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Case Report

Pseudohemoptysis in an elderly due to *Serratia marcescens* pneumonitis

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nosocomial outbreak.^{1,2} We report a case of *S. marcescens* pneumonia in a 89-year-old male, who presented with fever and cough with reddish mucoid expectoration.

Case report

An 89-year-old male patient was brought to the emergency department with complaints of high-grade continuous fever, productive cough with reddish mucoid expectoration, and breathlessness of four days duration. He was a veteran soldier, non-smoker, a known case of hypertension, bronchial asthma, and type II diabetes mellitus for over two decades under regular medical follow up. Clinical examination revealed axillary temperature of 37.8 °C, tachycardia (104/min), tachypnoea (28/min), and elevated blood pressure (150/96 mm of Hg). His oxygen saturation (SpO₂) was 90% at room air. Inspiratory crackles were heard over lower lobe of left lung on auscultation.

Chest radiograph showed hilar prominence with homogeneous opacity over left lower zone. Hematological examination indicated microcytic anemia and polymorphonuclear leucocytosis without any toxic granulation. Acid fast bacilli could not be demonstrated on multiple Ziehl-Neelsen (ZN) stained sputum smear examination. Freshly collected reddish and mucoid sputum sample was processed for Gram staining and culture on third day of admission. Gram stained sputum smears revealed Gram-negative bacilli with numerous polymorphonuclear leucocytes in the background. Sputum wet

Introduction

Serratia marcescens, a Gram-negative, lactose non-fermenting bacilli of family *Enterobacteriaceae*, was considered a saprophyte in the past. Over the past decade, *Serratia* is increasingly being implicated as an agent of hospital-acquired infections. Ability to survive in harsh conditions, especially on antiseptic solutions, hand disinfectants, saline bottles, and other fomites makes *Serratia* an ideal candidate for cross infection and

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Fig. 1 – Red pigmented colonies of *Serratia marcescens* on nutrient agar and antibiotic sensitivity pattern on Mueller Hinton agar.

mount did not show any red blood corpuscles or yeast cells. Culture on MacConkey, blood, and nutrient agar grew characteristic dark red-pigmented colonies on aerobic incubation at 37 °C for 24 h (Fig. 1). Gram staining of colonies confirmed presence of Gram-negative bacilli. The organism was motile, lactose non-fermenter, and negative for cytochrome oxidase activity or indole production. The isolate was identified as *S. marcescens* by Vitek 2 (bioMérieux) automated bacterial identification system with 98% homology. The organism was sensitive to cotrimoxazole, piperacillin, ciprofloxacin, levofloxacin, amikacin, gentamicin, and ceftriaxone. Aerobic and anaerobic blood culture remained sterile till seven days of incubation. Sputum culture for *Mycobacterium tuberculosis* on Lowenstein Jenson's medium also remained sterile till six weeks.

The patient was managed with oxygen supplementation, bronchodilators, intravenous ceftriaxone, and other supportive measures. He became afebrile 48 h after initiation of antibiotics. Repeat sputum culture after four days of institution of antibiotics did not isolate *Serratia*. The patient was discharged on completion of one week of antibiotic therapy. Complete remission of chest opacities was noticed on repeat radiograph four weeks after discharge.

Discussion

Over the past decade, *S. marcescens* has transformed from a harmless gut commensal to a nosocomial pathogen responsible for invasive infections. It is increasingly being implicated in the nosocomial outbreak in intensive care units.^{1,2} *Serratia* is commonly found in soil and water and was considered as an environmental contaminant of culture plates in the past. The spectrum of infections caused by *Serratia* includes pulmonary, CNS, conjunctival, urinary tract, joint, skin, wound, catheter, prosthetic device-related infections, and septicemia.³⁻⁵ *S. marcescens* is easily recognizable in culture due to the production of a distinct red pigment, prodigiosin.

Hemoptysis is defined as bleeding from lower respiratory tract, presented as bright red colored blood mixed frothy expectoration. Depending on quantum of bleed, patient may

complain of difficulty in breathing and sensation of warmth in the chest. The pH of blood in true hemoptysis is alkaline, whereas, in case of pseudohemoptysis, the source of bleed is usually upper aerodigestive tract. Presence of food particles, nausea, and acidic pH of the blood indicates gastric source of the bleed. The reddish mucoid expectoration in case of *Serratia* pulmonary infection can be mistaken for hemoptysis.^{6,7}

In a country with highest global TB burden, the most common cause for hemoptysis remains pulmonary tuberculosis. At times, acid fast bacilli are difficult to demonstrate in sputum ZN stained smear examination due to its inherent low sensitivity. Although in this case the radiological features were against pulmonary Kochs, it was routine bacteriological culture that clinched the diagnosis. Episodes of pseudohemoptysis and radiological lesions at times mimics pulmonary tuberculosis. Thus, apart from sputum Gram stain, ZN stain, and culture for *Mycobacterium*, bacterial culture on non-selective medium is essential in case of lower respiratory tract infection. Using appropriate personal protection, sputum wet mount examination for red blood cells also confirms a true bleed.

Availability of automated culture and identification system has improved the isolation of non-fermenters in the laboratory, especially the non-pigmented species of *Serratia*. *Serratia* is also gaining importance due to acquisition of multidrug resistance.⁸ Although this isolate was sensitive to routine antibiotics, the ability to produce inducible chromosomally mediated Amp C beta lactamases restricts the use of cephalosporins.⁹ Further, IncL and IncM class of plasmids are added armamentarium that impart resistance to carbapenems and other beta lactam antibiotics.¹⁰ Clinical and Laboratory Standard Institute (CLSI) guidelines for antimicrobial sensitivity testing recommend repeated culture and antibiotic sensitivity testing as *Serratia* may develop resistance to third generation cephalosporins on prolonged usage. Extremes of age, immuno-suppression, and recent invasive procedures are considered risk factors for nosocomial infection due to *Serratia*. A recent observational study has reported high mortality associated with *Serratia* infection.¹¹ Although our patient denied any history of invasive procedures such as bronchoscopy, he frequently visited outpatient department of

our hospital for treatment of acute exacerbation of bronchial asthma with bronchodilators and corticosteroid nebulization. Elderly age, diabetes mellitus, and intermittent steroid inhalation were predisposing factors in our patient for *Serratia* pneumonitis. He responded well to the targeted antibiotic therapy and was asymptomatic at follow-up visit at four weeks.

Conclusion

To conclude, pulmonary infection by pigmented strains of *S. marcescens* can cause reddish mucoid expectoration mimicking hemoptysis. *Serratia* is emerging as one of the leading cause of nosocomial infection. *Serratia* infection is identified by routine bacteriological culture and can be managed by a course of targeted antibiotic therapy. Thus, in a country with high prevalence of tuberculosis, clinicians need to be aware of this differential diagnosis of hemoptysis.

Conflicts of interest

The authors have none to declare.

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