RESEARCH ARTICLE

Role of supportive drugs in the management of urinary tract infections in hospital settings - A prospective observational study

Pallavi Kulkarni, Alice Kuruvilla, Regina Roy

Department of Pharmacology, Karuna Medical College, Palakkad, Kerala, India

Correspondence to: Pallavi Kulkarni, E-mail: pallavid30th@gmail.com

ABSTRACT

Background: Although antibiotics are the mainstay of treatment for urinary tract infections (UTIs), in view of growing antibiotic resistance, role of supportive drugs in the management of UTI cannot be ignored especially those requiring hospital care. **Aims and Objective:** The aim of the study was to assess the pattern of supportive drugs used in the management of UTIs in hospital settings. **Materials and Methods:** This was a prospective observational study, 80 patients above the age of 18 years, admitted to the hospital with UTI were included in the study. Their case records were evaluated to know the pattern of supportive drugs. The patients were assessed for the clinical and bacteriological outcome at the end of treatment. The data were analyzed using descriptive statistics, namely mean and standard deviation. **Results:** Mean age of presentation was 51.25 ± 12.7 years with 59% females ($n = 47$) and 41% males ($n=33$). Lower UTI ($n = 58$, 73%) was more common than upper UTI ($n = 16$, 20%). Analgesics and antipyretics (paracetamol: 32, 40%; diclofenac: 40, 50%; and tramadol: 20, 25%) were the most common supportive drugs. 74 patients (93%) received urinary alkalizers (sodium/potassium citrate). Antispasmodics (flavoxate: 27, 34%; oxybutynin: 8, 10%; and darifenacin: 7, 9%) and alpha-blockers (tamsulosin: 8, 10%; alfuzosin: 15, 19%; and doxazosin: 4, 5%) were used in subgroup of patients. Acid suppressants (proton pump inhibitors: 41, 51% and ranitidine: 22, 28%) and antiemetics (ondansetron: 34, 43%) were used in patients with gastric distress. 95% ($n = 76$) had clinical cure and 39% ($n = 31$) had bacteriological cure at the end of treatment. **Conclusion:** Appropriate supportive drugs when used along with antibiotics, can have a potential for rapid symptom relief, hasten recovery, may reduce duration of hospital stay and thus aid for more efficient and complete management.

KEY WORDS: Urinary Tract Infection; Antibiotics; Analgesics; Supportive Drugs

INTRODUCTION

Urinary tract infections (UTIs) are one of the most common bacterial infections in adults, affecting considerably more women than men.[1] Common organisms causing UTI include *Escherichia coli*, *Klebsiella,* Proteus, Enterococci, and Staphylococci.[2]

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Choice of management depends on the type of UTI, whether it is uncomplicated or complicated UTI. Uncomplicated UTI is managed on an outpatient basis with the course of antibiotics, analgesics, and general measures. Complicated UTI and severe forms of UTI require hospitalization, antibiotics, supportive drugs, and management of underlying abnormality.[3]

Antibiotics are undoubtedly the main part of UTI treatment. However, antibiotic use in UTI accounts for 10–20% of all antibiotic prescriptions and second only to respiratory infections. Inadvertent use of antibiotics has led to the emergence of multidrug-resistant strains of *E. coli*, *Proteus*, *Klebsiella*, *Enterobacter,* etc., especially in the hospital

settings.[4] Optimal use of antibiotics in UTI can potentially reduce the risk of antibiotic resistance. Therefore, benefits of antibiotic use should be weighed against the potential for adverse effects both at individual and population levels (antibiotic resistance).[3] Control of antibiotic resistance is the need of the hour. In recent years, to promote the rational use of antibiotics and minimize the development of resistance, focus has shifted to the role of supportive drugs in UTI. Along with antibiotics, supportive drugs such as antipyretics, analgesics, antispasmodics, and urinary alkalizers are also part of the management.[5,6] A recent German study showed that the use of analgesics in UTI significantly reduced the duration of antibiotic use and also delayed the antibiotic prescription.[7,8] Very few studies have evaluated the pattern of supportive drugs in UTI. Although supportive drugs cannot replace antibiotics, appropriate choice of supportive drugs can play a crucial role especially in UTIs requiring hospitalization. This present study was done to evaluate the pattern of supportive drugs used in the management UTI in inpatients in a tertiary care hospital.

MATERIALS AND METHODS

Institutional Ethics Committee approval was obtained, and informed consent from the patients was taken before the start of the study, after explaining the procedure and purpose of the study. This was a prospective observational study. Inclusion criteria were any patient above the age of 18 years, of either gender with symptoms of UTI requiring hospitalization. A total of 80 patients who met the inclusion criteria were included in the study. The case records of these patients were assessed to know the pattern of supportive drugs used along with the main antibiotic therapy in the management of UTI. All the supportive drugs used during their entire hospital stay were recorded. Clinical and bacteriological outcomes were assessed at the time of discharge. The data were analyzed using descriptive statistics, namely mean and standard deviation.

RESULTS

Table 1 shows the demographic characteristics and nature of UTI of patients included in the study. The mean age of presentation was 51.25 ± 12.7 years with 58.8% females (*n* =

47) and 41.3% males (*n* = 33). Average duration of symptoms was 7.71 ± 3.9 days. Common symptoms included dysuria (*n* = 63, 78.8%), frequency (*n* = 42, 52.5%), and fever with or without chills (*n* = 37, 46.25 %). 58 patients (72.5%) had lower UTI, and 16 patients (20%) had upper UTI. 17 patients (*n* = 17, 21.25%) had history of recurrence.

The pattern of supportive drugs used is the patients during their hospital stay as shown in Table 2. Analgesics and antipyretics were the most common drugs used and included paracetamol (*n* = 32, 40%), diclofenac (*n* = 40, 50%), tramadol (*n* = 20, 25%), and aceclofenac (*n* = 6, 7.5%). 93% of the patients (*n* = 74) were treated with urinary alkalizers (potassium or sodium citrate). Antispasmodics such as flavoxate (*n* = 27, 34%), oxybutynin (*n* = 8, 10%), and darifenacin (*n* = 7, 8.75%), and alpha-blockers such as tamsulosin (*n* = 8, 10%), alfuzosin (*n* = 15, 18.75%), and doxazosin (*n* = 4, 5%) were used in a subgroup of patients.

Majority of the patients received proton pump inhibitors (*n* = 41, 51.25%), histamine antagonists (*n* = 22, 27.5%), antiemetics (*n* = 34, 42.5%), and sucralfate (*n* = 6, 7.5%) for the management of gastric distress. Hematinics (*n* = 9, 11.25%) and multivitamins (*n* = 11, 13.75%) were also used. The other class of drugs (*n* = 35, 44%) included the drugs used for the management of comorbidities in the patients such as antidiabetic drugs, anti-hypertensive drugs, drugs for benign prostate hypertrophy (BPH), and drugs for ischemic heart disease (IHD).

Table 3 shows the drugs prescribed for the patients at the time of discharge. Majority of the patients (*n* = 76, 95%) had complete symptom relief at the time of discharge. The average duration of hospital stay was 7.46 ± 2.27 days. The bacteriological cure was confirmed in 31 patients (38.75%). Drugs prescribed at the time of discharge included prophylactic antibiotics (*n* = 15, 18.75%) and cranberry products (*n* = 15, 18.75%) in patients with a history of recurrence. 30% (*n* = 24) who still had gastric distress were prescribed ranitidine (*n* = 10, 12.5%), pantoprazole (*n* = 8, 10%) or rabeprazole (*n* = 6, 7.5 %), and hematinics and multivitamins (*n* =18, 22.5%).

Commonly used antibiotics in these patients included second- and third-generation cephalosporins (Cefotaxime: 22, 27.5%; Ceftriaxone: 15, 19%; Cefoperazone: 12, 15%; and

Table 1: Demographic characteristics and nature of UTI in the patients			
Parameters	Male (*n*=33) *n* (%)	Female (*n*=47) *n* (%)	Total (*n*=80) *n* (%)
Mean age of presentation (years)	53.75±12.9	47±12.8	51.25±12.7
Average duration of symptoms (days)	7.94±3.2	7.55±3.9	7.71±3.9
Site of infection			
Upper urinary tract	13 (39.4)	3 (6.4)	16 (20)
Lower urinary tract	21 (63.6)	37 (78.4)	58 (72.5)
Both	4 (12)	2 (4.2)	6 (7.5)
History of recurrence	9 (27.3)	8 (17)	17 (21.25)

UTI: Urinary tract infections

Table 2: Supportive drugs used for the management of UTI

Category of drugs	Total (*n*=80) *n* (%)
Analgesics and antipyretics	
Paracetamol	32 (40)
Diclofenac	40 (50)
Aceclofenac	6 (7.5)
Tramadol	20 (25)
Urinary alkalizers	
(Potassium/sodium citrate)	74 (92.5)
Drugs to manage gastrointestinal disturbances	
Proton pump inhibitors	41 (51.25)
H2 receptor blockers	22 (27.5)
Sucralfate	6 (7.5)
Ondensetran	34 (42.5)
Antispasmodics	
Flavoxate	27 (33.75)
Oxybutynin	8 (10)
Darifenacin	7 (8.75)
Alpha-blockers	
Tamsulosin	8 (10)
Alfuzosin	15 (18.75)
Doxazosin	4 (5)
Hematinics	
Iron	3 (3.75)
Vitamin b12 and folic acid	6 (7.5)
Multivitamins	11 (13.75)
Others	35 (43.75)

UTI: Urinary tract infections

Table 3: Outcome and drugs prescribed at the time of discharge

Parameters assessed	*n* (%)
Outcome at the end of treatment	
Complete relief of symptoms	76 (95)
Bacteriological cure	31 (38.75)
Average duration of hospital stay	7.46±2.27
Drugs prescribed at the time of discharge	
Prophylactic antibiotics	15 (18.75)
Cranberry products	15 (18.75)
Drugs for gastric distress	
Ranitidine	10 (12.5)
Pantoprazole	8 (10)
Rabeprazole	6 (7.5)
Hematinics and multivitamins	18 (22.5)

Cefuroxime: 12, 15%) and fluoroquinolones (Ciprofloxacin: 10, 12.5%; Ofloxacin: 11, 14%; Levofloxacin: 4, 5%; and Norfloxacin: 7, 9%). Aminoglycosides (Amikacin: 14, 17.5%; Gentamicin: 10, 12.5%) were used in some cases as adjuvant antibiotics. Many patients received more than one antibiotic (combination therapy).

DISCUSSION

Although antibiotics are the mainstay of treatment in the management of UTI, the role of supportive drugs in the management cannot be ignored. Patients requiring hospital admission for UTI usually have severe symptoms at the time of presentation or have associated risk factors (complicated UTI). Analgesics and antipyretics (NSAIDS: Non-steroidal anti-inflammatory drugs, opioids), urinary alkalizers, antispasmodics, and acid-suppressants were the common drugs used for supportive management of the patients in this study. Most patients required a combination of two or more of the above-mentioned drugs during their hospital stay. Other drugs for management of comorbidities (diabetes, hypertension, Ischemic heart disease [IHD], and Benign prostatic hypertrophy [BPH]) do have a substantial role in the treatment of infection, especially complicated UTIs. Control of comorbidities has a direct impact on the elimination of infection and prevention of relapse.[9]

95% of the patients had complete symptom relief at the time of discharge. 39% of the patients attained bacteriological cure, in the rest of the patients' bacteriological cure could not be assessed as they were not willing to repeat urine culture after clinical cure. Some patients required prophylactic antibiotics (for recurrent UTI) at the time of discharge.

Very few studies have evaluated the pattern of supportive drugs in UTI, especially in the inpatients, to compare and contrast the findings in this study. However, there are few studies with a focus on NSAIDs in the management of UTI on an outpatient basis. A pilot study done by Gagyor *et al*. compared use of 3 days doses of ibuprofen (*n* = 248) with a single dose of fosfomycin (*n* = 243) in management of women with uncomplicated UTIs; results showed that a significant number of patients in the ibuprofen group could delay antibiotic prescriptions and required fewer antibiotic prescriptions; this would likely contribute directly for a decrease in antibiotic resistance.[3,8,10] Another study done by Kronenberg *et al*. compared diclofenac (*n* = 125) with norfloxacin (*n* = 118). The results showed that diclofenac was inferior to norfloxacin; however, diclofenac did reduce the antibiotic use.[3,11] Studies have shown that NSAIDs can delay progression of lower urinary tract symptoms (LUTS-storage, voiding, and incontinence symptoms). A study done by Gates *et al*. showed that use of over the counter NSAIDS in women and men with arthritis has a protective role in delaying progression of LUTS.[12,13] In the Olmsted County Study, NSAID use was inversely associated with the incidence of LUTS in men with no history of the urologic disease. LUTS is a common risk factor for UTI in advanced age both in men and women.[14,15]

Urinary alkalizers are commonly prescribed with antibiotics both in hospital and outpatient department settings. Urine alkalanization hastens symptom relief and also common antibiotics such as fluoroquinolones, penicillins, gentamicin,

and trimethoprim attain better urinary concentrations at alkaline pH and thus aids for better antimicrobial action.[6] Antispasmodics (flavoxate, oxybutynin, and darifenacin) and alpha-blockers (tamsulosin, alfuzosin, and doxazocin) may not be routinely used in UTI; they may be required in a subgroup of patients who had associated spasmodic pain due to urolithiasis, bladder neck obstruction, etc.[16,17] The criteria for the use of multivitamins could not be evaluated. Multivitamins are used randomly in many hospital settings, and the rationality for use remains unclear.[18]

Strength and Limitations

This is one of the very few studies evaluating supportive drugs for UTI in hospital settings. This study highlights the importance of supportive drugs in the treatment of UTI for a more effective and completes management. This study could pave the way for further study with a larger population with a more accurate objective assessment of clinical and bacteriological outcomes. The limitation of the study was that the bacteriological cure could not be assessed in all the patients as some of them were not willing to repeat urine culture after clinical cure.

CONCLUSION

From this study, we conclude that although antibiotics are the mainstay of treatment, supportive drugs also play a key role especially in the management of patients with UTI requiring hospital admission. Appropriate supportive drugs when used along with antibiotics, can have a potential for rapid symptom relief, hasten recovery, may reduce the duration of hospital stay thus aids for effective and complete management.

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