A CASE REPORT ON SERRATIA MARCESCENS

Soumya Dasgupta¹, Indrani Bhattacharyya², Amiya Kumar Pandit³, Neha Patnaik⁴, Bhaktipada Barman⁵

¹Postgraduate, Department of Microbiology, CSTM.

²Associate Professor, Department Microbiology, CNMCH.

³Postgraduate, Department of Microbiology, CSTM.

⁴Postgraduate, Department of Microbiology, CSTM.

⁵Postgraduate, Department of Microbiology, CSTM.

ABSTRACT

Serratia marcescens is widely distributed in nature. Pigmented and non-pigmented strains are found from time to time in the human respiratory tract, faeces, urine, wounds and blood. Most infections are nosocomial. We isolated a pigmented *Serratia marcescens* strain from sputum of a patient who was admitted with fever and chest symptoms. Isolation of *Serratia* species as a nosocomial organism is an occasional finding. However, community acquired *Serratia pneumonia* is uncommon, hence we are reporting this case study.

KEYWORDS

Lower Respiratory Tract Infections, *Serratia Marcescens*, Pneumonia, Enterobacteriaceae, Sputum, Coccobacilli.

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INTRODUCTION

Serratia marcescens is a member of the Enterobacteriaceae family. It is widely distributed in nature and can be isolated as saprophytes from soil and water. Reports of nosocomial infections caused by *Serratia marcescens* have increased in recent years. Infections include UTI, RTI, septicaemia, meningitis and endotoxic shock. Only small proportion (<10%) of strains responsible for infection are pigmented. It is the most common clinical isolate among *Serratia*.¹ We isolated *Serratia marcescens* from sputum of a hospitalised patient who was hospitalised with fever, cough and vomiting.

PATIENT PROFILE

A 43-year-old female, weighing 48 kg, residing at Rajchandrapur, Howrah was admitted with complaints of high grade fever for last 15 days, cough, chill & rigor. Patient had 2-3 episodes of vomiting initially, which later subsided. She had occasional body ache, pain abdomen and weakness. She was non-hypertensive and non-diabetic.

Initially, she was treated by a local physician with Tab Cefpodoxime; however, fever did not subside and she was admitted to Beliaghata ID & BG hospital. There, she received Inj. Linezolid, Inj. Meropenem and Inj. Levofloxacin for 3 days. However, she was referred here for better diagnosis and management.

General examination was normal; however, on chest examination, left lower zone crepitations were heard. Other systemic examination was normal.

USG abdomen showed normal study. LFT-normal study, Hb-10.8 g, TLC-11400/cu. mm; N53 L45, HIV I & HIV2 - Non-reactive, NS1 & Dengue IgM non-reactive, Widal test was

negative, Routine stool & urine examinations were normal and Blood culture showed no growth.

Sputum microscopy showed presence of plenty of pus cells and Gram-negative bacilli.

MATERIALS AND METHODS

Sputum was inoculated in MacConkey agar and blood agar plates and was incubated aerobically at 37°C for 24 hours. On MacConkey agar convex, effuse, colonies with irregular cremated edges developed with bright red pigmentation. On blood agar convex, raised, greyish colonies with narrow zone of haemolysis was seen.

Gram stain showed small Gram-negative coccobacilli. Hanging drop preparation showed motile organism.

Biochemical Tests

Indole- Neg; TSI-K/A, no H₂S; Urease -Neg, Citrate +ve, Oxidase -Neg, Lysine +ve, Ornithine +ve, Arginine - Neg, PPA - Neg, Reduced nitrate to nitrite, ONPG +ve, Glucose- Acid, no gas; Sucrose-Acid, no gas; Mannitol-Acid, no gas; Arabinose-not fermented.

Morphology, colony characters and biochemical tests were indicative of *Serratia marcescens*.^{2,3} We inoculated two nutrient agar tubes and kept one of them in room temperature (25°C) and another one at 37°C for pigment production. Abundant deep red non-diffusible pigment developed on nutrient agar kept in air at room temperature (25°C). At 37°C there was less pigment production. The pigment was soluble in absolute alcohol, acetone, chloroform but insoluble in water.⁴

Based on Gram-stain, morphology, motility, colony character, biochemical tests, pigment production and character of the pigment, the organism is diagnosed as *Serratia marcescens*.

We also subcultured the organism and put it in Vitek2 which also diagnosed it as *Serratia marcescens*.

Drug Susceptibility

Done on Mueller-Hinton agar plate also shows non-diffusible red pigmentation and the following sensitivity pattern- Sensitive to: Piperacillin-Tazobactam, Cotrimoxazole, Imipenem, Gentamicin, Ciprofloxacin and Cefixime.

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Corresponding Author:

Dr. Indrani Bhattacharyya,

37 J/1D, Raja Manindra Road,

Kolkata-700037.

E-mail: indranichaudhuri@yahoo.com

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Resistant to Colistin, which also justified the diagnosis as *Serratia* are intrinsically resistant to Colistin.⁵

TREATMENT HISTORY

Patient was on IV fluid and Inj. Meropenem. Ciprofloxacin was added later. Patient was responding to treatment.

Fig. 1: Gram Stain

Fig. 2: Pigment Production
Left-37°C; Right- 25°C

Fig. 3: Colony on Blood Agar

Fig. 4: Colony on MacConkey Agar

Fig. 5: Drug Susceptibility on Mueller-Hinton Agar with Disk diffusion method (CL- Colistin, PIT- Piperacillin-Tazobactam, GEN- Gentamicin, COT- Cotrimoxazole, CFM- Cefixime, CIP- Ciprofloxacin, IPM- Imipenem

DISCUSSION

Serratia marcescens was first described and named by Bizio in 1823. Gaughran (1969) assumed that the first recorded account of *Serratia marcescens* dates back to 332 B.C.

Genus *Serratia* contains 9 species. Most strains of *S. plymuthica*, *S. rubidaea* (syn. *S. marinorubra*) and some strains of *S. marcescens* produce magenta red pigment (prodigiosin) but former two species are negative for lysine and ornithine decarboxylase. *S. odorifera* is a non-pigmented species which is lysine positive but has a characteristic musty potato like odour which aids its recognition in the laboratory.¹ Some strains of *S. marcescens* may grow in chlorhexidine based disinfecting solution. Some of the strains are resistant to cephalosporins. Such resistance is frequently plasmid mediated and readily transferrable to other members of the Enterobacteriaceae.⁶

Nosocomial *Serratia marcescens* infection is not an uncommon finding. These infections pose the problem of drug resistance. Community acquired *Serratia marcescens* infection is not a very common finding as yet, but the problem of drug resistance is likely to occur considering the track record of the organism. As the drug resistance is

transferable, the medical fraternity should be very cautious and make a concerted effort to contain such infections particularly when they are found in a community setting. Microbiologists and physicians together should see to it that the detected cases get completely cured and community spread is minimised. For this not only should we try for good drug compliance but we should also pay attention to proper health education so that spread of infection among relatives and contacts is prevented.

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