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EVALUATION OF ANTIBIOTIC PRESCRIPTION PATTERN IN IN-PATIENTS WITH URINARY TRACT INFECTION IN A TERTIARY CARE CENTRE

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Conflicts of Interest: Nil

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ABSTRACT

Background: An infection of the urinary tract (UTI) is the microbial invasion of the normally sterile urinary tract. It is among the most prevalent bacterial illnesses in the globe.
Goals and objectives: Our study's main objective was to evaluate the antimicrobial prescription trends among in-patients who were admitted with urinary tract infections.
Resources and methodology: In-patients over the age of 18 who were admitted to a medical college in Central India between August 2011 and July 2012 with a diagnosis of urinary tract infection were the subjects of this retrospective descriptive hospital-based study. The patient's case record files were used to gather all pertinent information, which was then analysed using descriptive statistics.
Results: Fluoroquinolones (54.6%) and cephalosporins (70.4%) were the most frequently prescribed antimicrobials. Ceftriaxone, the most often prescribed cephalosporin antibiotic, received 36.1% of prescriptions, followed by cefixime (16.5%) and cefoperazone (7.7%). Ciprofloxacin was the fluoroquinolone that was most often prescribed, with 40.8% of all prescriptions. Amoxicillin was the most frequently given antibiotic for expectant mothers.
Conclusion: Choosing the right antibiotic is crucial in this age of antimicrobial resistance. To provide the best care possible to patients with urinary tract infections, the treating physician should be knowledgeable about the uropathogens that are to blame as well as the local pattern of antibiotic resistance.

Keywords: Prescription, Antimicrobials, Urinary Tract Infection

Introduction

An infection of the urinary tract caused by bacteria is known as a urinary tract infection (UTI). It is among the most prevalent bacterial illnesses in the globe[1]. Direct expenditures associated with community acquired UTI to the US healthcare system total $1.6 billion annually. It is the third most frequent infection to present itself to our healthcare system in India[2-5]. More than one-third of females have at least one UTI episode in their lives. UTIs can be difficult to treat, not only because of the enormous number of cases they account for annually but also because it is not always easy to diagnose them. There are several different clinical entities associated with urinary tract infections, including urethritis, cystitis, and acute and chronic pyelonephritis[6]. They may manifest as asymptomatic bacteriuria, a severe or simple clinical infection, or both (ASB). In a healthy genitourinary tract without blockage or previous instrumentation, uncomplicated UTIs typically happen. E. coli (80%–85%) and Staphylococcus saprophyticus (10%–15%) are the two most common uropathogens associated with acute, uncomplicated UTIs. UTI is made more difficult by elements including advanced age, diabetes, spinal cord injury, and catheterization. When compared to uncomplicated UTI, the range of microorganisms that cause difficult UTI is wider. Therefore, it is essential to actively control UTI because, under some conditions, it

might result in chronic kidney damage (renal scarring) [7]. The absence of any complicating factors eliminates the need for additional testing to detect recurrent UTI. When a complex UTI is suspected, patients should have a urinalysis as well as culture and sensitivity testing done on the suspected uropathogen because the aetiology and susceptibility of the causative uropathogen are unpredictable in these circumstances. Treatment of complex UTIs can be exceedingly difficult due to a lack of well-designed clinical studies and an increasing prevalence of antibiotic resistance. The treatment of UTI involves the use of antibiotics extensively. However, improper use of antimicrobials has resulted in a worrying rise in the number of bacterial resistant strains, which in turn raises disease morbidity and treatment costs. When choosing a treatment plan, doctors should consider things like in vitro susceptibility, cost-effectiveness, selection of resistant strains, and side effects[8-10]. For the treatment to be safe and effective, this is crucial. Therefore, a more effective prescription and consequently a better treatment outcome will result from a periodic examination of pathogen prevalence, pattern of antibiotic consumption, and bacterial susceptibility. The therapeutic management of uncomplicated UTI has been compromised as a result of the rise in antibiotic resistance, and the therapeutic options for patients with severe UTI have also been restricted[11]. At the moment, non-antimicrobial preventative measures are being investigated. Widespread antibiotic resistance, particularly to extended-spectrum -lactams, carbapenems, and fluoroquinolones among uropathogens, has become a serious issue in many nations. This study's main goal was to identify the antimicrobial prescription trends among in-patients who were admitted with urinary tract infections.

Aim and Objective: To evaluate the antimicrobial prescription trends among in-patients who were admitted with urinary tract infections.

METHODOLOGY

This study, which examined patients in Central India who had been hospitalised with UTI, was retrospective and descriptive. The institutional ethics committee gave its clearance before the study could be carried out. The study included all in-patients of either gender over the age of 18 who were diagnosed with UTI between August 2011 and July 2012 and were admitted to a medical college in central India. Information was gathered from the patient's case record files, which were obtained from our hospital's medical records department. A proforma sheet was previously created and contained all pertinent information regarding the type of clinical presentation, demographic distribution, associated risk factors, co-morbid conditions, prescription pattern for antibiotics, and duration of administration. The study excluded patients under the age of 18, seriously ill patients, and those with insufficient case records.

STATISTICAL ANALYSIS

An excel spreadsheet was used to tabulate the pertinent information from the case record forms, and statistical analysis was conducted. Mean, frequency, and percentage descriptive statistics were used to analyse the data. The results were presented in tables and graphs. Making graphs and tables required the usage of Microsoft Excel.

RESULTS

520 case records in all were examined. According to our study, female patients (65%) had a higher risk of UTI than male patients (35%). In the age groups of 21 to 30 for females and 41 to 50 for males, UTI prevalence was higher in the former group. (Table 1)

Table 1: Distribution of males and females in specific age group

AGE GROUP	Female	Male
18-20 years	14 (4.1%)	6 (3.3%)
21-30 years	86 (25.4%)	24 (13.2%)
31-40 years	50 (14.8%)	16 (8.8%)
41-50 years	44 (13.0%)	40 (21.9%)
51-60 years	40 (11.8%)	34 (18.7%)
61-70 years	60 (17.8%)	22 (12.1%)
71-80 years	32 (9.5%)	22 (12.1%)
81-90 years	12 (3.6%)	18 (9.9%)
Total	338	182

Fever was the most typical presenting symptom, followed by dysuria, diarrhoea, nausea, and increased frequency of urination (table 2).

TABLE 2: CHIEF COMPLAINTS / PRESENTING SYMPTOMS

CHIEF COMPLAINTS	FREQUENCY(n)	PERCENT (%)
Dysuria	334	64.2%
Increased urinary frequency	178	34.2%
Fever	366	70.4%
Hematuria	6	1.2%
Urinary retention	18	3.5%
Nausea and vomiting	248	47.7%
Abdominal pain	136	26.2%
Urinary incontinence	20	3.8%
Generalised weakness	40	7.7%
Urgency	36	6.9%

In our analysis, the most frequent risk factor for complex UTI was diabetes mellitus. The postmenopausal age group, benign prostatic hyperplasia, recurrence, calculi, pregnancy, and catheterization are additional risk factors (figure 2). Only 436 of the 520 patients who underwent a culture sensitivity test. Cephalosporins (n=366, 70.4%) and fluoroquinolones (n=284, 54.6%) were the most frequently prescribed antimicrobials, followed by penicillins (n=94), nitrofurantoin (n=88), aminoglycosides (n=44), and cotrimoxazole (n=36). Ceftriaxone, the most often prescribed cephalosporin antibiotic, received 36.1% of prescriptions, followed by cefixime (16.5%) and cefoperazone (7.7%). Ciprofloxacin was the fluoroquinolone that was most often prescribed, with 40.8% of all prescriptions. In pregnant women, the most common antibiotic prescribed was amoxicillin. The mean duration of antibiotic treatment was found to be 10.38 days.

Table 3: Prescription pattern of antimicrobials in this study sample

ANTIMICROBIALS	FREQUENCY (n)	PERCENT (%)
Amikacin	44	8.5 %
Amoxicillin-clavulanate	12	2.3 %
Amoxicillin	12	2.3 %
Cefditoren	2	0.4 %
Cefixime	86	16.5 %
Cefixime + clavulanate	2	0.4 %
Cefoperazone + sulbactam	40	7.7 %
Cefotaxime	4	0.8 %
Cefpodoxime	12	2.3 %
Ceftazidime	2	0.4 %

Ceftriaxone	188	36.1 %
Ceftriaxone + sulbactam	4	0.8 %
Cefuroxime	20	3.9 %
Cephalexin	6	1.2 %
Ciprofloxacin	212	40.8 %
Cotrimoxazole	36	6.9 %
Crystalline penicillin	2	0.4 %
Doxycycline	16	3.1 %
Ertapenem	2	0.4 %
Faropenem	2	0.4 %
Imipenem	2	0.4 %
Levofloxacin	50	9.6 %
Linezolid	2	0.4 %
Meropenem	6	1.2 %
Metronidazole	26	5.0 %
Nitrofurantoin	88	16.9 %
Norfloxacin	14	2.7 %
Ofloxacin	4	0.8 %
Ornidazole	4	0.8 %
Piperacillin +tazobactam	68	13.1 %
Prulifloxacin	4	0.8 %
Tinidazole	6	1.2 %

DISCUSSION

An analysis of 520 case data revealed that 35% of them were male and 65% of them were female. This gender imbalance was also noted in a study by Martnez et al., where it was discovered that women experience UTI episodes twice as frequently as men do. Females are more likely to develop UTI due to shorter urethra, close closeness of the urethral meatus to the anus, and behavioural traits[7-10]. In our study, 86 of the 110 patients (n = 110) were female, and 24 were male. The majority of the patients (n = 110) were in the age range of 21 to 30 years. According to Table 1, the age groups 41 to 50 years (n=40) and 51 to 60 years (n=34) saw the majority of male UTI cases. Men's UTIs are typically caused by structural or functional issues with the genitourinary tract. Prostatic hypertrophy and genitourinary equipment are the two most typical UTI risk factors in men. Increased incidences of diabetes mellitus and prostate illness in males are to blame for the rise in UTI cases among the elderly. The most common presenting symptoms, accounting for 70.4% and 64.2% respectively, were fever and dysuria. Other symptoms include stomach discomfort (26.2%), generalised weakness (7.7%), urgency (6.9%), nausea and vomiting (47.7%), increased frequency of urination (34.2%), urine incontinence (3.8%), urinary retention (3.5%), and haematuria (1.2%). Similar findings were found in investigations by Prakasam et al. and Eshwarappa et al. Anatomically or functionally altered urinary systems can become infected with complicated UTIs. Complications from severe UTI are often accompanied by other disorders[11-13]. According to our study, diabetes mellitus was shown to be the condition most frequently linked to complicated UTI, as depicted in figure. This finding was equivalent to research by Prakasam et al. and Muraraiah et al. UTIs are more common in diabetic patients due to a number of factors, including increased bacterial adhesion to uroepithelial cells, glycosuria, and neutrophil dysfunction. Only 436 of the 520 patients who underwent a culture sensitivity test. Antimicrobials were empirically started in the remaining patients. The prescribing practises for antibiotics in our study sample are shown in Table 3. Cephalosporins (n=366, 70.4%) and fluoroquinolones (n=284, 54.6%) were the most frequently prescribed antimicrobials, followed by penicillins (n=94), nitrofurantoin (n=88), aminoglycosides (n=44), and cotrimoxazole (n=36). Ceftriaxone, the most often prescribed cephalosporin antibiotic, received 36.1% of prescriptions, followed by

cefixime (16.5%) and cefoperazone (7.7%). Ciprofloxacin was the fluoroquinolone that was most often prescribed, with 40.8% of all prescriptions. Ceftriaxone, cefotaxime, and ciprofloxacin were the most frequently prescribed antibiotics among in-patients with UTI, according to a study by Ramanath et al. Mahadevamma and colleagues' investigation produced similar findings. As long as UTI resistance doesn't exceed 10%, fluoroquinolones are the preferred antimicrobials, according to IDSA guidelines. The most widely used medications right now are first generation fluoroquinolones, especially ciprofloxacin and norfloxacin, due to their effective treatment of gramme negative bacilli and affordable price. But the prevalence of resistance among uropathogens has increased due to overuse of fluoroquinolones in prescriptions[14,15]. Prescriptions for nitroimidazoles made up 6.9% of the total. They were discovered to be given in conjunction with either or both beta lactam antibiotics and aminoglycosides. Microorganisms that are anaerobic and microaerophilic are highly selectively favoured by them. The majority of these antibiotics are highly concentrated in urine. Because urine's antimicrobial action is sufficient to get rid of the infection in lower UTIs, smaller than usual doses are needed. It was discovered that the average antibiotic therapy lasted 10.38 days. The least often administered medications in our analysis were tetracyclines (n=16), linezolid (n=2), and carbapenems (n=12). In addition, the prescription pattern for antibiotics during pregnancy was evaluated in our study. Amoxicillin was the antibiotic that was prescribed the most (n = 10) and the least (n = 2) was cefixime. Four pregnant women each received prescriptions for nitrofurantoin and ceftriaxone. All of the antibiotics that were prescribed to expectant mothers fell under FDA category B, which is regarded as safe[16]. Nitrofurantoin was found to be the most frequently prescribed antibiotic among pregnant women with UTI in a related study carried out in India. The majority of the time, urine culture and sensitivity reports came before the start of antimicrobial therapy. However, improper antimicrobial selection and administration will not only encourage antibiotic resistance but also lead to therapeutic failure. This will thus raise the disease's morbidity and the cost of treating it[17]. A worldwide and regional issue is the rise in antibiotic resistance. The use of antibiotics in Indian hospitals must now be rationalised immediately. Therefore, empirical therapy should always be based on knowledge of the aetiology and pattern of antibiotic resistance of uropathogens in the area.

CONCLUSION

A common ailment that frequently presents to our hospital is urinary tract infection. If not properly handled, complications may arise, which in turn raises the disease's morbidity. Urinary tract infections must be managed with the use of antibiotics. However, picking the right antibiotic is crucial in this age of antimicrobial resistance. Cephalosporins and fluoroquinolones were the most frequently recommended antimicrobials in our study. Ciprofloxacin was the fluoroquinolone antibiotic that was most frequently prescribed. Fluoroquinolones may have been widely and irrationally used in empirical medicine, which may have contributed to this antimicrobial resistance. In order to provide the best care possible for patients with urinary tract infections, it is crucial for a treating physician to be aware of the local patterns of antibiotic resistance and the causative uropathogens.

REFERENCES

1. Barber AE, Norton JP, Spivak AM, Mulvey MA. Urinary tract infections: current and emerging management strategies. Clin Infect Dis. 2013 Sep;57(5):719-24. doi: 10.1093/cid/cit284.
2. Foxman B. Epidemiology of urinary tract infections: incidence, morbidity, and economic costs. Am J Med. 2002 Jul 8;113 Suppl 1A:5S-13S.
3. Biswas D, Gupta P, Prasad R, Singh V, Arya M, Kumar A. Choice of antibiotic for empirical therapy of acute cystitis in a setting of high antimicrobial resistance. Indian J Med Sci. 2006 Feb;60(2):53-8.
4. Salvatore S, Salvatore S, Cattoni E, Siesto G, Serati M, Sorice P, et al... Urinary tract infections in women. Eur J Obstet Gynecol Reprod Biol. 2011 Jun;156(2):131-6. doi: 10.1016/j.ejogrb.2011.01.028.

5. Wilson ML, Gaido L. Laboratory diagnosis of urinary tract infections in adult patients. Clin Infect Dis. 2004 Apr 15;38(8):1150-8.
6. Kunin CM. Urinary tract infections in females. Clin Infect Dis. 1994 Jan;18(1):1-12.
7. Nicolle LE. Urinary tract infection: traditional pharmacologic therapies. Dis Mon. 2003 Feb;49 (2): 111 -28.
8. Ronald A. The etiology of urinary tract infection: traditional and emerging pathogens. Am J Med. 2002 Jul 8;113 Suppl 1A:14S-19S.
9. Franz M, Hörl WH. Common errors in diagnosis and management of urinary tract infection. I: pathophysiology and diagnostic techniques. Nephrol Dial Transplant.1999 Nov;14(11):2746-53.
10. Bader MS, Hawboldt J, Brooks A. Management of complicated urinary tract infections in the era of antimicrobial resistance. Postgrad Med. 2010 Nov;122(6):7-15.
11. Linhares I, Raposo T, Rodrigues A, Almeida A. Frequency and antimicrobial resistance patterns of bacteria implicated in community urinary tract infections:a ten-year surveillance study (2000-2009). BMC Infect Dis. 2013 Jan 18;13:19. doi: 10.1186/1471-2334-13-19.
12. Gupta K, Hooton TM, Stamm WE. Increasing antimicrobial resistance and the management of uncomplicated community-acquired urinary tract infections. Ann Intern Med. 2001 Jul 3;135(1):41-50.
13. Mathai D, Jones RN, Pfaller MA; SENTRY Participant Group North America. Epidemiology and frequency of resistance among pathogens causing urinary tract infections in 1,510 hospitalized patients: a report from the SENTRY Antimicrobial Surveillance Program (North America). Diagn Microbiol Infect Dis. 2001 Jul;40(3):129-36.
14. Nicolle LE. Update in adult urinary tract infection. Curr Infect Dis Rep. 2011 Dec;13(6):552-60. doi: 10.1007/s11908-011-0212-x.
15. Chen YH, Ko WC, Hsueh PR. Emerging resistance problems and future perspectives in pharmacotherapy for complicated urinary tract infections. Expert Opin Pharmacother. 2013 Apr;14(5):587-96. doi: 10.1517/14656566.2013.778827.
16. Martínez MA, Inglada L, Ochoa C, Villagrasa JR; Spanish Study Group On Antibiotic Treatments. Assessment of antibiotic prescription in acute urinary tract infections in adults. J Infect. 2007 Mar;54(3):235-44.
17. Hooton TM. Pathogenesis of urinary tract infections: an update. J Antimicrob Chemother. 2000 Aug;46 Suppl A:1-7.