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 RAOULTELLA ORNITHINOLYTICA A RARE ORGANISM AS CAUSE OF
RESISTANT UTI IN APPARENTLY IMMUNOCOMPETENT CHILD: A CASE
REPORT.

 Nishant Acharya
 MD Peadiatrics Dr. RKGMC Hamirpur H.P.

 Priyanka Sharma*
 MS Obstetrics and Gynaecology, Bhandari Hospital Hamirpur H.P.
*Corresponding Author

ABSTRACT Urinary tract infections (UTI) are the most common bacterial infection in pediatric population, invariably caused by the family Enterobacteriaceae among whom Raoultella ornithinolytica is a rare species associates with human infections. Though majority of case are associated with malignancy, diabetes and immunocompromised states, the cases are increasingly been isolated in immunocompetent individuals. Cases are underreported by conventional phenotypic methods but arrival of newer techniques such as, MALDI-TOF MS has assured a very promising role in their identification. We are illustrating here a paediatric case with resistant UTI in whom Raoultella ornithinolytica has been isolated.

KEYWORDS: UTI, Enterobacteriaceae, Raoultella, Antimicrobial resistance.

INTRODUCTION

A urinary tract infection (UTI) remains the most common bacterial infection in childhood1. While most UTI are caused by bacteria, other infectious cause of UTI includes viruses, fungi and mycobacteria. In clinical settings three species of family enterobacteriaceae i.e Escherichia coli, Klebsiella pneumoniae, and Proteus mirabilis are associated with 80 to 95% of all isolates identified in paediatric cases of UTI2.

The genus Raoultella is a rare entity associated with human infection, it is composed of Gram-negative, oxidase-negative, aerobic, non-motile, capsulated, facultative anaerobic bacilli within the Enterobacteriaceae family3. Initially in 1989 Sakazai et al described R. ornithinolytica as Klebsiella ornothinolytica.[4] but the current taxonomy was later established based on comparative analysis of the 16S rRNA and rpoB genes, resulting in the creation of the new genus Raoultella. The name of the genus was introduced in honour of the French microbiologist Didier Raoult3. Till date four species are being isolated in the genus i.e Raoultella planticola5, Raoultella ornithinolytica4, Raoultella terrigena3 and Raoultella electrica⁶.

The first human infection by this species was described in 20097,8. According to Seng et al, urinary tract infections are the most common form of infections with this bacteria and account for 36% of them9. Other clinically significant infections caused by R. ornithinolytica are biliary tract infection, respiratory tract infections, bacteremia, skin and soft tissue infections and joint infections. We are illustrating a case of an apparently immunocompetent child with resistant UTI in whom R. ornithinolytica has been isolated in urine culture.

CASE STUDY

An eleven year male child reported at outpatient department with history of high grade fever, dysuria and increased frequency of micturition. Clinical examination was unremarkable. A clinical diagnosis of UTI was made and patient was subjected to urinalysis which was also suggestive of UTI with 10-12 leucocytes/HPF and nitrites were positive, ultrasound KUB done was unremarkable. Patient was subjected to urine culture and empirically treatment started with oral antibiotic amoxyclavunate at a dose of 40mg/kg/day, which was associated with symptomatic improvement. Raoultella ornithinolytica sensitive to amoxyclavunate was isolated on urine culture and antibiotic continued for two weeks as per sensitivity pattern and repeat culture was sent though the patient was asymptomatic. Raoultella ornithinolytica was isolated once again whereas it was resistant to amoxyclavunate. Patient was started on intravenous ceftriaxone as per the sensitivity pattern for a period of two week followed by microbiological clearance in repeat urine culture.

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DISCUSSION

Raoultella ornithinolytica is an encapsulated Gramnegative aerobic bacillus belonging to the Enterobacteriaceae family. Human infections due to Raoultella ornithinolytica have not been commonly reported. Rauoltella species are mostly found in water, plants and soil and has been isolated from fishes, termites10. Factors involved in pathogenicity of R. ornithinolytica are ability of adherence to human tissues, presence of histidine decarboxylase thus causing flushing and redness of the skin and ability to form bio-films in urinary catheters.

R. ornithinolytica infections in humans may be underestimated because the bacterium is difficult to identify using phenotypic methods. R. ornithinolytica can be misdiagnosed as Klebsiella pneumonia or Klebsiella oxytoca in clinical laboratories using conventional methods of identification11. Matrix assisted laser desorption/ionization time of frame mass spectrometry (MALDI-TOF-MS) is technique having high specificity and sensitivity for diagnosis of Raoultella ornithinolytica¹².

The pathogenic potential of R.ornithinolytica isolates in human disease has become increasingly important. However, the clinical features, antimicrobial susceptibility, and clinical outcomes of R. ornithinolytica infection have not yet been well elucidated. Study done by Seng P et al, a high rate of hospital-acquired infection was observed (49%), The ability to colonize the inner surfaces of indwelling urinary catheters is a major cause of hospital-acquired urinary tract infections. Moreover, it was found that half of the patients had diabetes mellitus, a solid cancer, or an immunodeficiency9. S. Chun et al. reported 16 cases of R. ornithinolytica associated bacteremia in 2015, Ninety four percent of these patients had underlying malignancies13. As a contrast our patient did not have any obvious immunodeficiency. Out of the 112 patents with R. ornithinolytica isolates in the review, 95% of were resistant to amoxicillin, 16% to amoxicillin-clavulanic acid, 13% to ticarcillin-clavulanic acid, 4% to ceftriaxone, 6% to quinolones, 1% to aminoglycoside, and 10% to cotrimoxazole9. The presence of a chromosomal bla gene is key to the mechanism of beta-lactam resistance displayed by R. ornithinolytica isolates14. In view of the emerging antimicrobial resistance, the consensus for the treatment of Raoultella sp. Infections is being increasingly shifted towards third- to fourth-generation cephalosporins or fluoroquinolones alone or with aminoglycosides.

CONCLUSIONS

R. ornithinolytica is a virulent pathogen of communityacquired infections that has become an emerging hospitalacquired infection, particularly after invasive procedures. Though majority of case are associated with malignancy, diabetes and immunocompromised states, the cases are increasingly been isolated in immunocompetent individuals. Rarity of Raoultella infection in humans warrants more specific investigations for early diagnosis of patients. Cases are underreported because of difficulty in identification of Raoultella sp. by conventional phenotypic methods whereas arrival of MALDI-TOF MS technique has assured a very promising role in their diagnosis. In the future identification and screening of R. ornithinolytica clinical isolates for reduce susceptibility to antibiotics will improve our understanding of the mechanisms underlying increased antibiotic resistance.

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