A case of urinary tract infection caused by *Kocuria* species and identified by conventional methods

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ABSTRACT

We report a rare case of urinary tract infection caused by uncommon gram positive cocci, *Kocuria* spp, belonging to the phylum *Actinobacteria* and the family *Micrococcaeae*. These bacteria although are frequently isolated in clinical specimens, were till recently ignored as common laboratory and specimen contaminants. *Kocuria* spp were also misidentified either as coagulase negative *Staphylococci* (CoNS) or as *Micrococci* due to their uncharacteristic morphological, cultural and biochemical characteristics.

Keywords: *Kocuria* spp, *Staphylococcus* spp, *Micrococcus* spp

INTRODUCTION

Kocuria are a group of gram positive cocci arranged in irregular clusters and tetrads. *Kocuria* spp were first recognized by Miroslav Kocur, a Slovakian microbiologist in a case of urinary tract infection way back in 1974. *Kocuria* spp are a group of gram positive cocci belonging to the phylum *Actinobacteria* and family *Micrococcaceae* and showing varied morphology as compared to *Staphylococcus* spp and *Micrococcus* spp[1,2]. They appear large in size in contrast to *Staphyococci* and also form tetrads morphologically resembling *Micrococci*. Recently there have been several reports of infections caused by *Kocuria* spp[3]. We report a case of urinary tract infection caused by *Kocuria* spp and identified by conventional techniques.

CASE REPORT :

A 65-year-old female patient presented to the medical out-patient department with pain in the abdomen, frequency of urination and burning micturition. Patient's past medical history revealed hemiparesis and cardiovascular disease. Midstream urine was sent to the laboratory for microbiological evaluation. The wet mount preparation of urine showed 3-4 pus cells per high power field. Gram's stain showed gram positive cocci in clusters along with pus cells. After an overnight incubation at 37^0 C, culture on blood agar revealed moderate growth of 2-3 mm small round, raised, convex, whitish colonies with no hemolysis as shown in Figure 1. There was no growth on MacConkey's agar. Gram's stain of the isolated bacterium showed large gram-positive cocci arranged in singles, pairs, short chains, tetrads and clusters as shown in Figure 2.

Unlike *Staphylococci*, these bacteria were large and showed both tetrads *(Micrococci)* and clusters. Interesting observation in gram's stained smear included the presence of darkly stained and abnormally large clones of cocci, which are not observed in the case of *Staphylococci* and *Micrococci* as shown in Figure 2.

The isolated bacterium was catalase positive, negative for both urease test and citrate utilization test. Other biochemical tests revealed negative for mannitol fermentation and coagulase enzyme (both bound and free coagulase). Susceptibility testing with Kirby-Bauer disc diffusion method revealed sensitivity to vancomycin, linezolid, imipenem, amikacin, ofloxacin, trimethoprim-sulfamethoxazole, clindamycin, erythromycin and tetracycline. Resistance was observed against ampicillin, oxacillin, cefoxitin, ciprofloxacin, norfloxacin, nalidixic acid, piperacillin-tazobactam, amoxicillin-clavulanic acid, and cephalosporin group of antimicrobials including ceftriaxone, cefotaxime, cefepime and ceftazidime. Susceptibility towards bacitracin and resistance to nitrofurantoin was noted separating this bacterium from both *Staphylococcus* spp and *Micrococcus* spp. Modified oxidase test was negative ruling out *Micrococcus* spp. Owing to the limitations of our laboratory, the isolated bacterium was presumptively identified and could not be confirmed by other confirmatory methods.

DISCUSSION

Isolation, identification and antimicrobial susceptibility testing form a significant part of clinical microbiology laboratory. Isolation of microbial species apart from established

pathogenic ones requires caution as few of them could be either normal flora or specimen and laboratory contaminants. Many clinical microbiology laboratories ignore some bacteria (Coagulase negative *Staphylococcus* (CONS) spp, *Micrococcus* spp and Non-diptheritic *Corynebacterium* spp) undermining their clinical significance[4]. *Kocuria* spp belong to this category of bacteria which are usually ignored by clinical microbiologists. Recently there have been increased reports of isolation of *Kocuria* spp from human clinical specimens. *Kocuria* spp are present as a normal flora of skin of human and animals and in the environment[2]. *Kocuria* has been previous isolated from several cases that included both immunocompromized as well as immunocompetent individuals[5]. Infections associated with various species of *Kocuria* identified thus far include Catheter related bacteraemia, endocarditis, ocular infections, peritonitis, necrotizing mediastinitis, and meningitis [6, 7, 8, 9, 10, 11 ,12].

Most infections related to *Kocuria* spp have been in debilitated and immunosuppressed patients. Predisposing factors that could contribute to *Kocuria* infections are extreme age groups (neonates and elderly), patients suffering from both haematological and solid organ malignancies, and patients suffering from chronic kidney diseases[13,14,15,16,17]. The antimicrobial susceptibility pattern of *Kocuria* spp isolated in the present case revealed resistance to most of the third generation cephalosporin's in contrast to previous reports which only showed resistance to oxacillin, cefazolin, ciprofloxacin and norfloxacin[3, 18, 19, 20 ,21].

Confirmation of this bacteria requires advanced/ molecular laboratory techniques like the 16s rRNA phylogenetic studies, polymerase chain reaction (PCR) and Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometry (MALDI-TOF-MS). Utility of automated identification systems including VITEK (bioMe´rieux), VITEK 2 (BioMerieux), API (BioMerieux) and the BD Phoenix identification systems has been plagued by false identification of CoNS as *Kocuria* spp and vice-versa[3].

CONCLUSION

This case report re-emphasizes the importance of conventional microbial identification methods. Recently there have been several reports of infections caused by hitherto unknown microbes. There are few organisms which are considered as non-pathogenic and are frequently isolated in human clinical specimens. Although their pathogenic potential is not yet confirmed, clinical microbiologists should remain cautious and carefully consider their association with infection and evaluate their clinical significance. In the era of emerging and re-emerging microbial infections and uncontrollable prevalence and spread of antimicrobial drug resistance, it becomes very significant for both clinicians and clinical microbiologists to get updated on the pathophysiological properties of clinically relevant rare microbial species.

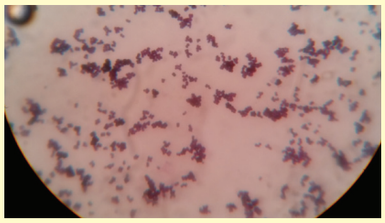

Figure 2 : Gram's stain of Kocuria spp showing large sized cocci arranged in pairs, short chains, tetrads, irregular clusters and deeply stained very large cocci.

Figure 1 : Appearance of Kocuria spp on blood agar after 24 hours of aerobic incubation

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