

## **Urinary Tract Infection in Elderly: Clinical Profile and Outcome**

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### **I. Introduction**

UTI is one of the most common infectious diseases among the geriatric population. Due to their anatomy and reproductive physiology, females are more susceptible. Diagnosis and treatment of UTI in the elderly varies when compared to younger patients and is rather difficult due to the absence of specific symptoms and lack of clear clinical history. This leads to under diagnosis and inadequate treatment.

Previous studies show that UTI is frequently erroneously diagnosed in around 40% of hospitalized elderly admissions, because of nonspecific symptomatology. Bacteria are the most common causative agents causing UTI in humans. Occasionally viruses and fungi can also be responsible; hence these should not be ignored. Gram-negative bacilli (eg. *Escherichia coli*, *Enterobacter* spp, *Klebsiella* spp, *Proteus* spp) are the most common. There is a noticeable increase in more resistant bacteria when compared to young adults.

Examples :- • *Pseudomonas aeruginosa* • Gram-positive organisms like:- enterococci (*E. faecalis* and *E. faecium*) - coagulase-negative staphylococci - group B *Streptococcus* (*Streptococcus agalactiae*). Elderly population comprises a subset of population, more vulnerable to UTI; both in community and long term care facilities.

High risk may be attributable to differing characteristics such as :- • anatomical and hormonal changes • presence of comorbidities such as neurological and urological abnormalities • diabetes mellitus • prolonged indwelling catheter use in hospitals and long term care facilities. A considerable difference from typical clinical presentation of UTI is seen in elderly population. Marked by :- • absent or reduced fever • change in mental status • nonspecific symptoms such as anorexia and increased lethargy.

Management of UTI in elderly is complicated by - • increased prevalence of asymptomatic bacteriuria • presence of benign urinary symptoms • atypical clinical presentation and underlying cognitive impairment • limitation of use of urine culture in diagnosis of symptomatic infection • increasing resistance to antibiotics among uropathogens with geographical variation • parallel increase in financial burden in UTI care.

**OBJECTIVES** UTI the most common bacterial infection with considerable morbidity and mortality especially in hospitalized geriatric patients. However, there is not much information pertaining to various aspects of UTI in the elderly in India. Hence, this study was done to find out :- • the present clinical profile • predisposing factors • uropathogen profile causing UTI • outcome of UTI in elderly • to identify associated factors responsible for mortality.

### **II. Methodology**

This was a prospective, observational study. Done in the department of Medicine and Microbiology at KEM hospital, Mumbai conducted over a period of one year. Done after obtaining approval from Institutional ethics committee and written informed consent from participants, 95 indoor patients from medicine wards of age 60 years and above having symptoms of UTI and urine culture showing significant growth were included in the study. Patients with negative urine culture, not willing to participate in the study were excluded. Data including age, sex, occupation, predisposing factors and clinical profile was taken. Detailed history of symptoms was taken, like :- • fever with chills • urgency, dysuria, pyuria, hematuria, frequency • backache, pain in abdomen • loin tenderness • altered sensorium and clinical examination. Patients were observed with respect to :- • anatomical location of infection site • uncomplicated UTI manifesting as cystitis • complicated UTI in individuals with functional or structural abnormalities of the genitourinary tract • causative organism and susceptibility to various antibiotics till estimated outcome either discharge or death. The laboratory tests included :- • complete blood picture • renal and liver function test • urine microscopy including culture/ sensitivity • Ultrasonography Kidney Ureter Bladder (KUB) • Computerised Tomography KUB if required. Descriptive and inferential statistical methods were used. A probability of < 0.05 was accepted as significant. **RESULTS** Among study population :- • 50.52% patients were in age group of 61 to 70 years. • 37.89% were in 71 to 80 year group. • 11.57% patients were above age of 80 years. Male and female formed 55.78% and 44.21% of study population respectively. In our study population :- • frequency of

micturition was seen in (65.26%) patients • urgency (62.10%) • dysuria (62.10%). ØFever was present in 45.26% of the study population. ØDiabetes mellitus was predisposing factor associated with UTI seen in (46.31%) patients. ØBenign Prostatic Hyperplasia (41.50%) among males. ØCystocele (30.95%) among females. ØUrine culture showed growth of :- • gram negative organism in 88 (92.63%) patients • gram positive organism in 7 (7.36%) patients. ØE.coli was isolated from urine culture in (47.36%) patients. ØKlebsiella group in (18.94%) ØPseudomonas group in (14.73%). ØE.coli isolates were sensitive to :- • Imipenem (97.77 %) • Meropenem (88.88%) • Piperacilin + Tazobactam (82.22%) ØKlebsiella group isolates were sensitive to :- • Imipenem (83.33 %) • Meropenem (77.77%) • Levofloxacin (72.22%). ØPseudomonas group isolates were sensitive to :- • Imipenem(85.71%) • Meropenem (78.57%) • Levofloxacin (64.28%). ØProteus group isolates were sensitive to :- • Imipenem(91.66%) and Meropenem (91.66%) • Levofloxacin (83.33%) ØOrganisms were least susceptible to :- • Cefotaxime, followed by • Ceftriaxone. Ø17(17.89%) of the 95 patients with UTI died during hospitalization. Ø78(82.10%) patients from study population were discharged. Ø There was no significant difference in mortality between men and women and in different age groups. ØSignificantly higher mortality was seen in patients with diabetes mellitus compared with patients without diabetes mellitus (36.36% versus 1.96%;  $p < 0.0001$ ). ØComplicated UTI patients had higher mortality compared with uncomplicated UTI (28.88% versus 8%;  $p < 0.001$ ). ØMortality was also higher among patients having dementia compared with patients having reserved cognitive status (40% versus 5%;  $p < 0.0001$ ). ØCompromised renal function with serum creatinine  $> 1.4$  mg/dl was significantly associated with mortality:- • 25.45% (14/55) of these patients died compared to 7.5% (3/40) in patients with preserved renal function ( $p < 0.0001$ ). ØMortality was significantly related to the number of predisposing factors, with mortality rates of :- • 9.52% (4/42) in patients with 0-1 predisposing factor. • 21.05% (8/38) in those with 2-3 factors. • 33.33% (5/15) in those with three and more predisposing factors. ØMortality was not significantly related to the use of urethral catheters. ØMortality rates of 14.28% in patients with urethral catheters compared with those 22.05% patients not having urethral catheters. ØAlso, there was no significantly higher incidence of death in patients with neutrophilia (leucocyte count  $\geq 11,000$  cells/dl), compared to patients with normal leucocyte count (18.57% compared to 16%).

### **III. Discussion**

ØUTI is an important cause of morbidity and sepsis in elderly patients having a spectrum varying from benign cystitis to potentially life threatening pyelonephritis. ØIn our study, lower urinary tract symptoms were more common with frequency of micturition being the most common symptom f/b urgency, dysuria which may be attributed to more number of cases suffering from diabetes mellitus and obstructive uropathy in our study population. ØIn study conducted by Mahesh E et al. fever was the most common symptom followed by dysuria. ØBlunted fever response might be in part because of a lower basal body temperature in elderly. ØAltered sensorium, an atypical symptom in general population, was found in 17.89% of our study population which was not evaluated in earlier studies. ØAs typical features such as fever and leucocytosis can be absent in elderly population, a subtle clue to underlying UTI may be change or a decline in mental status. ØDiabetes mellitus was the most common predisposing factor in this study found in 46.31% cases f/b BPH in males and cystocele in females. ØBacteriuria is more common in diabetics than in non-diabetics due to a combination of host and local risk factors. ØLonger duration and greater severity of diabetes significantly increases chances of occurrence of UTI by causing neutrophil dysfunction, diapedesis and phagocytosis. ØHowever, prevalence of dementia and urinary catheterization was higher in study by Tal S et al. which could be attributed to high mean age at presentation. ØIn study conducted by Ibak G et al., urogenital procedures was most common predisposing factor followed by Diabetes Mellitus. ØIn our study, there is striking resemblance in pathogenic organisms with other studies. ØGram negative organisms were primarily etiological organisms causing UTI in 92.63% patients. ØE.coli being the most common isolate (47.36%) in urine culture as it's a commensal found in gastrointestinal and genitourinary tract f/b Klebsiella species, Pseudomonas, Proteus. • Staphylococcus aureus was the least common isolated pathogen which was in contrast to a Nigerian study. • As staphylococcus aureus has a status of common contaminant, it can produce a diagnostic dilemma among practitioners, under treatment of which can lead to lifethreatening staphylococcal bacteremia. ØWe evaluated sensitivity pattern to various antibiotics including penicillins, cephalosporins, quinolones, aminoglycosides and others. ØIn our study, E. coli isolates were highly sensitive to carbapenems like Imipenem and meropenem though studies done in catheterassociated UTI showed production of carbapenemases making even these drugs ineffective. ØE. coli isolates were least sensitive to third generation cephalosporins. ØCefotaxime thus showing trend towards resistance to higher antibiotics. ØStudy done by Ramaprasad AV, et al in India showed effectiveness of quinolones like ciprofloxacin against E. Coli. ØThis was in contrast to our study thus pointing towards emergence of drug resistance except levofloxacin which showed some promising results. ØAnother important finding in this study was non-E.coli gram negative organisms such as Pseudomonas, Klebsiella showed lower sensitivity to: - Levofloxacin, - Piperacillin + Tazobactam -Amikacin -Ceftazidime ØShowing trend towards resistance to higher antibiotics compared to other studies. ØSome factors that might be responsible for emergence of drug

resistant organisms are:- • irrational and inappropriate use of antibiotics for prophylaxis as well as treatment • excessive use of indwelling urinary catheters • nosocomial sources of infections. ØThus more aggressive and rational antibiotic therapy must be considered in these patients. ØIn our study, statistically important risk factors for mortality include presence of diabetes mellitus and complicated UTIs. ØFactors which can predispose to UTI are :- • hyperglycaemia • impaired immune system • autonomic neuropathy leading to incomplete bladder emptying • drug resistant organisms. ØComplicated UTIs in diabetics include :- • renal and perirenal abscess • emphysematous pyelonephritis • emphysematous cystitis • fungal infections • papillary necrosis. ØEarly diagnosis, prompt therapy, regular monitoring of blood sugar levels are key factors for improved outcomes in these patients. ØAnother important determinant for higher mortality in our study was altered sensorium and dementia. ØThese factors can lead to impaired mobility and urinary incontinence leading to UTI. ØThese factors can be attributed to poor physical health resulting in mortality. ØIn contrast to previous studies, there was no evidence that use of indwelling catheters is a risk factor for mortality. ØPossible explanation could be lower mean age of our study population. ØTransient use of catheters for urinary output monitoring may not influence clinical course if concomitant factors such as cerebrovascular accident or urosepsis are absent. ØJudicious use of indwelling catheters can reduce :- • length of hospital stay • investigations • resistant pathogens • medicinal costs • thus, morbidity and mortality. ØThe limitations of this study were :- • Less statistical power due to small study population • single center study • non – generalizable results • small duration • non-assessment of source of UTI whether community or hospital acquired. ØThe strength of the study were the :- • prospective design • attempt to standardize evaluation and management of UTI • high performance of processes of care such as blood culture collection or early antimicrobial administration • evaluation of outcome based on comorbidities.

#### IV. Conclusion

This study focused on epidemiology, risk factors, clinical features and especially on outcome of UTI in elderly patients. • It suggests more appropriate antibiotic therapy particularly in non-E.coli UTI after culture and sensitivity tests. • Thus, early diagnosis of UTI and aggressive therapy are critical to reduce overall mortality.

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