

Roseomonas Bacteremia as a Cause of Febrile Neutropenia: A Case Report

Somnuek Sungkanuparph, M.D.*

Malai Vorachit, D.Sc.**

Asda Vibhagool, M.D.*

Abstract

We reported a first case of roseomonas bacteremia in a patient who had underlying gastrointestinal malignant lymphoma and presented with febrile neutropenia in Thailand. *Roseomonas* species was isolated from blood culture obtained on admission. The microorganism was susceptible to amoxicillin/clavulanic acid, cefuroxime, cefoxitin, ceftriaxone, ceftazidime, gentamicin, netilmicin and amikacin and resistant to ampicillin, cephalothin, ofloxacin, cotrimoxazole and vancomycin. It should be recognized as another cause of febrile neutropenia. (*J Infect Dis Antimicrob Agents* 2000;17:119-21.)

INTRODUCTION

Febrile neutropenia is a common life-threatening complication during the treatment of hematologic malignancy and solid organ cancer.¹ Over the half of these patients, the source of infection cannot be identified.² In most cases with identified pathogens, though there has been a shift toward gram-positive coccal bacteremia today,³⁻⁵ gram-negative bacteremia is the main reason for prompt evaluation and empirical treatment.⁶ Various gram-negative bacteria, particularly Enterobacteriaceae, are recognized as the pathogens and cephalosporins are empirically used.^{1,2,6} *Roseomonas* spp. is a new group of pink-pigmented non-fermentative gram-negative bacteria,⁷ mainly resistant to cephalosporins,⁷ and considered as significant pathogens in persons with underlying medical complications.⁸ We described a case with roseomonas bacteremia as a cause of febrile neutropenia in underlying malignant lymphoma. The clinical feature, microbiological study, treatment and outcome may be the additional

data for medical persons who care the patients with febrile neutropenia or related illness.

CASE REPORT

A 72-year-old woman with underlying small intestinal malignant lymphoma was admitted to the hospital with fever, chill, and painful buccal mucosa for 3 days. She presented with complete intestinal obstruction 8 months ago and was found to have ileocolic intussusception during the operation. The pathological diagnosis of the resected ileum was malignant lymphoma. Chemotherapy was given for six courses and the last one was 2 weeks ago. The patient had never been febrile neutropenia before. She developed anorexia and felt weak after the last chemotherapy. High fever, chill, and painful buccal mucosa were developed three days prior to admission.

On admission, temperature was 38°C. pulse rate, respiration and blood pressure were normal. The patient was alert, slightly pale, and shaking chill.

*Department of Medicine,

**Department of Pathology, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok 10400, Thailand.

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Reprint request: Somnuek Sungkanuparph, M.D., Department of Medicine, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok 10400, Thailand.

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There were no jaundice, bleeding diathesis, cervical lymphadenopathy and embolic phenomenon. Buccal mucosa was slightly injected. The cardiovascular and pulmonary systems were normal. The abdomen was soft and not tender. Liver and spleen were not palpable. The rest of neurological examination was normal.

Laboratory investigations showed a haemoglobin of 9.3 g/dL, leukopenia, 1,200 white blood cells/mm³ with 20 percent neutrophil, and normal platelets. The other laboratory investigations including blood glucose, blood urea nitrogen, creatinine, liver function test, serum electrolytes, urinalysis, and chest radiography were within the normal range. The anti-HIV test was negative.

Because of febrile neutropenia without identified source of infection and mild buccal mucositis, the patient was empirically treated with intravenous amoxicillin/clavulanic acid and gentamicin. The fever subsided in 3 days and general condition was improved. Two days later the microbiology laboratory reported the growth of gram-negative diplococci in the blood. The antibiotics were continued because of the improved clinical condition with the empirical antibiotics. One week later, *Roseomonas* spp. was reported as the end result and the organism was susceptible to the given antibiotics. Repeated blood culture was performed and resulted in no organism growth. Amoxycillin/clavulanate and gentamicin were discontinued after 10 days. The complete blood count returned to normal range and the patient was discharged.

Organism Identification and Susceptibility

One blood sample obtained on admission was culture in BacT/Alert standard adult bottle (Organon). A positive signal was detected 44.2 hours after incubation, the gram stain revealed few gram-negative diplococci. Upon subculture on chocolate, blood and MacConkey agar the growth appeared after 2 days incubation at 35°C as hemolysis, mucoid, entire, pale pink colonies of 1-2 mm. in diameter. The bacteria were weakly staining gram-negative, plump, coccoid rods, appearing in pairs or short chains. The organism was oxidase weakly positive (after 30 seconds), catalase, urease, nitrate reduction and esculin hydrolysis positive, citrate negative, no H₂S in triple sugar iron agar and non-motile. All the findings were suggestive of *Roseo-*

monas species.^{7,8,9}

The strain isolated from this patient was susceptible to amoxicillin/clavulanic acid, cefuroxime, cefoxitin, ceftriaxone, ceftazidime, gentamicin, netilmicin, amikacin and resistant to ampicillin, cephalothin, ofloxacin, cotrimoxazole and vancomycin.

DISCUSSION

Roseomonas spp. was first described as unnamed pink-pigmented oxidative bacteria by Gilaedi and Faur in 1984.¹⁰ The 156 clinical isolates were studied in biochemistry and chemistry by CDC in 1990 and termed as "pink coccoid group".⁹ *Roseomonas* was proposed as genus name by Rihs and colleagues in 1993.⁷ Although a few *roseomonas* isolates have been recovered from the water in environment,⁷ most strains have been isolated from potentially significant clinical specimens.^{7,9,10} An initial appraisal of clinical significance by Struthers and colleagues suggests that *Roseomonas* spp. may be significant pathogens in persons with underlying medical complication.⁸ Most of the cases reported in the literatures had bacteremia,^{9,11,16} partly as catheter-related bacteremia,^{15,16} and the others including osteomyelitis,¹⁷ peritonitis¹⁸ and meningitis are scanty.

The patient in our report had underlying disease requiring chemotherapy and resulted in neutropenia, the predisposing condition of *roseomonas* bacteremia which was previously described. Though only one blood culture was taken and revealed *Roseomonas* spp. growth, the organism is still considered as pathogen in this case. Previous reports had noted that *Roseomonas* spp. was recovered from only one of several sets of blood culture bottles.^{8,13} The clinical response to susceptible antibiotic in this case also supported the role of *Roseomonas* spp. as pathogen. The organism in this case had been recovered on the second day, shorter period than the previous report.¹³ *Roseomonas* spp. are relatively slow growing bacteria and may be missed if blood cultures are not incubated for prolonged period of time.

The characteristics used to differentiate *roseomonas*^{9,12} from other pink-pigmented bacteria isolated from clinical specimens, such as *rhodococcus*¹⁹ and *methylobacterium*^{9,12} are; gram stain and microscopic appearance modified acid-fast

bacilli stain, colonial morphology, growth on MacConkey agar and susceptibility to vancomycin.

The susceptibility patterns of *Roseomonas* spp. in this case is quite interesting. In previous reports,^{7,18} the organism was resistant to penicillin and cephalosporins, and susceptible to all aminoglycosides. This fact emphasizes that *Roseomonas* spp. should be considered in the cases of febrile neutropenia who did not respond to empirical cephalosporins without aminoglycoside. The source of infection in this case was not found. A few of *Roseomonas* spp. isolates have been recovered from water sources in environment⁷ or nonsterile anatomic sites, including respiratory and urogenital tract.^{7,10} Unfortunately, we have not performed surveillance culture from the water supply for this case.

To our knowledge, this is the first case report in Asia and the worldwide case reports are still scanty. The data from our case report may be another evidence of *Roseomonas* spp. as pathogen and extend the causal spectrum of bacteremia in patient with febrile neutropenia.

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