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CASE REPORT

TIP OF THE ICEBERG: INFECTIVE ENDOCARDITIS IN AN INTRAVENOUS DRUG USER

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ABSTRACT

Tricuspid valve infective endocarditis is a known complication of injecting drug use (IVDU) and is said to be rare in Africa. The most common etiological microbial agent of infective endocarditis (IE) in IVDU is Methicillin sensitive Staphylococcus aureus. Antibiotic treatment should start immediately after blood cultures have been obtained once IE is diagnosed. Treatment of IE in patients with IVDU is more difficult, and has a high recurrence rate due to medical non-compliance and continuing IVDU. The status of IVDU in Ethiopia is not known. The updated strategies of diagnosis and treatment as well as prognosis of IE in an IVDU patient who presented with respiratory symptoms and later diagnosed with TV endocarditis will be discussed.
Keywords: *Tricuspid valve endocarditis, Infective endocarditis, Right-sided Endocarditis, Injecting drug use*

INTRODUCTION

The incidence of infective endocarditis (IE) has remained almost the same over the past few decades despite development of advanced diagnostic methods, antimicrobial agents and modern surgical devices (1). Right sided endocarditis, accounting for 5-10% of all infective endocarditis, predominantly affects the tricuspid valve (2). Injecting drug use (IVDU), a predisposing factor for Tricuspid valve infective endocarditis (TVIE), is becoming one of the main underlying causes of IE in developed countries. The overall incidence of IE among IVDUs is estimated to be 1.5-20 per 1000 drug user per year and there are increasing reports of TVIE. (3).

Estimated prevalence of people from Africa who inject drugs among the general population aged 15-64 years is 0.17% in 2012 and there is a perceived increasing opiate use in Africa (4). Unlike various case reports of tricuspid valve endocarditis (TVE), there is no report from Ethiopia so far.

CASE PRESENTATION

A 26-year-old male, presented with history of fever, cough and shortness of breath for which he was treated with antibiotics for 10 days as a case of pneumonia. Despite the antibiotics there was no response over the last two months and he developed leg swelling. Additional history revealed that he is an Intravenous drug user.

Physical examination on presentation was significant for an acutely ill patient, temperature of 38.6^0C, normal blood pressure, sinus tachycardia at a rate of 112 beats/min, and a respiratory rate of 28/min. Oxygen saturation was 90% on room air. Jugular venous pressure was 5 cm above the sternal angle and there was a grade 3/6 holosystolic murmur over left lower sternal border. There was hepatomegaly and peripheral edema.

Laboratory results included leukocytosis of 16,000, and increased BUN/creatinine 34/1.6. HIV screening test was negative. Blood film for hemoparasites and workup for other causes of febrile illnesses were negative. Chest X-ray was initially unremarkable.

Transthoracic echocardiography showed dilated right atrium and right ventricle with a large, oscillating vegetation attached to the septal tricuspid valve leaflet [Figures a and b]. There was severe tricuspid regurgitation with right ventricular systolic pressure gradient of 43 mmHg, and right ventricular systolic dysfunction. The left side of heart was normal. Three sets of blood culture were negative.

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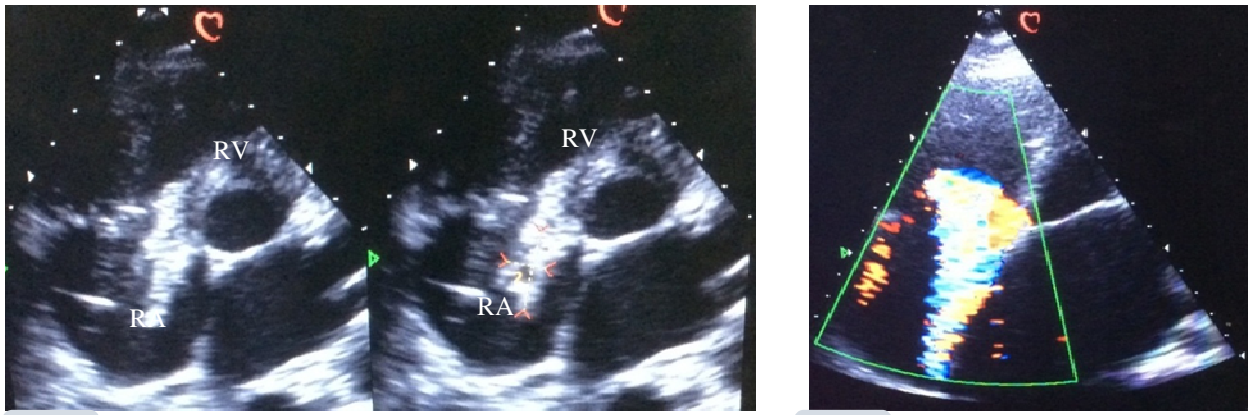

Figures. Transthoracic echocardiography (a and b) showing a large vegetation on septal tricuspid valve leaflet (arrowheads) and severe tricuspid regurgitation in a patient with IV drug abuse. RA, right atrium; RV, right ventricle.

He was admitted to hospital and treated with intravenous vancomycin for 4 weeks and gentamycin for 2 weeks. One week after treatment with antibiotics, he was clinically stable and afebrile. However repeated echocardiogram showed persistence of vegetation, with severe tricuspid regurgitation, and right ventricular systolic dysfunction. He completed his antibiotic treatment and discharged with clinical recovery.

DISCUSSION

The 2012 global estimate by the joint UNODC/ WHO/UNAIDS/World Bank of the number of people who had recently injected drugs was 12.7 million, a prevalence of 0.27% of population aged 15-64. Estimate for Africa, 0.17%, is one of the lowest but there has been an increase from the previous figures (4). IVDU is associated with complications like IE, primarily right side(5).

Right-sided endocarditis accounts for 5 to 10% of all IE and commonly involves the tricuspid valve (2). TVIE occurs predominantly in IVDUs, patients with pacemakers or defibrillators or central venous lines, those on hemodialysis and those with congenital heart diseases (2). It is estimated that incidence of IE in IVDUs is 2 to 5% per year and overall death rate is 5 to 10%(6).

Etiology: *Staphylococcus aureus* is the causative agent in 60-70%of IE related to IVDU, and it is mostly MSSA. Tricuspid valve is infected in 50-70% of IVDU cases of IE. Mitral and aortic valves are involved in 20-30% of cases. Tricuspid valve may be more susceptible to heroin use, while aortic and mitral valves are more susceptible to cocaine and metamphetamines (7).

Diagnosis: Diagnosis of IE at present relies on the modified Duke Criteria. There are two major criteria which include sustained bacteremia and involvement of the endocardium.

1. Sustained bacteremia is confirmed by blood culture
   If blood sample is sent before administration of antibiotics, sensitivity of blood cultures is over 90%. Culture negative IE is frequently because of prior antibiotic usage or infections by fastidious and atypical organisms (8).
2. Involvement of endocardium is confirmed by echocardiogram: presence of vegetation, abscesses or new valvular regurgitation.
   Transthoracic echocardiography (TTE) has 60-70% sensitivity for detecting vegetation and identifying affected valves. It can detect tricuspid vegetation with higher sensitivity (80%). Tricuspid vegetation is large due to the low pressure in right heart chambers, allowing them to grow and may be in excess of 2 cm(9). In our patient, transthoracic echo-

cardiography identified tricuspid valve vegetation, ratifying TTE as an affordable and sensitive first-line examination for diagnosis of TVIE.

Minor criteria for IE include predisposing heart diseases, fever, vascular or immunologic phenomena, and microbiological or echocardiography evidences which do not meet major criteria.

The patient in the case described above had signs of right side heart failure. Right heart failure is rare, but can be caused by the increase of pulmonary pressures or severe right-sided valvular regurgitation or obstruction (2).

Treatment:
Antibiotic treatment should start immediately after blood cultures are obtained. First line treatment in IVDU-related IE is parenteral bactericidal antibiotics for 4-6 weeks. The choice of antibiotics essentially depends on likely microorganisms, involved valves and types of injected drugs the patient has used. Since MSSA is the most common microorganism in IE of IVDU, narrow spectrumbeta-lactamase-resistant penicillin such as nafcillinor oxacillin is the first line agent.

Synergistic effect of gentamicin with penicillin may be important in eradication of MRSA or penicillin-resistant streptococci, as well as in IVDU patients and patients with prosthetic valves. For patients allergic to penicillin, cephalosporins are used but if the patient has a history of anaphylaxis, vancomycin is the recommended drug.

Surgical intervention is indicated for TVIE in the active stage for: 1) right heart failure with poor response to diuretic therapy; 2) IE caused by persistent or recurrent infections, 3) tricuspid valve vegetation >20 mm which persist after recurrent pulmonary emboli with or without concomitant right heart failure, 4) IE of prosthetic valves, development of ring abscess, fistulae or worsening conduction abnormalities. Both mechanical and bioprosthetic valves have similar 15-year survival and re-operation-free survival. The likelihood of continuing parenteral drug misuse and medical non-compliance carries high risk of re-infection, overdose and other complications (2).

Prognosis:
Compared to general population, IVDU have a more severe clinical course and higher mortality. Among IE in IVDU, TVIE usually has a benign prognosis, and in-hospital mortality is less than 5 %. Eighty percent of uncomplicated TVIE is effectively treated medically while in the remaining 20%, surgical treatment is required (10). It is recommended to treat right side IE medically with antibiotics initially before sending to surgery as they are well tolerated (10). However, because of the expected higher rate of recurrence, IE patients with IVDU require aggressive treatments. High mortality is associated with left -sided IE, 20-30%, particularly when complicated or aortic valve is involved. The other poor prognostic factors are IE with Gram negative bacilli and fungus, presence of multi-organ failure, severe sepsis, or systemic septic embolization (2).

Conclusion: There was no report about IVDU from Ethiopia so far. This patient with TVIE might be a tip of the iceberg for IVDU in Ethiopia. Patients with right sided endocarditis can present with longstanding history of fever or the clinical feature could mimic pulmonary infections. Given sign and symptoms of right sided heart failure and fever in IVDU patients, like the patient in this case report, right-sided endocarditis should be considered as one of the primary diagnosis and should be ruled out early. In such circumstances, Echocardiography is an accurate, fast, and affordable diagnostic tool. As an aid to diagnosis and treatment, there is a need for an effort to upgrade the yield of blood cultures. The status of IVDU in Ethiopia and possible solutions also need to be evaluated.

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