

## Tricuspid Valvectomy in Drug Addicts with Native Valve Endocarditis: A Case Series

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### Abstract

From Jan –2004 to Dec-2004, five patients were referred to the surgical department with a diagnosis of endocarditis refractory to medical therapy. Patients were all male, age ranging 16 years to 28 years with a mean of 22 years. All of the five patients had native valve endocarditis of the tricuspid valve with a history of drug addiction in common. Their presentations included, sepsis, failure and recurrent pulmonary embolism. Three of them had bacterial, while two had fungal infection which was proven after blood cultures. After resuscitation, stabilization and preoperative workup, tricuspid valvectomy was performed on these patients because of the destructive and irreparable nature of the native valve. Fortunately, all had uneventful recovery after surgery. Pre-operatively these patients were treated with antibiotics and antifungals, and continued thereafter for almost 4 to 6 weeks in the post-operative period. Postoperatively there was significant tricuspid regurgitation in a subset of patients who had a follow-up. The Left Ventricular (LV) function remained normal to moderate with a moderate pulmonary artery pressure. These patients were discharged on antibiotics and anti-failure medications as per the GDMT.

**Conclusion:** Tricuspid valvectomy is an acceptable approach for treatment of the native valve endocarditis with redundant leaflets. Patients who develop significant right-sided heart failure can be treated with valve replacement later on, provided they must have given-up drug addiction.

**Keywords:** Tricuspid Valve; Valvectomy; Endocarditis

## Introduction

Infective Endocarditis (IE) is an infection of the endocardium that typically affects one or more heart valves. The condition is usually a result of bacteremia, which is most commonly caused by dental procedures, surgery, distant primary infections, and nonsterile injections.

Tricuspid valve endocarditis is a rare disease that is primarily found in intravenous drug abusers. Its occurrence is quite less than the left-sided endocarditis, however, it has a better prognosis. Right-sided infected infective endocarditis accounts up to 5 to 10 percent among all the cases of infective endocarditis (IE). Medical management is the mainstay of treatment but surgical intervention is required in a subset of patients. Surgical treatment options include valve excision and replacement or valve reconstruction.

Surgical treatment of IE is reserved for individuals with the following: [1-3]

- TV vegetation > 2cm with septic pulmonary emboli.
- Persistent bacteremia for one week despite adequate treatment.
- Severe tricuspid regurgitation with right-sided heart failure.

## Methods

Between Jan 2004 to Dec 2004, a total of five patients was referred to the surgical department for tricuspid valve endocarditis. These were all male patients having a history of I/V drug abuse in common. Age ranging from 16 to 28 years mean 20 years. They were all admitted as emergency on the medical floor for sepsis, right-sided failure and recurrent pulmonary embolism.

Echocardiography was performed on all of these patients and was found to be positive for tricuspid regurgitation with vegetations on the tricuspid valve.

Blood cultures of these patients were positive for Staph. Aureus in three patients and Aspergillus fumigatus in two patients. The patients with bacterial infection were started on with Benzyl penicillin, third generation Cephalosporins where as the two other patients with fungal infections were commenced on Vancomycin, Amphotericin and third generation Cephalosporins.

Three of these patients had a history of recurrent embolization and hemoptysis and were operated upon with in two weeks. The other two patients failed to respond to medical treatment with persistent sepsis and were operated later than two weeks (Table 1).

| Gender        | Male                                     |
|---------------|--|
| Age           | 16-28 yrs                                |
| Cultures      | 3-staph aureus, 2 aspergillus fumagatus  |
| Antibiotics   | B. Penicillin, Cephalosporin, Vancomycin |
| Surgery       | Valvectomy                               |
| Ventilation   | 12-24 hrs                                |
| Follow up     | 6 months, two lost                       |
| Complications | One resumed addiction                    |

**Table 1:** Patients requirements

## Surgical Technique

Conventional median sternotomy and standard CPB was established with bicaval venous drainage, caval snaring. Return was in the usual fashion through the aortic cannula to the ascending aorta. Temperature was cooled down to 28 degrees Celsius and St. Thomas cold crystalloid Cardioplegia was used for myocardial protection added with topical cooling. Through right atriotomy tricuspid valves were exposed and examined to determine the damage. In three patients the valves were completely eaten up with vegetations which was extending into sub-valvular apparatus. The valve along with the apparatus was excised and sent for culture and sensitivity (C/S). In the other two patients only, the leaflets were involved in one and the septal leaflet was hardly preserved. The apparatus and the tissues were friable as a common entity, thus the option for replacement was deferred. The excised leaflets along with the vegetations were sent to the laboratory for Culture sensitivity. Patients were weaned off bypass uneventfully and after hemostasis the chest was closed routinely. Patients were shifted to the intensive care unit (ITU) with touch of inotrope mainly epinephrine (Figures 1 and 2).



Figure 1: Vegetation

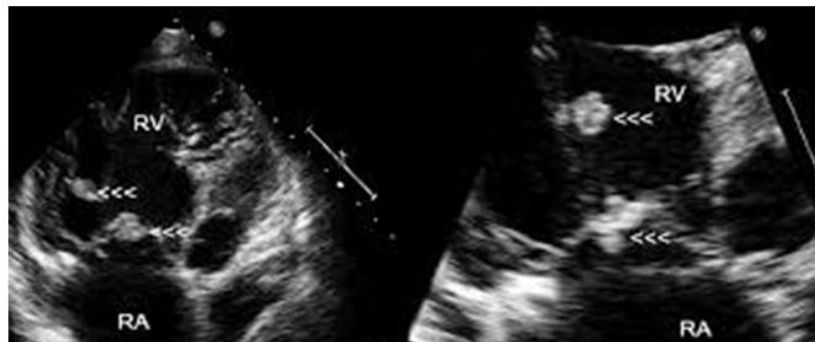


Figure 2: VEcho

## Results

Post operatively these patients were nursed in the cardiac intensive treatment unit (ITU), with a ventilation time of 12 to 24 hours approximately. There was no surgical morbidity or mortality and the patients had a smooth ITU stay mean of 5 days. The patients were shifted from the cardiac ITU to the ward in stable condition. The antibiotics and antifungal treatment were continued post operatively and the regime was continued for six to eight weeks on case-to-case basis. Thorough psychological and post-operative standard care counseling of these patients was done after which they were discharged from the hospital.

## Follow up

These patients were followed up after discharge with 1, 3 and 6 months of intervals. Two of these patients were lost to follow up. One of these patients was reported to have recommenced I/V drug abuse and was referred elsewhere for rehabilitation. The remaining two patients remained free from addiction until the last follow-up with acceptable functional class of NYHA-II and the one with addiction was in NYHA-III of heart failure.

These patients were treated medically later in the follow up in addition to psychotherapy and with home healthcare counseling as a corner stone.

Echocardiography performed at six-month interval and is done in one patient so far. Left Ventricular function remained normal with moderate to severe tricuspid insufficiency and a pulmonary artery pressure of 45 mmHg.

## Discussion

Tricuspid endocarditis is a rare disease and mostly affects the drug addicts. The commonest organisms are *Pseudomonas aeruginosa*, *Staph. Aureus*, Gram negative organisms and candida species. Medical management is the mainstay of treatment but surgical intervention is required in a subset of patients. Surgical treatment options include valve excision and replacement or valve reconstruction. Surgical management of tricuspid valve endocarditis can be achieved with satisfactory outcomes. However, the optimal indication and timing of surgery remain unclear, and the frequent association with intravenous drug use complicates management. Repair techniques are preferable though there is no clear evidence supporting one method over another [1-3]. Few authors have reported that tricuspid repair had better early survival and RHF rates as compared to Tricuspid valve replacement, while in other studies there was no significant difference between replacement and repair. In the early reports of Tricuspid valve replacement, there was a high incidence of valve-related complications including reinfection, heart block, prosthetic thrombosis, and poor hemodynamic performance, which may explain the former indifference. The Society of Thoracic Surgeons and European Society of Cardiology guidelines recommend debridement of the infected area, tricuspid repair for native TVE (Class I recommendation), and the use of a mechanical or stented tissue valve, if repair is not feasible (Class IIa recommendation) [4-7].

Arbulu et al. was the first to describe the valvectomy procedure in patients with Tricuspid valve endocarditis result in severe destruction of valvular structures. However, they showed that right ventricular dysfunction might develop approximately in one-third of patients due to pulmonary hypertension secondary to multiple pulmonary emboli. Tricuspid valvectomy with replacement in the same sitting also has a high mortality due to inability to control persisting or recurrent infection. Reinfection due to return to drug abuse becomes a fatal complication due to non-compliance of the patients to anticoagulation and medical therapy. [1,2,8-16].

Tricuspid valve excision leads to severe Tricuspid regurgitation but if the valve replacement is done as a primary treatment, then the chances of prosthetic valve endocarditis are higher specially when the I/V drugs abuse is continued. The late mortality in these patients is mostly from drug addiction than the right-sided failure. Patients who give up drug addiction and develop right-sided failure can be considered for valve replacement later. Bioprosthetic valve is ideal in the elderly patients but in young patients a low-profile large size mechanical prosthesis can be used and will require lifelong anti coagulation unless contraindicated otherwise. Tricuspid valve repair in endocarditis has been recommended but most of the time these valves are so badly infected and dysfunctional that the repair becomes beyond the scope of surgery [1,3-5,7,15,16].

## Conclusion

Tricuspid endocarditis is a rare disease mostly affecting I/V drug abusers. Tricuspid valve replacement or excision (valvectomy) remains the treatment of choice in selected subjects. These patients can be managed medically after surgery specially for the right-sided heart failure. Patients who develop severe right-sided failure and give up I/V drug abuse should be considered for Tricuspid valve replacement later in the life when and as indicated. The choice of the prosthesis, mechanical or biological, depends upon the demographics of the patient. In patients above 70 years of age, bio-prosthesis should be used as the valve of choice, while in the young patients, low profile large sized mechanical prosthesis should be used with lifelong anticoagulation unless there is no contraindication for anticoagulation.

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