Case Report

Community acquired *Roseomonas* infection in a pre-existing Tubercular lung lesion

Navinchandra M. Kaore, Zoyev Khan, Atul R. Aher, V. K. Ramnani

Department of Microbiology, Peoples Collegeof Medical Sciences and RC, Bhanpur Road, Bhopal, Madhya Pradesh, India

ABSTRACT

Roseomonas are nonfermenting opportunistic Gram-negative bacilli belonging to the newly established genus of *Roseomonas*. The clinical experience with the species is limited and is difficult to diagnose because of limited expertise and lack of commercially available identification kits with any of the automated systems. This is a first ever reported case of secondary bacterial infection due to *Roseomonas genomospecies 6* in a patient of pulmonary tuberculosis from the Indian subcontinent.

KEY WORDS: Community acquired, pulmonary tuberculosis, *Roseomonas*, rare non-fermenter

Address for correspondence: Dr. Navinchandra M. Kaore, HIG, Block A – 13, Peoples College of Medical Sciences & RC, PCMS Campus, Bhanpur Road, Bhopal – 462037, Madhya Pradesh, India. E-mail: navinnmk@gmail.com

INTRODUCTION

Roseomonas species is known to cause the opportunistic infections in hospital settings. This pink coccoid group of bacteria has been frequently reported in western countries causing peritonitis, septicemia, and catheter associated infections in adults and pediatric immunocompromised patients.[1-6] Here we are presenting a rare case of community acquired secondary infection caused by *Roseomonas genomospecies 6* in a patient of pulmonary tuberculosis. To the best of our knowledge this is the first ever report from Indian subcontinent.

CASE REPORT

A 37-year-old male, farmer by occupation was admitted to the Pulmonary Medicine ward with complaints of fever with cough and expectoration since last one and half month. Fever was mild to moderate grade with chills and no diurnal variation. Cough was 10 to 15 times a day, 10-15 ml, foul smelling, and yellow without any blood tinge.

Access this article online

Quick Response Code:

Website: www.lungindia.com

DOI: 10.4103/0970-2113.135785

The patient was a known case of pulmonary tuberculosis diagnosed 2 years back and was on category I anti-tubercular treatment (ATT) which was discontinued by him after 2 months. After initiation of cough one and half month back he was again tested for Acid-Fast Bacilli (AFB) and was put on category I ATT without any alleviation from cough and fever.

On admission sputum was sent for AFB examination again at DOTS center which turned out to be negative. X-ray examinations showed hilar lymphadenopathy with cavitary lesions in the right upper lobe with calcification. The patient was put on ATT Category II suspecting it to be multi-drug resistant (MDR) tuberculosis.

Bacteriological study and diagnosis

Meanwhile sputum sample was sent for Gram's staining and aerobic culture to Microbiology Department. Gram's staining of the sputum showed plenty of pus cells with faintly stained, short stout Gram-negative bacilli. Repeat AFB staining after Petroff's Concentration Technique was negative for AFB. Aerobic culture of the sample was put on Blood Agar (BA) and MacConkeys agar (MA) plates. After 24 hours of incubation at 37°C, BA showed 2-3 mm large round, convex, grayish white mucoid colonies with entire margin without hemolysis, whereas MA showed non-lactose fermenting (NLF) colonies. The NLF colonies were catalase positive and was weak Oxidase positive giving the positive reaction after 20 to 25 seconds on moist filter paper with freshly prepared oxidase reagent. The Gram's staining of the colonies revealed faintly stained Gram-

negative coccobacilli without any vacuolation. Routine biochemical test for identification and antimicrobial sensitivity testing (AST) was put up for NLF colonies. Next day the organism showed a non diffusible rose pink pigment production on Muller Hilton Agar (MHA) and was sensitive to Cefoperazone/Sulbactam, Amikacin, Ceftazidime, Imipenem, Piperacillin, Tobramycin, Piperacillin/Tazobactam, Levofloxacin and resistant to Ampicillin/Sulbactum. Among biochemical reactions Triple Sugar Iron Agar revealed alkaline slant with no change in butt confirming a non-fermenter, citrate utilization was positive, urease was hydrolyzed, indole not formed, methyl red test positive, VP negative with motile coccobacilli.

Suspecting it to be a member of the pink coccoid group tests were put up to differentiate it from the Methylobacterium group. Unlike methylobacterium the organism was motile, shows growth on MA and Sabaroud's Dextrose Agar (SDA) [Figure 1], unable to utilize methanol for acid production [Figure 2], was non-fluorescing in transmitted U.V. light [Figure 3], unable to utilize acetamide[Figure 2]and non-vacuolation on Gram's stain.[7] The strain was finally identified on the basis of Bile Esculin hydrolysis [Figure 2], citrate utilization and motility with other biochemical test to be *Roseomonas genomospecies 6*.[8] [Chart 1].

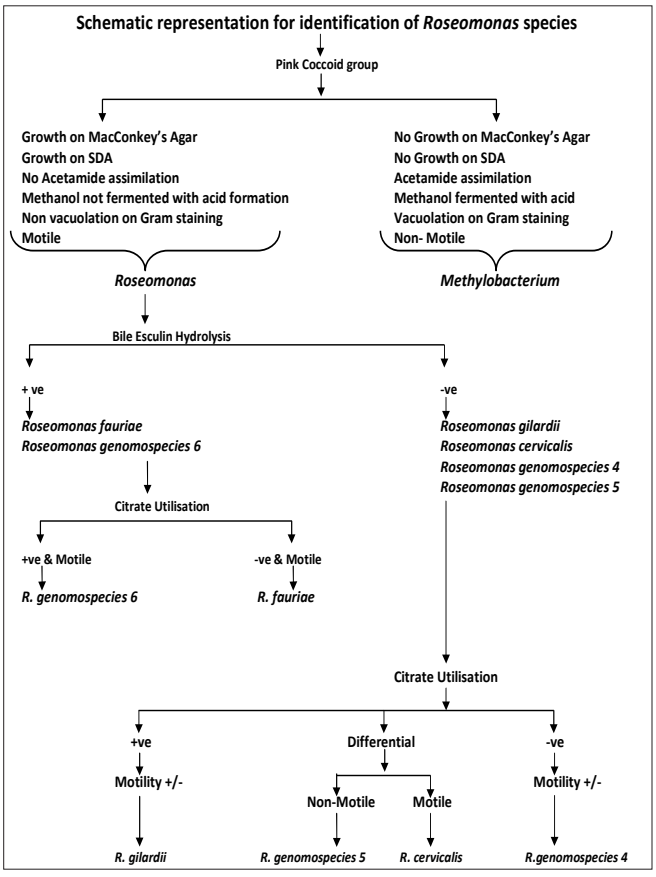

Chart 1: Schematic representation for identification of *Roseomonas* species

On the basis of AST, the patient was put on Cefoperzone/Sulbactam with Amikacin and showed remarkable clinical recovery within 5 days but lost to immediate follow up

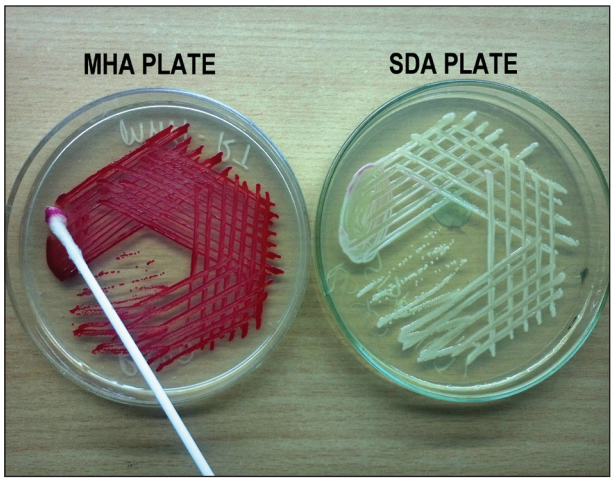

Figure 1: Shows *Roseomons genomospecies* 6 on MHA plate on left with non-diffusible rosy pink pigment production at 25°C and growth on SDA plate on right.

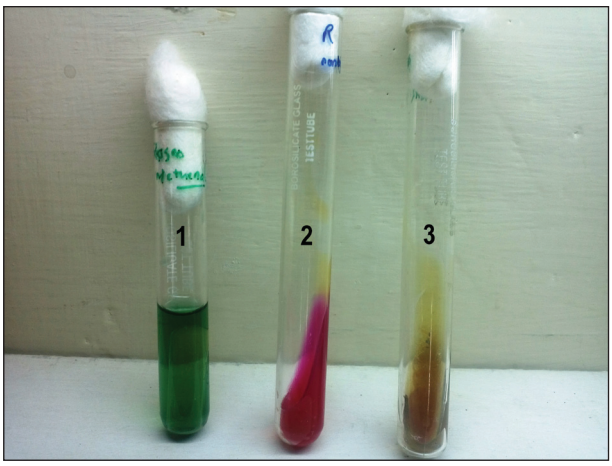

Figure 2: (1) No fermentation of methanol; (2) No assimilation of acetamide; (3) Positive bile esculin hydrolysis

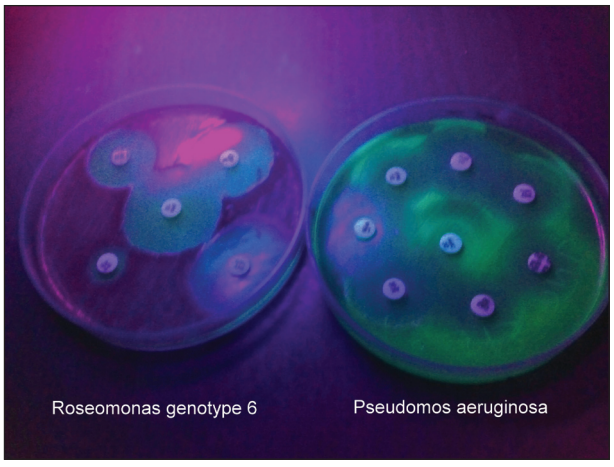

Figure 3: Non-fluorescing *Roseomons genomospecies* 6 on left and fluorescing Pseudomonas aeruginosa on the right as a positive control.

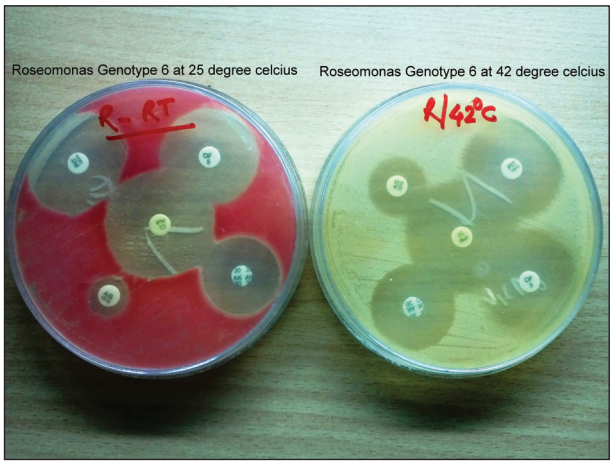

Figure 4: Pink pigment production by *Roseomons genomospecies* 6 at 25°C whearas no pigment production at 42°C

as the patient being poor and feeling well has left against medical advice.The patient was contacted again on follow-up visit of his DOTS therapy and was not only negative for AFB on sputum microscopy but sputum culture also showed no evidence of *Roseomonas*.

DISCUSSION

In 1984,Gilardi and Faur[9] described a new group of unnamed pink-pigmented non-fermentative bacteria that phenotypically resembled Methylobacterium extorquens (*Pseudomonas mesophilica*). The vernacular term "pink coccoid" group was subsequently coined by the Centers for Disease Control and Prevention (CDC) to refer to this collection of phenotypically related organisms.[10]

The bacterial genus *Roseomonas* was named in 1993 by Rihs *et al*. on the basis of DNA hybridization after they performed studies of 42 strains of pink-pigmented, aerobic, slow-growing, Gram-negative bacteria. This genus includes six species: *Roseomonas gilardii* (or *genomospecies 1*), *Roseomonas cervicalis* (*genomospecies 2*), *Roseomonas fauriae* (*genomospecies* 3), and 3 unnamed *Roseomonas genomospecies* (*genomospecies 4, 5, and 6*). These organisms have been isolated from the aquatic environment and various clinical samples, such as blood, wound, urinary and respiratory specimens, peritoneal dialysis fluid, corneal scrapings and bones.[2,5,6,11]

The clinical experience with *Roseomonas* infection is relatively limited because of the recent establishment of the genus. *Roseomonas* spp. appears to have low pathogenic potential for humans, but some species may cause clinically significant or even fatal disease in immunocompromised patients.The infections particularly occur in the immunocompromised persons like those with leukemia, septicemia, cancer chemotherapy and dialysis.[1,6]

The patient was a known case of pulmonary tuberculosis and a farmer by occupation. As a defaulter of ATT category I he might have developed cavitary lesions with secondary bacterial infection from environmental sources. The continuation of fever with cough with expectoration even after starting of ATT category II,whereas resolution of symptoms within 5 days of treatment with Amikacin and Cefoperazone/Sulbactam clearly reveals that one should always look for secondary infections in non-resolving cases of pulmonary tuberculosis. In this case, the patient's ATT was reverted back to category I from category II.

Most clinical laboratories are unable to report *Roseomonas* species confidently because of lack of expertise and lack of identification kits with any of the automated systems currently available in market. A high level of suspicion with faintly staining Gram-negative coccobacilli which are producing rose pink non-diffusible pigment, having differentiating biochemical reaction from Methylobacterium species with other specific biochemical reaction, are good enough to identify a *Roseomonas* species pending confirmation by sequencing.[7,8]

The isolated strain, *Roseomonas genomospecies 6*,showed growth at all the temperatures ranging from 25˚C to 42˚C which is in accordance with the findings of previous reports but interestingly it has given pigment production only in temperature range of 22˚C to 30˚C[5][Figure 4].

The isolated *Roseomonas genomospecies 6* strain revealed an antimicrobial susceptibility pattern similar to that of other *Roseomonas* spp. previously reported like resistance to Ampicillin and Ampicillin/Sulbactam. The patient recovered well with Amikacin and Cefoperazone/Sulbactam well in accordance with the sensitivity pattern reported for this species by the researchers.[2,3,6]

To the best of our knowledge the community acquired secondary bacterial infections caused by *Roseomonas genomospecies 6* in patients of pulmonary tuberculosis has not been reported earlier in the literature.

REFERENCES

1. Tsai SF, Chen CH, Shu KH, Wu MJ. Peritonitis caused by *Roseomonas* in a patient undergoing automated peritoneal dialysis: Case report and literature review. Intern Med 2012;51:1721-4.
2. Han XY, Pham AS, Tarrand JJ, Rolston KV, HelselLO,Levett PN. Bacteriologic characterization of 36 strains of *Roseomonas* species and proposal of *Roseomonas* mucosa spnov and Roseomonasgilardiisubsproseasubspnov. Am J ClinPathol 2003;120:256-64.
3. Mclearn TW, Rouster SK, Woods CR, Shetty AK. Catheter related bacteremia due to *Roseomonas* species in pediatric hematology/oncology patients. Pediatr Blood cancer 2006;46:514-6.
4. Srifuengfung S, Tharavichitkul P, Pumprueg S, Tribuddharat C. Roseomonasgilardiisubsprosea, a pink bacterium associated with bacteremia: The first case in Thialand. Southeast Asian J Trop Med Public Health 2007;38:886-91.
5. Struthers M, Wong J, Janda JM. An initial appraisal of the clinical significance of *Roseomonas* species associated with human infections. Clin Infect Dis 1996;23:729-33.

6. Dé I, Rolston KV, Han XY. Clinical significance of *Roseomonas* species isolated from catheter and blood samples: Analysis of 36 cases in patients with cancer. Clin Infect Dis 2004;38:1579-84.
7. Washington CW Jr, Stephen DA, William MJ, Koneman EW, Procop GW, Schreckenberger PC,*et al*. The nonfermentative gram-negative bacilli. In: Koneman's Color Atlas and Textbook of Diagnostic Microbiology. 6thed. New York: Lippincott Williams and Wilkins; 2006. p. 316-91.
8. Weyant RS, Whitney AM. Genus XIII *Roseomonas*. In:Garrity GM,editor. Bergey'smanual of systemic bacteriology. 2nded., Vol. 2. New York: Springer; 2005. p. 88-93.
9. Gilardi GL, Faur YC. Pseudomonas mesophilica and an unnamed taxon, clinical isolates of pink-pigmented oxidative bacteria. J Clin Microbiol1984;20:626-9.
10. Wallace PL, Hollis DG, Weaver RE, Moss CW. Biochemical and chemical characterization of pink-pigmented oxidative bacteria. J ClinMicrobiol 1990;28:689-93.
11. Rihs JD, Brenner DJ, Weaver RE, Steigerwalt AG, Hollis DG, Yu VL. *Roseomonas*, a new genus associated with bacteremia and other human infections. J Clin Microbiol 1993;31:3275-83.

How to cite this article: Kaore NM, Khan Z, Aher AR, Ramnani VK. Community acquired *Roseomonas* infection in a pre-existing Tubercular lung lesion. Lung India 2014;31:289-92.

Source of Support: Nil, **Conflict of Interest:** None declared.

Announcement