

CASE REPORT

Serratia Marcescens Endocarditis

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ABSTRACT

Serratia marcescens is an opportunistic, gram-negative bacillus classified as motile, non-lactose fermenting and a facultative anaerobe. The risk factor for the development of *Serratia marcescens* endocarditis is intravenous drug use (IVDU). We are reporting a case of infective endocarditis (IE) caused by *S. marcescens* involving the mitral valve further complicated by multifocal brain abscesses. JMS: 2023; 26(3):30-33 DOI: <https://doi.org/10.33883/jms.v26i3.1301>

INTRODUCTION

First described in 1885 by William Osler, endocarditis is defined as the inflammation of the inner lining of the heart, usually involving the heart valves¹. The term “infective” endocarditis is used when the inflammation is secondary to an infectious agent like bacteria or fungi². The clinical presentation of IE is diverse and is influenced by multiple contributing factors, like virulence of the infecting organism and persistence of bacteremia; extent of local tissue destruction of the involved valves and hemodynamic sequelae; perivalvular extension of infection; and septic embolization to any organ in the systemic arterial circulation. Initial presentations are non-specific including fever, chills, sweating, myalgias, arthralgias and weight loss. More sinister presentations are not uncommon and can involve skin, eyes and other vital organs³. Intravenous drug use (IVDU) is an important risk factor for IE, frequently affecting the tricuspid valve and to a lesser extent the mitral and aortic valves⁴. Among the causative organisms, gram-positive cocci like staphylococci and streptococci comprise the majority of cases, with gram-negative bacterial insults occurring infrequently. *Serratia Marcescens* has been implicated in only a few cases of infective endocarditis⁵. Our case report highlights the occurrence of left-sided

native valve endocarditis in an IVDU by an unusual organism (*S. marcescens*) that got complicated by multifocal brain abscesses.

CASE PRESENTATION

An 18-year-old boy with a history of IV substance use (Heroin), was brought to our Emergency department (ED) with 3 days history of fever and 1 day history of altered mental status. There was an associated history of headaches and multiple episodes of vomiting. On presentation, his vitals were heart rate 115 bpm, blood pressure 110/70 mmHg, respiratory rate 22/min, O₂ saturation 95% at room air and his temperature (oral) was 101of. physical examination revealed altered mental status, neck rigidity, positive Kernig's sign and 4/6 systolic murmur in the mitral area. Fundus examination revealed multiple Roth spots on both sides (Fig. 1a & 1b)

Lab investigations revealed haemoglobin (Hb) of 6.9g/dl with mean corpuscular volume (MCV) of 83 fl, WBC count 9.3k/MCL, platelet 91k/MCL, erythro-sedimentation rate 55 mm/hr, blood glucose 96mg/dl, urea 38mg/dl, creatinine 0.56mg/dl, Na⁺ 135 mmol/L, K⁺ 3.5mmol/L; Cerebrospinal fluid analysis revealed total cell count of

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Fig. 1a

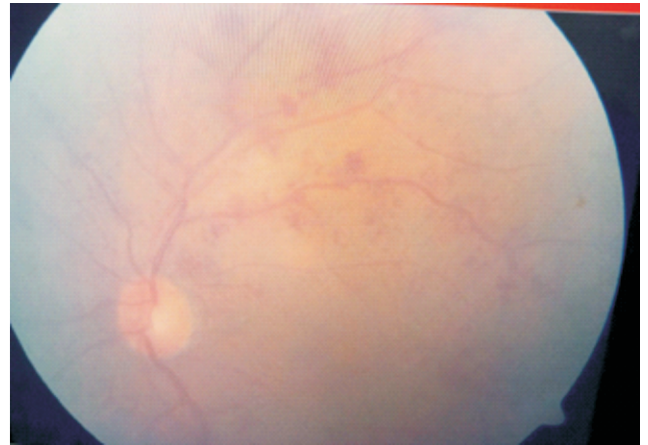


Fig. 1b

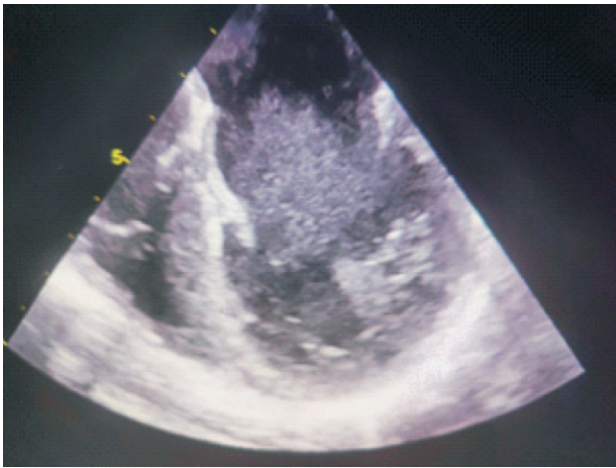


Fig. 2a

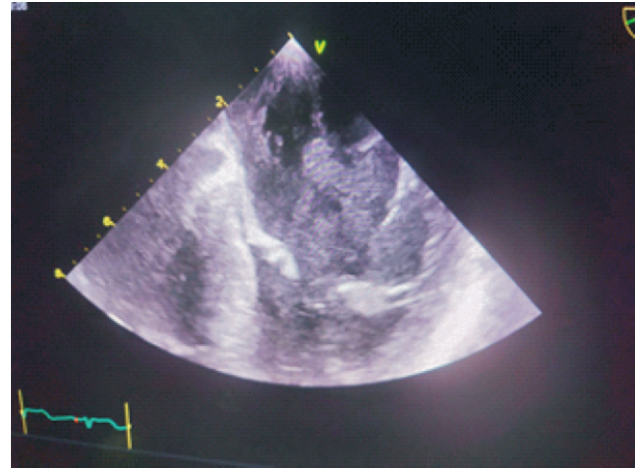


Fig. 2b

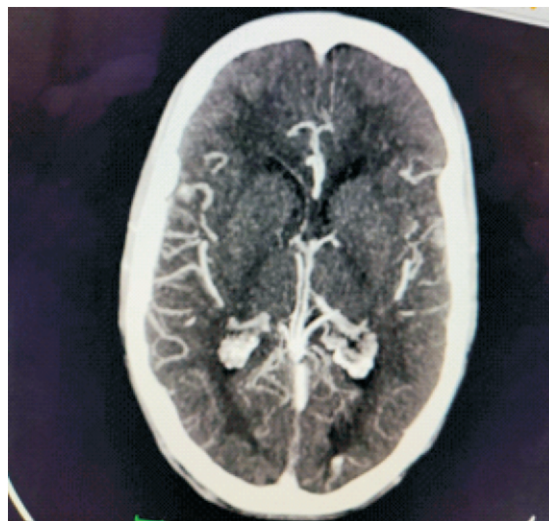


Fig. 3

180/MCL, Neutrophils 75%, Lymphocytes 25% (Neutrophilic pleocytosis); protein 98mg/dl and sugar 58mg/dl. On further evaluation, Hepatitis C card as well as anti-HCV (ELISA) came positive and Hepatitis C RNA levels were 202508 IU/ml; USG HBS did not reveal any features of chronic liver disease or portal hypertension. Transthoracic echocardiogram (TTE) revealed severe MR; torn anterior mitral leaflet (AML) with 13mm linear vegetation on AML body. Transesophageal echocardiogram (TEE) findings were consistent with TTE (Fig.2a and 2b). CT scan of the head revealed enhancing lesions in bilateral cerebral hemispheres suggestive of multifocal brain abscesses and pachymeningeal enhancement along the left frontoparietal region (Fig.3).

The patient was started on empirical treatment with vancomycin and meropenem after the first set of blood cultures was taken. Blood cultures turned out to be positive for *Serratia marcescens*, sensitive to meropenem, amikacin, gentamicin and ciprofloxacin. Antibiotic therapy was tapered to meropenem 2g iv every 8 hours. During the hospital stay patient regained consciousness and his condition also improved in terms of other clinical parameters like headache, body temperature & heart rate. Meanwhile, the case was discussed with a cardiologist and cardiothoracic surgeon, and surgery was planned but was deferred improving the condition of the patient on the current antibiotic regimen. Given hepatitis C positivity with a high viral load, the patient was put on antiviral treatment (sofosbuvir and velpatasvir). The patient was discharged in clinically stable condition after receiving 6 weeks of intravenous antibiotic therapy and was advised to follow up in the cardiology unit of the institute.

DISCUSSION

Serratia marcescens is an aerobic (facultative anaerobe), motile, oxidase-negative, non-lactose-fermenting gram-negative bacillus. The organism was first identified in 1819 by BartolemeoBizio⁶. *S. marcescens* has been isolated from soil, a variety of plants and animals, and most importantly a wide range of water sources, both natural and municipal⁵. This predilection for water likely accounts for the prominent contribution of *S.marcescens* to sporadic ventilator-associated pneumonias⁷, catheter-associated urinary tract infections, and other hospital-acquired infections⁸. *S. marcescens* endocarditis has been

infrequently described in the literature with one study implicating the organism in 0.14% of IE cases⁹.

In our patient the presumed risk factor for the development of *Serratia marcescens* IE is IVDU. Over the years it has been studied that IVDU is associated with right-sided endocarditis¹⁰. However, this ubiquity has been challenged with the investigation of left-sided IE due to *serratia marcescens* in IVDU. The relationship between intravenous drug use (IVDU) and *Serratia marcescens* IE has been established by a landmark study from San Francisco, wherein out of a total of 19 *S. Marcescens* IE 17 were IV drug users and 12 patients had embolic events to the brain, iliofemoral arteries or lungs^{11,12}. The affinity of *S. marcescens* for left-sided valves holds even in the absence of IVDU as a risk factor¹³. The mechanism for this predilection is unclear but may involve the organism's virulence factors, cardiac architecture, hemodynamics, endothelial surface protein expression and bacterial load^{13,10}.

The therapeutic approach has been largely heterogeneous throughout the literature. Treatment regimens have included gentamicin, meropenem, levofloxacin, ceftriaxone, and piperacillin-tazobactam^{13,14}. Goodberlet et al. address this heterogeneity and the high mortality rate, reporting a favourable clinical outcome with Meropenem 2 g every eight hours together with Levofloxacin 750 mg every 24 h¹⁴. In our case, we initially started the patient on Meropenem 2g every 8 hours and Vancomycin 1g every 12 hours empirically and after collecting the sensitivity reports, Meropenem 2g IV three times daily was continued for 6 weeks.

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Conflict of Interest: None

Written informed consent: Taken

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