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PATHOGENS IN URINARY TRACT INFECTIONS (Six months hospital based cross sectional descriptive study)

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ABSTRACT

OBJECTIVE: *To determine the frequency of urinary tract infection and associated pathogens at tertiary care hospital.*
PATIEHTS AND METHODS: *This descriptive type cross sectional study was conducted at tertiary care hospital. All patients above 12 years of age, of either gender present with shaking chills, fever, pain or burning when urinating, altered urine colour, urethral discharge, frequent and urgent need to urinate, blood in urine, discomfort in the middle of the lower abdomen (suprapubic pain and flank pain) with nausea and vomiting were enrolled and evaluated for presence of urinary tract infections (UTIs) and associated pathogen through urine detail report (urine DR) and urine for culture and sensitivity (C/S).*
RESULT: *Out of 110 suspected cases of UTI, 85 (77%) patients were found to be positive for urinary tract infection with mean age 34.73 ± 7.61 (SD). The pathogens identified were Escherichia coli (61%), Staphylococcus aureus (13%), Proteus (17%), Pseudomonas aeruginosa (1%) and Klebsiella (8%). The fever was observed in 72(85%) subjects, chills in 60(71%) patients, nausea and vomiting in 42(49%) subjects, sweating in 58(68%) patients, blood in the urine 52 (61%) patients, pain or burning when urinating in 75(88%) patients, altered urine colour in 20(24%) subjects, urethral discharge in 16(19%) patients, frequent and urgent to urinate in 80(94%) subjects and suprapubic pain in 38(45%) patients.*
CONCLUSION: *The female gender was predominant, and identified urinary pathogen were Escherichia coli, Staphylococcus aureus, Proteus, Pseudomonas aeruginosa and Klebsiella.*

KEY WORDS: urinary tract infection (UTI), Escherichia coli (E. coli), Staphylococcus aureus, Proteus, Pseudomonas aeruginosa and Klebsiella.

INTRODUCTION:

A urinary tract infection (UTI) is a bacterial infection that affects any part of the urinary tract. The main causative agent is Escherichia coli. The urine contains a variety of fluids, salts, and waste products; it usually does not have bacteria in it.[1]When bacteria get into the bladder or kidney and multiply in the urine causes UTI. The most common type of UTI is a bladder infection which is also often called cystitis. Another kind of UTI is a kidney infection, known as pyelonephritis, and is much more serious. Although they cause discomfort but urinary tract infections can usually be quickly and easily treated with a short course of antibiotics.[2] Infections of the urinary tract are the second most common type of infection in the body. Urinary tract infections (UTIs) account for about 8.3 million doctor visits each year. The risk of developing a UTI may be increased by a number of factors, especially sexual intercourse. The use of spermicides, particularly in combination with a diaphragm also increases the risk of UTI in women. Men who engage in anal intercourse are more likely to become infected, as are men who are uncircumcised. Men, women, and children with underlying health problems may also be at higher risk for developing a UTI, including use of a bladder catheter, a recent procedure or surgery involving the urinary tract, an anatomic abnormality or blockage of the urinary tract, the inability to empty the bladder completely, pregnancy, diabetes, or age =65 years. The leading risk factor for bacteriuria is the duration of catheterization: With each day of catheterization, the prevalence of bacteriuria increases 3% to 10%.[3]
The typical symptoms of acute cystitis are pain or burning when urinating, frequent and urgent need to urinate, blood in the urine, discomfort in the middle of the lower abdomen

(suprapubic pain), cloudy urine, foul or strong urine odor, fever (not everyone will have a fever), painful sexual intercourse.[4-6] If the infection spreads to the kidneys, symptoms may includes chills and shaking, fatigue, fever above 102 ºF, which lasts for more than 2 days, flank (side) pain, flushed, warm, or reddened skin, general ill feeling, mental changes or confusion (in the elderly, these symptoms often are the only signs of an UTI), nausea, vomiting and severe abdominal pain (sometimes).[7] Urinalysis commonly shows white blood cells, red blood cells, and nitrates in the urine while special urine tests (urine culture and sensitivity) may be done to determine the type of bacteria in the urine and the appropriate antibiotic for treatment.[8] Simple bladder infections are usually diagnosed based upon symptoms alone. This is especially true if a woman has frequent UTIs and can recognize the symptoms easily, however urine culture is a test that uses a sample of urine to try and grow bacteria in a laboratory. It usually requires about 48 hours for results to return.[9]

Most UTIs can be treated with oral antibiotics such as trimethoprim, cephalosporins, nitrofurantoin, or a fluoroquinolone (e.g. ciprofloxacin or levofloxacin).[10] By keeping and considering such debate in mind the present study was conducted in the department of medicine by focusing the urinary tract infections and associated pathogens. The study will provide the local epidemiological data in relation to urinary tract infections.

PATIENTS AND METHODS:

This cross sectional descriptive study was carried out in the department of medicine at Liaquat University Hospital (a tertiary care 1500 bedded hospital) Hyderabad from March 2008 to August 2008. All patients above 12 years of age, of either gender present with shaking chills, fever, pain or burning when urinating, altered urine colour, urethral discharge, frequent and urgent need to urinate, blood in the urine, discomfort in the middle of the lower abdomen (suprapubic pain and flank pain) with nausea and vomiting, through outdoor patient department (OPD), indoor patient and causality outdoor department (COD) were evaluated and enrolled in the study. The referred suspicious patients of UTI from different departments (where they initially admitted) were also included in our study. The technique used for sample collection was non probability purposive. The data was collected through a pre-formed proforma / questionnaire. The detail history of all such patients was taken; complete clinical examination and routine investigation were performed. For the evaluation of UTI all such subjects were advised for urine detail report and urine culture and sensitivity (urine for C/S) by collecting urine sample in sterilize bottle, labeled it and sent to laboratory for analysis. The non cooperative patients or who refused to participate in the study were considered to be in exclusion criteria. The informed consent was taken from every patient or from attendant of patients after full explanation of procedure regarding the study, and all such maneuvers were under medical ethics. The data was collected, saved and analyzed in SPSS version 10.00. The frequency and percentage of UTI and associated pathogens was calculated by detecting the number of positive and negative cases. The frequency and percentage was also calculated for gender distribution. The mean and standard deviation was calculated for age.

TABLE: 01

IDENTIFIED PATHOGENS IN URINARY TRACT INFECTIONS

PATHOGENS	*n* = 85 (%)
Staphylococcus aureus	11 (13%)
Escherichia coli	52 (61%)
Proteus	14 (17%)
Pseudomonas aeruginosa	01 (1%)
Klebsiella	07 (8%)

TABLE: 02

IDENTIFIED PATHOGENS IN RELATION TO GENDER DISTRIBUTION

Organism	Gender (*n* = 85)	
	Male (29)	Female (56)
Staphylococcus aureus	04 (14%)	07 (13%)
Escherichia coli	15 (52%)	37 (66%)
Proteus	06 (20%)	08 (14%)
Pseudomonas aeruginosa	-	01 (2%)
Klebsiella	04 (14%)	03 (5%)

RESULTS:

Out of 110 suspected cases of UTI, 85 (77%) patients were found to be positive for urinary tract infection with mean age 34.73 ± 7.61 (SD) and the observation of the study is mentioned in Table: 01. Of eighty five, 55(50%) patients presented through causality outpatient department (COD), twenty five (23%) through outpatient department (OPD) and 05 were referred from different wards i.e. Gynaecology & Obstetrics and Surgery where they were initially admitted but during hospitalization they were complained of urinary symptoms (pain, burning, urgency, urethral discharge) and fever were then referred to medical department for specific management after an documented evidence of urinary tract infection i.e. the report of urine culture and sensitivity. The gender distribution is shown in Table: 02. The fever was observed in 72(85%) subjects, chills in 60(71%) patients, nausea and vomiting in 42(49%) subjects, abdominal / flank pain in 75 (88%) patients, headache in 28(33%) patients, sweating in 58(68%) patients, blood in the urine 52 (61%) patients, fatigue in 22(26%) patients, pain or burning when urinating in 75(88%) patients, altered urine colour in 20(24%) subjects, urethral discharge in 16(19%) patients, frequent and urgent need to urinate in 80(94%) patients, discomfort in the middle of the lower abdomen (suprapubic pain) in 38(45%) patients. Nine (11%) subjects were un-circumcised. Sixteen subjects (19%) had history of urethral catheterization and 13 (15%) were already catheterized since 10-15 days before arrived at casualty department of hospital. Twenty five (29%) patients left ward against the medical advice (LAMA), five (6%) patients left the ward on request (discharge on request) while fifty five (65%) patients were recovered i.e. became healthy and discharged from hospital.

DISCUSSION:

The prevalence of UTI varies widely by age, gender and circumcision status and this confirms the importance of demographic

and clinical characteristics when considering further diagnostic testing. The quantitative prevalence estimates presented in our study provide the clinician with a better sense of the relative importance of each variable. By incorporating information about the patient's age, gender and circumcision status, the clinicians can make more informed decisions on a case-by-case basis. We found slightly higher prevalence rates than a 1999 study of UTI prevalence in which the pooled prevalence of UTI in 10 studies was 5%.[11] The symptoms observed in our study were fever, chills, nausea and vomiting, abdominal / flank pain, headache, sweating, blood in the urine, urinary urgency, fatigue, and pain or burning when urinating, altered urine colour where as similar features were also identified by Ferryet al.[12]Our results are consistent with data from large epidemiologic UTI studies, [13-14]Knowledge of the baseline probability of UTI, along with information on the unique clinical presentation, can help the clinician decide whether obtaining a urine specimen is indicated. Among febrile males, circumcision status was important in determining risk for UTI. Uncircumcised male had the highest prevalence of UTI of any group whereas circumcised males had one of the lowest rates. Among febrile male 20.1% of uncircumcised males had a UTI as compared to circumcised male (2.4%),[15]this finding suggests that clinicians need to carefully ascertain circumcision status in all males with unexplained fever. Bacteriological studies usually reveal the involvement of gram negative enteric organisms that commonly causes urinary tract infections such as E. coli, Klebsiella species, and the Proteus species.[16]Similarly, the predominant numbers of pathogens isolated in our study were gram negative bacilli rather than gram positive pathogen. Among the patients infected with gram negative bacilli in our study, Escherichia coli was isolated from 52(%) of the subjects, Klebsiella spp. from 7(%), Pseudomonas spp. from 1(%),Staph. aureus 11(%) and the Proteus spp in 14(%). In a study from India, it was found that E. coli was the most commonly grown organism (64.3%), followed by Staphylococcus aureus (21.4%), and Klebsiella pneumoniae (14.3%).[17]it was also noted an increased adherence of E. coli with type 1 fimbriae to uroepithelial cells isolated from the urine of women.[18]Urinary tract infections due to Enterococci are quite common, particularly in patients who have received antibiotic treatment or who have undergone instrumentation of the urinary tract. It has been reported that the prevalence of enterococci as a cause of nosocomial UTI increased between 1975 and 1984.[19]Lloyds et al have shown that Enterococcal species accounted for 35% of urinary tract isolates.[20]Gram positive cocci play a lesser role in UTIs. However, Staphylococcs saprophyticus, a novobiocin-resistant, coagulase-negative species, accounts for 10-15% of acute symptomatic UTIs in young females.[21]In our study the urinary tract infection was mostly observed in female subjects (66%) and it is similar with the study by Huppert et al.[22]The choice of antibiotic therapy should integrate the local sensitivity pattern of the infecting organisms. For seriously ill patients including patients infected with Pseudomonas, agents such as Imipenem, Ticarcillin-clavulanate, and Piperacillin-tazobactum may also be considered.[23]

The results obtained from this and earlier studies clearly indicate that UTI is an important occult infection and urine microscopy as a guide to the presence of UTI is unreliable and significant bacteruria can occur in the absence of pyuria.[24]In this study too, urine microscopy by itself was not of much use and culture was necessary to arrive at a diagnosis. It is, therefore recommended that urine culture should be performed in all suspicious subjects to diagnose UTI.

The present study has significant strength because there is huge data and studies available on urinary tract infection in children but there is yet limited data and studies on urinary tract infections in adults, therefore the current study provide a more updated picture of UTI prevalence in adult subjects and further extensive studies in advanced mode on similar and related topic should be conducted at various health care clinics and centers to maintain the epidemiological data in relation to urinary tract infections.

CONCLUSION:

The most common pathogen identified in our study was Escherichia coli (E. coli). The frequency, clinical profile and identified pathogens for urinary tract infection in patients presented to tertiary care hospital, Hyderabad is not significantly different from that of developing and developed countries.

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