RESEARCH

ASSESSMENT OF CLINICAL AND MICROBIOLOGICAL PROFILE OF URINARY TRACT INFECTION AMONG ELDERLY ADMITTED TO A TERTIARY CARE HOSPITAL IN CENTRAL KERALA

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Abstract

Background: To assess Clinical and Microbiological profile of Urinary tract infection among elderly admitted to a tertiary care hospital in central Kerala. **Materials and Methods:** Eighty- five suspected cases of UTI of both genders in age group >60 years were enrolled. History of the patient and clinical symptoms were recorded. Complete haemogram, fasting and post prandial blood glucose level, blood urea, serum creatinine, liver function test, ultrasound abdomen and urine samples were obtained. Microscopic examination and culture of urine sample was done on CLED agar (Cysteine Lactose Electrolyte Deficient agar). Based on colony morphology in CLED agar relevant biochemical reactions were done and microorganisms were identified. Antibiotic sensitivity testing was done by the modified Kirby-Bauer disc diffusion method according to the Clinical and Laboratory Standards Institute (CLSI) guidelines. The antibiotics tested were Imepenem, Meropenem, Ciprofloxacin, Ofloxacin, Norfloxacin, Amikacin, Gentamicin, Nitrofurantoin, and Cotrimoxazole **Result:** Out of 85 suspected cases of UTI, 50 were males and 35 were females. Of which 72 had positive urine culture .Common symptoms were fever in 56, abdominal pain in 74, altered sensorium in 64, hematuria in 8, increased frequency of micturition in 72, loin pain in 18, nausea in 25, vomiting in 39, dysuria in 32 and urgency in 29 patients. The difference was significant among symptoms in patients (P< 0.05). Pathogens isolated from urine samples were *E. coli* in 65%, *Klebsiella* spp. in 10%, *Pseudomonas* spp. in 8%, *Enterococcus* spp. in 8%, *Proteus mirabilis* in 6%, *Staphylococcus aureus* in 2% and *Citrobacter freundii* in 1%. A significant difference among different pathogens was observed (P< 0.05). USG showed cystitis in 63% patients, renal parenchymal disease in 27%, renal calculi in 12%, benign prostatic hyperplasia (BPH) in 6%, pyelonephritis in 2% patients. A significant difference among different USG findings was observed (P< 0.05). A high rate of resistance was seen among Ciprofloxacin (74%), Ofloxacin (74%) and Norfloxacin (74%) followed by Gentamicin (51.2%), Amikacin (32%), Cotrimoxazole (31.4%), Nitrofurantoin (27.5%), Imepenam (6%) and Meropenam (4%) **Conclusion:** Common pathogens isolated in UTI were *E. coli*, *Klebsiella* spp., *Pseudomonas* spp., *Enterococcus* spp., *Proteus mirabilis, Staphylococcus aureus*, and *Citrobacter freundii*.

INTRODUCTION

Urinary tract infection (UTI) is defined as an infection which involves the lower and/or the upper urinary tract of the body. It is regarded as the most common outpatient complaint in the population. Its prevalence is high among geriatric group.[1] Urinary tract infection may be asymptomatic or symptomatic.[2] It manifests as asymptomatic bacteriuria, cystitis, prostatitis and pyelonephritis. Urosepsis and septic shock are complications of long-standing urinary tract infections having high mortality upto 40%.[3]

The etiological agents of community-acquired and hospital acquired UTIs differ. Enteric bacteria such as *Escherichia coli* is the most frequent cause of UTI, although recent research indicates that the percentage of UTIs caused by *E. coli* is decreasing rapidly.[4] Risk factors for developing symptomatic UTI in the ageing population are different to those in younger population. Risk of UTI is higher in young females, however risk of UTI in both genders in old age are almost equal.[5] It is observed that due to sepsis mortality increases with age. Age-associated changes in immune function, exposure to nosocomial pathogens and an increasing number of comorbidities put the elderly at an increased risk for developing infection.[6] Changes in the anatomy and hormonal profile; presence of co-morbidities such as neurological, urological, diabetes mellitus, long term catheterization are factors that attribute to an increased risk of UTI among elderly.[7] Considering this, we selected present study to assess Clinical and Microbiological profile of urinary tract infection among elderly admitted to a tertiary care hospital in Central Kerala.

MATERIALS AND METHODS

After considering the utility of the study and obtaining approval from ethical review committee of the institute, we selected eighty- five suspected cases of UTI of both genders of age group more than 60 years who got admitted to P K Das hospital from March 2021 to August 2021. History of the patient and clinical symptoms were recorded. Assessment of risk factors and presence of other co-morbidities, previous hospitalizations etc. were recorded. Complete haemogram, fasting and postprandial blood glucose level, Blood urea, serum creatinine, liver function test, ultrasound abdomen were obtained. A clean catch midstream urine specimen or urine sample from catheterised patients or suprapubic aspirate was collected in a sterile wide mouth leak proof container. Wet mount examination was done. Sample was cultured by inoculating on CLED agar and incubated at 35-37 ^{0}C for 24 hours. A specimen was considered positive for UTI if a single organism was grown on CLED agar at a count of $> 10^5$ Colony forming units/mL of urine. The Gram positive and Gram- negative organisms were further identified by using various biochemical reactions upto genus/ species level. Out of 85 patients, 72 had positive urine culture. Antibiotic sensitivity testing was done by the modified Kirby-Bauer disc diffusion method according to the Clinical and Laboratory Standards Institute (CLSI) guidelines. The antibiotics tested were Imepenem, Meropenem, Ciprofloxacin, Ofloxacin, Norfloxacin, Amikacin, Gentamicin, Nitrofurantoin, and Cotrimoxazole. The results were compiled and subjected for statistical analysis using Mann Whitney U test. P value less than 0.05 was set significant.

RESULTS

Out of 85 suspected cases of UTI, 50 were males and 35 were females [Table 1].

Table 1: Distribution of patients

Total- 85		
Gender	Males	Females
Number	50	35

Out of which 72 had positive urine culture, 44 were males and 28 were females

Table 2: Assessment of clinical symptoms

Clinical symptoms	Number	P value
Fever	56	0.01
Abdominal Pain	74	
Altered Sensorium	64	
Hematuria	8	
Increased frequency of micturition	72	
Loin Pain	18	
Nausea	25	
Vomiting	39	
Dysuria	32	
Urgency	29	

Common symptoms were fever in 56, abdominal pain in 74, altered sensorium in 64, hematuria in 8, increased frequency of micturition in 72, loin pain in 18, nausea in 25, vomiting in 39, dysuria in 32 and urgency in 29 patients. The difference was significant (P< 0.05) [Table 2, Figure 1].
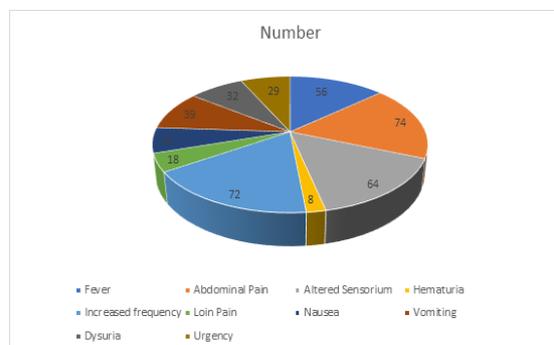

Figure 1: Assessment of clinical symptoms

Table 3: Pathogens found in UTI cases

Pathogens	Percentage	P value
E. coli	65%	0.032*
Klebsiella spp.	10%	
*Pseudomona*s spp.	8%	
Enterococcus spp.	8%	
Proteus mirabilis	6%	
Staphylococcus aureus	2%	
Citrobacter freundii	1%	

*p<0.05

Pathogens isolated in 72 UTI cases were *E. coli* in 65%, *Klebsiella* spp in 10%, *Pseudomonas* spp. in 8%, *Enterococcus* spp. in 8%, *Proteus mirabilis* in 6%, *Staphylococcus aureus* in 2%, and *Citrobacter*

freundii in 1%. A significant difference was observed (P< 0.05) [Table 3].

Table 4: Ultrasound findings in suspected cases

USG Findings	Percentage	P value
Cystitis	63%	0.02
Renal parenchymal disease	27%	
Renal calculi	12%	
BPH	6%	
Pyelonephritis	2%	

USG showed cystitis in 63% patients, renal parenchymal disease in 27%, renal calculi in 12%, benign prostatic hyperplasia (BPH) in 6% and pyelonephritis in 2%. A significant difference was observed (P< 0.05) [Table 4].

Table 5: Resistance pattern of the uropathogens to various antibiotics

Antibiotics	Percentage
Imepenam	6%
Meropenam	4%
Amikacin	32%
Ciprofloxacin	74%
Ofloxacin	74%
Norfloxacin	74%
Nitrofurantoin	27.5%
Cotrimoxazole	31.4%
Gentamicin	51.2%

A high rate of resistance was seen among Ciprofloxacin (74%), Ofloxacin (74%) and Norfloxacin (74%) followed by Gentamicin (51.2%), Amikacin (32%), Cotrimoxazole (31.4%), Nitrofurantoin (27.5%), Imepenam (6%) and Meropenam (4%) [Table 5].

DISCUSSION

Urinary tract infections (UTIs) are among the most common bacterial infections.[8] It has been estimated that symptomatic UTIs result in as many as 7 million visits to outpatient clinics, 1 million visits to emergency departments, and 100,000 hospitalizations annually.[9,10] UTIs have become the most common hospital-acquired infection, accounting for as many as 35% of nosocomial infections, and they are the second most common cause of bacteraemia in hospitalized patients.[11,12] The present study assessed Clinical and Microbiological profile of Urinary tract infection among elderly admitted to a tertiary care hospital in Central Kerala.

Our results showed that out of 85 suspected cases of UTI of age group >60, 50 were males and 35 were females. Of which 72 had a positive urine culture (44 were males and 28 were females).Fadel et al,[13] found that out of 116 patients, there were 121 UTI episodes, 97 of which were community acquired and 24 of which were hospital acquired. There was clearly a predominance of women in the patient population, especially in the community-acquired UTI group. Fever was a common presenting symptom, reported in 83% of all UTI episodes, whereas urinary symptoms, including dysuria, frequency of micturition, or suprapubic pain, were present in only 39% of the cases. Most of the hospital-acquired UTI episodes (96%) occurred in the setting of a urinary catheter, whereas only 9% of the community-acquired UTI episodes were associated with catheters.

Our results showed that common symptoms were fever in 56 patients, abdominal pain in 74, altered sensorium in 64, hematuria in 8, increased frequency of micturition in 72, loin pain in 18, nausea in 25, vomiting in 39, dysuria in 32 and urgency in 29 patients. Kakde et al,[14] in their study found frequency of micturition as the most common symptom (65.26%) followed by urgency and dysuria (both 62.10%), and fever in 45.26% of patients.

Our results showed that pathogens isolated in 72 UTI cases were *E. coli* in 65%, *Klebsiella* spp. in 10%, *Pseudomonas* spp. in 8%, *Enterococcus* spp. in 8%, *Proteus mirabilis* in 6%, *Staphylococcus aureus* in 2%, and *Citrobacter freundii* in 1%. Kauffman et al,[15] found that the prevalence of UTI (significant bacteriuria) was 23.4% (236 patients). Among the total 236 UTI patients, 134 were females (56.8%) and 102 were males (43.2%). Out of total 1008 patients, 236 (23.4%) had significant bacteriuria, in which 12 (5.1%) patients were aged less than 20 years, 51 (21.6%) patients were in the age group 21-40 years, 110 (46.6%) patients were in the age group 41-60 years and 63 (26.7%) were aged more than 60 years. Out of total 236 isolates *Escherichia coli* was most frequently isolated microorganism from 104 (44%) patients, followed by *Klebsiella* 33(14%), *Enterobacter* 23(9.74%), *Citrobacter* (7.20%), *Enterococcus, Pseudomonas, Proteus, MRSA, Acinetobacter, Staph aureus* and least is *Coagulase negative staphylococcus*.

We observed that USG showed cystitis in 63% patients, renal parenchymal disease in 27%, renal calculi in 12%, benign prostatic hyperplasia (BPH) in 6%, pyelonephritis in 2% patients. Caljouw et al,[16] found that the incidence in elderly men and women of this age group was 0.08 per person-year and 0.13 per person-year respectively. Antibiotic resistance is becoming a serious global health problem and updated surveillance of antimicrobial susceptibility of a specific type of infection is of great importance for initial empirical therapy. The mechanisms of antimicrobial resistance varied in main pathogens of UTI. A high rate of resistance was seen among Ciprofloxacin (74%), Ofloxacin (74%) and Norfloxacin (74%) followed by Gentamicin (51.2%), Amikacin (32%), Cotrimoxazole (31.4%), Nitrofurantoin (27.5%), Imepenam (6%) and Meropenam (4%).

CONCLUSION

Common pathogens isolated in UTI were *E. coli*, *Klebsiella* spp., *Pseudomonas* spp., *Enterococcus*

spp., *Proteus mirabilis, Staphylococcus aureus*, and *Citrobacter freundi*.- Highest rate of antibiotic resistance was found for Fluoroquinolones followed by Aminoglycosides. Least resistance was found for Carbapenems.

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