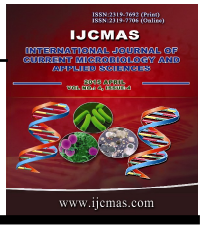
Int.J.Curr.Microbiol.App.Sci (2015) 4(4): 885-889

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 4 Number 4 (2015) pp. 885-889**
http://www.ijcmas.com



Case Study

Is *Kocuria kristinae* an upcoming pathogen?

Mapary Lakshmikantha, Verma Devki* and Chander Yogesh

D-182 Defence Colony, New Delhi -110024, India
**Corresponding author*

Keywords

Kocuria kristinae, Pathogen, skin and mucous membranes

A B S T R A C T

Kocuria kristinae , is a gram positive coccus usually found in irregular clusters and tetrads. It is usually non pathogenic and is a normal commensal of skin and mucous membranes, rarely been isolated from clinical specimens, in patients with indwelling devices, underlying diseases or suppressed immunity. Presently, we are reporting the isolation of *Kocuria kristinae* from the urine as well as blood samples.

Introduction

Kocuria kristinae, previously called *Micrococcus Kristinae* was first described in 1974[1]. The organism is found widespread in nature, frequently as normal skin flora on humans and other mammals. It is usually non-pathogenic. There are very few documented cases with infections caused by *Kocuria kristinae* . Of these a majority occur in patients with indwelling devices, underlying diseases and suppressed immunity. It was previously classified into the genus *Micrococcus*, but was dissected from *Micrococcus* based on phylogenetic and chemotaxonomic analysis [2]. It has been reclassified in the new genus *Kocuria*along with *K.rosea, K. varians, K. palustris* and *K. rhizophila* [2]. *Kocuria kristinae* is a facultative anaerobic, non-motile, gram positive coccus occurring in irregular clusters and tetrads.

Case presentation

An 18 year old male was brought to a tertiary care hospital in Greater Noida in an unconscious non-responsive statewith alleged history of consumption of an unknown substance on 27th June, 2014 at 11:36 pm. Examination revealed bilateral pin point pupils and bilateral pulmonary crepitations. The patient was admitted to the Medical ICU and put on mechanical ventilation and a RT sample was sent for a toxicology screen. It revealed organophosphorous poisoning and the patient was treated with Inj. Atropine along with other supportive care. He was catheterised and routine investigations including urine culture & sensitivity and blood culture & sensitivity were done which revealed no growth.

Repeat urine culture & sensitivity was done on 8th July, 2014 with a sample from the catheter tip. On microscopic examination, 15-20 pus cells per high power field were reported. The sample was inoculated onto Blood Agar and McConkey's Agar plates and plates were incubated at 37^0 C. After overnight incubation culture showed growth of pure, tiny, pale, smooth, convex and non-haemolytic colonies on Blood Agar, whereas no growth was observed on McConkey's Agar. Gram staining revealed gram positive cocci in irregular clusters and tetrads. The organism was non-motile, catalase positive, coagulase negative and oxidase positive. An antibiotic sensitivity test was performed on Muller Hinton Agar by Kirby Bauer disc diffusion method according to Clinical and Laboratory Standards Institute (CLSI) guidelines for *Staphylococcus* [3].Isolate was found to be resistant tonitrofurantoin, penicillin, erythromycin, ceftazidime, ceftriaxone, gentamicin, amikacin, oxacillin, ciprofloxacin, imipenem, amoxicillin and vancomycin. Isolate was reprocessed using the VITEK 2 Compact (bioMerieux) automated identification system (Card no. GP REF 21 342) and it was confirmed as *K. kristinae*.

A repeat urine culture & sensitivity was done with mid stream urine on 10th July. The growth on the plates, the biochemical tests and the antimicrobial susceptibility tests showed similar results as before. The VITEK 2 Compact (bioMerieux) automated identification system (Card no. GP REF 21 342) confirmed the presence of *K. kristinae*. There by excluding the possibility of it being a contaminant in the catheter.

The second case was a neonate, born at term by normal vaginal delivery with meconium staining of liquor. He did not cry at birth and had difficulty in breathing and was given ventilator support. He developed fever within a few hours and examination revealed bilateral pulmonary crepitations. Routine investigations including blood culture & sensitivity were ordered on the following day on the 22nd July, 2014. Blood culture was done using Bact Alert Automated System. Sample was inoculated onto Blood Agar and McConkey's Agar plates and plates were incubated at 37 C. After overnight incubation the colony characteristics, gram staining and biochemical reactions were similar to the previously isolated *Kocuria kristinae* . The isolate was found to be *Kocuria kristinae* and this was also comfirmed by VITEK 2 Compact (bioMerieux) automated identification system (Card no. GP REF 21 342). Antibiotic Sensitivity test was performed on Muller Hilton Agar by Kirby Bauer disc diffusion method according to CLSI guidelines for *Staphylococcus* and the organism was sensitive to only Levofloxacin and Minocycline. The fever subsided with Levofloxacin and the neonate improved and he was discharged.

The third case was of a 5 year old boy who presented with chief complaints of high grade fever for 5 days not associated with chills and rigors , dry cough for 3 days and development of pustules all over body for 1 day associated with itching all over body. The patient was admitted in the general medicine ward. Routine investigations including throat swab culture and sensitivity were sent on 30th August, 2014. The throat swab sample was inoculated onto Blood Agar and McConkey's Agar plates and plates were incubated at 37 C. After overnight incubation the colony charecterisics, gram staining and biochemical reactions were similar to the previously isolated *Kocuria kristinae* . The isolate was found to be *Kocuria kristinae* and this was also comfirmed by VITEK 2 Compact (bioMerieux) automated

identification system (Card no. GP REF 21 342). Antibiotic Sensitivity test was performed on Muller Hilton Agar by Kirby Bauer disc diffusion method according to CLSI guidelines for *Staphylococcus* and the organism was sensitive to only Levofloxacin, Minocycline, Erythromycin, Amikacin and Vancomycin. The patient could not be followed up because the patient got discharged against medical advice.

Discussion

Kocuria kristinae is usually non pathogenic and is found as a normal flora of the skin and mucosa. Infections related to this organism are uncommon but are found to be responsible for causing infections in immunocompromised patients with underlying diseases. It is also implicated in causingperitonitis in continuous ambulatory dialysis [4], endocarditis [5], infection of cerebrospinal fluid shunts [6] and cholecystitis in immunocompetent hosts. Infections in indwelling devices like catheter related bacteraemia [7,8] and central venous catheter related bacteraemia in patients with pulmonary hypertension receiving continuous epoprostenol infusion [9,10], ovarian cancer [8,11], acute leukaemia [12] and in pregnant females [14] have been reported.

One of our cases is of an 18 year old, unconscious, non-responsive male with organophosphorous poisoning in the Medical ICU with a catheter and hence, can be corelated with the association between indwelling devices and *Kocuria kristinae* .The second case is of a neonate on a ventilator and thus correlation can be made between the use of ventilator and the isolation of *Kocuria kristinae*. However, in the third case there was no involvement of indwelling devices thus, no such association can be made in the case of the 5 year old boy.

Kocuria kristinae has been reported earlier to be sensitive to many commonly used antibiotics like penicillins, macrolides, clindamycin, trimethoprim/ sulfamethoxazole, vancomycin and fluoroquinolones [11,12,15]. Ben Ami et al reported that most strains of *Kocuria* and *Micrococcus* were sensitive to doxycycline, ceftriaxone, cefuroxime, amikacin and amoxicillin with clavulanic acid, but resistant to ampicillin and erythromycin. [16]. However, the organism isolated by us in the 18 year old boy is resistant to penicillin, amikacin, ampicillin, vancomycin, ceftriaxone, clindamycin, cefazolin, erythromycin, levofloxacin minocycline and nitrofurantoin, the one isolated from the neonate is resistant to all but levofloxacin and minocycline and the one isolated from the 5 year old boy was only sensitive to Levofloxacin, Minocycline, Erythromycin, Amikacin and Vancomycin.

There have been reports about the misidentification of coagulase-negative staphylococci (CNoS) as *Kocuria* spp. by the Vitek 2 system (bioMérieux) with the use of the Vitek 2 ID GPC gram-positive identification card [16]. However, the new Vitek 2 gram-positive identification card GP and database recently introduced by bioMérieux was used by us. This GP card allows for the identification of additional taxa including *Kocuria kristinae* .[17].

Conclusion

Although previously regarded as an innocuous microorganism, the clinical spectrum of infections caused by *Kocuria kristinae* has expanded. Due to lack of advanced Laboratory facilities many a times it is misdiagnosed as Coagulase Negative *Staphylococcus aureus*. There are increasing number of recent reports describing infections caused by *Kocuria* sp. in both

immunocompromised and immunocompetent patients, thus highlighting the significance of their isolation from clinical specimens. The resistance of *Kocuria kristinae* to antibiotics further increases its clinical importance.

References

1. Kloos WE, Tornabene TG, Schleifer KH: Isolation and characterization of micrococci from human skin, including two species: *Micrococcus lylae* and *Micrococcus kristinae*. Int J SystBacteriol 1974;24:79-101.
2. StackebrandtE,Koch C, Gvozdiak O, Schumann P: Taxonomic dissection of the genus *Micrococcus*:*Kocuria*gen.nov., *Nesterenkonia* gen. nov., *Kytococcus* gen. nov., *Dermacoccus* gen. nov., and *Micrococcus* Cohn 1872 gen. emend.Int J SystBacteriol 1995, 45:682-692.
3. Clinical and Laboratory Standards Institute (CSLI). Performance standards for antimicrobial susceptibility testing; Eighteenth Informational Supplement. Zone Diameter Interpretive Standards and Equivalent Minimal Inhibitory Concentration (MIC) Breakpoints for *Staphylococcus* spp. 2008 M 100-S18;28:48.
4. Spencer RC: Infections in continuous ambulatory peritoneal dialysis. J ClinMicrobiol 1988, 27:1-9.
5. Richardon JF, Marples RR, de Saze MJ: Characteristics of coagulase-negative *Staphylococci* and *Micrococci* from cases of endocarditis. J Hosp Infect 1984, 5:164-171.
6. Shapiro S, Boaz J, Kleiman M, Kalsbeek J, Mealy J: Origin of organisms infecting ventricular shunts. *Neurology* 1988, 22:868-872.
7. Altuntas F, Yildiz O, Eser B, Gundogan K, Sumerkan B, Cetin M: Catheter-related bacteremia due to *Kocuriarosea* in a patient undergoing peripheral blood stem cell transplantation. BMC Infect Dis 2004, 4:62.
8. Basaglia G, Carretto E, Barbarini D, Moras L, Scalone S, Marone P, De Paoli P: Catheter-related Bacteremia due to *Kocuria kristinae* in a patient with ovarian cancer. J ClinMicrobiol 2002, 40:311-313.
9. Yap RL, Mermel LA: *Micrococcus* infection in patients receiving epoprostenol by continuous Infusion. Eur J ClinMicrobiol Infect Dis 2003, 22:704-705.
10. Oudiz RJ, Widiltz A, Beckmann XJ, Camanga D, Alfie J, Brundage BH, Barst RJ: *Micrococcus*- Associated central venous catheter infection in patients with pulmonary arterial hypertension.Chest 2004, 126:90-94.
11. Lai CC, Wang JY, Lin SH, Tan CK, Wang CY, et al. Catheter-related bacteremia and infective endocarditis caused by *Kocuria* species. ClinMicrobiol Infect. 2011;17:190-192.
12. Martinaud C, Gaillard T, Brisou P, Gisserot O, Jaureguiberry JP. Bacteremia caused by *Kocuria kristinae* in a patient with acute leukemia. Med Mal Infect. 2008;38:165-166.
13. Ryan D, Sara B, Michael ZD. Central venous catheter related bacterimia caused by *Kocuria kristinae* case report and review of literature. Annals of Clinical Microbiology and Antimicrobials. 2011;10:31.
14. Ma ES, Won CL, Lai KT, Chan EC, Yam WC, et al.*Kocuria kristinae* infection associated with acute

Cholecystitis. BMC Infec Dis. 2005;5:60.

15. Szczerba I: Susceptibility to antibiotics of bacteria from genera *Micrococcus, Kocuria,Nesternkonia, Kytococcus*and*Dermatococcus*. Med DoswMikrobiol 2003, 55:75-80
16. Ben-Ami, R., S. Navon-Venezia, D. Schwartz, Y. Schlezinger, Y. Mekuzas and Y. Carmeli.Erroneous reporting of coagulase-negative staphylococci as *Kocuria* spp. By the Vitek 2 system.J. Clin. Microbiol.2005,43:1448-1450.
17. Funke G., and P. Funke-Kissling.2005. Performance of the new Vitek 2 GP card for identification of medically relevant gram positive cocci in a routine clinical laboratory. J. Clin. Microbiol.43:84-88.