete without effective post-operative harm reduction intervention program.

Introduction

Tricuspid valve infective endocarditis is an uncommon diagnosis and accounted for 5 to 10% of all infective endocarditis. It is commonly associated with intravenous drug use, intracardiac devices, and central venous catheters, all of which has become more common over the last decade(1). Despite appropriate early surgical therapy, the long term mortality and morbidity for intravenous drug users remain high due to recurrent infection from continued drug injection(2).

Case Report

A 24 years old female intravenous drug user (IVDU) was admitted to the hospital with malaise, chest pain and dyspnea. Past medical history included asthma, anxiety, hepatitis C, body mass index of 18, regular intravenous opiates and amphetamines use. Staphylococcus aureus was isolated from multiple blood cultures and the echocardiography scan revealed large vegetations on the anterior and posterior leaflets of the tricuspid valve. There was torrential tricuspid regurgitation as the leaflets were destroyed and failed to co-apt properly. A diagnosis of native tricuspid valve endocarditis was made according to Duke's criteria. Despite medical therapy with intravenous antibiotics the patient developed multiple pulmonary septic emboli with occlusion of pulmonary artery branch in the right lower lobe.

The patient underwent complex tricuspid valve repair without annuloplasty ring implantation. Intra-operatively, large vegetations were found attached to the anterior and posterior leaflets of the tricuspid valve (Figure 1). All the infected material (debris and the associated leaflets) were excised and removed completely. A pericardial patch was used to reconstruct the anterior and posterior leaflets of the tricuspid valve. The free edges of the pericardium patch were supported by two artificial polytetrafluoroethylene (PTFE) chords (Figure 2) . Intra-operative post-procedural trans-oesophageal echocardiography scan following surgical repair showed only trivial tricuspid regurgitation. Post-operative recovery was uneventful and she was discharged with oral anticoagulant and local counselling for drug rehabilitation. The patient was lost to follow up in the clinic due to non-attendance.

One year later, the patient was readmitted to the hospital with chest pain, palpitation and dyspnea. Sepsis screen was positive and the blood culture grew *S. aureus* in four separate samples. Echocardiography scan revealed a small mobile residual echogenicity attached to the septal tricuspid leaflet with mild to moderate tricuspid regurgitation and normal biventricular function. Further CT scan of thorax and ultrasound scan of lower limbs revealed recurrent pulmonary embolism and deep venous thrombosis. The patient recovered following a course of antibiotics. She underwent appropriate counselling and education about the importance of opioid cessation, medication compliance and regular follow up. The patient was enrolled in methadone rehabilitation program and was followed up by substance misuse team. The annual echocardiography scan for the last 5 years showed unchanged appearance of tricuspid valve with no obvious vegetations and no significant haemodynamic lesion across the repaired tricuspid valve.

Discussion

Infective endocarditis (IE) is a life-threatening condition with a 50% requirement for surgery and the mortality at one year is 30% (3). The primary objective of surgery is to eliminate the source of sepsis and embolism by radical debridement of all the infected materials. Any prosthetic material poses a rise of recurrent IE especially in IVDU and hence surgical management should strive to avoid artificial material insertion and focus on repair whenever possible. In a meta-analysis conducted by Yanagawa et al(4), tricuspid valve repair was associated with lower recurrent infective endocarditis (RR 0.17, 95% CI: 0.05 to 0.57, p=0.004) and need for reoperation (RR 0.26, 95% CI: 0.07 to 0.92, p=0.04).

Although drug addicts tend to be younger and have fewer risk factors, the main issue a clinician will likely encounter in this group of patient is the risk of reinfection. In a prospective study by Straw et al(2), the authors demonstrated that despite comparable early outcomes, the long-term survival is lower in IVDU group compared to non-IVDU group. Kim et al(1) compared IVDU and non-IVDU among 436 patients with infective endocarditis and they found that the rate of reinfection was higher in IVDU group (36% vs. 4%, p <0.001). It is notable that current guidelines suggest normal indications for surgery are applied to IVDU but the management must include treatment of addiction(3). This may pose a clinical dilemma on the threshold for surgery in active IVDU given the high recidivism rate and diminished survival benefits of surgery.

In our case study the patient is vulnerable from reinfection and complications of systemic embolism following surgery and we believe it is important to encourage uptake of local services and identify barriers to drug rehabilitation to improve long term outcomes. In a large contemporary analysis of 202 people with intravenous drug use and first-episode infective endocarditis, Rodger et al(5) found that the rate of referral

to addiction services is surprising low at 19.8% and that referral to addiction treatment is associated with improved survival (Hazard ratio (HR) 0.29, 95% CI 0.12-0.73, $p=0.008$). Long term success of surgery in IE is related to prevention of drug misuse and surgeons should make a concerted effort to collaborate with local providers to encourage patient uptake of local drug addiction services.

Conclusion

The case presented here not only highlights the complex nature of repair techniques that can be utilized to reconstruct the tricuspid valve after extensive debridement but also reminds us that in active IVU, treatment is incomplete without effective post-operative harm reduction intervention program.

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Author contributions

Author 1: Design, conception, planning, manuscript writing

Author 2 Design , manuscript writing and preparation

Author 3 Manuscript editing, review and approval

Author 4 Manuscript editing, review and approval

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