International Journal of Advanced Educational Research
ISSN: 2455-6157; Impact Factor: RJIF 5.12
Received: 02-11-2018; Accepted: 05-12-2018
www.educationjournal.org
Volume 4; Issue 1; January 2019; Page No. 01-02

A case study of urinary tract infection (UTI) caused by *Kocuria species* with clinical significance of *Kocuria species* in various infections

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Abstract
We report a rare case of urinary tract infection caused by uncommon gram positive entity *Kocuria species*, which are gram positive cocci often considered to be contaminant. In present case a 65 years male patient a known case of diabetes mellitus for past 30 years was admitted with complain of fever, generalized lower abdomen pain, discomfort and pain during micturition along with increased frequency and discomfort. Renal function test showed alteration. Urine sample was sent for routine microscopy and culture sensitivity for 3consecutive days. On each occasion tetrads and irregular clusters were seen on culture smear, initially we considered it as contaminant, since similar growth pattern and microscopic findings was seen on repeated isolation. We considered them significant by co-relating to patient's clinical condition. Conventional methods showed coagulase negative (both slide and tube coagulase), mannitol was not fermented; however *Kocuria species* was identified with help of Vitek-2 compact. Antibiotic susceptibility testing showed sensitivity to vancomycin, Linezolid, Amikacin, Erythromycin, Teicoplanin. Most of the clinical microbiology laboratories ignore such bacteria as laboratory or specimen contamination, with increase reports of infection with this bacteria, it has now become important for clinical Microbiologists to identify them as potential pathogens and enumerate the antibiotic susceptibility pattern of these bacteria which will be helpful to clinicians for management of such patients.

Keywords: *Kocuria species*, urinary tract infection (UTI), Renal function test

1. Introduction
Kocuria species are gram positive cocci arranged in irregular clusters and tetrads, morphologically similar to both staphylococci and micrococci. *Kocuria species* belongs to family Micro coccaceae which includes *Staphylococcus species and Micrococcus species*. *Kocuria species* was first recognized by Miroslav Kocur, a Slovakian Microbiologist in a case of UTI way back in 1974 [1].

These species are often confused with CONS and Micrococcus due to variable morphology, cultural and biochemical characteristics. In past they were often considered to be laboratory or specimen contaminants as they are ubiquitous in nature also may also appear as normal flora of skin and mucous membranes in human and animals. *Kocuria species* have recently gained more clinical importance as there is rise in reports of infections associated with it especially in patients with immuno-compromised state, although they are also reported in immuno-competent patients [2, 3].

Kocuria species belong to Phylum Actinobacteria, Class Actinobacteria, Order Actinomycetales, sub-order Micrococcaceae. Currently there are more than 18 species known which were identified on the basis of 16S- RNA phylogenetics studies [4, 5, 6].

Kocuria species infections most commonly includes urinary tract infection, cholecystitis, Catheter associated bacteremia, dacrocystitis, keratitis, native valve endocarditis, brain abscess and meningitis [2, 3, 4, 5]. Underlying conditions associated with *kocuria* infections includes diabetes mellitus, tuberculosis, stem cell transplant patients, patients with malignancies and those suffering from methylmalonic aciduria and pancreatic pseudocyst [6, 7, 8].

2. Case Report
A 65 year old male was admitted to the hospital with complain of fever, generalized lower abdomen pain, discomfort and pain during micturition along with increased frequency. Benign prostatic hypertrophy (BPH) was ruled out. On asking about patient's history it was found that patient is known case of diabetes since past 30 years and has significant family history as his father also had diabetes and hypertension. Various samples were send for routine investigation, RFT (renal function test) showed alteration as all markers were raised, urine was send for Routine microscopy and Culture and sensitivity. On routine microscopy 10 pus cells/hpf were seen, samples were inoculated on blood agar and Mac conkey medium incubated at 37º C for 18-20 hours. No growth was seen on the Mac Conkey agar, blood agar showed non- hemolytic colonies 2-3 mm in size, white in colour, convex colonies with entire margins. On culture smear gram positive cocci were seen as irregular clusters and tetrads, since pus cells in wet mount were significant for UTI, conventional methods were used for identifications, coagulase both slides and tube were negative, mannitol was not fermented, we concluded that it was CONS (*Coagulase negative streptococcus aureus*). Antiobiotic sensitivity showed high sensitivity to vancomycin Linezolid, Erythromycin, Amikacin and Teicoplain. However, on

dispatching the report we informed the clinician to co relate clinically and also to send repeat urine sample as CONS can be commensal on skin or can also be a contaminant while sample collection. Three repeat sample were sent for three consecutive day and on each occasion similar morphological and biochemical characteristics were seen, although on wet mount pus cells has decreased to
4-5 pus cells/hpf. We subjected the colonies to vitek-2 Compact for identification and antibiotic susceptibility testing by which *Kocuria species* were identified, since patient was immune compromised it was seen to be one of the predisposing condition for *Kocuria* infections so this case report points out to the pathogenic potential of *Kocuria species* which is usually ignored by laboratories personnel's as containment, here we want to stress that in such conditions repeat samples should be asked for establishment of pathogenically of *Kocuria species*. As they are widely distributed in environment and also found as normal flora on skin of humans.

3. Discussion

Recent reports have suggested significance of *Kocuria species* in causing hospital acquired infections, while reporting it is important for clinical microbiologists to consider the clinical conditions of patients and in case of doubts, regarding the pathogenic nature of organisms repeat sample is must. Major drawback in identification of *Kocuria species* is requirement of advance techniques like 16 S sequencing, MALDI TOF MS (Matrix assisted laser desorption/Ionization time of flight mass spectrometry) and Vitek - 2 compact which is not available in all the laboratories [9, 10], *Kocuria species* are not routinely reported so data on antibiotic susceptibility pattern is insufficient to draw any inferences. This case report reviews the occurrence and clinical significance of *Kocuria species*.

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