

Tricuspid valve endocarditis in a drug addict: will two operations do?

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A case of tricuspid valve endocarditis in a young drug addict is described which was treated surgically by valve replacement. Failure to stop intravenous drug abuse led to early destruction of the implanted bioprosthesis in a new onset of prosthetic valve endocarditis. A comparison of the operative findings at the initial operation and reoperation underlines the difficulties in the treatment of infective endocarditis in intravenous drug addicts. Different treatment strategies are discussed.

Key words: Tricuspid valve – Endocarditis – Drug abuse – Surgery

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V kasuistice je popsán případ endokarditidy na trikuspidální chlopni u mladého toxikomana, která byla řešena náhradou chlopně. Při pokračování v intravenózní aplikaci drog došlo k časné destrukci implantované bioprotézy v důsledku nové ataky protézové endokarditidy. Srovnání operačního nálezu při první operaci a reoperaci dokumentuje úskalí léčby infekční endokarditidy u intravenózních toxikomanů. V diskusi jsou probírány možné léčebné postupy.

Klíčová slova: Trikuspidální chlopeň – Endokarditida – Drogová závislost – Operace

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Case report

A 27-year-old male, an intravenous pervitine addict, was diagnosed with infective endocarditis of the tricuspid valve. *Staphylococcus aureus* was repeatedly isolated in blood cultures. Multiple pulmonary septic emboli were identified by computed tomography. Conservative treatment with antibiotics for 8 weeks led to a decrease of inflammatory signs; however, severe tricuspid regurgitation due to infective destruction of the valve, right ventricular overload and pulmonary hypertension were documented on echocardiography. On psychiatric examination, the patient denied continuation of drug abuse and proclaimed his firm intention to abstain. At surgery, the damaged tricuspid valve with fenestrations of the septal leaflet and large vegetations was replaced with an Epic SJM 31 bioprosthesis (Figures 1 and 2). The postoperative course was uneventful and patient discharged on the 14th postoperative day.

Fifteen months later, the patient was readmitted for rapid onset of sepsis and dyspnea. He denied drug administration

despite the presence of multiple skin puncture wounds and pervitine positivity in urine. *Staphylococcus aureus* was again the infective agent. Transesophageal echocardiography revealed large vegetations (21 × 12 mm) at the bioprosthesis creating severe tricuspid stenosis with a diastolic gradient of 16 mmHg. Uncontrollable sepsis and multiple pulmonary embolizations necessitated urgent reoperation. At surgery, massive vegetations were found at the bioprosthesis that virtually obliterated the tricuspid orifice and filled the inlet portion of the right ventricle (Figure 3). The infected bioprosthesis was replaced by a new one (also an Epic SJM 31). The postoperative course was critical due to circulatory shock, right ventricular and respiratory failure requiring extracorporeal membrane oxygenation (7 days), administration of nitric oxide and levosimendan, continuous dialysis. Despite various complications, the patient became gradually stable and, after 2 months at the intensive care unit (ICU), he was transferred to a regional hospital. At out-patient follow-up 5 months later, he was without signs of infections and in NYHA class II.

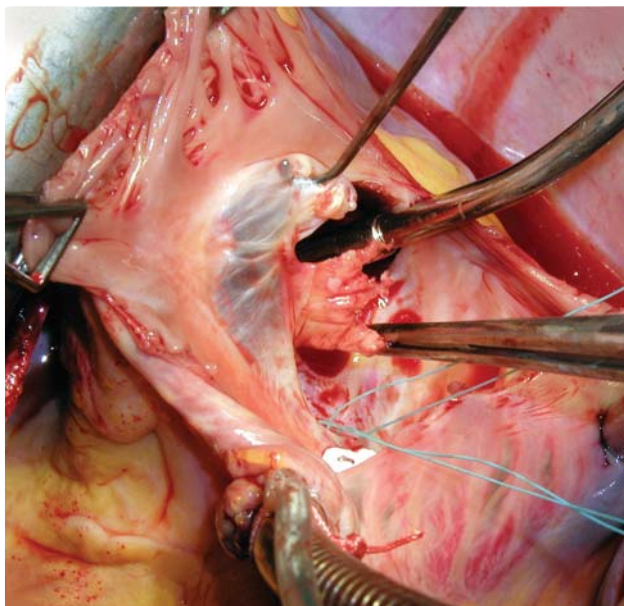


Figure 1 Large vegetations seated at the anterior tricuspid leaflet in native valve endocarditis (primary surgery)

Discussion

Tricuspid valve endocarditis is a disease typically associated with intravenous drug abuse although it may occur also in connection with right-sided catheterization, pacemaker implantation or congenital heart defects. Its prevalence among injection drug users in urban communities in developed countries has been increasing.¹ In this patient population, other frequently present medical factors (hepatitis, HIV, nutritional and immunological status), socio-economic status, poor adherence to therapy, and uncertain cessation of addiction affect the final results of treatment.

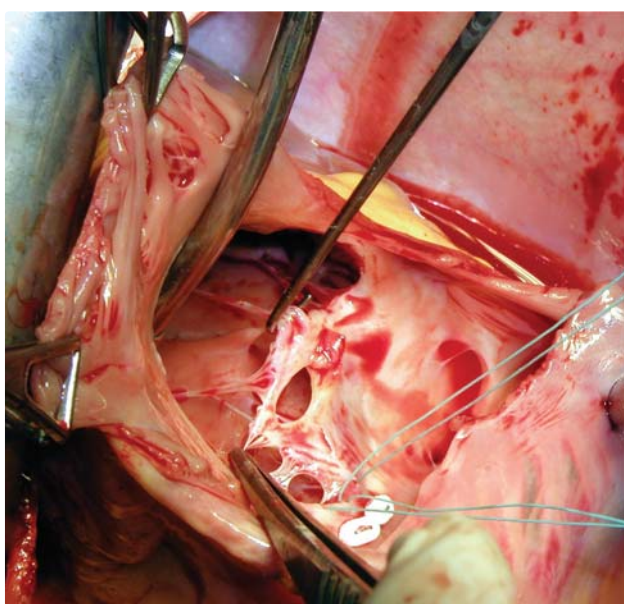


Figure 2 Multiple fenestrations of the septal leaflet resulting from infective destruction (primary surgery)

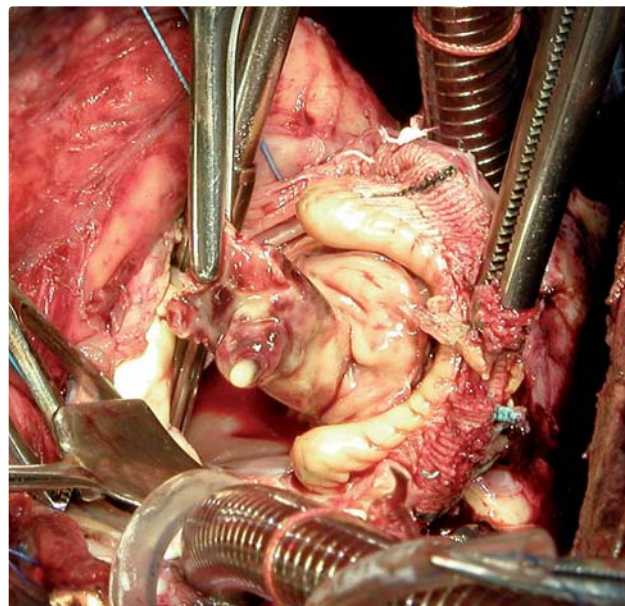


Figure 3 At reoperation, almost complete obliteration of the prosthetic orifice as well as of the inlet portion of the right ventricle due to vegetations was found

The dominant infective agent is *Staphylococcus aureus* (about 70% of infections), followed by streptococcal species, Gram negative organisms, fungi or diptheroids.¹ Clinical manifestations are usually persistent fever, bacteraemia, and multiple pulmonary emboli. Septic pulmonary emboli may lead to various pulmonary complications which compromise the right heart performance and ultimately result in right heart failure. Tropic infective destruction of the tricuspid valve causes tricuspid regurgitation, right-sided volume overload, chamber dilation, and right heart failure. Abscess formation is rare.¹⁻² Supraventricular arrhythmias occur frequently.

Tricuspid valve endocarditis is considered to be a relatively benign disease which responds well to medical treatment in a majority of cases.³ Surgical treatment is, however, indicated in uncontrolled sepsis and intractable right heart failure. Large-size vegetations (over 10 mm in diameter) and recurrent pulmonary embolizations speed up the indication for operation.

At surgery, the principles of removal of all infected tissue and restoration of valve competence have to be balanced with an effort to minimize implantation of foreign material with regard to unpredictable cessation of drug abuse. A reasonable attempt to repair the valve should be undertaken wherever possible. The conservative surgical procedure consists of vegetectomy² together with removal of the infected area of the leaflet. Involvement of a single leaflet only allows for total excision of the posterior leaflet or quadrangular resection of the anterior leaflet.⁴ Multileaflet infective involvement is a contraindication to valve repair. After excision of the infected tissue, valve competency is restored by suture techniques (Kay's bicuspidalization technique⁵ in the case of posterior leaflet resection and De Vega annuloplasty⁶ after partial resection of the anterior leaflet). Autologous pericardium

may be used for correction of defects or strengthening of the annuloplasty.²

Replacement of the valve may be the surgical option if the degree of valve destruction precludes its repair. Regarding choice of the valve for replacement, biological valves are generally preferred though supporting literature data remain controversial.^{7,8} Use of a homograft can also be considered.^{9,10}

An alternative strategy is excision of the tricuspid valve without its replacement. The rationale for such an approach is complete avoidance of artificial material in patients continuing their drug abuse and quick accomplishment of the procedure on the beating heart in severely compromised patients. As reported and advocated by Arbulu,¹¹ absence of the tricuspid valve can be tolerated quite well although in part of patients treated in such a way, right heart failure may later necessitate valve replacement.¹²

In our case, valve replacement was the only solution due to severe destruction of the valve and presence of pulmonary hypertension which contraindicated mere valve excision. Despite the imperative experience of cardiac surgery and intentions to stop drug abuse, the patient was not able to control his addiction. The resulting prosthetic endocarditis required difficult reoperation followed by a critical postoperative course. In light of the self-inflictive nature of this affection, the economic burden is also of interest. The total hospitalization bill for two cardiac operations in this patient was 2.3 mil. CZK (approx. 80,000 EUR).

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