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CASE REPORT / *OLGU SUNUMU*

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Bacteremia and Pneumoniae Caused by *Kocuria Kristinae*: A Rare Case

Kocuria Kristinae'nin Sebep Olduğu Bakteriyemi ve Pnömoni: Nadir Bir Olgu

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ABSTRACT *Kocuria kristinae*, previously known as *Micrococcus kristinae*, are common in nature but are included in the normal skin flora, mucous membrane, and oropharynx in humans and are generally not pathogenic. Kocuria species are facultative anaerobic, catalase positive, and coagulase negative cocci. It can cause peritonitis associated with peritoneal dialysis, catheter-related urinary tract infections, acute cholecystitis, infective endocarditis, meningitis, brain abscess, and pneumonia in patients with chronic disease and immunocompromised patients. This article presents a case of pneumonia and bacteremia due to *Kocuria kristinae*, reported for the first time in Turkey, in a 72-year-old female patient with a history of comorbid diseases and tracheostomy.
Keywords: *Kocuria kristinae*, pneumonia, bacteremia, intensive care unit

ÖZ Önceleri *Micrococcus kristinae* olarak bilinen *Kocuria kristinae*, doğada yaygın bulunmakla beraber insanlarda deri, müköz membran ve orofarenksin normal flora elemanları arasındadır ve genellikle patojen değildir. Kocuria türleri fakültatif anaerop, katalaz pozitif, koagülaz negatif koklardır. Kronik hastalığı olan, bağışıklık sistemi baskılanmış hastalarda periton diyalizi ile ilişkili peritonit, kateter ilişkili üriner sistem enfeksiyonları, akut kolesistit, enfektif endokardit, menenjit, beyin apsesi ve pnömoniye sebep olabilmektedir. Bu makalede, 72 yaşında komorbit hastalıkları ve trakeostomi öyküsü olan kadın hastada Türkiye'den ilk defa bildirilen *Kocuria kristinae*'ya bağlı pnömoni ve bakteriyemi olgusu sunulmuştur.
Anahtar Kelimeler: *Kocuria kristinae*, pnömoni, bakteriyemi, yoğun bakım ünitesi

Introduction

Kocuria species are facultatively anaerobic, catalase-positive, coagulase-negative cocci, which are considered sensitive to most antimicrobials (1). Although Kocuria species are common in nature, they are among the standard flora elements of the skin, mucous membrane, and oropharynx in humans and are generally not pathogenic. Cases of peritonitis associated with peritoneal dialysis, catheter-related urinary tract infections, acute cholecystitis, infective endocarditis, meningitis, brain abscess, and rarely pneumonia have been reported in patients with chronic disease and whose immune system is suppressed (2-8).

This study presents the first case of pneumonia and bacteremia due to *Kocuria kristinae* in Turkey, which was treated in the intensive care unit (ICU).

Case Report

A 72-year-old, body mass index: 42.9 kg/m^2 obese female patient with chronic obstructive pulmonary disease (COPD), heart failure, and hyperthyroidism was admitted to the emergency department with complaints of respiratory failure, tachypnea, fever, and cough lasting for several days. It was learned that the patient was followed in the ICU for three months due to respiratory distress due to COPD and

heart failure two months ago. A percutaneous tracheostomy was performed during the ICU follow-ups. The tracheostomy of the patient, who was followed up at home for two months with a home ventilator, was closed one month ago.

In her physical examination, the patient was confused. She had subfebrile fever (37.9) and bilateral crepitant rales on lung auscultation. Heart rate was 100-105 min^{-1}, blood pressure was 85/60 mmHg, respiratory rate was 22 min^{-1}, SPO_2 in pulse oximetry was 75-80% in room air and 88-90% under oxygen. The laboratory examination showed white blood cell: $11x10^3$ μL^{-1}, C-reactive protein: 130 mg L^{-1}, and procalcitonin 0.29 μL^{-1}. No abnormality was detected except a small number of erythrocytes in the urinalysis.

When a radiological examination was performed, no pathology was observed in the cranial tomography of the patient. Chest tomography showed cardiomegaly, bronchopneumonia infiltrates, and atelectatic areas. The patient, who was diagnosed with pneumonia, was admitted to the ICU as extubated. Peripheral blood cultures, urine culture, and tracheal aspirate culture (TAC) were taken from both arms, and empirical antibiotic therapy of meropenem 1 g 2x1 and amikacin 500 mg 3x1 was started.

Non-invasive mechanical ventilation was started on the patient. The patient was unconscious, peripheral oxygen saturation decreased, hypotension was observed, and the patient was intubated. Low-dose vasopressor support was started. The patient was extubated on the third day of intubation. *K. kristinae* was isolated in both blood cultures of the patient, who was reintubated due to severe respiratory failure and tachypnea. No growth was observed in the urine culture and TAC. A culture antibiogram showed it was resistant to ampicillin/sulbactam and meropenem but sensitive to tigecycline. Thereupon, meropenem was stopped, and after loading tigecycline 100 mg, maintenance treatment was started with 50 mg 2x1.

On the fifth day of intubation, the patient was extubated, whose hemodynamic stabilization was achieved, and his breathing was relieved. The patient, who was followed up and treated in the ICU for 13 days, was discharged from the inpatient service.

Verbal and written consent was obtained from the patient and her relatives for the case report.

Discussion

K. kristinae, previously known as *Micrococcus kristinae*, was first described in 1974. It is a natural member of many mammals' skin and mucosal flora and functions as an opportunistic pathogen. Although the disease caused by this organism is sporadic, it has been reported more frequently since the end of the 20th century. Five of the 18 known species of the genus Kocuria spp. have been reported to be pathogenic *(K. kristinae, K. rhizophila, K. rosea, K. varians*, and *K. marina*) (9). A systematic meta-analysis reported that *K. kristinae* was the causative agent of central venous catheter-related bacteremia in 17 cases, infective endocarditis in four cases, acute peritonitis in three cases, and abdominal abscess, acute cholecystitis, and urinary tract infection in one case (10). When the literature is reviewed, although cases of infective bacteremia, endocarditis, and meningitis caused by Kocuria species have been reported from Turkey, no pneumonia cases have been reported (5,11).

Kim et al. (12) reported a case of empyema caused by *K. kristinae* in a 57-year-old man with diabetes mellitus. It was reported that the patient was started on ceftriaxone, levofloxacin, and clindamycin antibiotics. When his fever did not decrease, he was switched to a piperacillin-tazobactam antibiotic, and the patient recovered after three weeks of treatment (12).

As far as we can reach in the literature, two cases of pneumonia caused by *K. kristinae* and *K. rosea* have been reported (7,8). Bernshteyn et al. (7) reported a case of bacteremia and pneumonia due to *K. kristinae* in a 62-year-old man with heart failure, hypertension, diabetes mellitus, and hypothyroidism. Piperacillin-tazobactam and azithromycin treatment was started for pneumonia in the patient who developed acute hypoxic respiratory failure and was intubated. After an unsuccessful extubation attempt in the patient after four days of treatment, *K. kristinae* was isolated in both blood cultures. It was stated that after switching to linezolid treatment, the patient's clinical condition improved within two weeks, and he was discharged.

Páez et al. (8) also reported a case of bacteremia and community-acquired pneumonia due to *K. rosea* in a 71-year-old male patient with a history of diabetes mellitus, COPD, and previous cerebrovascular accident. The patient, who had a productive cough and severe respiratory distress for three days, was intubated and taken to the ICU under vasopressor support. It was stated that piperacillin-tazobactam and clarithromycin antibiotic therapy was started on the patient, and *K. rosea* was grown in the bronchoalveolar lavage culture. It has been reported that the patient was discharged with hemodynamic stabilization after five days of treatment.

It has been reported that the Kocuria species causes infections in patients with comorbid diseases or weakened immune systems (1-12). In our case, COPD, heart failure, hyperthyroidism, and morbid obesity stand out as risk factors. In addition, we think that the recent follow-up of the patient in the ICU for three months, opening and closing a percutaneous tracheostomy, facilitated this agent, a member of the normal skin flora, to become a cause of bacteremia and pneumonia. Empirical antibiotic therapy was started for the patient, whose follow-up and treatment were started in the ICU, but no clinical response was obtained. According to the culture antibiogram results, the patient whose pneumonia regressed with tigecycline was discharged.

Kocuria species can be mistakenly interpreted as coagulase-negative *staphylococci* in microbiology laboratories (7). It has been reported that it cannot be differentiated when evaluated with manual methods due to their similarities. It is important to use automated systems such as VITEK-2 that help with accurate identification (7,9). Szczerba (13) stated that Kocuria species are sensitive to doxycycline, ceftriaxone, cefuroxime, amikacin, and amoxicillin-clavulanic acid, while they are resistant to ampicillin and erythromycin.

In our case, species-level identification was made with the VITEK-2 (bioMerieux, France) method to isolate the agent. The patient was empirically treated with meropenem and amikacin antibiotics. As a result of the culture antibiogram, the agent was found to be resistant to meropenem and ampicillin/sulbactam, and tigecycline treatment was started.

In conclusion, *K. kristinae* and other sub-strains are among the standard flora elements of the mucous membranes and oropharynx. They may rarely lead to life-threatening conditions such as pneumonia. Although it may be difficult to distinguish by manual methods due to its similarities to coagulase-negative *staphylococci*, it is more frequently defined and reported with automated systems today. It should be kept in mind that although it is generally sensitive to antibiotics, it cannot respond to empirical treatment. It is essential to regulate the treatment according to the culture antibiogram result.

Ethics

Informed Consent: Verbal and written consent was obtained from the patient and her relatives for the case report.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Concept: K.A., A.S.Ş., Design: K.A., A.S.Ş., Data Collection and/or Processing: K.A., Analysis and/or Interpretation: K.A., A.S.Ş., Literature Search: K.A., Writing: K.A.

Conflict of Interest: No conflict of interest was declared by the authors.

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