Letter to the Editor

Kocuria rosea bacteremia: two case reports and a literature review

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Kocuria rosea is a Gram-positive, aerobic, coagulase-negative coccoid that is generally considered as a non-pathogenic commensal [1]. Infection from *Kocuria rosea* is rare, and only a limited number of case reports have been published. Here we present two cases of *K. rosea* bacteremia, as well as a review of the literature of the bacteremia due to this organism.

This is an observational, noncomparative, retrospective study. We report 2 patients diagnosed with *K. rosea* bacteremia at Istanbul Florence Nightingale Hospital and review case reports in the literature.

The National Library of Medicine MEDLINE database was queried using the key terms "kocuria rosea" and "kocuria rosea bacteremia" to identify published cases of *K. rosea* bacteremia. The reviewed cases were restricted to English language reports.

Two patients were identified at Istanbul Florence Nightingale hospital. A summary of the clinical characteristics of these cases and those identified in the literature are presented in the Table I.

A 68-year-old man with a history of cardiomyopathy and diabetes mellitus was admitted to the emergency department with an acute episode of dyspnea. He progressed to respiratory failure secondary to severe decompensated heart failure. After intubation, he was admitted to the intensive care unit (ICU). On the sixth day in the ICU, the patient's condition became complicated with ventilation-associated pneumonia. A combination of vancomycin and ceftriaxone was empirically started. Three days after starting the treatment, his clinical condition improved. The tracheal secretion culture yielded methicillin-resistant *Staphylococcus aureus*, then ceftriaxone was stopped, and he was successfully treated with vancomycin for a total of 14 days. The patient continued to be intubated and remained clinically stable. Thereafter, at day 38 after admission, he developed a fever of 38.4°C, but other vital signs were within normal limits. He had a temporary triple lumen central venous catheter (CVC) in the right jugular vein with a dwell time of 14 days, a radial arterial catheter with a dwell time of 8 days, a peripheral venous catheter with a dwell time of 2 days, and a Foley urinary catheter with a dwell time of 26 days. Laboratory parameters showed a normal level of white blood cells (9.2×10^9 /mm^3), serum creatinine (0.7 mg/dl), platelets (49×10^9/l), hemoglobin level (13.2 g/dl), aminotransferases (alanine aminotransferase 38 IU/l and aspartate aminotransferase 41 IU/l), and elevated inflammatory markers (procalcitonin 1.3 ng/ml (reference value < 0.05 ng/ml), C-reactive protein 12.9 mg/dl (reference value < 0.5 mg/dl)). The chest radiograph showed no pathologic

Table I. Clinical findings for the 5 patients with *Kocuria rosea* bacteremia

Authors	Year	*N*	Age	Sex	Immune status	30-day mortality	Underlying disease	Clinical diagnosis	Sensitivity	Antibiotic treatment	Outpatient/ nosocomial	Underlying disease
Present study:												
Case 1		1	68	M	Immunocompetent	No	Cardiomyopathy, diabetes mellitus	Primary bacteremia	Clindamycin, vancomycin, trimethoprim/ sulfamethoxazole, levofloxacin, and penicillin	Vancomycin	Nosocomial	Diabetes mellitus, cardiomyopathy
Case 2		1	78	M	Immunocompetent	No	Hemodialysis for end stage kidney disease	Primary bacteremia (central venous catheter related)	Clindamycin, vancomycin, trimethoprim/ sulfamethoxazole, levofloxacin, and penicillin	Imipenem-cilastatin	Nosocomial	Hemodialysis for end stage kidney disease
Srinivasa *et al.* [2]]	2013	1	35	M	Immunocompetent	No	Rheumatic mitral valve disease	Infective endocarditis		Gentamycin and ceftriaxone	Outpatient	Rheumatic mitral valve disease
Altuntas *et al.* [3]	2004	1	39	M	Immunocompromised	No	Autologous transplantation for Hodgkin disease	Primary bacteremia (central venous catheter related)	Ampicillin-sulbactam, erythromycin	Imipenem-cilastatin, amikacin, vancomycin	Nosocomial	Hodgkin disease, autologous transplantation
Moreira *et al.* [4]	2014	1	10	F	Immunocompetent	No	Surgically corrected aortic coarctation, congestive heart failure	Infective endocarditis		Amoxicillin-clavulanate	Outpatient	Aortic coarctation, which was surgically corrected, congestive heart failure

M – male, F – female

findings. One set of blood cultures (BacT/ALERT 3D; bioMérieux, Marcy-l'Etoile, France) from the CVC, one set from the arterial catheter and one set from a peripheral vein (PV) were obtained in addition to urine and tracheal aspirate cultures. Because he was hemodynamically stable, an antibiotic treatment was not started. Since the fever persisted, after blood cultures were repeated, vancomycin 1 g IV every 12 h and ceftriaxone 2 g IV every 24 h were started empirically on the next day. The patient became afebrile after 24 h of the antibiotic treatment. Urine and tracheal aspirate cultures were sterile, but on the second day of the antibiotic treatment, blood cultures from two different central venous catheters and the peripheral vein that were taken one day apart were positive for Gram-positive cocci in tetrads. Transthoracic echocardiography showed no pathology. The colony grew under aerobic conditions at 37°C in 5% sheep blood medium (BioMérieux, France). The colonies were then identified by the Vitek 2 ID-GPC card (BioMérieux, France) as *K. rosea*. The antibiogram test by the Vitek 2 system (BioMérieux, France) showed that the organism was sensitive to clindamycin, vancomycin, trimethoprim/sulfamethoxazole, levofloxacin, and penicillin. Ceftriaxone was stopped, and the patient was treated successfully with a total of 14 days of vancomycin treatment. After a challenging intensive care unit stay for 102 days, the patient eventually was discharged to an inpatient rehabilitation unit.

A 78-year-old male patient on maintenance hemodialysis for end stage kidney disease was transferred to our ICU for suspected septic shock. He had been receiving hemodialysis for 5 years. The patient had a temporary subclavian dialysis catheter for 20 days. One set of blood from the peripheral vein and the central venous catheter were sent for culture, and empiric therapy with vancomycin and piperacillin-tazobactam was initiated. After withdrawing the catheter, a new catheter was implanted in the right femoral vein for hemodialysis therapy. The patient's clinical symptoms and laboratory findings improved with antibiotic therapy. *Escherichia coli* was isolated in the four bottles of the blood cultures. Because the isolate was sensitive to piperacillin-tazobactam, vancomycin was stopped, and piperacillin-tazobactam was continued for 15 days with full recovery. While he recovered from bacteremia, he was kept on artificial breathing through endotracheal intubation, which remained in place for 31 days. Later tracheostomy was performed. The patient continued undergoing regular hemodialysis. On day 39, he developed a fever of 38.7°C. The other vital signs were as follows: pulse 112 beats per minute and blood pressure 120/70 mm Hg. Complete blood count revealed a white blood cells (WBC) of 12,700/mm^3 (normal: 4,400–11,000/ mm^3) with 86.4% granulocytes, 12.6% lymphocytes, and 1.0% monocytes. C-reactive protein was 11.24 mg/dl (normal: 0–0.5 mg/dl). Procalcitonin was 1.75 µg/l (normal: 0–0.05 µg/l). The chest radiograph showed no pathologic findings. He had a temporary dialysis CVC in the left femoral vein with a dwell time of 18 days, a radial arterial catheter with a dwell time of 6 days, and a peripheral venous catheter with a dwell time of 3 days. Empiric imipenem (2 g/day) and vancomycin (2 g/day) was started. After 96 h, he was still febrile, and blood cultures from both the central venous catheter and peripheral vein yielded Gram-positive cocci. His CVC and arterial catheters were removed due to non-response, and a new central venous and arterial catheter were inserted at different sites. He was continued on antibiotics. After removal of the catheters, the patient's clinical symptoms, including fever, were improved. The blood and CVC tip culture revealed *K. rosea*, confirmed by the Vitek 2 system (BioMérieux, France). The antibiogram test by the Vitek 2 system (BioMérieux, France) showed that the organism was sensitive to clindamycin, vancomycin, trimethoprim/sulfamethoxazole, levofloxacin, and penicillin. According to the susceptibility test, vancomycin was stopped, and imipenem was administered for a total of 2 weeks. The patient's general condition improved. However, due to other medical problems, the patient remained in the ICU for 11 days, after which he was discharged to the ward.

We identified only a total of three *K. rosea* bacteremia cases in published English language studies for review [2–4]. The small number of reported cases of *K. rosea* bacteremia might have been a consequence of their misidentification as staphylococci due to limited biochemical tests and automated identification systems [4].

A summary of available demographic and clinical data for all 5 patients (2 from our experience and 3 from the literature) is presented in the Table I. These infections were associated with diabetes mellitus, cardiomyopathy, hemodialysis for end stage kidney disease, rheumatic mitral valve disease, autologous transplantation for Hodgkin disease, and surgically corrected aortic coarctation and congestive heart failure (Table I). In general, *Kocuria* isolates are considered to be responsible for infections mostly in immunocompromised hosts [5]. However, in our study, immunodeficiency was present only in one of the 5 cases, suggesting the organism as a causative agent in both immunosuppressed and immunocompetent hosts. In the cases described here, all of the patients responded well to intravenous antibiotics and survived, even though 2 patients had infective endocarditis as a severe infection. This may show that the organism is seldom virulent. In 3 of the 5 patients, the infections were nosocomi-

al, showing the organism as the causative agent in both nosocomial and outpatient states.

Most *Kocuria* isolates were reported to be susceptible to many commonly used antibiotics, including tetracycline, erythromycin, polymyxin, vancomycin, penicillin G, streptomycin, gentamycin, ceftriaxone, chloramphenicol, and ampicillin-sulbactam [1, 2, 5]. Similarly, the isolates recovered from our patients were sensitive to clindamycin, vancomycin, trimethoprim/sulfamethoxazole, levofloxacin, and penicillin.

In conclusion, careful laboratory analysis of Gram-positive bacteremia may reveal more cases of *K. rosea* infections, which may contribute to better understanding and early treatment of these infections. This report emphasizes that *Kocuria rosea* should be considered as both a nosocomial and community-acquired pathogen.

Conflict of interest

The authors declare no conflict of interest.

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