ABSTRACT

Serratia marcescens (S.M) is a species of gram–negative bacteria in the family enterobacteriaceae. A human pathogen, S. marcescens is involved in nosocomial infections, particularly in urinary tract and wound infections.

This report describes a 63 years-old man that referred to hospital with dyspnea FC IV and he underwent cardiac valves replacement surgery with a diagnosis of severe mitral stenosis (M.S), severe tricuspid regurgitation (T.R), and moderate aortic insufficiency (A.I). Five days after operation, he presented with 40 °C fever, respiratory distress, elevation of liver enzymes, and decreased consciousness. Sepsis work up showed positive blood culture for Serratia marcescens. Despite therapy, he died due to Serratia marcescens endocarditis and mediastinitis.

Positive blood culture for Serratia marcescens is very rare but it should be considered in post operation patients after cardiac valve replacement presenting with fever. Besides, prevention of endocarditis due to Serratia marcescens should be observed.

Key words: Serratia marcescens, Endocarditis, Mediastinitis

Introduction

Serratia marcescens is an opportunistic gram negative, bacillus shaped bacteria that belongs to the family enterobacteriaceae. In 1819, Bartolomeo Bizio, an Italian pharmacist discovered S. marcescens. Bizio identified the bacterium as the cause of the miraculous bloody discoloration of cornmeal mush or polenta. He named Serratia in honor of the Italian physicist Serratia who invented the steamboat, and named marcescens from the Latin word for decaying because the bloody coloration quickly disappeared. Key characteristics of S. marcescens include the production of DNAase, lipase, and gelatinase and it is oxidase negative. These bacteria grow well on standard media and produce a red to dark pink pigment that aids in identification (1). Some strains of S. marcescens are capable of producing a pigment called prodigiosin, which ranges in color from dark red to pale pink, depending on the age of the colonies (2). This pathogen tends to colonize the respiratory and urinary tracts of adults in hospitals. In adult patients, it is responsible
for 2% of nosocomial infections of the blood stream, lower respiratory tract, urinary tract, surgical wounds, skin and soft tissues (2). In pediatric wards, there have been outbreaks of S. marcescens meningitis, wound infections, and arthritis. Moreover, in people addicted to heroin, S. marcescens cause endocarditis and osteomyelitis in patients. Mortality rate is very high. For those patients with nosocomial blood stream infections, crude mortality is 26%. In urinary tract infections, approximately 30-35% of the patients are asymptomatic. In 90% of urinary infection cases, the patients had a recent history or instrumentation of the urinary tract. Patients with respiratory tract infection are usually infected with S. marcescens following instrumentation such as ventilation or bronchoscopy. Meningitis or cerebral abscesses caused by S. marcescens can occur in premature children and neonates with prior sepsis or after a head surgery, neurosurgery, or lumbar puncture (3).

Case report

A 63-years old man presented with progressive dyspnea FC IV from three months ago. In his physical exam, there was a systolic murmur III/IV at mitral valve position, diffuse expiratory wheeze and rales at base of both lungs, hyperpigmentation, scaling and lower extremity edema 3+, and increased jugular vein pressure (JVP). In his electrocardiogram (ECG), RBBB and left ventricle hypertrophy (LVH) and a Q wave (III, aVF, V1-V3) was observed. Echo was performed and there was severe MS, severe TR, moderate AI and he has mild LV dysfunction. Lab test data were as follows: WBC = 4.8×10^3/μl, Hb = 10.1 g/dl, PLT = 83×10^3/μl, PT = 15.2 Sec, PTT = 28 Sec, INR = 1.9, AST = 44 IU/l, ALT=22 IU/l, ALK-P=783 IU/l, T. BIL = 1.5 mg/dl, D. BIL = 0.8 mg/dl, CRP = 3+, ESR = 90 mm/h.

He underwent cardiac valve replacement surgery. Five days after operation, he presented with 39.5 °C fever, elevated liver enzymes up to 2-3 fold, dyspnea, GI bleeding and mild and decreased consciousness. Sepsis workup showed positive blood culture for S.M (Figure. 1). This bacterium produces late lactose fermenter colonies. S.M may be red pigmented, especially if plate is left at 25 °C on macConkey agar (Mac), colorless colonies on Hecton enteric agar (HR), yellow or colorless on xylose-lysine-deoxycholate agar (XLD) (4,5). IMVIC reaction for S.M consists of: indole = negative, methyl red = variable, voges-proskaver = positive, citrate (simmons) = positive. Triple sugar iron (TSI) agar profile for S.M showed the following: the entire medium becomes acidic (yellow) and on KIA, alkaline (red) slant/acid (yellow) both, and no gas. Routine tests for identification of S.M consist of DNAase and gelatinase, especially at 25 °C. Supplemental test for identification of S.M included as: lysine and ornithine decarboxylase = positive, and arginine didydrolans and lactose fermentation = negative. Differentiation between S.M and Serratia liquefaciens group is based on l-arabinose fermentation that S.M is negative and Serratia liquefaciens group is positive (5). Then, he was diagnosed with S.M endocarditis or mediastinitis according to antibiogram treated with imipenem and ceftriaxone, but after 3 days he died from septic shock due to spreading infection.

Figure 1. Red pigmented Serratia marcescens on Mueller- Hinton agar

Discussion

Hospital-acquired infection (HAI) is an important cause of increased morbidity and mortality amongst hospital patients and represents a major health and economic burden worldwide. Contributory factors include inadequate infection control practices coupled with growing range of modern medical procedures. Increasing antimicrobial resistance complicates the situation further (1,6-8). In an investigation by Bai-
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