

## Original Paper

# Urinary Tract Infections (UTI) Among Patients at the University Hospital Center "Mother Theresa", Tirana, Albania.

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**Abstract**

**Background & objectives:** The resistance of bacteria causing urinary tract infection (UTI) to commonly prescribed antibiotics is increasing both in developing as well as in developed countries. Resistance has emerged even to more potent antimicrobial agents. The primary objective of the study was 1) to detect the prevalence rate of bacterial infection among urinary isolates from patients having UTI and 2) to detect prevalence rate of drug resistance among pathogen isolate from patients having UTI.

**Methods:** Early morning mid-stream urine samples were collected using sterile, wide mouthed container with screw cap tops. On the urine sample bottles were indicated name, age, sex, and time of collection along with requisition forms.

**Results:** Significant association ( $P < 0.001$ ) of prior use of antibiotics in males, UTI in adults, gynaecological surgery in females, obstructive uropathy in males and complicated UTI in females with the occurrence of UTI with ciprofloxacin resistant *Escherichia coli* was noted. Significant association was noted in females with prior antibiotics, with prior urological surgery and in males with prior complicated UTI. Fluoroquinolone resistance was found to increase with age.

**Interpretations & conclusions:** Ciprofloxacin resistance has emerged due to its frequent use. This resistance was seen more in the in-patients, elderly males and females. Also the resistance to other antibiotics was also high. Increasing antibiotic resistance trends indicate that it is imperative to rationalize the use of antimicrobials in the community and also use these conservatively.

**Key words:** Ciprofloxacin - *Escherichia coli* - minimum inhibitory concentration - urinary tract infection

## 1. Introduction

Urinary tract infections (UTIs) are amongst the most common infections encountered in clinical practice. In Albania symptomatic urinary tract infections (UTI)

occur in as many as 30 000 visits to emergency units and 500 hospitalizations annually.

The commune bacterial agent involved in causing UTI is *Escherichia coli*, from the Enterobacteriaceae family in at

least 59% of cases. Other less common pathogens include Klebsiella, Proteus, Enterobacter spp, etc.

To be mentioned that the distribution of pathogens that cause UTI is changing. There are several factors and abnormalities of UTI that interfere with its natural resistance to infections. These factors include sex and age disease, hospitalization and obstruction in urinary tract.

The treatment of UTIs varies according to the age of the patient, sex, underlying disease, infecting agent and whether there is lower or upper urinary tract involvement. Diagnosis of UTI often requires laboratory examination of a urine sample in addition to clinical evaluation. Although many guidelines indicate that the culture of urine is not required in most cases of uncomplicated cystitis[1], the laboratory in UHC Mother Teresa, accepts all such requests from patients to send samples on all suspected UTI.

With the increasing trend of antibiotic-resistance in *E. coli*, the management of urinary tract infections is likely to become complicated with limited therapeutic options.

## 2. Material & Methods

*Study site:* The study was carried out in the Department of Emergency, University Hospital Center "Mother Theresa", Tirana, Albania from November 2006 to September 2007.

This was an analysis of data generated from the records of consecutive urine samples received in the laboratory during the study period.

Analysis of the data was carried out focusing on the age, gender, whether admitted or not, whether received prior antibiotic therapy, any surgical or gynaecological intervention performed in the recent past, and any history of urinary tract infection in the past. The antibiotic susceptibility data of all isolates were also reviewed and analyzed. Samples received included mid-stream clean catch urine, suprapubic aspirate, urine collected from Foley's catheter and from the nephrostomy tube under sterile precautions, in patients who had undergone percutaneous nephrostomy. Samples were processed and isolates were identified as per standard methods 14. All urine samples were inoculated onto cysteine lactose electrolyte deficient (CLED) medium using a calibrated loop (volume-0.005 ml) and were incubated for 18-24 h at 37°C. Wet mount preparations

were also made from all urine samples to look for pus cells and epithelial cells. Depending upon the number of the colonies grown on the CLED medium, the interpretations of urine culture were made as insignificant (<50 colonies), doubtful significance (>50 - <500 colonies) and significant ( $\geq$ 500 colonies) with due clinical correlation as per recommendations. The antibiotic susceptibility testing of the isolated bacteria was carried out by the Kirby Bauer method.

#### *Determination of minimum inhibitory concentration*

(MIC): The MIC testing was

dissolved in sterile distilled water as per the recommendations. The antibiotic was used immediately after reconstitution. The different concentrations of the drug analyzed were 0.5 to 256  $\mu\text{g/ml}$ <sup>15,16</sup>. ATCC *E. coli* 25922 was inoculated on each plate as the growth control. The growth control was read first followed by the MICs of the test strains.

*Statistical analysis:* Statistical software SPSS<sup>®</sup> 19.0 (IBM SPSS Statistics Base,) were used to analyze the data.

Table 1. Frequency of bacterial pathogens isolated from positive cultures

Organisms	Male	Female	Total
Escherichia coli	97 (55.42)	338 (64.75)	435 (62.41)
Enterobacter spp	24 (13.71)	73 (13.98)	97 (13.91)
Klebsiella spp	12 (7.05)	39 (7.47)	51 (7.31)
Proteus spp	10 (5.71)	29 (5.55)	39 (5.59)
Pseudomonas spp	8 (4.57)	19 (3.63)	27 (3.87)
Staphylococci spp	7 (4)	12 (2.29)	19 (2.72)
Others	17 (9.71)	12 (2.29)	29 (4.16)
Total	175 (100)	522 (100)	697 (100)

performed as per guidelines. The MIC interpretive standards for the susceptibility categories were as per the recommended breakpoints by the Clinical Laboratory Standards Institute (CLSI) for ciprofloxacin<sup>16</sup>. Ciprofloxacin hydrochloride was obtained from. The antibiotic was

### 3. Results

A total of 2876 patients (1627 women [56.58%] and 1249 men [43.42%]), aged from younger than 1 month to 91 years (mean 21.7 years), were studied. In evaluation of studied specimen, 697 samples (522 females and 175

males) had positive culture result and there was a statistically significant relation between gender and UTI ( $p=0.005$ ).

Wet mount microscopy for presence of bacteria or pus cells in significant amount per field had sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of 83, 58, 44 and 89 per cent, respectively in detecting infections.

Of the 2876 culture positives, *E. coli* was the most common (59%) isolate. (Table I).

#### 4. Discussion

Ciprofloxacin and ofloxacin are the most extensively used fluoroquinolones for the treatment of UTIs. This study showed that *E. coli* was the commonest pathogen causing complicated and uncomplicated UTI as described previously[1] [3]. There are several organisms known to cause UTIs, including *P. aeruginosa*, *S. saprophyticus*, *S. epidermidis*, *Enterococcus* spp, *P. mirabilis*, *Klebsiella* spp., *Citrobacter* spp, etc. as reported by earlier workers[4]. This study also demonstrates the emergence of *E. faecalis* and the non-fermenters *Acinetobacter* spp and *Pseudomonas* spp as major uropathogens especially in the patients admitted in the hospitals, more so in the

intensive care units. Such findings have been documented elsewhere[5-16]. The percentage of isolates of *E. coli* resistant to ampicillin was found to be as much as 80 per cent in our set up. Such high levels of resistance to ampicillin have been quoted by many other studies from different parts of Albania[5]. Our MIC results showed that fluoroquinolone resistance increased significantly with patient's age. An MIC of 256  $\mu\text{g/ml}$  was noted in the age group of >60 yr of age. There could be two explanations for this. Firstly, as a consequence of frequent exposure to fluoroquinolones resulting from the treatment of repeated infections in elderly leads to increase in MIC of fluoroquinolone[19]. Secondly, unlike urinary tract infections (UTIs) in females, UTIs in males are frequently complicated and are more likely to require prolonged antimicrobial therapy, especially in the elderly, potentially explaining the fluoroquinolone the higher MIC[25].

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