



Infective Endocarditis in Intravenous Drug Abusers

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ABSTRACT

Infective endocarditis (IE) is one of the most severe complications in intravenous drug abusers (IVDA). IE usually involves the tricuspid valve (70%). Commonly, these patients develop endocarditis on the right side heart valves. *Staphylococcus aureus* is the most common etiologic agent, and has a relatively good prognosis. We describe a case of Tricuspid Valve Endocarditis (TVE) in a 33-year-old male with a history of intravenous drug abusers.

Keywords: Infective endocarditis, intravenous drug abuse, right-sided endocarditis, *Staphylococcus aureus*, tricuspid valve endocarditis.

ABSTRAK

Endokarditis infeksi (*infective endocarditis*/ IE) merupakan salah satu komplikasi yang paling berat pada penyalahguna obat intravena (IVDA). IE biasanya melibatkan katup trikuspid (70%). Umumnya, pasien tersebut mengalami endokarditis pada katup jantung sisi kanan. *Staphylococcus aureus* adalah etiologi yang paling umum, dan memiliki prognosis relatif baik. Pada laporan kasus ini, kami menjelaskan kasus *tricuspid valve endocarditis* (TVE) pada laki-laki berusia 33 tahun dengan riwayat pengguna obat-obatan secara suntikan. **Agnita Irawaty, Ardian J. Saputra.** Endokarditis Infektif pada Penyalahguna Obat Intravena.

Kata kunci: Endokarditis infeksi, endokarditis katup trikuspid, endokarditis sisi kanan, penyalahgunaan obat intravena, *Staphylococcus aureus*

INTRODUCTION

Drug abuse and addiction are major burdens to society. Overdose, cutaneous complications, pulmonary embolism, infective endocarditis (IE), community-acquired pneumonia, pulmonary tuberculosis, septicemia, and transmission of blood-borne infections are well-known complications of IVDA. Tricuspid valve endocarditis (TVE) occurs predominantly in IVDA and *Staphylococcus aureus* is the usual etiology (60%-70%).

CASE REPORT

A 33-year-old man, intravenous drug abuser presented with history of fever, cough, and dyspnoea for 1 month. He felt weakness in both legs 4 days before admission. He had history of hepatitis C since the previous 2 months without treatment. On physical examination, his blood pressure was 120/60 mmHg, pulse rate 110 beats/min, temperature of 38.8°C, respiratory rate 22/min, oxygen saturation 98%, and JVP 10 cm. There was a mild pansystolic murmur in the precordial, bilateral crackling in the lung, and mild pedal edema.

Laboratory worked up showed leukocytosis of 15.900/ul, 84% neutrophils, platelet 24.000/

ul, CRP 192 mg/dL, total bilirubin 3.86 mg/dL, albumin 2.5 g/dL, and procalcitonin 0.7. HIV screening test was negative, hepatitis C virus was positive with HCV-RNA 6.32×10^5 IU/mL.

Chest X-ray showed bilateral pulmonary infiltrates (**Figure 1**). Computed tomography (CT) showed bilateral pulmonary infiltrates with segmental atelectasis in the left sided and bilateral pleural effusion (**Figure 2**).

Figure 1. Chest X-ray



Figure 2a. Chest CT



Figure 2b. Chest CT



The initial diagnosis were pneumonia and active hepatitis C. Antimicrobial treatment was initiated with meropenem 1 g IV q8h. Despite treatment, febrile remained. On the third hospital day, blood culture were found positive for *Staphylococcus aureus*. The antibiotic regimen was then changed to tazobactam-piperacillin 4.5 g IV q6h and levofloxacin 750 mg IV/ day. He was also treated with albumin for 2 days and diuretic (furosemid 20 mg IV/ day) due to hypoalbuminemia and pedal edema.

Transthoracic echocardiography was done and showed dilated right atrium (RA), right ventricle (RV), main pulmonary artery (MPA) with a large vegetations in non septal leaflet $\pm 3 \text{ cm} \times 1.5 \text{ cm}$. There was severe tricuspid



Figure 3. Transthoracic echocardiography (1st)

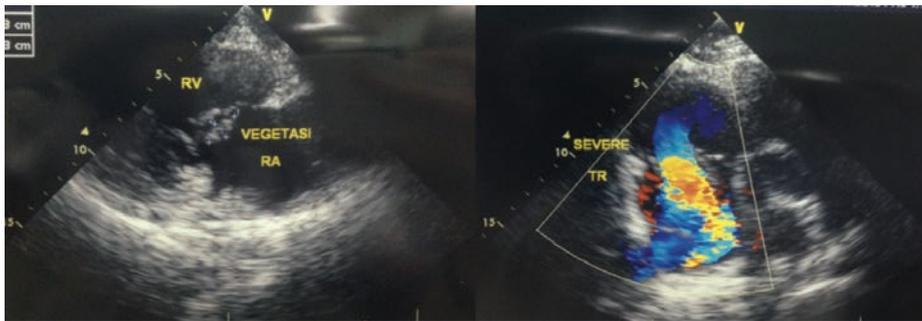


Figure 4. Transthoracic echocardiography (2nd)

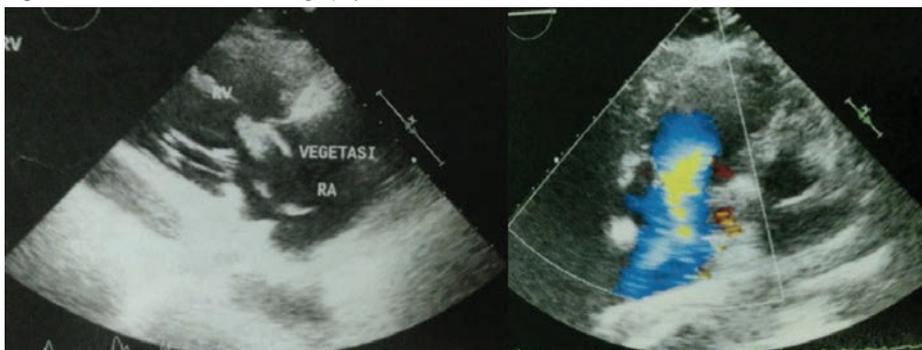


Table. Modified Duke criteria⁶

Major Criteria	
Microbiological	
1.	Typical microorganism isolated from two separate blood cultures. <i>Viridans streptococci</i> , <i>Streptococcus bovis</i> , HACEK group*, <i>Staphylococcus aureus</i> , or community acquired enterococcal bacteraemia without a focus, OR
2.	Microorganism consistent with infective endocarditis isolated from persistently positive blood cultures OR
3.	Single positive blood culture for <i>Coxiella burnetii</i> or phase I IgG antibody titre for <i>Coxiella burnetii</i> >1800 is evidence of endocardial involvement
4.	New valvular regurgitation (worsening of preexisting not sufficient), OR
5.	Positive echocardiogram (transesophageal recommended)
Minor Criteria	
1.	Predisposition to infective endocarditis that includes certain cardiac conditions and injection drug use.
2.	Fever (temperature >38°C)
3.	Vascular phenomena (petechiae and splinter haemorrhages excluded)
4.	Immunologic phenomena (presence of rheumatoid factor, glomerulonephritis, Osler's nodes, or Roth Spots)
5.	Microbiological findings (positive blood cultures that do not meet major criteria requirements).

regurgitation with left ventricular ejection fraction (LVEF) 67% (Figure 3). The left side of heart was normal. On the sixth day, he was afebrile and clinically stable.

On the eighth day, fever relapsed accompanied with dyspnoe. Laboratory findings were leukocyte 19.050/ul, CRP 82.2 mg/dL. Transthoracic echocardiography was replicated, showed vegetations size was not reduced, and there was rupture of the chordae. (Figure 4). Cardiothoracic surgeon was consulted for surgical excision of the vegetation. The patient moved to another hospital because of financial problem.

DISCUSSION

Infective endocarditis (IE) is one of the most severe complication of intravenous drug abuse. The tricuspid valve is the most frequently involved (70%) and *Staphylococcus aureus* is usually the etiology (60%-70%).¹ Hepatitis C was common in IVDA with IE. Damage to the right-sided valves from injected particulate matter, contaminated drug solutions, and immune abnormalities are some of the causes for TVE in IVDAs.^{2,3} The presenting clinical manifestations of right- and left-sided endocarditis differ. In right-sided endocarditis, the usual manifestations are persistent fever, bacteremia, and multiple

pulmonary emboli.^{2,3} Hence, pleuritic chest pain, dyspnea, cough, may be the presenting features, as in this case. The occurrence of peripheral emboli or neurologic symptoms in an IVDA should be a strong consideration of either left-sided endocarditis or paradoxical embolism.³

Only 35% IVDAs with IE demonstrate heart murmurs on admission. Thirty percent (30%) have pleuritic chest pain and pulmonary findings may dominate the clinical picture. In 75 to 85% of the patients, chest X-ray or CT will document abnormalities such infiltrates, nodules, or wedge-shaped opacities with or without cavitation, and abscesses suggesting septic emboli.^{2,4,5} Almost two-thirds have extravalvular sites of infection, which are helpful in the diagnosis.⁴

The findings of typical echocardiographic features involving right heart structures in the presence of positive blood cultures with a typical organism should be regarded as diagnostic of right-sided endocarditis, as was the case in our patient. In our patient, transthoracic echocardiography identified the tricuspid valve vegetation, confirming that transthoracic echocardiography remains an easy and highly sensitive first-line examination for the diagnosis of TVE.

Diagnosis of IE involves integration of clinical, laboratory and echocardiographic data and is included in the modified Duke criteria (Table).⁶ Definite diagnosis requires that either 2 major criteria are met, or one major plus three minor or five minor criteria. Probable cases are defined as fulfilling one major and one minor criterion or three minor criteria.⁶

The choice of antibiotics essentially depends on the likely microorganisms, involved valves and the types of injected/abused drugs. Since *Staphylococcus aureus* is the most common microorganism, narrow-spectrum beta-lactamase-resistant penicillin such as nafcillin or oxacillin (8-12 g/day) is the first line agent,⁷ but it is not available in Indonesia. Both tazobactam-piperacillin and levofloxacin were given after blood cultures for *Staphylococcus aureus* were confirmed positive. Vegetation size is associated with mortality in patients with TVE. Vegetations <1 cm have been associated with very high cure rates, whereas vegetations >2 cm have been associated with

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mortality rates of >30%. The role of surgery remains controversial.⁸

CONCLUSION

Tricuspid valve endocarditis is one of the

most severe complications in intravenous drug abusers (IVDA). This infection is often associated with prolonged morbidity and increased mortality. Patients who present with a fever >38.5°C and a history of IVDA should

be strongly considered to have infective endocarditis. They should be aggressively investigated, and should be empirically started on an antibiotic. Vegetation size is associated with mortality in patients with TVE.

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