ORIGINAL RESEARCH PAPER

Clinical Microbiology

COMMUNITY ACQUIRED URINARY TRACT INFECTIONS CAUSING MICROORGANISMS AND THEIR RESISTANCE PROFILE – A STUDY CONDUCTED IN A TERTIARY CARE HOSPITAL KERALA, INDIA

KEY WORDS:

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ABSTRACT

Background: Community-acquired urinary tract infection (CA-UTI) is the most common infection caused by Gram negative rods. Acute, uncomplicated urinary tract infections (UTI) are among the most commonly encountered bacterial infections. Management of these infections has been made more complicated by the trend toward increasing antimicrobial resistance. Therefore this study emphasis on the causative agents and their resistance profile. **Objectives:** This study was designed to identify the most common uropathogens and also to determine the antibiotic resistance pattern of isolated strains thereby highlighting the bacterial resistance in community. **Method:** This descriptive cross sectional study was conducted in 100 patients presented with symptoms of UTI. The urine samples were collected and subjected to bacterial culture and identification methods. **Result:** A total of 100 urine samples were collected from infected peoples among which 94 (94%) were women and 6 (6%) men. Most prevalent bacteria causing UTI are Escherichia coli (60%) followed by Klebsiella species (26%) Proteus species (10%) and Pseudomonas species (4%) and the isolated organisms showed resistance to beta lactam antibiotics. **Conclusion:** The present study has shown community acquired UTI is more common in females as compared to men and the primary bacterial causative agent is E.coli followed by Klebsiella species, Proteus species and Pseudomonas aerugenosa and showed antibiotic resistance to some beta lactam antibiotics and are susceptible to Nitrofurantoin, Cephalosporin and Aminoglycosides.

I. INTRODUCTION

Community acquired urinary tract infection (CA-UTI); defined as an infection of the urinary tract that occurs in the community or within less than 48 hours of hospital admission and was not incubating at the time of hospital admission, is the second commonest diagnosed infection in the community[1]. Urinary tract infections are defined as inflammatory syndrome caused by microorganisms. A UTI is almost always associated with bacteriuria, the presence of bacteria in urine, and pyuria, the presence of white blood cells in the urine[2]. Bacteriuria can be present without pyuria, which could be due to bacterial contamination or aseptic technique in the urine collection. On the contrary, pyuria can be present without bacteriuria indicating an inflammatory process of the urothelium such as a urinary stone or a malignancy[3]. Typical symptoms of UTI include the triad of urgency (the enhanced desire to void the bladder), frequency (increased frequency of urination) and dysuria (painful urination)[4]. UTI is a wide term that encircles both asymptomatic bacteriuria and symptomatic infection with microbial invasion and inflammation of the urinary tract[5]. For a urinary infection to occur, there are many superimposing factors that interplay including host factors, inoculum size, and the virulence of the infecting bug. The first event that leads to a UTI is the inoculation. The most common form of inoculation is the ascending route. Enteric bacteria colonize the perineum and ascend into the urethra and bladder[6]. As for the recurrence of a urinary infection, multiple factors play a role. On the microbiological level, one reason is the decrease of peroxide-producing lactobacilli, predisposing to increased colonization with pathogenic enteric bacteria. Another reason is the formation of intracellular clusters of bacteria that are not sensitive to antibiotics, while others postulate a change in the glycosaminoglycan barrier of the urothelium that makes an individual more susceptible to enteropathogenic infection[7].

II. METHODS

This was a hospital based study carried out in the department of microbiology, Kannur Medical College, Anjarakandy, Kannur over a period of 3 months starting from March 2015 to May 2015. Systematic random sampling technique was used to identify the study subjects. All the subjects underwent medical history assessment, general clinical examination, before enrolment. Patients gave informed consent before they selected in the study. A total of 100 urine samples were collected from patients presenting with the symptoms of UTI. About 5 ml of midstream urine was collected for microscopic analysis and cultured for finding presence of any microbes, by clean catch method in a sterile bottle. The sample processing was carried out within 2 hours of specimen collection. Microscopic examination of urine was done for pus cells. All samples were cultured on CLED agar. Incubation was done at 37°C aerobically for 12-24 hours. Antimicrobial susceptibility testing was done on Mueller-Hinton agar using disk diffusion (Kirby Bauer's) method according to the Clinical and Laboratory Standards Institute (CLSI) guidelines using the following antimicrobial drugs: Amikacin, Gentamicin, Ciprofloxacin, Norfloxacin, Nitrofurantoin, Ampicillin ,Aztreonam, Carbapenams (Ertapenam, Imipenam),Piperacillin and Cephalosporin (4thgeneration).

III. RESULT

Out of 100 urine samples collected in this study 94 samples were from females and 6 samples from males. Gender distribution in this study shows (94%) females and (6%) males (Table.1).The most common isolates in this study have been isolated and identified as *E.coli* (60%) followed by *Klebsiella* species (26%), *Proteus* species (10%), *and Pseudomonas aerugenosa* (4%). (Table.2)

Table.1: Gender distribution

Gender	Number of cases	Percentage
Male	6	6%
Female	94	94%

Table.2: Isolate distribution

Isolated organism	No. isolate	Percentage
E.coli	60	60%
Klebsiella species	26	26%
Proteus species	10	10%
Pseudomonas aerugenosa	4	4%

E.coli was the predominant isolate showed antibiotic sensitivity towards Amikacin, Nitrofurantoin, Ertapenam, Aztreonam, Cefepime and resistant to Ampicillin and Nalidixic acid. *Klebsiella,* the second prevalent organism

showed high sensitivity to Amikacin, Ciprofloxacin, Nitrofurantoin, Cefepime and resistant to Ampicillin and Imipenam. *Proteus* species were sensitive to Aztreonam, Cefotaxime Nitrofurantoin, and Gentamicin and resistant to ampicillin and Imipenam. *Pseudomonas aerugenosa* isolates were sensitive to Ceftazidime, Ciprofloxacin, Piperacillin, and Nitrofurantoin and resistant to Imipenam and Aztreonam.

IV. DISCUSSION

Among the total 100 isolates only *E.coli* are sensitive to Carbapenams (60%) and remaining isolates are resistant to Carbapenams (40%) and all isolates are resistant to beta lactam antibiotics (ampicillin). Isolates are sufficiently sensitive to Aminoglycosides (Amikacin, gentamicin), Nitrofurantoin and Cephalosporin antibiotics (Cefepime, ceftazidime). *Nicolle LE.* reported in their study *E.coli* is the predominant organism in community acquired UTI other bacterial agents include species of *Klebsiella, Proteus, Pseudomonas* As per this report, this study demonstrated *E coli* to be the predominant etiological agent (60%). *Grude N et al.*,in their study reported that the isolates of most of these species exhibited a high rate of resistance to Ampicillins and other beta lactam antibiotics and Carbapenams. This pattern of resistance has also been reported in this study.

V. CONCLUSION

This study aimed at determining the most prevalent organism causing community acquired UTI and their antimicrobial pattern. The present study concluded that the most common etiological agent causing CA-UTI is E.coli and more common in females as compared to males. This study also concluded that antibiotic resistance among Gram negative bacteria are increasing day by day especially beta lactam antibiotics and Carbapenamase producing Enterobacteriaseae are also emerging in the community. The most effective antibiotic drug used to treat UTI found in this study are Amikacin, Gentamicin, Aztreonam, Nitrofurantoin and fourth generation Cephalosporins.

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