



# Surgery of Tricuspid Valve Infective Endocarditis Associated with Myelodysplastic Syndrome

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## Abstract

Isolated tricuspid valve infective endocarditis occurs quite infrequently and differs from left-sided infective endocarditis in several aspects. Medical therapy is very effective and surgical intervention is a rare clinical entity for this subset of patients. However, the operative mortality is similar to that of left-sided infective endocarditis. It might be the reason that the surgical indications for tricuspid valve infective endocarditis are not well defined. The predisposing conditions such as hematological malignancy for right-sided infective endocarditis also affect complications of open heart surgery. We experienced a 56-year-old female with the association of tricuspid valve infective endocarditis and myelodysplastic syndrome. Surgery comprising vegetectomy and tricuspid valve repair was successfully employed after the failure of medical treatment due to deterioration of immunity by myelodysplastic syndrome.

**Keywords:** Endocarditis; Surgery; Myelodysplastic syndrome; Cardiology

## Introduction

Tricuspid Valve Infective Endocarditis (TVIE) comprises about 5% to 15% of all cases of Infective Endocarditis (IE) [1-3]. TVIE differs from left-sided IE in several aspects including predisposing factors. Despite the rare occurrence of TVIE, the incidence is increasing rapidly because of the recent exponential increase in implantable device such as pacemakers, defibrillators, indwelling central venous catheters and intravenous drug use [2,4]. The primary therapy for isolated TVIE is medically and is very effective with less than 5% of a hospital mortality [5,6]. Although only 4.1% of TVIE was treated surgically, the risk of surgery remains similar to that of left-sided IE. The early surgery is warranted for patients with TVIE when they are bacteremia and/or systemically infected despite optimal medical treatment [7,8]. The treatment strategy should be modified depending on the etiology such as hematological malignancy which resulted in immunodeficiency. Myelodysplastic Syndrome (MDS), a preleukemic disorder, is a subset of this kind of disease and greatly affects perioperative condition of cardiac surgery [9-11]. Here in, we present a successful surgical intervention of TVIE caused by MDS with consideration of surgical indication and procedures for TVIE.

## Case Presentation

A 56-year-old female was referred to Nagoya City University Hospital with pancytopenia and acute renal failure after four months' treatment of antibiotics therapy for low grade fever elevation based on a diagnosis of bronchitis at another hospital. She was healthy by nature and had no history of dental work and/or carries recently. Abnormal laboratory data at the admission was as follows: leukocytes 3020/ $\mu$ l, Hemoglobin 5.3 g/dl, platelets 35000/ $\mu$ l, C-reacting protein 2.9 mg/dl, BUN 66.8 mg/dl, Cre 5.41 mg/dl, BNP 139 pg/ml, CH50 10 U/ml, C3 19 mg/dl, C4 4 mg/ml. Echocardiography demonstrated two vegetations sized 28 mm  $\times$  16 mm and 20 mm  $\times$  18 mm, respectively, attached to the tip of the Anterior Tricuspid valve Leaflet (ATL) and severe Tricuspid valve Regurgitation (TR) (Figure 1). Computerized tomography indicated a pulmonary embolism. *Enterococcus faecalis* was detected in blood cultures. Thus, a diagnosis of TVIE was made and appropriate antimicrobial therapy comprising ABPC/SBT 6 g/day and GM 100 mg/day was initiated. Renal insufficiency appeared to be infection-associated immune complex nephritis. MDS was diagnosed by a bone marrow biopsy for her pancytopenia. In spite of appropriate antibacterial treatment during seven days, the reduction of vegetation and the improvement of renal function could not be established. Surgery was employed on the 10 days after admission with preoperative transfusion of platelets to correct the count from 24000/ $\mu$ l to 72000/ $\mu$ l. Two large vegetations were observed on the tip

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**Figure 1:** Transthoracic- echocardiogram showed two vegetations (white arrows) and severe TR.



**Figure 2:** (A) Two huge vegetations were attached to the anterior leaflet of tricuspid value. (B) Resection (vegetectomy) and sutures with Kay's annuloplasty were performed.

of ATL (Figure 2). One sized 25 mm at the tip of antero septal side of ATL and another sized 20 mm at the anteroposterior were fragile. Both of vegetations were completely removed including their conjoined loci to ATL by wedge-resections. Defects were repaired by direct suture in ease. Although the entire annulus of TV did not extend, anteroposterior commissure area showed poor coaptation with localized dilatation proved by water test. A Kay's annuloplasty was placed at the area (Figure 2). Separation from CPB was smooth without TR and hemostasis was completed without problem. Postoperative bleeding and infection including surgical site infection did not occur. We continued antibiotic therapy for four weeks after surgery. Even normalizing the blood data of inflammation and renal function without dialysis, pancytopenia did not improve, eventually. She was discharged independently on the 35 postoperative days. No recurrence of infection and TR has been confirmed one year after the surgery.

## Discussion

Right-sided IE is different from left-sided IE in several points as follows: incidence, etiology, treatment strategy, and prognosis. The predisposing factors also include immunodeficiency disease [1]. MDS was highly considered to be a causative factor in our case. Patients with MDS have risks of infection, hemorrhage and transformation due to acute myelogenous leukemia [11]. Thus, MDS must affect treatment strategy of IE concerning perioperative infectious management and surgical procedure in particular. Although no clear guidelines of cardiac surgery associated with MDS are defined, replacement and pharmacotherapy are important perioperatively. We managed the patient with the following benchmarks: leukocytes  $\geq 3000/\mu\text{l}$ , hemoglobin  $\geq 6.0$  g/dl, and platelets  $\geq 30000/\mu\text{l}$ . No granulocyte colony stimulation factor was administered because of acceptable level of her granulocytopenia. The prognosis of TVIE is also comparatively good, and most cases are successfully treated medically [6]. Therefore, surgical timing and indication is relatively difficult

to decide in TVIE. The European Society of Cardiology stated that surgery should be considered in the following situations with class IIa recommendations: (1) right heart failure secondary to severe TR with poor response to diuretic therapy, (2) IE caused by organisms that are difficult to eradicate (e.g. persistent fungi) or bacteremia for at least 7 days despite adequate antimicrobial therapy, and (3) tricuspid valve vegetations  $>20$  mm that persist after recurrent pulmonary emboli with or without concomitant right heart failure [1]. We converted a treatment policy to surgical intervention for the reason that neither reduction of vegetation nor remission of immune-complex nephritis was obtained despite the appropriate antibiotics with underlying MDS condition. Consideration must be taken in several important surgical aspects. Successful surgery requires radical debridement of infected tissue first. Renzulli et al. [12] reported that it is possible to repair up to 3/4 destruction of one valve leaflet or destruction of the posterior leaflet and other 1/3 leaflet in TVIE. The vegetation masses and infected loci were confined to the edge of ATL, meaning that resection volume of the leaflet was small and only direct suture were available to accomplish valve repair. However, extensive defect of leaflet should be augmented by autologous pericardium patch [13]. In cases with underlying illnesses or when treating younger individuals, infection recurrence and the complications associated with artificial valves should be considered. In particular, given the presence of MDS synthetic device including annuloplasty ring and postoperative anticoagulant therapy should be avoided. Although the fixing of a synthetic annulus is linked with long-term improvement of TR, suture annuloplasty such as Kay's procedure has an advantage of avoiding prosthetic materials infection [13,14].

## Conclusion

We report a successful surgery of TVIE caused by MDS. Although TVIE is rare and treated medically in usual, the surgical risks remain similar to that of left-sided IE. The treatment strategy should be modified and tailored depending on the etiology.

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