

Bioprosthetic tricuspid valve degeneration: a challenging case report

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Résumé

Introduction: La sténose de la valve tricuspide est rare avec une prévalence inférieure à 10%. La dégénérescence de la bioprothèse est la cause principale, qui est une complication grave après RVT responsable d'insuffisance cardiaque et dont le traitement principal est une réintervention chirurgicale, mais elle est considérée comme à très haut risque. Différentes autres modalités de traitement existent comme l'implantation tricuspid valve-dans-valve et la valvuloplastie par ballonnet mais sont encore peu étudiées.

Présentation du cas: Un homme de 41 ans toxicomane actif consulte pour une insuffisance cardiaque droite. Aux antécédents de 2 remplacements valvulaires tricuspides par bioprothèse suite à une endocardite infectieuse. L'échocardiographie et la tomodensitométrie cardiaque ont montré une sténose sévère de la valve tricuspide.

Une réintervention chirurgicale présentait un risque accru car il s'agissait de sa troisième sternotomie. La valvuloplastie par ballonnet n'était pas possible en raison de l'IT sévère et le patient n'était pas disposé à s'abstenir. Le patient est donc sorti sous traitement médical avec un suivi clinique et échocardiographique.

Conclusion: Bien que rare, la dégénérescence d'une bioprothèse en position tricuspid est une complication extrêmement grave. Différentes modalités de traitement existent mais en l'absence d'études confirmant la supériorité de certains sur les autres, une prise en charge au cas par cas est nécessaire.

Mots-clés

Dégénérescence, tricuspid, bioprothèse

Summary

Background: Tricuspid valve stenosis is very rare. One important cause is bioprosthetic tricuspid valve degeneration, which is a serious complication after tricuspid valve replacement. Redo surgery has been the standard of care for significant prosthetic valve degeneration but it is deemed at very high risk. Different other treatment modalities exist like tricuspid valve-in-valve implantation and balloon valvuloplasty.

Case presentation: An active intravenous drug using 41-year-old man consulted for right sided heart failure. His history included 2 tricuspid valve replacements by bioprostheses for infective endocarditis. Echocardiography and cardiac computed tomography showed severe tricuspid valve stenosis.

A tricuspid valve replacement was considered at increased risk because this would have been his third sternotomy. Balloon valvuloplasty was not possible due to the severe tricuspid regurgitation and the patient was not willing to abstain from drugs. The patient was therefore discharged on medical treatment with active clinical and echocardiographic follow-up.

Conclusion: Although rare, bioprosthetic degeneration in the tricuspid position is an extremely serious complication. Different treatment modalities exist but in the absence of studies confirming the superiority of some over the other, a case by case management is necessary.

Keywords

Tricuspid, bioprostheses, degeneration

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BACKGROUND

Tricuspid valve stenosis (TS) is very rare with a prevalence inferior to 10% (1). Many mechanisms are responsible for this condition, mainly rheumatic heart diseases (2). Less common etiologies include congenital heart disease, infective endocarditis with large vegetations, pacemaker lead insertion across the tricuspid valve and carcinoid syndrome (2). Another important cause is bioprosthetic tricuspid valve degeneration, which is a serious complication after tricuspid valve replacement (TVR).

Redo surgery has been the standard of care for significant prosthetic valve degeneration but it is deemed at very high risk (3)

Herein we present an interesting case of a young active drug user with a history of 2 tricuspid valve surgeries for infective endocarditis presenting with tricuspid bioprostheses degeneration.

CASE PRESENTATION

A 41-year-old man presented with symptoms of right-sided heart failure. His history was significant for active intravenous drug use (IVDU) and tricuspid valve (TV) infective endocarditis in February 2011 caused by *Staphylococcus aureus* for which he received IV gentamycin for 2 weeks and IV vancomycin for 6 weeks and on week 7 he had undergone TV replacement (TVR) with the use of a 29 bovine bioprostheses. The operation was complicated by complete Atrioventricular (AV) block treated with an epicardial pacemaker (PM). Four months later, he was hospitalized for fatigue and fever. Echocardiography revealed a vegetation of 2.6cm² on the TV bioprostheses. He was put on antibiotics and underwent a second TVR with bovine bioprostheses. The patient was lost to follow-up until his current consultation.

His vital signs at presentation were as follows: blood pressure of 160/75mmHg, heart rate of 40 b.p.m. and respiratory rate of 18 cycles/min. His jugular venous pressure was elevated. Lung sounds were normal; however, there were signs of right heart failure. A 12-lead electrocardiogram (ECG) showed complete AV block suggesting a non-functioning PM. An echocardiogram showed thickened leaflets of the bioprosthetic tricuspid valve, with restricted opening and turbulent flow across the tricuspid valve (Figure 1). Doppler examination showed a markedly high TV gradient up to 16.5mmHg and a peak velocity of 2.5m/s (Figure 2A, B, C and D).

Doppler velocity index was 6.5 confirming the stenosis. Severe Tricuspid regurgitation (TR) was also noted. The size and function of the left ventricle were normal, but the right ventricle and the right atrium were enlarged (Figure 3A and B). The aortic, mitral, and pulmonic valves appeared to be normal. Transesophageal echocardiography confirmed the diagnostic of bioprosthetic degeneration.

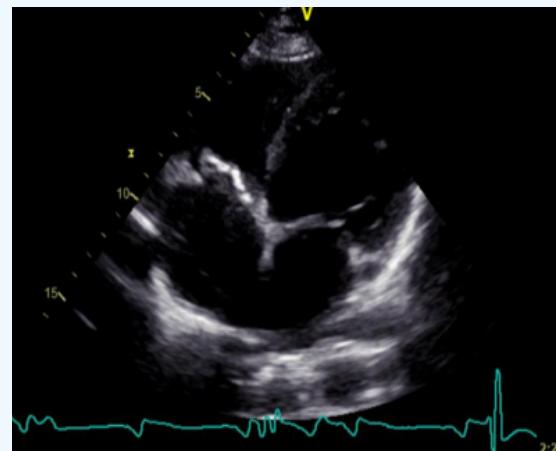


Figure 1: 2D echocardiography in the apical 4 chambers view showing thickened leaflets of the bioprosthetic tricuspid valve.

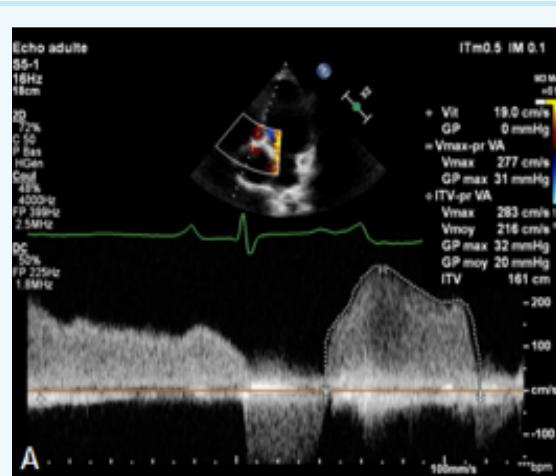


Figure 2: Doppler echocardiography of the tricuspid valve showing markedly high TV gradient peak velocity.

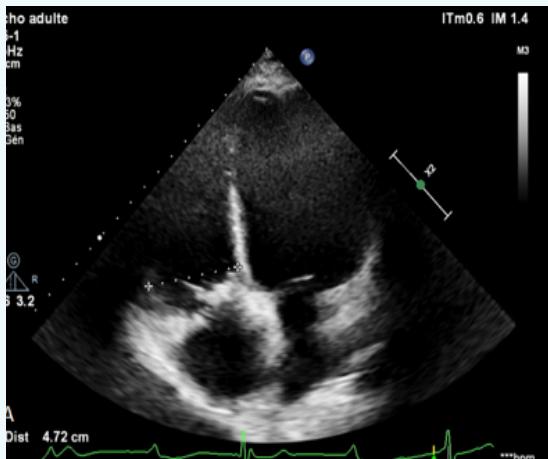


Figure 3: 2D echocardiography in the apical 4 chambers view showing dilated right cavities.

Cardiac computed tomography scan showed thickening and calcification of the 3 leaflets of the tricuspid valve with failure to open of the septal and anterior leaflets. No vegetation, no thrombus and no pulmonary embolism were diagnosed. PM telemetry was not possible, we proceeded therefore to changing the PM pocket. A second telemetry revealed failure to output. A test with 10V showed intermittent stimulation. Fibrosis around the epicardial lead was suspected.

The patient noted symptom improvement after he was put on high dose IV diuretics

A tricuspid valve replacement was considered at increased risk because this would have been his third sternotomy. Balloon valvuloplasty was not possible due to the severe TR.

Transcatheter Valve in valve implantation is a good alternative but the patient was not willing to abstain from drugs. Tricuspid valvectomy with epicardial PM lead and its tunneling to the pocket was discussed. Finally, the patient refused any intervention and was discharged and medically treated. Follow-up at 3 months noted no symptoms aggravation and no hospitalization.

DISCUSSION

Bioprosthetic TS is defined as a mean tricuspid valve gradient greater than 5mmHg (measured and averaged from at least five cardiac cycles) (2). Bioprosthetic valve dysfunction or obstruction usually results from leaflet calcification, thrombosis, pannus ingrowth, or

vegetation (1).

Patients with TS usually present with syncope and signs of right-sided heart failure, such as hepatomegaly, anasarca, lower-extremity edema, and ascites but early diagnosis can be made with serial echocardiographic examination.

In a patient with symptomatic TS, intervention should be considered. the American College of Cardiology/American Heart Association 2014 valvular heart disease guidelines give surgical replacement a class I recommendation for both tricuspid bioprosthetic and native valve stenosis (3) but redo surgery is associated with mortality ranging from 17% to 37% (3).

Transcatheter tricuspid valve-in-valve implantation may be an attractive alternative to redo valve surgery, yet it is an under-explored treatment option and rather exceptional (5).

The largest series published to date, the tricuspid VIVID registry (6), on the outcomes of 152 patients confirmed high procedural success (99%) as well as excellent safety. All-cause mortality was low, with a reported incidence of 3% at 30 days and a total of 22 deaths (15%) during a median follow-up period of 13 months.

Bioprosthetic percutaneous tricuspid transcatheter balloon valvuloplasty (PTTBV) can also be an appropriate consideration for patients who are not surgical candidates or are at high risk of surgery because of comorbidities, and who have mild TR (7).

Data on PTTBV in patients with bioprosthetic TS are more limited still, consisting of isolated case reports (8,9) and Long-term follow-up data, when available, in patients treated with PTBBV identified cases of restenosis (8,10).

There have been no randomized controlled trials to prove the efficacy of PTTBV so Further evidence is required before we can recommend PTTBV as a frontline therapy for such patients;

A rarely considered forth option is tricuspid valvectomy, which has been proposed to completely avoid any foreign material in cases of high recidivism in the intravenous drug use population, intractable infection, or poor compliance with antibiotic therapy (7).

Tricuspid valvectomy can be a feasible option in patients with active ongoing IVDU, normal pulmonary pressure, normal biventricular heart function, high degree of valvular destruction and high risk of reoperation, recidivism and recurrence for infection (11).

Medical management for intravenous drug using patients remains the mainstay of therapy. This case illustrates the difficulties faced by medical care givers to present the best treatment possible and to take account of the patient's history. In fact, the decision of choice and whether to offer surgical therapy for patients with active intravenous drug using is a complex one with social, clinical and ethical considerations

CONCLUSION

Although rare, bioprosthetic degeneration in the tricuspid position is an extremely serious complication. Different treatment modalities exist but in the absence of studies confirming the superiority of some over the other, a case by case management is necessary.

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