

Isolation and Screening of Bacterial Isolates in UTI Patients in Different age and Gender Groups in Namakkal District, Tamil Nadu

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ABSTRACT

Approximately 1 in 3 women will require antimicrobial treatment for a urinary tract infection (UTI). Forty to fifty percentage of the woman will have a UTI before the age of twenty four during their life time. UTI'S in male patients are rare but once infected considered to be complicated. Infection of urinary tract is amongst the most common bacterial infections that prompt patient's to seek medical advice second only to infection of respiratory tract In the present study, the isolation of urinary tract infecting pathogens from patients of different gender and age group revealed that *Escherichia coli* was the dominant isolate followed by *Klebsiella*, *Enterobacter*, *Pseudomonas*, *Proteus*, *Acinetobacter*, and *Staphylococcus aureus*.

INTRODUCTION

Urinary tract infection (UTI) is the second most common infectious presentation in community medical practice. Worldwide, about 150 million people are diagnosed with UTI each year, and UTI are classified as uncomplicated or complicated (Stamm *et al.*, 2001). Uncomplicated UTIs occur in sexually active healthy female patients with structurally and functionally normal urinary tracts. Complicated UTIs are those that are associated with co morbid conditions that prolong the need for treatment or increase the chances for therapeutic failure. These conditions include abnormalities of the urinary tract that impede urine flow, the existence of a foreign body (e.g., indwelling catheter, stone), or infection with multidrug resistant pathogens. UTIs in male patients are considered complicated (Hooton, 2000; Stapleton, 2003). Despite involvement of the upper urinary tract, pyelonephritis can be considered uncomplicated when it occurs in a healthy patient. Urinary tract infection may involve only the lower urinary tract or both the upper and the lower tracts.

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The term cystitis has been used to describe the syndrome involving dysuria, frequency, and occasionally suprapubic tenderness. Acute pyelonephritis describes the clinical syndrome characterized by flank pain or tenderness, or both, and fever, often associated with dysuria, urgency, and frequency (Mandell *et al.*, 2005). More than 95% of urinary tract infections are caused by a single bacterial species. *E. coli* is the most frequent infecting organism in acute urinary tract infection (Jellheden *et al.*, 1996; Ronald, 2002). *Klebsiella*, *Staphylococci*, *Enterobacter*, *Proteus*, *Pseudomonas*, and *Enterococci* species are more often isolated from inpatients, whereas there is a greater preponderance of *E. coli* in an outpatient population (Bronsema *et al.*, 1993). *Corynebacterium urealyticum* has been recognized as an important nosocomial pathogen (Soriano *et al.*, 1990). Anaerobic organisms are rarely pathogens in the urinary tract (Jacobs, 1996). Coagulase Negative Staphylococci are a common cause of urinary tract infection in some reports. *Staphylococci saprophyticus* tends to cause infection in young women of a sexually active age (Schneider and Riley, 1996). The aim of this study was to study the pathogenic agents involved in UTI in different age groups of male and female population and ascertain the dominant bacterial species involved in such infection.

MATERIALS AND METHODS

Isolation of UTI isolates

A total of 175 urine samples from UTI patients were collected from different hospitals, health centre and clinical laboratories in Namakkal district of Tamil Nadu. The samples were collected from different age groups such as 0-20, 21-40, 41-60 and 61-70 in both male and female.

For collection of urine samples patients were advised to collect a clean catch midstream urine specimen in a sterile, wide mouthed leak proof container supplied by the laboratory and bring to the laboratory as early as possible. Isolation and identification of bacterial pathogens was done by microscopy and culture methods.

Microscopy

The urine samples were mixed thoroughly, centrifuged and examined microscopically for wet mount preparation. These samples were cultured on UTI chromogenic agar, EMB and Mac Conkey agar and incubated at 37°C for 18 hours (Forbes *et al.*, 2007). Positive cultures were subjected to various morphological and biochemical tests for identification.

For identification of gram negative bacteria

To check morphological characteristics, gram staining, capsule staining and motility test were performed. To check the growth pattern, different media include, macconkey agar, EMB agar were used. For biochemical identification of the bacterial isolates, sugar fermentation, IMVIC, TSI and nitrate tests were performed (Forbes *et al.*, 2007; Thomas, 1995).

For identification of gram positive bacteria

To check morphological characteristics, gram staining, capsule staining and motility test were performed. To check the growth pattern, different media including macconkey agar, nutrient agar, mannitol salt agar and blood agar were used. For identification of bio chemical characteristics, sugar fermentation, oxidase catalase, coagulase tests were performed (Forbes *et al.*, 2007; Thomas, 1995).

RESULT

Urinary tract infections are among the most commonly prevalent infection in clinical practice. In the present study, 175 suspected patients were found to be urine culture positive. Among them, there were 88 male and 87 females in patients with urine positive culture respectively. The *Escherichia coli* were found to be the predominant organism than other pathogenic bacteria. The infection percentage of different bacterial isolates in the urinary samples were, *Escherichia* (50%), *Pseudomonas* (10.2%), *Proteus* (4.6%), *Enterobacter* (6.1%) and *Staphylococcus aureus* (4.6%) Fig.1.

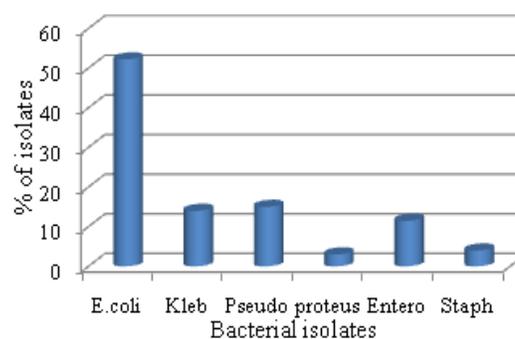


Fig. 1: Prevalence of bacterial isolates from Urine samples.

Table 1: Prevalence of Urine isolates in different age groups.

S.No	Sex	Age groups			
		0 to 20	21 to 40	41 to 60	61 to 70
1.	Male	21/26(80.7%)	22/30(73.3%)	20/25(80%)	5/7(71.4%)
2.	Female	14/22(63.3%)	35/41(85.3%)	17/19(89.4%)	4/5(80%)

When the data were classified into different age and gender groups, it appeared that the cases of urinary tract infections (UTIs) were more in boys than in girls of 0-20 age group. The male had 80.7% infection and female had 63.3%, in the age group of 21-40 whereas the male showed 73.3% and female showed 85.3%. In the age group 41-60 and 61-70 male had 80% and 71.4% infection and female had 89.4% and 80% infection respectively [Table 1].

Table 2: Prevalence of *E. coli* in different age groups.

S.No	Sex	Age groups			
		0 to 20	21 to 40	41 to 60	61 to 70
1.	Male	12 (46%)	15(50%)	18 (72%)	5 (71.4%)
2.	Female	10 (45%)	26 (63%)	14 (73.6%)	4 (80%)

In the present investigation, among the uropathogens *E. coli* was the most frequent in both sexes and different age groups. Male in the age group of 0-20 showed 46% infection whereas female showed 45%, in the age group of 21-40 male showed 50% and female showed 63% infection. In the age group between 41-60 and 61-70 male had 72% and 71.4% female had 73.6% and 80% infection respectively [Table 2].

DISCUSSION

Urinary tract infections are common conditions worldwide and the pattern of antimicrobial resistance varies in different regions. It is one of the commonest domiciliary and nosocomial bacterial infections, comprising of a variety of clinical conditions caused by microbial invasion of tissue lining the urinary tract which extends from renal cortex to urethral meatus. Infection of adjacent structures such as prostate and epididymis is also included in this entity. It also refers to the presence of bacteria undergoing multiplication in urine within the urinary drainage system (Hooton, 2000) and presence of more than 10^5 organisms per ml. in the mid stream sample of urine. It has been estimated that about six million patients visit outpatient departments and about 300,000 are treated in the wards every year for UTI

(Stapleton, 2003) worldwide. Approximately, 10% of human population gets UTI at some stage during their lives. In the United States, UTIs account for seven million office visits and 100,000 hospitalizations yearly, making them the most common bacterial infections in outpatient settings (Foxman, 2002, 2003).

Approximately 1 in 3 women will require antimicrobial treatment for a UTI before age 24, and 40% to 50% of women will have a UTI during their lifetime (Foxman, 2003). The estimated annual cost of UTIs is \$1.6 billion for evaluation and treatment. Despite advances in antimicrobial therapy, UTIs remain a significant cause of morbidity (Foxman, 2002, Warren *et al.*, 1999). UTI occurs when gastrointestinal bacteria enter through the urethra and start multiplying in the bladder. Our defense system is designed to keep such germs out, but sometimes they fail, and bacteria may take hold and multiply into an infection. It is among the most commonly prevalent infection in clinical practice, among gram negative *E.coli* was the most predominant organism.

In this present study, we describe the relationships between sex and isolated bacterial agents of UTIs. The most frequent causative agent of UTIs in this study was found to be *E.coli* (50%) followed by *Pseudomonas* (10.2%), *Proteus* (4.6%), *Enterobacter* (6.1%) and *Staphylococcus aureus* (4.6%). Prevalence of different pathogens is dependent on several population attributes, sample size and hygienic conditions of the patients. In the present study when the data were visualized in different age groups for both genders it appeared that the cases of urinary tract infections (UTIs) were more in boys than girls of 0-20 age groups. Male had 80.7% and female had 63.3% infection for the age group 21-40, the male showed 73.3% and female showed 85.3%. For the age group 41-60 and 61-70 male had 80% and 71.4%, female had 89.4% and 80% respectively. The present study clearly signifies that *E. coli*, *Proteus sp.*, *Enterobacter*, *Citrobacter sp.*, *Staphylococcus sp.* and *Proteus sp.* are the six important pathogens involved in urinary tract infections. Among the uropathogens *E. coli* was the most frequent in both sexes with different age groups.

CONCLUSION

It was concluded that 175 suspected patients were reported to be urine culture positive and among them 88 were found to be male and 87 females. The predominant bacterium involved in urinary tract infection was *E.coli*, followed by *Pseudomonas*, *Proteus*, *Enterobacter*, and *Staphylococcus aureus*. The data on UTI classified into different age and gender groups, revealed that the cases of urinary tract infections (UTIs) was more in boys than girls.

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