Case Report

Bacteremia due to *Roseomonas gilardi*: A case report

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ABSTRACT

Implantation and the use of long-term central venous catheters are associated with complications like bacteremia. Contamination from the skin during handling is the most common source of the organisms causing these infections. Rarely, environmental organisms may cause these infections. *Roseomonas gilardii* is a rare opportunistic pathogen that can cause bacteremia in immunocompromised patients on long-term central venous catheters. We report the case of a 57-year-old woman diagnosed with acute myeloid leukemia who presented with fever and febrile neutropenia. The patient was diagnosed with *R. gilardii* bacteremia probably from peripherally inserted central catheter line infection.

Key words: Bacteremia, Immunocompromised, Neutropenia, *Roseomonas*

A new group of unnamed pink-pigmented non-fermentative bacteria that resembled *Methylobacterium extorquens* phenotypically was described in 1984 by Gilardi and Faur [1]. Based on the results of DNA hybridization, Rihs *et al*. in 1993 included this group of pink-pigmented Gram-negative bacteria in the genus *Roseomonas* [2]. There are more than 20 species in the genus *Roseomonas* of which Roseomonas gilardii subspecies rosea, R. gilardii subsp. gilardii, and Roseomonas mucosa are the major human pathogens [3-5]. *Roseomonas* is a Gram-negative, non-fermentative, slow-growing, aerobic bacteria that produces pink-pigmented colonies. These species are rare opportunistic pathogens with low virulence in humans. Infections in the immune-compromised patients have increasingly been reported in the last two decades [4-7]. These organisms are commonly known to cause central line-associated bloodstream infections but they also have the potential to cause skin and soft tissue, urinary tract, and respiratory infections. They have also been infrequently associated with subretinal abscesses and endophthalmitis [8-10]. Water supplies may be the natural reservoir of *Roseomonas* species and they may also be present in humans as commensals [3,11].

Here, we report a case of bacteremia in an acute myeloid leukemia (AML) patient likely associated with a central venous catheter.

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CASE REPORT

A 57-year-old female was evaluated for complaints of easy fatiguability and breathlessness. She had a history of hypertension for 6 years for which she was on angiotensin-converting enzyme inhibitors (Telmisartan 40 mg once daily).

On evaluation, she was found to have pancytopenia. Complete blood picture (CBP) showed hemoglobin-4 g/dL, white blood cells (WBC) counts-3000/µL, and Platelets-46000/µL. She underwent marrow aspiration and biopsy which was suggestive of AML without maturation. The family was counseled about the diagnosis, prognosis, and treatment.

In the perspective of age, options of 7+3 induction versus chemotherapy with Decitabine and Venetoclax were given. The family opted for Decitabine+Venetoclax. Peripherally inserted central catheter (PICC) line placement was done and the patient was started on chemotherapy with injection Decitabine 20 mg/m^2 for 5 days and tab. Venetoclax 100 mg OD from day 1 to day 7 q28d. Prophylactic antibiotics and antifungals were started.

On Day 2 of chemotherapy, she had a fever. CBP showed neutropenia. Hemoglobin was 8.5 g/dL, WBC counts were 770/µL, platelets were 35000/µL, and absolute neutrophil count was 385, hence started on IV antibiotic (inj. Cefoperazone and sulbactam 3 g IV BD) empirically. Procalcitonin was 0.09 ng/mL and the blood culture sent was sterile. The family was counseled about the need for granulocyte infusion and administered. In the context of persisting febrile neutropenia, antibiotics were escalated to Meropenem

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1 g IV TID. Eventually, her fever spikes reduced and counts improved. Blood and blood product transfusions were given as and when required. She was given cycle 2 Decitabine+Venetoclax. Venetoclax was given daily for 14 days from cycle 2 in view of good tolerability in cycle 1. Post-cycle 2, she was admitted 2 times with febrile neutropenia. Every time cultures were reported negative and she improved with empirical antibiotics. She completed three cycles of Decitabine+Venetoclax uneventfully. Reevaluation showed marrow in morphological remission. On Day 24 of cycle 4 Decitabine with Venetoclax, she presented with complaints of intermittent high-grade fever with right jaw pain for 3 days.

On examinations, her vitals were stable. Oral cavity examination revealed an erythematous whitish patch over the right tonsillar area with the right submandibular tenderness. A contrast-enhanced computed tomography chest was done for dry cough and was normal. On lying down, her cough increased, so 2D Echo was done which was normal. On evaluation, she had neutropenia (WBC-800/μL). Serum procalcitonin was 0.12 ng/mL, blood cultures were sent. She was started on empirical antibiotics with injection cefoperazone and sulbactam 3 g IV BD and growth factors. Her fever spikes continued and in view of her neutropenic status Meropenem 1 g IV BD was started. The blood culture bottle signaled positive on day 4 and grew Gram-negative bacilli. On Blood and chocolate agar, the colonies were large, round, slightly pink in color, and mucoid (Fig. 1).

Gram's staining showed Gram-negative coccobacilli. The Gram-negative bacilli were identified as *R. gilardii* by Vitek 2 compact system (Biomerieux) with 99% probability. Antibiotic susceptibility was done by Kirby-Bauer disk diffusion method and interpreted as per CLSI interpretative criteria for non-fermentative Gram-negative bacteria. Based on the antibiotic sensitivity pattern, the patient was continued on Meropenem. She became afebrile but improved clinically in the next 24 h. Her WBC counts improved to 1300/μL and she was discharged in stable condition after 2 days. The patient is still on follow-up.

DISCUSSION

Roseomonas species are non-fermenting Gram-negative bacilli which belong to the genus Roseomonas. It is a rare pathogen with low virulence which can cause infections in immunocompromised patients. The clinical significance of this organism is not very well understood. In a retrospective review of 35 isolates by Struther's *et al*., only 60% of isolates were thought to be of clinical significance. Most of these strains were isolated from patients with underlying conditions like cancer and in patients with clinical signs of sepsis. The most frequently isolated species was *R. gilardii* and they concluded that *R. gilardii* may be a significant pathogen in persons with underlying medical conditions although this genus has low pathogenic potential for humans [8].

Figure 1: Growth of *Roseomonas gilardii* on chocolate agar plate (original image)

Between 2000 and 2010, Wang *et al*. studied 20 patients whose blood cultures were positive for *Roseomonas* species. Malignancy is the most frequent comorbid condition and catheter-related bloodstream infection is the most common presentation in their study. They also concluded that irrespective of their immune status *Roseomonas* can cause infections in both adults and children [4]. Catheter-related bacteremia due to *R. gilardii* was also reported by Alcala *et al*. [12]. These findings are consistent with our study as our patient also had underlying malignancy and PICC line placement which could have been a risk factor for the bacteremia. In a study conducted by Dé *et al*. on 36 patients with *Roseomonas* bacteremia, fever was the most common symptom and central venous catheter was removed in only five patients [7]. This suggests the low pathogenicity of this organism. In our patient also, PICC line was not removed as her clinical condition improved.

Studies have shown that this organism was susceptible *in vitro* to Aminoglycosides (Amikacin, Gentamicin), and imipenem, resistant to newer generation cephalosporins, and around 65% of the isolates studied were sensitive to Ciprofloxacin [2]. Our isolate was also sensitive to amikacin, Meropenem, and ciprofloxacin and resistant to cefoperazone sulbactam and piperacillin tazobactum. The patient was initially started empirically on cefoperazone sulbactam but in view of persisting fever and febrile neutropenia, the antibiotic was escalated to Meropenem. Based on the susceptibility report, Meropenem was continued. Eventually, her fever spikes reduced and counts also improved, and she was discharged.

CONCLUSION

R. gilardii can cause infections in immunocompromised patients. Although it is a rare opportunistic pathogen, it should be considered in the differential diagnosis of Gram-negative septicemia especially in immunocompromised individuals on central venous catheters. Although this organism has low pathogenic potential awareness among clinicians is important due to its slow-growing nature and multi-drug resistant potential.

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