



Cesarean-Related *Kocuria kristinae* Bacteremia

Houqiang Su¹, Shuang Li¹ and Zhiming Hao^{1*}

¹Department of Gastroenterology, The First Affiliated Hospital, School of Medicine, Xi'an Jiaotong University, 277 Yantaxilu, Xi'an, China.

Authors' contributions

This work was carried out in collaboration between all the authors. Author HS collected the clinical data and wrote the draft of the manuscript. Author SL managed the literature searches. Author ZH supervised the work and corrected the draft. All the authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Kocuria kristinae infection is quite rare in clinical practice. Until now, only about 20 cases of *Kocuria kristinae* infection have been reported in immunocompromised individuals or in patients who have undergone surgery. Here we report a case of *Kocuria kristinae* bacteremia after cesarean section. The patient, a 28-year-old woman, experienced intermittent high fever for 2 months beginning 10 days after undergoing a cesarean section. Organ involvement was not observed in this patient. Repeated bacteria isolation from peripheral blood verified *Kocuria kristinae* infection. The patient recovered after 2 weeks of an intravenous levofloxacin and vancomycin treatment indicated by antibiotic sensitivity tests. The present report and previous literatures indicate that *Kocuria kristinae* infections occur not only in immunocompromised hosts but also in immunopotent individuals undergoing operations or interventional procedures. Clinicians should be aware that *Kocuria kristinae* is a potential pathogen in nosocomial infections.

Keywords: *Kocuria kristinae*; bacteremia; cesarean section.

*Corresponding author: E-mail: haozhm66@126.com;

1. INTRODUCTION

The genus *Kocuria* is a member of the Micrococcaceae family and consists of 17 species. This genus was previously classified into the *Micrococcus* genus, but was dissected from *Micrococcus* on the basis of phylogenetic and chemotaxonomic analyses by [1,2]. Members of the genus *Kocuria* are found on normal skin, mucosa and oropharynx in mammals, including human beings, and are considered non-pathogenic commensal bacteria. However, under special circumstances, *Kocuria* can cause opportunistic infection. Infection due to *Kocuria kristinae*, a member of *Kocuria*, is rather rare in clinical practice. Till now, only about 20 cases of *Kocuria kristinae* infection have been reported [3-14]. Here we report a case of *Kocuria kristinae* bacteremia in a 28-year-old woman after a cesarean section. The patient had no history of immune system disease and presented with an intermittent high fever, poor appetite, and fatigue. The pathogen was verified by bacterial isolation from peripheral blood and the patient recovered after administration of levofloxacin and vancomycin for 14 consecutive days.

2. CASE REPORT

A 28-year-old woman suffering from intermittent high fever was referred to The First Affiliated Hospital, Medical College of Xi'an Jiaotong University. Two months before admission, she underwent a uterine-incision delivery at a hospital. Fortunately, both the woman and newborn were safe. Ten days after delivery, the woman developed a fever with a peak temperature of 40°C. After 1 week of intravenous penicillin and cefazolin sodium treatment, the fever was controlled and she was discharged. Forty days postpartum, however, the fever recurred without any obvious predisposition, and failed to respond to penicillin treatment and patient was admitted to another hospital with reported pharyngalgia, debility, poor appetite, diarrhea, and high fever. Ultrasound examination of the abdomen and the urinary and cavitas pelvis, and computerized tomography of the chest showed normal images. Elevated white blood cell count ($26 \times 10^9/L$) and neutrophil percentage (90%), elevated blood sedimentation rate, and positive supersensitive C-reactive protein in the blood suggested inflammation. The patient was empirically treated with intravenous ceftriaxone at 2 g/day for 6 days with no effect. Finally, she was referred to our hospital. Physical examination revealed anemia, debility, and

cervical lymph nodes as well as lymph nodes under the jaw that were palpable and tumescent. Hematological parameters showed mild anemia (red blood cell count, $3.73 \times 10^{12}/L$; hemoglobin, 100 g/L), elevated white blood cell count ($26.67 \times 10^9/L$), and elevated neutrophil percentage (88.6%). Bone marrow examination excluded hematological malignancies. These examination results all suggested infection. Immediately after admission to our hospital, the patient was empirically treated with levofloxacin (200 mg/day). However, the patient's temperature still fluctuated between 38°C and 39°C. At the same time of levofloxacin treatment, peripheral blood samples were taken for three consecutive days to perform microbial culture with a BacT/ALERT 3D Microbial Detection system (bioMérieux, Organon Teknika, Durham, NC, USA). The peripheral blood specimen was transferred to the enrichment broths included in the BacT/Alert 3D system, and the system gave a positive signal 24 hours later. The positive culture was then spread onto 3 sheep blood agar plates and incubated at 37°C under aerobic conditions. Twenty-four hours later, pale, cream-colored, mucoid colonies emerged. They were non-hemolytic, catalase positive, and coagulase negative. Microscopic examination of the smear showed gram-positive cocci arranged in tetrads. The isolate was further identified as *Kocuria kristinae* using the Vitek 2 system (bioMérieux, France). An antibiotics sensitivity test was carried out using the disc diffusion method described by the Clinical and Laboratory Standards Institute guidelines [15] and the results showed that the cultured organism was sensitive to levofloxacin, ceftriaxone, teicoplanin, gentamicin, vancomycin, and linezolid, among other antibiotics. Examination of all the three consecutive blood samples showed the same results. On the basis of the culture and antibiotic sensitivity test results, the patient was administered intravenous levofloxacin (200 mg/day) and vancomycin (2 g/day) twice a day for 14 consecutive days. The temperature decreased gradually to normal in 3 days. Diarrhea disappeared and appetite recovered. Subsequent blood cultures were negative. After hospital discharge, the patient has undergone follow-up testing. The disease has been and remains in complete remission for the past 6 months.

3. DISCUSSION

Infections of *Kocuria kristinae*, just as other members of *Kocuria*, are likely to occur in immunocompromised individuals such as

patients with malignancies [3,5,12], renal failure undergoing hemodialysis or peritoneal dialysis [7,8,13], diabetes melitus [11], or infants [10,14] as opportunistic infections pathogens. Occasionally, *Kocuria kristinae* can infect immunopotent individuals after interventional treatment measures [6,9]. Only one case of *Kocuria kristinae* cholecystitis has been reported in a previously healthy person [4]. Here we present a case of *Kocuria kristinae* bacteremia after a cesarean section delivery with no evidence of immunosuppression.

The main clinical manifestations of our patient were intermittent fever, fatigue, and poor appetite. No obvious organ involvement was revealed despite the long duration of illness. These clinical features are typical for *Kocuria* infections. Possibly due to the mild virulence of the bacteria, patients often have a long duration of illness before successful diagnosis.

Diagnosis of *Kocuria spp.* infection relies on bacterial culture [16]. However, since this organism exists extensively on the skin and mucosa of humans and other mammals, false-positivity due to sample contamination should be excluded. In this present case, the diagnosis of *Kocuria kristinae* bacteremia was evidenced by repeated positive bacterial culture and further supported by the satisfactory response to culture-directed antimicrobial therapy. The fever initiated 10 days after uterine-incision delivery. Hence, we believe that the infection can be attributed to the cesarean section.

4. CONCLUSION

Reports of *Kocuria kristinae* infection are increasing in recent years. Literatures and the present report indicate that *Kocuria kristinae* infections occur not only in immunocompromised hosts but also in immunopotent individuals undergoing operations or interventional procedures. We propose that *Kocuria kristinae* is an unneglectable pathogen in nosocomial infections and that clinicians should be alert to infections by this organism in clinical practice.

CONSENT

All authors declare that written informed consent was obtained from the patient for publication of this case report.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Stackebrandt E, Koch C, Gvozdiak O, Schumann P. Taxonomic dissection of the genus *Micrococcus*: *Kocuria* gen. nov., *Nesterenkonia* gen. nov., *Kytococcus* gen. nov., *Dermaococcus* gen. nov., and *Micrococcus* Cohn 1872 gen. emend. Int J Syst Bacteriol. 1995;45:682–692.
2. Savini V, Catavittello C, Masciarelli G, Astolfi D, Balbinot A, Bianco A, et al. Drug sensitivity and clinical impact of members of the genus *Kocuria*. Med Microbiol. 2010;59:1395-1402.
3. Basaglia G, Carretto E, Barbarini D, Moras L, Scalone S, Marone P, et al. Catheter-related bacteremia due to *Kocuria kristinae* in a patient with ovarian cancer. J Clin Microbiol. 2002;40:311-313.
4. Ma ESK, Wong CL, Lai KT, Chan EC, Yam WC, Chan AC. *Kocuria kristinae* infection associated with acute cholecystitis. BMC Infect Dis. 2005;5:60.
5. Martinaud C, Gisserot O, Gaillard T, Brisou P. Bacteremia caused by *Kocuria kristinae* in a patient with acute leukaemia. Med Mal Infect. 2008;38:334-335.
6. Tewari R, Dudeja M, Das AK, Nandy S. *Kocuria kristinae* in catheter associated urinary tract infection: A case report. J Clin Diagn Res. 2013;7:1692-1693.
7. Carlini A, Mattei R, Lucarotti I, Bartelloni A, Rosati A. *Kocuria kristinae*: An unusual cause of acute peritoneal dialysis-related infection. Perit Dial Int. 2011;31:105-107.
8. Cheung CY, Cheng NH, Chau KF, Li CS. An unusual organism for CAPD-related peritonitis: *Kocuria kristinae*. Perit Dial Int. 2011;31:107-108.
9. Dunn R, Bares S, David MZ. Central venous catheter-related bacteremia caused by *Kocuria kristinae*: Case report and review of the literature. Ann Clin Microbiol Antimicrob. 2011;10:31.
10. Karadag Oncel E, Boyraz MS, Kara A. Black tongue associated with *Kocuria (Micrococcus) kristinae* bacteremia in a 4-month-old infant. Eur J Pediatr. 2012;171: 593.
11. Citro R, Prota C, Greco L, Mirra M, Masullo A, Silverio A, Bossone E, Piscione F. *Kocuria kristinae* endocarditis related to

- diabetic foot infection. J Med Microbiol. 2013;62(6):932-934.
12. Ahmed NH, Biswal I, Roy P, Grover RK. *Kocuria kristinae*, an unusual pathogen causing opportunistic infections in patients with malignancy. Indian J Med Microbiol. 2014;32:456-458.
 13. Chávez Valencia V, Orizaga de la Cruz C, Aguilar Bixano O, Huerta Ruíz MK, Sánchez Estrada EE. Infections due to *Kocuria kristinae*: Case reports of two patients and review of the literature. Gac Med Mex. 2014;150(2):183-185.
 14. Chen HM, Chi H, Chiu NC, Huang FY. *Kocuria kristinae*: A true pathogen in pediatric patients. J Microbiol Immunol Infect. 2015;48:80-84.
 15. Clinical and Laboratory Standards Institute. Performance standards for antimicrobial susceptibility testing; Twenty first Informational supplement. CLSI Document M100-S23; 2013;3.
 16. Boudewijns M, Vandeven J, Verhaegen J, Ben-Ami R, Carmeli Y. Vitek 2 automated identification system and *Kocuria kristinae*. J Clin Microbiol. 2005;43:5832.

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