ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

A Retrospective Study of Antibiotic Usage among In-Patients of UTI in A Tertiary Care Hospital.

Pratik Patel, KL Bairy*, and Mohan Babu Amberkar.

Department of Pharmacology, Kasturba Medical College, Manipal University, Manipal-576104, Karnataka India.

ABSTRACT

Urinary tract infections are quite common in the community medical practice. The objective of our study was to know the prescription pattern of antibiotics used in the treatment of UTI. A retrospective observational study was conducted at Kasturba Hospital, Manipal, from 1st Jan 2012 to 31st Dec 2012. The case records of 500 patients of either sex who were admitted to Kasturba Hospital, Manipal with diagnosis of UTI were studied. Majority of patients were treated with single antimicrobial agent. Cephalosporins were most commonly prescribed group of antimicrobial agent followed by penicillins. Among cephalosporins, cefoperazone-sulbactam was most commonly prescribed drug followed by ceftriaxone. In penicillins, piperacillin-tazobactam was commonly prescribed drug. Among fluoroquinolones, ciprofloxacin was commonly prescribed drug. Cephalosporins plus aminoglycosides was the most commonly prescribed combination of antimicrobial agent. At discharge, cefixime was most commonly prescribed antimicrobial agent followed by cotrimoxazole.

Keywords: UTI, Antibiotics, Prescription, Cephalosporins, Cefoperazone-Sulbactam

Corresponding author

ISSN: 0975-8585

INTRODUCTION

The biggest dilemma for prescribers is to select an appropriate antibiotic from the wide range available. The difficulty is further intensified by the variations in sensitivity patterns in different population [1].

Since the introduction of antibiotic stewardship, the prescribing of antibiotics is always the matter of debate. Due to emerging problems with resistant uropathogens and health care associated infection, the use of narrow spectrum agents should be recommended wherever possible. This has led to the formation of local guidelines highlighting the patterns of local resistance and prescribing pattern of antimicrobials [2].

There exists up to threefold variation among Western countries in antibiotic prescribing practices, without citing any reasons for such variations [3]. However as far as the treatment of UTI is concerned, this may hold true for a developing country like India also.

Studies related to antibiotic usage can contribute useful information for the rational use of drugs in a hospital. This will have a huge impact on patient's quality of life as well as financial cost. The assessment of the prescription can definitely help us to know prescribing skills of physician which may help to ensure rationality in the prescription [4].

Due to scarcity of literature regarding the management of UTI in in-patient settings in India, the present study was undertaken to evaluate the same objective. This data can help us to a local antibiotic utilization guideline for the treatment of in-patients UTI.

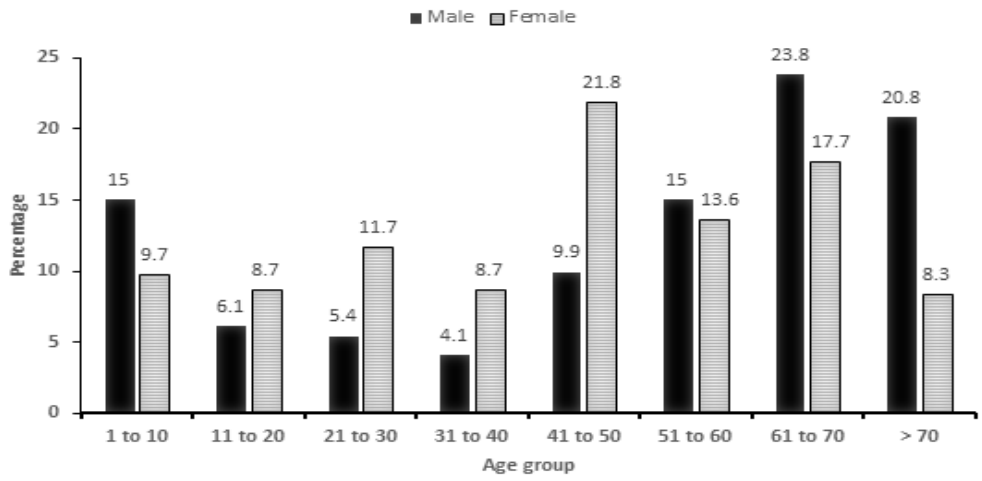
MATERIALS AND METHODS

A retrospective observational study was carried out at Kasturba Hospital, Manipal, a tertiary care teaching hospital from 1st Jan 2011 to 31st Dec 2011. The case record files of patients with a diagnosis of UTI were retrieved from medical records section after obtaining approval from Institutional Ethics Committee (letter no. IEC/324/2011). All the patients diagnosed to have UTI based on clinical, laboratory and culture sensitivity report during the above period were included in the study. Patients diagnosed with UTI associated with other systemic infection and malignancies were excluded from the study.

RESULTS

Out of 500 patients with UTI, 294 (58.80%) were male and 206 (41.20%) were female. The patients, who were diagnosed with UTI, were divided into 8 groups according to their age. The mean age of the patients was 49.14 ± 1.41 years in males and 43.49 ± 1.47 years in females. The study revealed peak incidence of UTI in the age group of 61-70 years in males and 41-50 years in females. The age distribution of study sample is shown in figure 1.

Figure 1: Age distribution of study sample



ISSN: 0975-8585

Comorbid conditions associated with UTI

Among 500 patients, comorbid conditions associated with UTI were present in higher number of males (76.5%) as compared to females (51%). (Table 1) Out of 500 patients, 330 (66%) patients of UTI had associated comorbid conditions. Diabetes mellitus was most commonly associated comorbid condition (47.87%), followed by hypertension (12.12%), renal stone (6.66%) and benign prostatic hyperplasia (6.66%). Other less common comorbid conditions included hydronephrosis (6.06%), vesicoureteric reflux (5.15%), chronic kidney disease (4.84%) and urological instrumentation (3.33%) as shown in table 2.

Table 1: Association of comorbid conditions in UTI with respect to gender (n=500)

Status of comorbid condition	Gender	
	Male n (%)	Female n (%)
Comorbid condition present	225 (76.50)	105 (51)
Comorbid condition absent	69 (23.50)	101 (49)
Total	294 (100)	206 (100)

Table 2: Comorbid conditions associated with UTI (n=330)

Comorbid conditions	n (%)
Diabetes mellitus	158 (47.87)
Hydronephrosis	20 (6.06)
Renal stone	22 (6.66)
Benign prostatic hyperplasia	22 (6.66)
Hypertension	40 (12.12)
Urological instrumentation	11 (3.33)
Vesicoureteric reflux	17 (5.15)
Renal failure	10 (3.03)
Posterior urethral valve	10 (3.03)
Chronic kidney disease	16 (4.84)
Urethral stricture	4 (1.21)
Total	330(100)

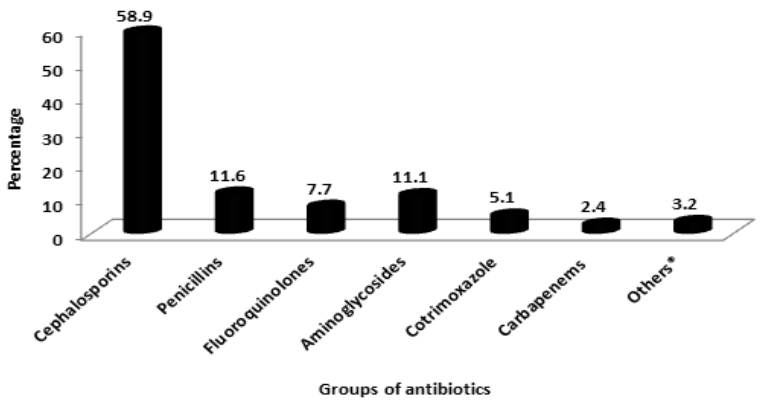
Monotherapy/ combination therapy

Out of 500 patients, 431 patients (86.2%) were given monotherapy while 69 patients (13.8%) received combination of antimicrobial agents.

Prescription rate of different groups of antimicrobial agents in monotherapy

Among 431 patients who received monotherapy, commonly prescribed group of antibiotic was cephalosporins (58.9%), followed by penicillins (11.6%), aminoglycosides (11.1%) and fluoroquinolones (7.7%). (Figure 2).

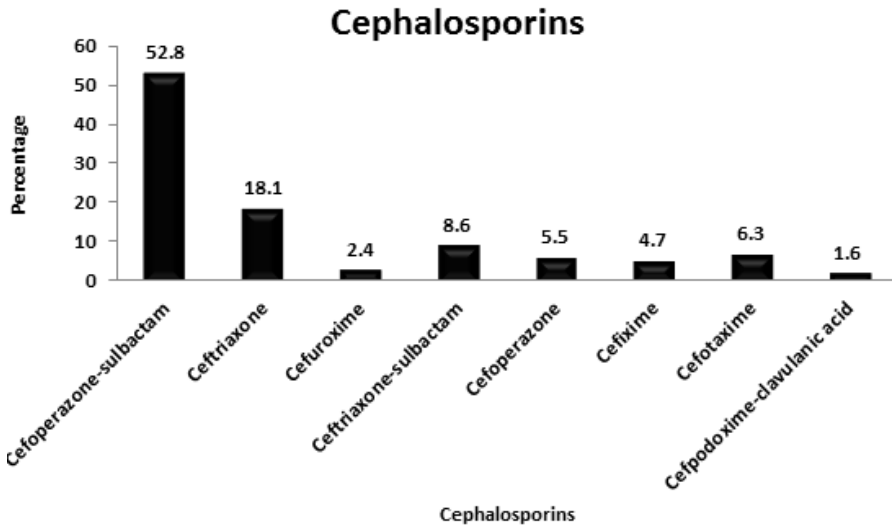
Figure 2: Prescription rate of groups of antibiotics in monotherapy (n=431)



Prescription rate of individual cephalosporins

Among cephalosporins, cefoperazone-sulbactam was prescribed for majority of patients (52.80%). Other commonly prescribed cephalosporins included ceftriaxone (18.10%), ceftriaxone-sulbactam (8.60%) and cefotaxime (6.30%). (Figure 3).

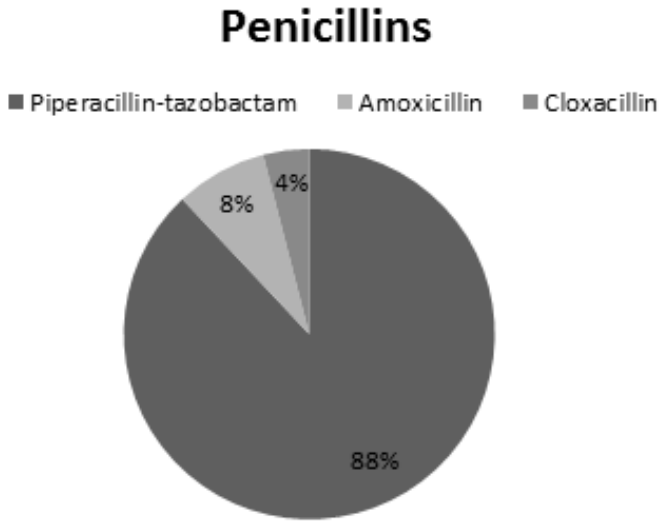
Figure 3: Prescription rate of individual cephalosporins (n=254)



Prescription rate of individual penicillins

Among penicillins, piperacillin-tazobactam was the most commonly prescribed (88%) antibiotic. Less commonly prescribed penicillins included amoxicillin (8%) and cloxacillin (4%). (Figure 4).

Figure 4: Prescription rate of individual penicillins (n=50)



Prescription rate of individual aminoglycosides

Among aminoglycosides, amikacin was most commonly prescribed (83.30%), followed by netilmicin (16.70%) as shown in table 3.

ISSN: 0975-8585

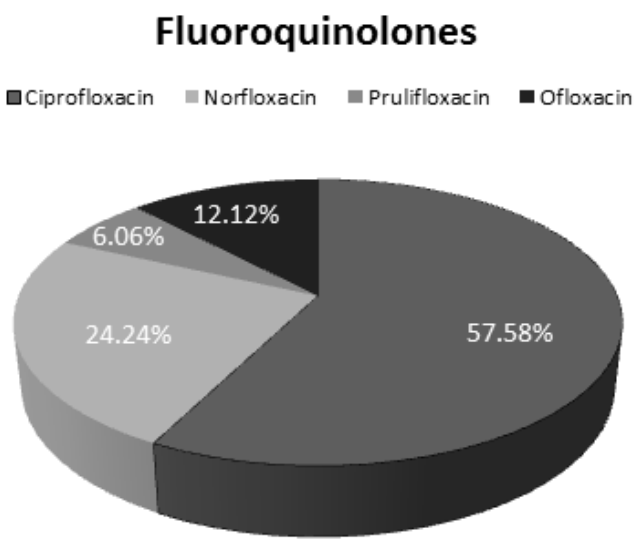
Table 3: Prescription rate of individual aminoglycosides (n=48)

Aminoglycosides	n (%)
Amikacin	40 (83.30)
Netilmicin	8 (16.70)
Total	48 (100)

Prescription rate of individual fluoroquinolones

Among fluoroquinolones, ciprofloxacin was most commonly prescribed (57.58%) followed by norfloxacin (24.24%). Less commonly prescribed fluoroquinolones included ofloxacin (12.12%) and prulifloxacin (6.06%). (Figure 5).

Figure 5: Prescription rate of individual fluoroquinolones (n=33)



Prescription rate of different combination of antimicrobial agents in UTI

The most commonly prescribed combination for UTI was Cephalosporins plus aminoglycosides(31.9%) followed by Cephalosporins plus fluroquinolones(29%) as shown in Table 4.

Table 4: Prescription rate of different combination of antimicrobial agents in UTI (n=69)

Combination of antibiotics	n (%)
Cephalosporins plus aminoglycosides	22 (31.90)
Cephalosporins plus fluoroquinolones	20 (29)
Aminoglycosides plus fluoroquinolones	14 (20.30)
Aminoglycosides plus cotrimoxazole	5 (7.20)
Cephalosporins plus nitrofurantoin	4 (5.80)
Penicillins plus aminoglycosides	4(5.80)
Total	69 (100)

Duration of treatment

About 290(58%) patients received treatment for 1-7 days, 205(41%) patients received for 8-14 days and 5(1%) patients received for more than 14 days. The mean duration of treatment for males was 8.87 ± 3.22 days and for females was 7.84 ± 3.77 days. The mean duration of treatment was significantly higher in males (p = 0.001) as compared to females. The mean duration of treatment for patients with comorbid condition was 9.02 ± 3.46 days and for patients without comorbid condition was 7.32 ± 3.27 days. The mean duration of treatment in patients with comorbid conditions was significantly higher ($p < 0.001$) than in patients without comorbid conditions.

Prescription rate of antibiotics at discharge

Out of 500 patients, 238 (47.6%) patients were prescribed antibiotics during discharge. Cefixime (42.85%) was most commonly prescribed antibiotic at discharge. Other commonly prescribed antibiotics at discharge were cotrimoxazole (15.96%), ciprofloxacin (8.40%), nitrofurantoin (6.72%), levofloxacin (5.88%) and amoxicillin-clavulanic acid (5.04%). (Table 5)

Table 5: Prescription rate of antibiotics at discharge (n=238)

Antibiotic	n (%)
Cefixime	102 (42.85)
Amoxicillin-clavulanic acid	12 (5.04)
Amoxicillin	4 (1.68)
Nitrofurantoin	16 (6.72)
Cotrimoxazole	38 (15.96)
Levofloxacin	14 (5.88)
Ciprofloxacin	20 (8.4)
Ofloxacin	2 (0.84)
Feropenem	4 (1.68)
Cefpodoxime proxetil	4 (1.68)
Cefpodoxime-clavulanic acid	6 (2.51)
Cefoperazone-sulbactam	10 (4.20)
Amikacin	6 (2.51)
Total	238 (100)

DISCUSSION

This study was undertaken to evaluate the drug prescribing pattern in UTI among 500 patients over a period of one year in a tertiary care hospital in South India.

Our study results showed higher prevalence of UTI in males as compared to females, which was consistent with studies conducted in South India by Chowta [5] and Savitha et al [6]. Another study by Mahesh et al [7] in complicated UTI also showed higher prevalence of UTI in males as compared to females. Even though UTI is more common in females [8,9], higher prevalence in male in our study could be due to more comorbid conditions in males as compared to females.

The mean age of the patients was higher in males as compared to females. Our study showed the peak incidence of UTI in males and females was in the age group of 61-70 and 41-50 years respectively. This was consistent with similar study done in India [6].

In our study, diabetes mellitus was most commonly associated comorbid condition with UTI. This is higher than that reported by Arul et al (21%) [10]. Another study conducted in complicated UTI by Muraraiah et al [4] and Mahesh et al [7] also reported almost similar findings (42.6% and 43%). It has been found that diabetic patients are particularly susceptible to rapid progression of renal parenchymal infection resulting in complications. However there are no recommendations on routine screening, treatment and prophylaxis of UTI in this patients [11].

Majority of patients in our study were given monotherapy. Among them, cephalosporins were most commonly prescribed group of antimicrobial agent followed by penicillins, aminoglycosides, and fluoroquinolones. This was consistent with study conducted by Chowta [5]. However prescription rate of group of antimicrobial agents are slightly different from that reported by Arul et al [10] in UTI, which reported prescription rate of 73.5%, 9.5%, 8.5% and 6.5% for fluoroquinolones, cotrimoxazole, cephalosporins and penicillins respectively.

Among cephalosporins, cefoperazone-sulbactam was the most commonly prescribed drug followed by ceftriaxone and ceftriaxone-sulbactam. This is in contrast to previous study done by Ramnath et al [12] where ceftriaxone (68.3%) and cefotaxime (12.2%) were commonly prescribed cephalosporins. Another study in complicated UTI, by Muraraiah et al [4] also reported commonly prescribed cephalosporins as ceftriaxone

(50%) and cefoperazone (34%). High prescription rate of cefoperazone-sulbactam in our study could be because of increased prevalence of resistance pathogens causing UTI. Other factors which might contribute to it are differences among patient populations based on geographical location and prior history of usage of antibiotic.

Piperacillin-tazobactam was the most commonly prescribed penicillin whereas ciprofloxacin was most commonly prescribed fluoroquinolones. This was consistent with study conducted by Muraraiah et al [4]. Among aminoglycosides, amikacin was most commonly prescribed followed by netilmicin.

In our study, most commonly prescribed combination of antimicrobial agent was cephalosporins plus aminoglycosides. A similar trend in prescription rate of combination of antimicrobial agents was reported by Pandey et al [13].

Out of 500 patients with UTI, 58% were prescribed antibiotics for 1 to 7 days, 41% were prescribed for 8 to 14 days and 1% received for > 14 days. For acute symptomatic episodes of UTI, the optimal duration of antimicrobial therapy has not been systematically studied. In UTI, a uniform recommendation for treatment duration is likely not appropriate because of the vast disparity in contributing factors like pathological abnormalities and history of disease. Majority of clinical trials have evaluated 7 to 14 days of therapy, but as short as five days and as long as twenty days have been reported [14]. However recent guidelines have recommended that treatment duration for patients with uncomplicated cystitis, uncomplicated pyelonephritis, complicated cystitis and that of complicated pyelonephritis is 3 to 5 days, 7 days, 7 to 10 days and 10 to 14 days respectively [15].

In our study, mean duration of treatment was significantly higher in males as compared to females. This could be because of increased association of comorbid conditions in males. It has been found that males are commonly affected with complicated urinary tract infections than women, requiring longer duration of treatment, which may play a significant role in the development of drug resistance to commonly used antimicrobial agents [16].

Our study revealed that, mean duration of treatment was significantly higher in patients with comorbid conditions as compared to patients without comorbid conditions.

Out of 500 patients, 238 (47.6%) patients were prescribed antibiotics during discharge from the hospital. Cefixime was most commonly prescribed antibiotic at discharge. Similar study by Pandey et al [13] reported that cephalosporins were commonly prescribed drugs at discharge.

In conclusion, specific recommendations for rational use of AMAs depending on differences of geographical locations has to be considered to prevent emerging resistant isolates and judicious use of antibiotics during discharge has to be considered.

REFERENCES

[1] Pais P, Khurana R, George J. Indian J Pharmacol 2002; 34:278-280
[2] Beveridge LA, Davey PG, Phillips G, McMurdo ME. Clin Interv Aging 2011;6:173-80.
[3] Murphy M, Bradley CP, Byrne S. BMC Fam Pract 2012;13:43
[4] Muraraiah S, Rajarathna K, Rahman F, Jayanthi. J Chem Pharm Res 2012;4(2):1222-30
[5] Chowta M. Instasci Journal of Medical Sciences and Clinical Research 2011;1(1):13-9.
[6] Savitha T, Murugan K, Thingamariappan K. Int J Curr Res 2011;2(1):67-72.
[7] Mahesh E, Ramesh D, Indumathi VA, Punith K, Raj K, Anupama HA. Al Ameen J Med Sci 2010;3(2):120-7.
[8] Manjunath GN, Prakash R, Annam V, Shetty K. Int J Biol Med Res 2011;2(2):504-7.
[9] Murugan K, Savitha T, Vasanthi S. Asian Pacific J Trop Dis 2012;2(5):375-80
[10] Arul Prakasam KC, Dileesh KG, Vijayan M. Int J Pharma Tech Res 2012;4(3):1309-16.
[11] Grabe M, Bjerklund-Johansen TE, Botto H, Wullt B, Çek M, Naber KG, et al. UTIs in renal insufficiency, transplant recipients, diabetes mellitus and immunosuppression. Guidelines on urological infections. Arnhem, The Netherlands: European Association of Urology (EAU); 2011. p. 52-63.
[12] Ramnath KV, Shafiya SB. Indian J Pharm Pract 2011;4(2):57-63.

[13] Pandey DK, Hardeep, Rauf MJ, Kumar R, Mubeen MF. Res J Pharm Biol Chem Sci 2012;3(4):1231-5.
[14] Nicolle LE. Can J Infect Dis Med Microbiol 2005;16(6):349-60.
[15] Mazzulli T. Can J Urol 2012;19 Suppl 1:42-8.
[16] Oladeinde BH, Omoregie R, Olley M, Anunibe JA. N Am J Med Sci 2011;3(2):75-7.