Original Research Article

Bacteriological Profile of Urinary Tract Infection in Female Patient Attending Tertiary Care Hospital, Indore, India

Madhurendra Singh Rajput, Nilesh Shyam Chavan*, Sadhvi Parashar, and S.M.Jain

Department of Microbiology, Index Medical College & Research Centre, Indore, India

*Corresponding author

A B S T R A C T

Keywords	Urinary tract infections (UTIs) are among the most prevalent infectious diseases. The prevalence and incidence of urinary tract infection is higher in women, which is likely to be due to several factors like anatomic differences, hormonal effects, and behaviour patterns. The incidence of UTI will also be correlated with various risk factors which make females more prone to UTI than males such as pregnancy and other causes leading to urinary obstruction,calculi, diabetes, and other causes of immunosuppressant. The study included 100 female patients, both OPD as well as IPD, highly suspected of urinary tract infection. Among these patients 61% of the female ware having the H/O UTI, and according to age wise distribution number of patient belong to 21 to 30 years of age.
UTI, Urinary obstruction, Catheterisation	

Introduction

Urinary tract infection (UTI) is a common and painful human illness that, fortunately, is rapidly responsive to modern antibiotic therapy. In the preantibiotic era, UTI caused significant morbidity. Hippocrates, writing about a disease that appears to have been acute cystitis, said that the illness could last for a year before either resolving or worsening to involve the kidneys. The clinical manifestations of UTI depend on the portion of the urinary tract involved, the etiologic organisms, the severity of the infection, and the patient's ability to mount an immune response to it [Tomas L et all]. Women are at greater risk for UTI than men, partly because of the relatively short straight urethra, retrograde ascent of bacteria from the perineum, changes in normal vaginal flora Genetic factors, including expression of HLA-A3 and Lewis blood group Le(a-b-) or Le[a+b] ,Sexually active women are at greater risk for UTI than women who do not engage in sexual intercourse. Simple hygiene habits, including voiding before and after sexual intercourse and wiping from anterior to posterior, are often advocated to decrease the risk of UTI.

Vesicoureteral reflux has been identified as a risk factor for the development of pyelonephritis. A foreign body in the urinary system like urinary calculi, involving

catheters may act as a nidus for infection and may be associated with recurrent infections. Post-menopausal women are at higher risk for UTI than younger women are, because they lack estrogen, which is essential to maintain the normal acidity of vaginal fluid. This acidity is critical to permit the growth of *Lactobacillus* in the normal vaginal flora, which acts as a natural host defense mechanism against symptomatic UTI. Other urologic factors potentially associated with an increased risk of UTI in post-menopausal women include urinary incontinence, cystocele, and elevated volumes of postvoid residual urine.[Boyko EJ et al 2002]. Therefore, the present study was performed to find out the isolates of bacterial pathogen in female patients suffering from UTI and find out the correlation between them.

Materials and Methods

Study Design

The present study was an open labelled, prospective study. The study was carried out in Index Medical College, Hospital & Research Centre, after approval from institutional ethics committee.

Patient Inclusion Criteria

The study included 100 female patients, both OPD as well as IPD, highly suspected of urinary tract infection, during January 2012 to December 2013, a period of 2 years.

Consent

A due written consent was obtained from the patient before proceeding with history, examination or sample collection.

History

A brief clinical history was obtained from each patient to find out if there is any risk factor predisposing to urinary tract infection.

Specimen Collection

A clean voided early morning midstream urine specimens was collected in a sterile container after proper anogenital toilet, before starting antibiotics. Diagnostic catheterization for urine sample collection will be avoided as even under ideal conditions, catheterization itself leads to UTI in about 2% patients.

Processing in Laboratory

Urine samples was examined & processed in the laboratory as soon as possible after collection. In case of delay, the sample will be stored in a refrigerator.

Microscopy

Urine specimens were examined by wet mounts and Gram staining. Presence of any pus cells, micro-organisms, RBC's, cast and crystals or any other finding has be noted.

Culture: A Urine specimen was cultured on Blood agar, MacConkey agar & using 0.01 mm calibrated loop. These plates was incubated overnight in an incubator at 37^0C, and observed for growth.

Significant Colony Counts

- $>10^5$ CFU/ml of midstream urine sample in a female with no risk factors.
- $>10^3$ CFU/ml of midstream urine sample in a symptomatic female or in a pregnant female

Identification of the organism (Isolate)

The isolate was identified on the basis of Colony morphology Motility testing Biochemical tests.

Antibiotic Sensitivity Testing

It will be carried out for commonly used antibiotics on Muller Hinton agar plate by standard Kirby Bauer disk diffusion method.

Results and Discussion

Among 100 female patients, 61% of the female have had a UTI, and according to age wise distribution number of patient belong to 21 to 30 years of age. This observation seems to agree with the finding of Obiogbolu GH et al (2009), who found incident of UTI was mostly in the age group of 15 to 40 years of age. They also found that out of 54% bacterial pathogens were isolated, of which *E.coli* 20% was Klebsiella was 11%, *Proteus mirabilis* was 9%, *Pseudomonas aeruginosa* was 7%, Staph aureus was 4% *Staph epidermitis* was 3%. In the study done by Gupta UP, et al (2013), total 58 % of patient was having UTI which was as similar to our study. He also estimated *E.coli* was the most prominent isolate causing UTI. In the study done by Ullah MA et al (2007) 50% of the patient was heaving UTI which was less as comparable to our study.

Comparing the study by Ullah MA et al (2007) who said that *E.coli* was the most prominent isolates causing UTI in females, which was followed by Klebsiella, Proteus .streptococcus. The uropathogens identified in our study are similar to those of many other studies conducted in different countries either in the region or internationally, however different results have been reported.

The similarities and differences in the type and distribution of uropathogens may result from different environmental conditions and host factors, and practices such as healthcare and education programmers, socioeconomic standards and hygiene practices in each country. While in study done by Samim M et al (2009) *E.coli* isolates was 59 % followed by the rest.

History of calculi was also the predisposing factor which was found in 17 patients. The presence of infection in urinary stone patients as well as infectious stones is still a significant cause of morbidity and mortality. [Bianca T et al 2013] demonstrated increased citrate concentrations in the urine of women. It has been postulated that this may aid in protecting females from calcium urolithiasis since citrate inhibits nucleation of calcium oxalate crystals. In this story the prevalence of UTI was 17 % as compare to other studies which was carried out by Nass T et al (2001). In his study the most common cause of urine calculi was serum calcium and phosphorus was elevated as in this study.

The study done by Saber H, et al (2010), they found that 63.8% females were suffering from DM of 196 female patients. which was more than the study done by us. The most common Uropathogen isolated was *E.coli* which was followed by Klebsiella, Pseudomonas sp, Candida, *Staph aureus* and other organisms. *Escherichia coli* isolated from diabetic patients was significantly less sensitive to ceftriaxone, ceftazidime, cefuroxime, netilmicin, gentamicin, ciprofloxacin and nitrofurantoin compared to non-diabetic patients, but rate of sensitivity to ampicillin, cephalexin, imipenem, amikacin, nalidixic acid, cotrimoxazole was most similar to study done by us.
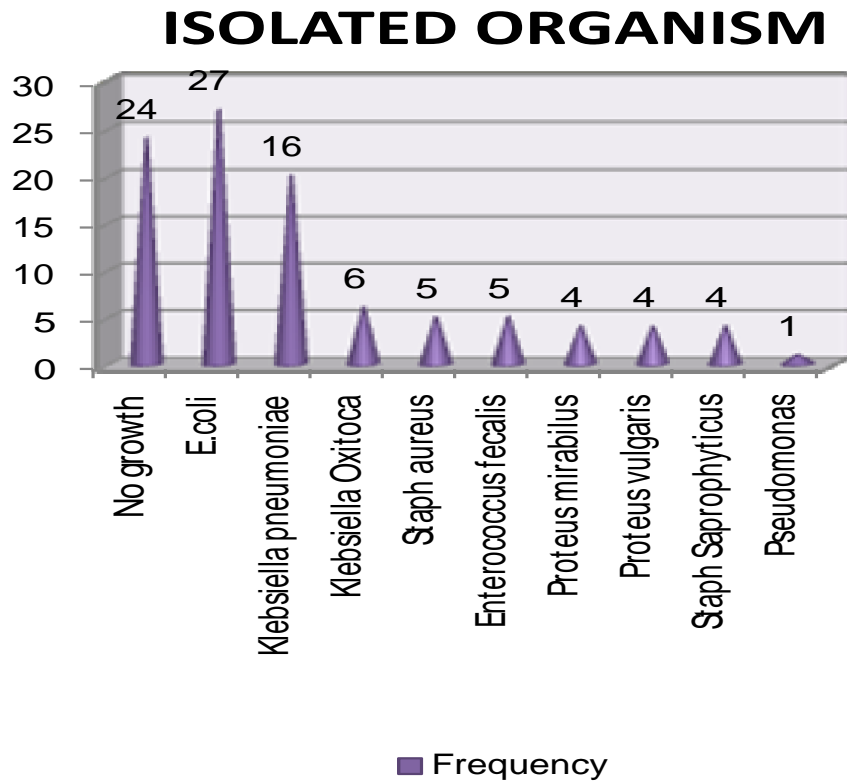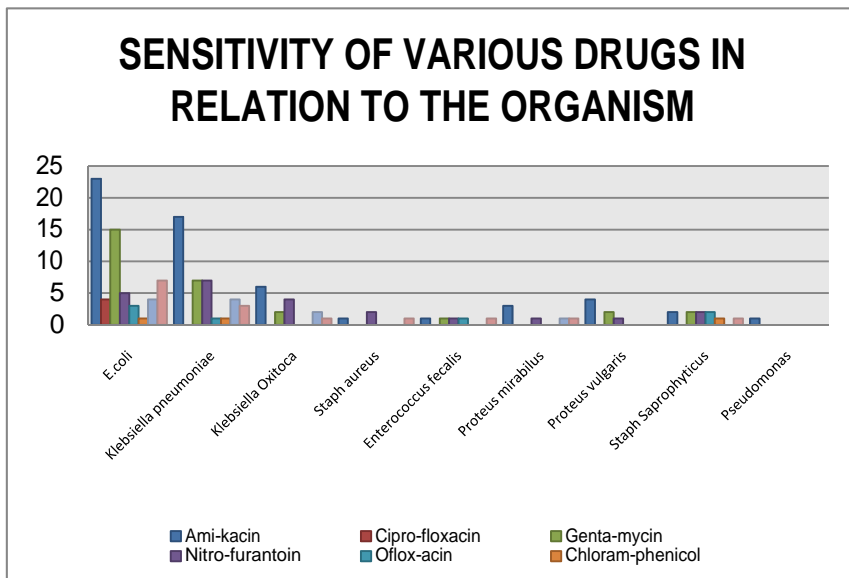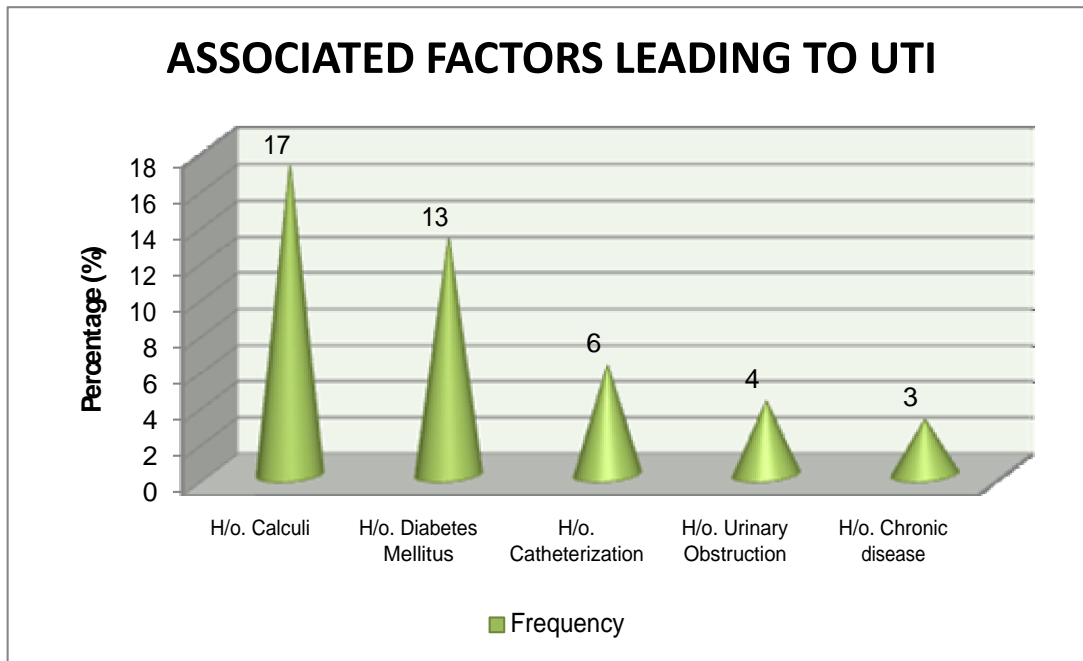
Fig.1

ISOLATED ORGANISM

Fig.2

Fig.3

In the study the most uropathogens isolated showed multiple antibiotics resistance. This gives idea about the common trend of increased antibiotics resistance of uropathogens in this region, which may be due to geographic variation or indiscriminate or sublethal use of antibiotic. This data not only help in proper treatment of UTI patients but also discourage the indiscriminate use of antibiotics and prevent further development of bacterial drug resistance. In the patient having Calculi it is necessary that chemical analysis of urinary stone is necessary to elucidate any factor predisposing to stone formation will help in the management and prevention of stone recurrence. Urinary Tract Infections are more frequent and are likely to have a more complicated course in patients with Diabetes Mellitus. India is considered to be the diabetic capital of world and many factors contribute to the emergence of Diabetes in developing nations. The mechanisms, which potentially contribute to the greater incidence of UTI in these patients, are malfunctioning in the local urinary cytokine secretions and an increased adherence of bacteria to the cells of the Uroepithelial cells. Thus we suggest screening of UTI in diabetic patients is imperative.

References

Tomas L. Griebling, Urinary Tract Infection in Women, Chapter 18, Urologic Diseases in America.

Ullah MA, Barman A, Siddique MA, Haque AKME. Prevalence of asymptomatic bacteriuria and its consequences in pregnancy in a rural community of Bangladesh, Bangladesh Med Res Counc Bull 2007;33:60-64.

Saleem M, Daniel B. Prevalence of Urinary Tract Infection among Patients with Diabetes in Bangalore City. Int J Emerg Sci 2011;1(2):133-142.

Boyko EJ, Fihn SD, Scholes D, Chen CL, Normand EH. Diabetes and the Risk of Acute Urinary Tract Infection Among Postmenopausal Women. Diabetes Care 2002;25:1778–1783.

Bianca T, Adrian M, Emil M, Adrian T. Microbiological study of urinary calculi in patients with urinary infections.AMT 2013;II:245-249.

Saber H, Barai L, Haq JA, Jilani SA, Begum J. The Pattern of Organism Causing Urinary Tract Infection in Diabetic and Non Diabetic Patients in Bangladesh. Bangladesh J Med Microbiol 2010;04(01):6-8.

Obiogbolu CH, Okonko O, Anyamere CO, Adedeji AO, Akanbi AO, Ejembi J, et al. Incidence of Urinary Tract Infections (UTIs) among pregnant women in Akwa metropolis, South-eastern Nigeria. Scientific Research and Essay 2009 Aug;4(8):820-824.

Gupta UP, Jaiswal S, Thapa L, Parajuli N, Nepali S. Prevalence of UTI infection among suspected female patients attending Manipal teaching hospital, Pokhra, Nepal. Journal of Microbiology and Virology 2013;3(2):1-10.