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EVALUATION OF PRESCRIBING PATTERN OF ANTIBIOTICS FOR URINARY TRACT INFECTION IN A TERTIARY CARE HOSPITAL: A PROSPECTIVE STUDY

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ABSTRACT

Introduction: Urinary tract infections are one of the most common infectious disease seen worldwide and can lead to secondary infections. Most urinary tract infections are treated with broad spectrum antibiotics and sensitivity testing is done only for a limited number of people. Analysing antibiotics prescribing pattern is important to understand emerging antibiotic resistance seen in urinary tract infections causing organism. **Objective:** To study and analyse the prescription pattern of antibiotics used in the treatment of urinary tract infection. Methods: A prospective observational study was conducted for a period of 6 months using the data collected from the patient medical records in a tertiary care hospital. **Results:** We found that out of 114 cases, the most commonly prescribed antibiotic was Amikacin (26.31%) followed by Ceftriaxone (21.92%). Culture sensitivity testing was done only in 17.54% and the rest were treated empirically. The most common organism isolated was *E. coli* (45%) followed by *Klebsiella pneumonia* (25%). Dual therapy was seen among 37.71% of the sample population and the rest were treated with mono therapy. **Conclusion:** In this study, Aminoglycosides and Cephalosporins were most commonly prescribed. E.coli was the most prominent organism found in the study. Present findings suggest that periodic monitoring of antibiotic sensitivity pattern is necessary to provide optimal therapy. This is in correlation with the findings of the past studies.

KEYWORDS: Antibiotics, Urinary tract infections, Prescription pattern, Sensitivity.

INTRODUCTION

A Urinary Tract Infection (UTI) is defined as the presence of microorganism in the urine that cannot be accounted for by contamination. The organism have the potential to invade the tissue of the urinary tract and adjacent structures.[1] If left untreated, the infection can spread from the bladder to the kidneys causing kidney damage that can result in temporary or permanent reduction in kidney function. In severe cases, the infection can enter the bloodstream and affect other organs. In can also lead to kidney failure in patients with existing kidney problems or impaired kidney function.[2]

Epidemiological data shows that there is a spike in the occurrence of UTI in young women aged between 14-24 years old, which is the sexually active period in a women's life. The data also shows an upward trend in the reported cases of UTI in women aged 65 and above.[3] Comparatively, the incidence of UTI in males below 50 years is less than that of females where females are 30% more likely to get a UTI.[4] This is primarily because of anatomic differences, including shorter urethral length and moist peri-urethral environment in women.

The main organism responsible for uncomplicated UTI is Escherichia coli, Klebsiella pneumonia, Proteus Mirabilis, and occasionally Pseudomonas aeruginosa are the other Gram negative bacteria causing UTI. Gram positive bacteria such as Staphylococcus aureus and Streptococcus spp. can also lead to UTI.

Most UTI are treated with broad spectrum antibiotics and sensitivity testing is done only for a limited number of people. Aminoglycosides, penicillins and cephalosporins are the most commonly prescribed drugs in treating uncomplicated UTI. Analysing the prescribing patterns of antibiotics in treating UTI is a fundamental step in understanding the emergence of bacterial resistance and the management of UTI.

MATERIALS AND METHODS

A prospective observational study was conducted among inpatients in general medicine, obstetrics and

gynaecology and surgery departments of a tertiary care hospital for a period of 6 months.

Inclusion criteria

- Patients of either sex of age group 18-80 years.
- Patients treated with antibiotics.

Exclusion criteria

- Patients visiting departments other than OBG, general medicine, surgery and urology
- Patients with incomplete medical records
- Comatose patients.

Sources of data: Patient case sheet, lab reports, medication chart.

Study procedure

The patients were selected based on the inclusion criteria and their case sheets, medication charts and lab reports were analysed and recorded in a well structured data collection form.

Statistical analysis

Descriptive statistical analysis has been carried out in the present study.

RESULTS

Among the 200 patients, 114 patients were enrolled in the study based on the inclusion criteria of which 39(34.21%) were male and 75(65.78%) were females (Fig. 1).

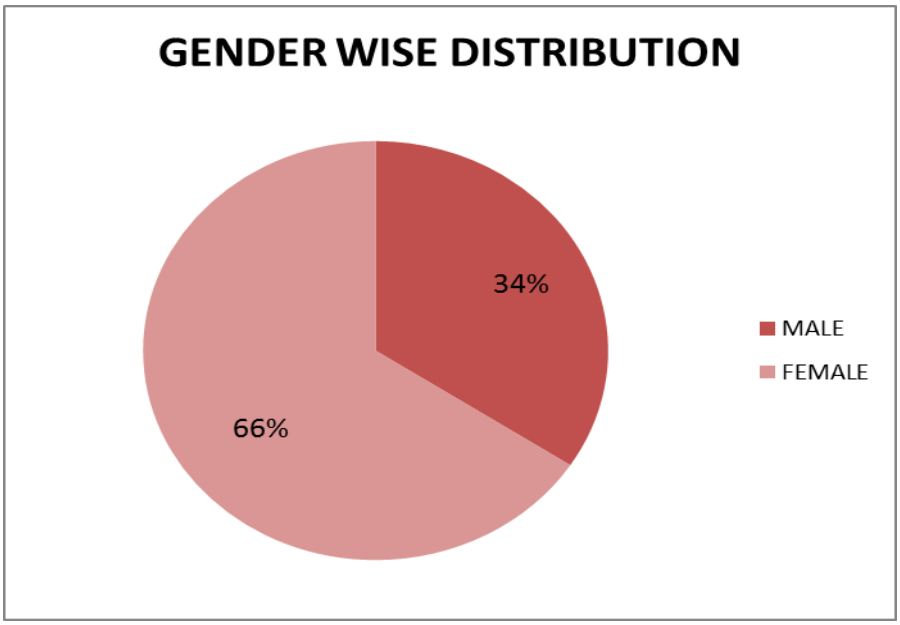

Fig. 1: Gender- Wise Distribution.

Most of the male patients were from the age group of 61-70 years (28.2%) and females were from 21-30 years (26.66%) (Table 1).

Table 1: Gender- Wise Distribution.

AGE IN YEARS	MALE		FEMALE		TOTAL	
	N	%	N	%	N	%
18-20	0	0	9	12	9	7.89
21-30	2	5.12	20	26.66	22	19.29
31-40	7	17.94	16	21.33	23	20.17
41-50	4	10.25	8	10.66	12	10.52
51-60	5	12.82	6	8	11	9.64
61-70	11	28.2	8	10.66	19	16.66
71-80	10	25.64	8	10.66	18	15.78
TOTAL	39	100	75	100	114	100
MEAN±SD	5.57±4.03		10.71±5.18		16.28±5.58	

Type 2 diabetes mellitus and hypertension were the most common co-morbidities accounting for 28.07% and 22.8% respectively (Fig. 2).

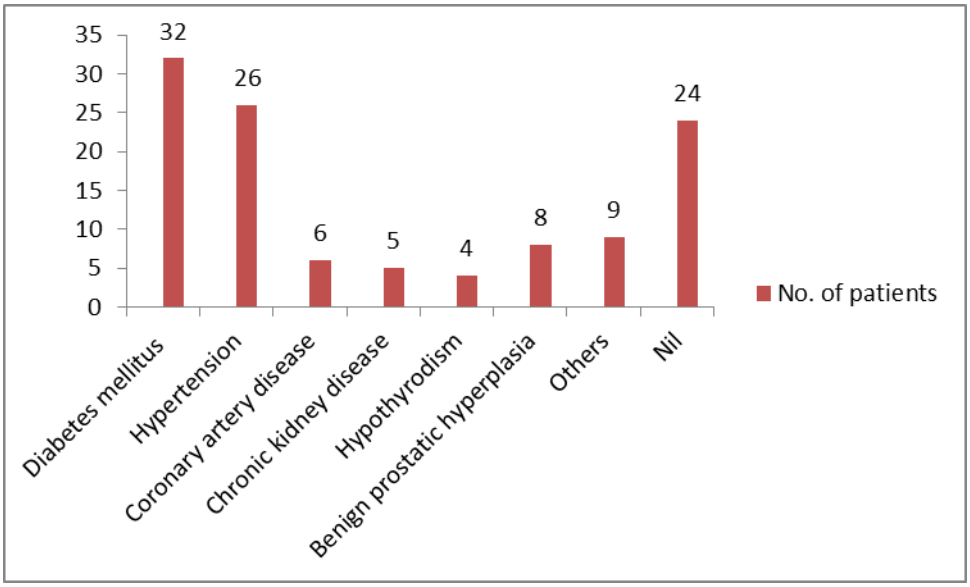

Fig. 2: Co-Morbidites.

Out of 114 patients the culture sensitivity test was done for only 29 patients and the rest were treated empirically. Of these, 9 patient specimens were sterile and the rest 20 showed growth of different organisms. Most common isolated organisms were *E. coli* (45%) and *Klebsiella pneumonia* (25%) (Fig. 3).

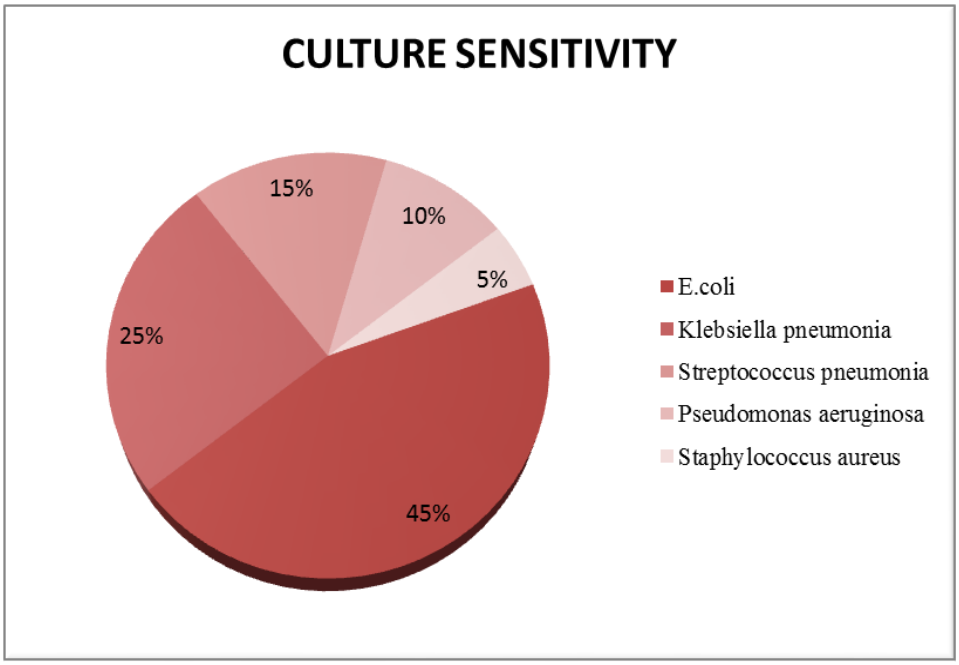

Fig. 3: Percentage of Microbes Obtained From Urine Culture.

Out of 200 UTI cases only 114 were prescribed with antibiotics. Among these 70 prescriptions had mono therapy and 44 prescriptions were dual therapy (Fig. 4).

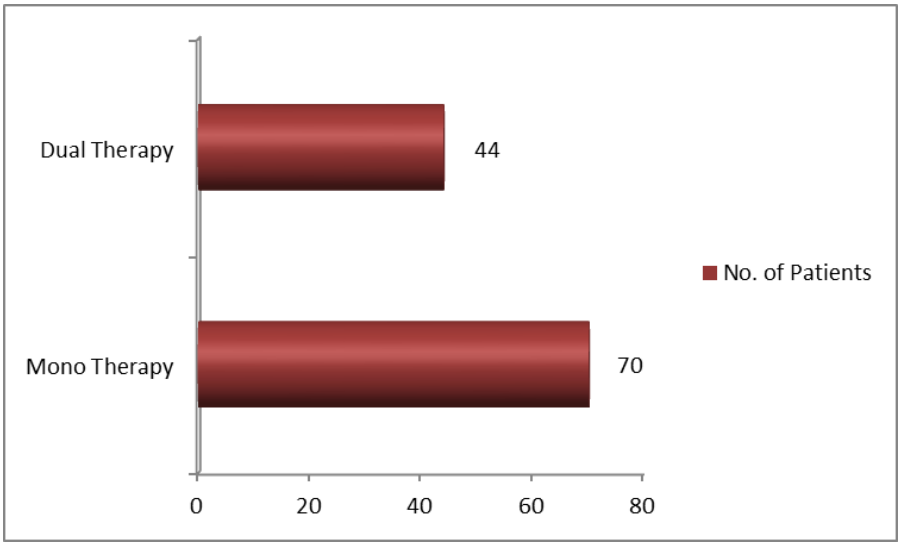

Fig. 4: Distribution of Dual and Mono Therapy

Amikacin (26.31%) was the most commonly prescribed antibiotic followed by ceftriaxone (21.92%) as these have good spectrum of activity and were indicated in many culture sensitivity report (Table 2 and Fig. 5).

Table 2: Distribution of Antibiotic According To Age Group.

DRUGS	18-20	21-30	31-40	41-50	51-60	61-70	71-80	TOTAL	%
Amoxicillin + Clavulanic Acid	3	0	8	0	0	3	0	14	12.28
Amikacin	3	5	12	5	2	2	1	30	26.31
Piperacillin + Tazobactam	0	0	0	0	0	5	0	5	4.38
Ciprofloxacin	2	0	0	0	0	3	4	9	7.89
Nitrofurantoin	3	9	2	1	0	0	2	17	14.91
Cefotaxime + Sulbactam	0	0	0	0	1	1	5	7	6.14
Ceftriaxone	1	8	5	7	0	2	2	25	21.92
Norfloxacin	0	2	0	0	4	1	0	7	6.14
Others	0	13	10	5	8	11	13	60	52.63

*Others: Cefuroxime, Amoxicillin, Doxycycline, Cefotaxime, Cefazolin, Ampicillin, Gentamicin, Metronidazole

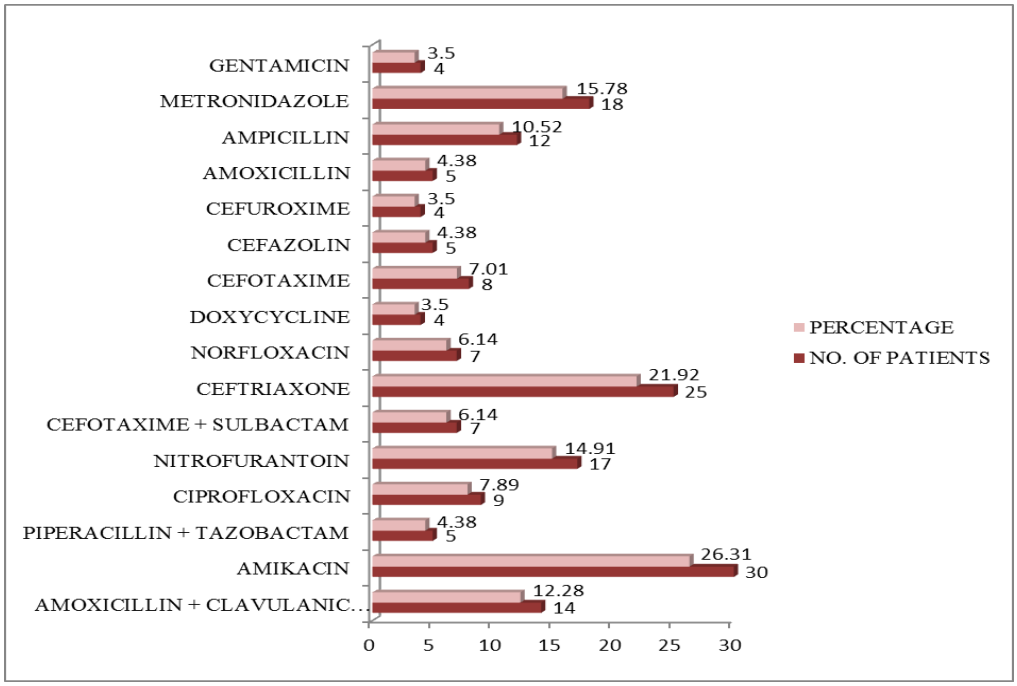

Fig. 5: Distribution of Antibiotic Utilization.

DISCUSSION

The main objective of the study was to evaluate the prescribing pattern of antibiotics in UTI in a tertiary care hospital. Analysing prescribing patterns of antibiotics is necessary to provide better disease management and improve therapeutic outcome. Study of antibiotic prescribing patterns can also help to identify irrational or inadequate prescription.

The study showed that out of 114 patients females were more likely to get UTI, comprising of 65.78%, than males which constitute only 34.2% (Fig. 1). Similar observations were found in the study conducted by Ramanath KV *et al.*[5]. The age group of the patients selected for the study is 18-80 years, out of this most females belonged to the age group of 21-30 which was consistent with the findings of Ramanath KV *et al.*[5], while males belonged to the age group of 71-80 which was similar to the findings of Gidamudi *et al*[6] (Table 1).

In this study, out of all the UTI cases diabetes mellitus and hypertension were the most common co-morbidities seen, accounting for 28.07% (32 cases) and 22.8% (26 cases) respectively. Other co-morbidities include benign prostate hyperplasia (7.01%), coronary artery disease (5.26%), chronic kidney disease (4.38%), hyperthyroidism (0.34%) and others (7.89%). The number of UTI only cases accounted for 21.05% (24 cases) (Fig. 2).

Culture sensitivity was done for 29 cases, of which 9 were sterile and the rest 20 showed positive bacterial growth. Of these the commonly isolated organism was *E.coli* (45%) followed by *Klebsiella pneumonia* (25%) which was similar to the findings of P. Behzadi *et al*[7] and Gidamudi *et al*[6]. Other organisms identified were *Streptococcus pneumonia* (15%), *Pseudomonas* aeruginosa (10%) and Staphylococcus aureus (5%) (Fig. 3).

Most of the cases were treated with Monotherapy which accounts for 61.40% (70 cases) and the rest 38.59% were treated with Dual therapy (44 cases) (Fig. 4).

The most commonly prescribed antibiotic was found to be Amikacin followed by Ceftriaxone which accounts for 26.31% (30 cases) and 21.92% (25 cases) respectively which was similar to the observations of Panayappan *et al.*[8] This was closely followed by Nitrofurantoin (14.91%), Ciprofloxacin (7.89%), Norfloxacin and Cefotaxime-Sulbactam (6.14%), Piperacillin – Tazobactam (4.38%) and Others (52.63%) (Fig. 5 and Table 2).

CONCLUSION

The most commonly prescribed antibiotics in this study were Amikacin and Ceftriaxone. Culture sensitivity testing was done only in a few cases and the rest were treated empirically. The most common organism isolated was *E. coli* followed by *Klebsiella pneumonia*. Dual therapy was seen among 38.59% of the sample population and the rest were treated with mono therapy. Analysing antibiotics prescribing pattern is important to understand emerging antibiotic resistance seen in UTI causing organisms. Present findings suggest that periodic monitoring of antibiotic sensitivity pattern is necessary to provide optimal therapy. This is in correlation with the findings of the past studies.

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CONFLICT OF INTEREST: All authors declare that there is no conflict of interest regarding the publication of this manuscript.

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