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Original Article

Tricuspid valve endocarditis in non-drug abusers: A case series from India

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ABSTRACT

Objective: The etiology of tricuspid valve endocarditis (TVE) seems to be different in our country as intravenous (IV) drug abuse is not known to be a major health hazard. The objective of this communication is to study the risk factors, clinical profile, follow up data of TVE patients and focus on the difficulties in diagnosis and variations encountered.

Methods: A retrospective analysis of data of ten patients of TVE managed in a tertiary care centre during January 1992 to June 2015 was done.

Results: TVE was encountered in a diverse subset of patients with cardiac implantable electronic device (CIED) (group I; 3 patients), immunocompromised state with indwelling central venous catheter (CVC) (group II; 2 patients), congenital heart disease (CHD) (group III; 3 patients) and in apparently healthy individuals (group IV; 2 patients). Blood cultures were negative in half the patients. In group I early surgical extraction of leads, device and vegetation provided excellent results. Prognosis was poor with 100% mortality in immunocompromised patients. Patients in group III did well on medical management. The overall mortality was high (30% in hospital and additional 20% within one year).

Conclusions: TVE is rare and can occur in different clinical scenarios. Indiscriminate use of antibiotics modifies the clinical picture causing delay in diagnosis and referral to speciality care. Echocardiography remains the main modality and should be used serially to facilitate early diagnosis. The prognosis is guarded. Early surgery is recommended in pacemaker lead, fungal endocarditis, persistent sepsis or hemodynamic instability for favorable prognosis.

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1. Introduction

Tricuspid valve endocarditis (TVE) is rare and mainly reported in intravenous (IV) drug abusers in the western literature. Endocarditis due to IV drug abuse is virtually unreported in India.^{1,2} TVE in non-drug abusers can occur in a variety of conditions including congenital heart disease (CHD), intra-cardiac devices, central venous catheters, immunocompromised patients and community acquired infections.^{3,4}

There are case reports of TVE and right sided endocarditis in Indian literature.^{1,2,5–8} The aim of this communication is to report clinical, investigative, management and outcome data in ten patients of TVE seen in our unit during the last 23 years.

2. Methods

The material for this study is obtained from records of academically interesting patients maintained by the author in a tertiary care referral postgraduate teaching institute. During 1992 to 2015, 10 cases of TVE were diagnosed, treated and followed up. The records of these cases form the material for this analysis.

The diagnosis of TVE was entertained on the basis of modified Dukes criteria.⁹ There was no history of intravenous drug abuse in any of the patients. Patients were categorized in four groups based on predisposing factors.

Group I: Cardiac implantable electronic device (CIED)

Group II: Immunocompromised state with indwelling central venous catheter (CVC)

Group III: Congenital cardiac malformation

Group IV: Unknown etiology

Clinical data, management details and follow up information was analyzed. Detailed laboratory workup including complete blood count, erythrocyte sedimentation rate (ESR), renal and liver function test and blood cultures were studied. Electrocardiogram

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(ECG), X-ray chest, echocardiography, computed tomography (CT) of chest (three patients) and surgical details (four patients) along with culture from excised material was available (three patients).

3. Results

Group I includes three patients with prior single (2) or dual chamber (1) pacemaker (PM) implantation. **Table 1** shows relevant clinical data. Cases 1 and 3 underwent pulse generator re-implantation due to pocket infection. Prior to referral to our center all had febrile illness, multiple hospitalisation and had received several courses of antibiotics. Transesophageal echocardiography (TEE) image from case 1 is shown in **Fig. 1A**.

Antibiotic therapy as per culture sensitivity (case 1 and 3) and empirical (case 2) was administered for six weeks. Case 1 underwent surgical removal of endocardial leads and vegetation from tricuspid leaflet along with epicardial lead placement. Patient improved rapidly and had an uneventful course during the next 14 years. Case 2 and 3 refused surgery and died of intractable heart failure within one year.

Group II data is shown in **Table 2** and includes patients with immunocompromised state and indwelling CVC.

Case 4 with chronic kidney disease (CKD) on maintenance dialysis through hemodialysis (HD) catheter was referred with febrile illness of three weeks, hemoptysis and tachypnea. ECG revealed sinus tachycardia, S1Q3T3 pattern and skigram chest showed multiple areas of consolidation consistent with pulmonary embolism. Despite antimicrobial therapy as per culture sensitivity he had rapid deterioration and death within a week due to multi-organ failure.

Case 5 had received cyclophosphamide and adriamycin chemotherapy for non-Hodgkins lymphoma through Hickman catheter. There was leucopenia and thrombocytopenia after chemotherapy with high grade fever and right heart failure. Skigram chest showed Hickman catheter port and multiple areas of consolidation. Transthoracic echocardiography (TTE) image is shown in **Fig. 1B**. Despite IV amphotericin B, oral itraconazole, multiple platelet transfusions, surgical excision of tricuspid valve vegetation and removal of Hickmans port, patient expired as a sequel to immunocompromised state. **Fig. 1C** shows echocardiogram performed after surgery.

Group III data is summarized in **Table 3**. All patients had underlying perimembranous ventricular septal defect (VSD) with left to right shunt. The VSD was restrictive and measured between 4 and 6 mm. Clinical presentation was dominated by febrile illness of 2–6 months with anemia, leucocytosis and elevated ESR. The referral diagnosis was pneumonia in case 6 and 7 which was unresponsive to multiple short courses of antibiotics. **Fig. 1D** shows vegetation in case 7.

Case 8 had fever, hemoptysis and was on empirical anti-tubercular treatment prior to cardiology referral. CT of chest revealed large irregular area of consolidation in anterior segment

of right upper lobe with multiple small nodular opacities in bilateral lung fields interpreted as pulmonary emboli and its sequel (**Fig. 2A**). Culture guided antibiotic therapy for six weeks resulted in clinical remission, negative blood cultures and disappearance of vegetation on TTE (**Fig. 2B** and **C**). Dental, ear, throat and other relevant check-up did not reveal any focus of infection.

The relevant data of **Group 4** is summarized in **Table 4**. Clinical presentation was marked by fever, pulmonary emboli (pneumonia) and right heart failure. The underlying risk factor for infective endocarditis was unclear in both the cases.

Case 10 was referred with diagnosis of pneumonia. There was right heart failure and tricuspid regurgitation (TR) with no clinical improvement despite antibiotics, decongestive and supportive medication. Excision of vegetation along with tricuspid valve (TV) replacement using 29 mm Sorin Biomed Biocarbon metallic valve was performed. Histopathology of excised valve tissue showed markedly thickened valve with fibro-collagenous tissue infiltrated with neutrophils, mononuclear cells, histocytes and multinucleate giant cells. Surface of the valve was covered with necrotic slough containing fungal hyphae. IV amphotericin B was administered for eight weeks followed by oral fluconazole 200 mg daily indefinitely. At 15 years follow up, patient is asymptomatic with normal functioning tricuspid valve. International normalized ratio is maintained around 3.

3.1. Summary of results

CIED (30%), CHD (30%) and CVC (20%) were common predisposing factors. Majority (70%) of the patients were male aged 7–68 years (average 35). Chest x-ray suggested features of pneumonia/pulmonary infarction in 7 (70%) patients. Blood cultures were negative in 50%. TTE provided diagnostic information in 8 (80%) patients and TEE was superior in CIED group. The overall in hospital mortality was 30% with invariably fatal outcome in immunocompromised patients.

4. Discussion

TVE in western world is predominantly reported in IV drug abusers. In earlier series from India right sided endocarditis was seen in CHD or in patients with puerperal sepsis and septic abortion.^{1,2} Compared to earlier series, TVE was encountered in a diverse subset of patients. There were several underlying risk factors which led to endocarditis. In young individuals it was usually due to underlying CHD, whereas pacemaker lead related TVE occurred in elderly population. In patients with CVC and immune compromised state, TVE was seen in a child and an adult. Surprisingly, TVE occurred in two apparently healthy individuals without any obvious cause. Despite advances in diagnosis the recognition of TVE remains difficult. Indiscriminate use of antibiotics modifies the clinical picture causing delay in diagnosis and

Table 1
Clinical data in group I.

Case (year of presentation)	1 (1996)	2 (1998)	3 (2001)
Age, sex	68, M	60, F	65, F
Risk factors	PM (1992), Reimplant (1993, 1996)	PM (1998)	PM (1997), Reimplant (2000)
Echocardiography	1.5 × 1 cm vegetation on TV (TEE)	1 × 1 cm vegetation on TV, 2/4 TR (TEE)	2 × 1 cm vegetation on TV, 3/4 TR, (TTE)
Blood/PM lead culture	Acinetobacter anitratus (lead culture- Pseudomonas)	Negative	Pseudomonas
Treatment	Surgical ^a	Antibiotics	Antibiotics
Outcome and FU	Excellent for 14 years	Death after 1 year	Death after 9 months

Abbreviations: M- male, F- female, FU- follow up. Rest abbreviations as in text.

^a Removal of endocardial leads and vegetation from septal leaflet along with epicardial lead implant.

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