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Drug Utilization and Prescribing Pattern of Antimicrobial in Surgical Wards of Tertiary Care Teaching Hospital

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ABSTRACT

Antibiotics are powerful and effective drugs in fighting against infectious diseases caused by bacteria and have been frequently used worldwide for effective treatment of a variety of bacterial infections. Infection is the cause for poor prognosis. Antibiotics are so commonly prescribed in surgical wards for prophylactic use or post operatively to control the infections. Present drug utilization evaluation study plays an important role in identifying the prescription pattern among the patients which helps in improvement of the appropriate and effective use of antibiotics. Hence the present study had been planned to evaluate prescribing pattern of antibiotics in surgical wards. The present study had been conducted in collaboration with department of surgery in a tertiary care teaching hospital. Data was collected from the medical record section and they were analysed with a study period of 6 months from Feb 2018 to July 2018 after approval from IEC with sample size of total no of patients n=330. Prescription Analysis of 330 patients had been done based on type and duration of antibiotics prescribed. The other parameters noted were Antibiotics prescribed commonly for prophylaxis or treatment, duration of hospital stay. Data was analysed using statistical software graph pad prism. Statistical analysis done for type of Antibiotics prescribed commonly for prophylaxis or treatment. Here most commonly used was third generation Cephalosporins, Metrogyl, Penicillin's and amino glycosides in mono or combination therapies. The current study could assess the prescribing pattern of antibiotics (as per the guidelines of WHO). Most commonly prescribed antibiotic in the study population was third generation Cephalosporins, an audit of antibiotic prescribing patterns is an important indicator of the quality and standard of clinical practice.

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Key Words

Drug utilization, antibiotic resistance, prophylaxis, treatment, cephalosporins

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INTRODUCTION

Drug Utilization Evaluation (DUE), is defined as an authorized, structured, ongoing review of healthcare provider prescribing, pharmacist dispensing and patient use of medication to ensure appropriate medication decision making and positive patient outcomes[1]. Drug therapy is one of the major components of patient management in healthcare settings which includes primary healthcare[2]. DUE has been recommended as a method for identifying inappropriate or unnecessary drug use to monitor, evaluate and promote rational drug therapy, an audit of antibiotic prescribing patterns is an indicator of the quality and standard of clinical practice. Several factors like irrational drug use, polypharmacy, incorrect dose, incorrect drug choices, drug interactions, have contributed to increased morbidity, mortality and health care. Drug utilization evaluation can be divided into descriptive and analytical with the ultimate goal to assess whether drug therapy is rational or not. Once irrational drug use in its various forms is determined, feasible means of intervention are tried with the hope to improve drug use[3]. Excessive prescription of antibiotics not only increases the burden of antibiotic resistance but also exposes patients to the side effects and increases the treatment costs[4]. World Health Organization recognized that an antibiotic resistance was a serious phenomenon, which has emerged due to the pervasive prescription of antibiotics in practice and most of the alternatives, i.e., second-and third-line agents are becoming ineffective in clinical practice[5]. Information about antibiotic use patterns is necessary for a constructive approach to problems that arise from the multiple antibiotics available[6]. The key action by the clinician should be the provision of a specimen for accurate identification of the offending pathogen by means of culture and sensitivity method[7]. The unnecessary use of antibiotics has imposed a huge burden on the patients, with this basis the present study had been planned to assess the drug utilization evaluation of antibiotics in tertiary care teaching hospital.

Objectives:

- To evaluate the prescribing patterns of antibiotics in the surgical wards.
- To assess the use of antibiotics for prophylactic and post-surgical purposes.

MATERIALS AND METHODS

Study Setting and Duration: This study was designed as a retrospective observational analysis aimed at evaluating the utilization and prescribing patterns of antimicrobial agents in the surgical wards of Gandhi Hospital, Secunderabad, Telangana. Gandhi Hospital is a 2000-bedded, multi-specialty tertiary care teaching hospital, one of the largest in the region, catering to a wide range of surgical cases, making it an ideal setting for this study.The data was collected over a six-month period, from February 2022 to July 2022.

Study Population and Inclusion Criteria: The study focused on postoperative patients who underwent surgery for specific conditions, including:

- Appendicitis
- Cellulitis
- Diabetic Foot Ulcer
- Hernia
- Hydrocele

These conditions were selected based on the frequent use of antibiotics for infection management and prevention in postoperative care. The study included 330 patients, selected based on the following criteria:
Patients aged 18 years and above.
Postoperative patients prescribed antimicrobial agents.
Those who underwent surgery for one of the targeted conditions during the study period.

Exclusion Criteria: Patients younger than 18 years, those who were not prescribed antibiotics, or whose medical records lacked essential information were excluded from the study.

Ethics Approval: Prior to initiating the study, ethical approval was obtained from the Institutional Ethics Committee of Gandhi Hospital, ensuring compliance with ethical standards and patient confidentiality throughout the research process.

Data Collection Procedure: Data was retrieved from the medical records department of the hospital. The case sheets of the included patients were reviewed, and key information was extracted. The data collection sheet was designed to capture the following parameters:

Demographics: Age, gender, co-existing medical conditions.

Surgical Details: Type of surgery, duration and any postoperative complications.

Antibiotic Use: Details of antibiotics prescribed, including the type, dosage, frequency, duration of therapy and route of administration.

Adverse Drug Reactions (ADRs): Any reported adverse effects associated with antibiotic use during the postoperative period.

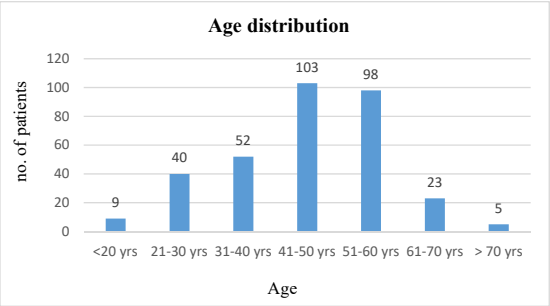
Data Management and Analysis: The collected data was systematically organized and tabulated for ease of analysis. Descriptive statistics were used to summarize the data, with key findings presented as frequencies

and percentages. Antibiotic prescribing trends were evaluated based on the type of surgery performed, with a focus on identifying the most commonly used classes of antibiotics and assessing their alignment with standard treatment guidelines. Further statistical analysis was conducted to determine any significant differences in antibiotic use across the different surgical procedures, where applicable. The analysis also explored potential correlations between patient demographics, surgical details and antibiotic prescribing patterns.

Outcome Measures: The primary outcome of the study was the pattern of antibiotic prescribing, including the most frequently prescribed antibiotics and their appropriateness based on clinical guidelines. Secondary outcomes included the incidence of ADRs and variations in antibiotic use based on the type of surgery and patient demographics.

RESULTS AND DISCUSSIONS

The Statistical analysis shows that the type of Antibiotics had been prescribed commonly for prophylaxis or treatment in surgical wards. Age, gender wise distribution of patients, class of antibiotics and type of treatment used were shown in respective figures.



Majority of patients received antibiotics were in the age group of 41-50 years (n=103) followed by 51-60 years (n=98), 31-40 years (n=52), 21=30 years (n=40), 61-70 years (n=23), <20 years (n=9), >70 years (n=5).

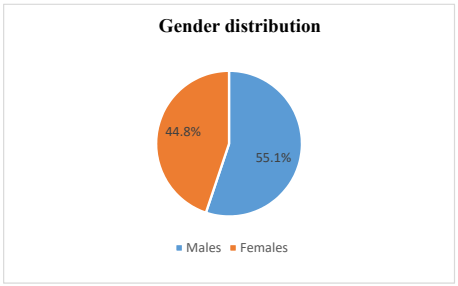


Fig. 2: Gender Wise Distribution

Among 330 patients, most of the patients' received antibiotics were males (55.1%) than females (44.8%).

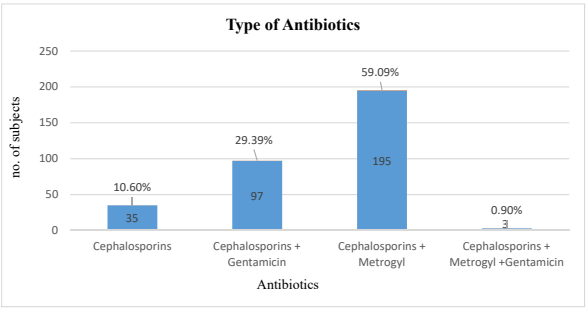


Fig. 3: Class of Antibiotics

Majority of patients received combination of cephalosporins+metrogyl (59.9%) followed by cephalosporins+gentamicin (29.39%) and cephalosporins (10.60%), cephalosporins + metrogyl +gentamicin (0.90%).

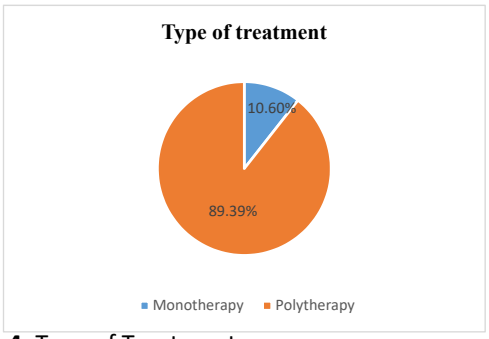


Fig. 4: Type of Treatment

Most of the patients in surgical ward received Polytherapy (cephalosporins+metrogyl+gentamicin 89.39%) than the Monotherapy (only cephalosporins 10.60%) treatment. Among 330 patients the most commonly used was 3rd generation Cephalosporins, Metrogyl, Penicillin's and amino glycosides respectively in mono or combination therapy.

The present study had been planned to identify prescribing pattern of antibiotics, comparison. Drug utilization research facilitates the rational use of drugs and suggests a way to improve prescribing patterns. Research and evaluation of antibiotic utilization and antibiotics cost plays an important role in identifying the extent, quality, necessity and outcome of antibiotic use. In our study antibiotics are used to cover before and after for different types of surgeries. Current study results showed that majority of patients received antibiotics were in the age group of 41-50 years (n=103), which was contrast to Samreen UA *et al*, showed patients were in the age group of 51-60 years (115 patients (26.80%))[8] and Akhilesh *et al,* which showed the age group of 20-30 years (95 patients (29.6%)) in their study[9]. In present study among 330

patients, most of the patients received antibiotics were males (55.1%) than females (44.8%), which was similar to the study done by Bhansali *et al*, showed (60%) of patients were male[10] and Ali *et al,* who concluded that (58.85%) of patients were male[11]. Majority of patients received combination of cephalosporins+metrogyl (59.9%) followed by cephalosporins+gentamicin (29.39%) and cephalosporins (10.60%), cephalosporins +metrogyl+gentamicin (0.90%) showed from the current study data, which was comparable to the study conducted by Prashanth *et al*, which showed ceftriaxone a third generation cephalosporins (22.94%), second most common being metronidazole (11.83%)[12]. Most of the patients in surgical ward received Polytherapy (cephalosporins+metrogyl+ gentamicin 89.39%) than the Monotherapy (only cephalosporins 10.60%) treatment. The third generation cephalosporins have much expanded gram-negative activity. Cefixime, cefoperazone, cefotaxime, cefpodoxime, ceftibuten, ceftriaxone are the most commonly used antibiotics in our study, which were remarkably safe class of antibiotics and usually cause few adverse effects. Hence, the present study results states that cephalosporins are the most commonly prescribed and safe drugs for prophylaxis and post-surgery.

CONCLUSIONS

The study describes the prescribing pattern of antibiotics, either for the prophylaxis, or for the treatment of different types of surgeries in surgery department. Most commonly prescribed antibiotics in the study population was third generation Cephalosporins, Metrogyl, Piperacillin/tazobactam followed by Augmenting, Amino glycosides. Cost evaluation of medication therapy under same title can also be performed for post-operative patients for avoiding unnecessary costing of medication in private setup.

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