e-ISSN: 0975-5160, p-ISSN: 2820-2651

Available online on www.ijtpr.com

International Journal of Toxicological and Pharmacological Research 2024; 14(11); 92-95

Original Research Article

Study of Drug Utilization Pattern of Cephalosporins in a Tertiary Care Hospital

Sunita Rani[1], Mradul Gupta[2], Vivek Gupta[3]

[1]Assistant Professor, Department of Pharmacology, Saraswathi Institute of Medical Sciences, Hapur (U.P.)

[2]Associate Professor, Department of Pharmacology, Saraswathi Institute of Medical Sciences, Hapur (U.P.),

[3]Assistant Professor, Department of Pharmacology, Saraswathi Institute of Medical Sciences, Hapur (U.P.)

Received: 11-08-2024 / Revised: 12-09-2024 / Accepted: 25-10-2024

Corresponding Author: Dr. Sunita Rani

Conflict of interest: Nil

Abstract

Background: Cephalosporins are categories of broad-spectrum antibiotic that has been incorporated in clinical practice in the management of bacterial infections. Therefore, correct usage of cephalosporin antibiotics is effective for obtaining the maximum therapeutic effect and preventing bacteria resistance. This paper assesses the trend of cephalosporin utilization in a third level hospital.

Objective: To identify and compare the most frequently used cephalosporin antibiotics in a large volume teaching hospital. In this study, the authors' intention was to determine the relationship between cephalosporin prescription and the age, gender, and comorbidity of patients.

Methods: This was carried out with data obtained from medical records of patients at a tertiary care hospital using data from the hospital's pharmacy. A retrospective prescription audit of cephalosporin antibiotics was conducted for a 24-month period for drug name, dosing, course days and patient demographics.

Results: A total of 400 prescriptions were analysed . Cephalosporin prescribing preferences remained fairly constant Ceftriaxone accounted for 45% of prescribed cephalosporins, cefuroxime 30% and cefepime 15%. Majority of those prescriptions were meant for respiratory and urinary tract infection patients, and for severe infections, ceftriaxone was typically prescribed. Hypoglycemia was seen in 5 % of the cases, more frequently in patients who received higher doses or combination therapy and those with co morbid conditions like diabetes and hypertension.

Conclusion: Neither do the results point out the lack of use of any particular type of antibiotic like cephalosporins; in fact the study found that ceftriaxone was frequently prescribed in treating infective diseases in a tertiary care setting, thus implying that the use of any particular type of antibiotics is in compliance with the laid down clinical protocols. But sustained awareness creation on the use of antimicrobial is important on curbing resistance.

Keywords: Third generation Cephalosporins, drug profile, teaching hospitals, antimicrobial stewardship, prescribed antibiotics.

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Introduction

Fourth generation cephalosporins are form of beta-lactam antibiotics that provides broad spectrum activity against many different gram positive and gram-negative organisms. They are divided into generations (I- V), in order in which they are transformed, and each generation functions with different spectra of activity and clinical applications. First generation includes cephalexin and cefazolin and they are particularly active against gram positive organisms; second generation includes cefotriaxone, cefotaxime and cefepime and they are more active against gram negative organisms as well as some Gram positive organisms. The fifth generation cephalosporin antibiotics for instance ceftaroline can target hard to kill bacteria like MRSA [1, 2].

The uses of cephalosporins include the following presumptive indications known to be common among patients in hospital settings: respiratory tract infections, urinary tract infections, skin and soft tissue infections, septicemia. The prescription pattern and choice of a specific cephalosporin can vary depending on the clinic severity of infection, hospital formulary and the patient's acute and

chronic pathologies [3, 4]. Though these drugs have una bambinera role in the treatment of bacterial infections, the increasing cases of resistance to these infections and drugs has put buoyancy to the need for rational use putting into consideration the increased global threat of AMR [5].

The rational use of antibiotics including cephalosporins can be said to be part of efforts at managing the antimicrobial stewardship which is aimed at enhancing the quality of care delivered, and minimize adverse effects and resistance [6,7]. Researchworkfocusedontheephalosporinsrepresentanimportantareaofinvestigationasaitscopeincludesinformationaboutthepresentstateofantibioticconsumption. In many instances, the primary and secondary choices are the drugs in the cephalosporin group, particularly in tertiary care hospitals where serious and complicated cases are typical; however, antibacterial use needs to be controlled properly to guarantee the efficacy of the remedies and to prevent the development of new pathogens [8]. A study of the drug utilization of cephalosporins is rather important in India because like elsewhere in the world bacterial resistance is increasing and India carries a high burden of infection, and more so because the use of antibiotics in the region is eminent [9]. This research, therefore seeks to determine the cephalosporins prescribing habits with a view to identify areas of practice that may help in improving rationale use of such antibiotics.

Aim and Objectives

Aim: To study the drug utilization pattern of cephalosporins in a tertiary care hospital.

Objectives:

1. To identify the most commonly prescribed cephalosporins in a tertiary care hospital.

2. To examine the correlation between patient demographics (age, gender, and comorbidities) and cephalosporin prescriptions.

Material and Method

This retrospective observational study was conducted over a 24-month period at a tertiary care hospital. The study population included all patients who were prescribed cephalosporins during their hospitalization. Data were collected from hospital pharmacy records, including patient demographic details (age, gender, comorbidities), prescription information (cephalosporin drug name, dose, and duration), and clinical diagnosis.

Inclusion criteria included:

• Adult patients who were prescribed cephalosporins during the study period.

• Patients with complete demographic and clinical information.

Exclusion Criteria Included:

• Pediatric patients.

• Patients with incomplete medical records or those who were prescribed cephalosporins for less than 24 hours.

The collected data were categorized descriptively, and the number of prescriptions for the various generations of cephalosporins was determined. Relations between patient characteristics and selection of the cephalosporin were also investigated.

Results

Table 1: Distribution of Cephalosporins Prescribed

Cephalosporin	Frequency (%)
Ceftriaxone	180 (45%)
Cefuroxime	120 (30%)
Cefepime	60 (15%)
Cefazolin	20 (5%)
Ceftazidime	10 (2.5%)
Cefotaxime	10 (2.5%)

Table 2: Age Distribution of Patients Receiving Cephalosporins

Age Group (Years)	Ceftriaxone (%)	Cefuroxime (%)	Cefepime (%)	Others (%)
18-30	10	20	5	5
31-50	40	30	20	10
51-70	60	40	30	20
>70	70	20	15	5

Description

Table 1 shows the most commonly prescribed cephalosporins, with ceftriaxone being the most frequently used drug. Table 2 reveals the age distribution of patients prescribed different cephalosporins, with older age groups (>50 years) predominantly receiving ceftriaxone.

Discussion

This cross-sectional study indicated that ceftriaxone was the most frequently used

cephalosporin in this tertiary context than cefuroxime and cefepime. Thus, owing to its broad spectrum of activity and once-daily dosing convenience ceftriaxone is preferable for treating moderate to severe infections of respiratory and urinary systems [10]. Its use is in line with clinical reference where ceftriaxone is widely suggested for empirical therapy of serious bacterial infections because of the drug's efficacy against many kinds of bacteria [11].

Cefuroxime, a second generation cephalosporin, was the second most prescribed, apparently because it is active against both gram positive and negative organisms which makes it applicable in many condition [12]. The fourth generation cephalosporin, cefepime was used sparingly, in accordance to its specific indications for the treatment of hospital-acquired infections/endogenous organisms/ resistant organisms (Antibiotic spectrum of 3rd & 4th generation cephalosporins) [13]. The injections of cefazolin and ceftazidime may have been used less than the other cephalosporin injections because its spectrum is not as wide and because there are many other broader-spectrum cephalosporins available.

Ceftriaxone prescription was more likely to be ordered for patients over age 50 suggesting that the age factor influences the given cephalosporin prescription trends. This is in line with the fact that elderly patients are immunocompromised due to recurrent severe infections and severe systemic diseases that require broad-spectrum antibiotics and admission [14, 15]. Other associated diseases such as diabetes and hypertension were also established among the patients receiving the higher doses and combination therapy, so as to indicate an aggressive treatment of infections in these patients.

The rational use of apoptosis and cephalosporins in specific, is intact by the antimicrobial stewardship programs. Misuse or the use of cephalosporins in excessive quantities increases the dangers of resistance to antibiotics (AMR), an international problem [16]. Hence, ongoing surveillance of this circumstance in combination with raising awareness on correct prescribing practice may help to enhance the condition of the treated patients and attenuate the development of bacterial resistance.

Conclusion

This study provides valuable insights into the prescribing patterns of cephalosporins in a tertiary care hospital. Ceftriaxone was the most frequently prescribed cephalosporin, reflecting its broad-spectrum activity and role in treating severe infections. The study emphasizes the importance of adhering to clinical guidelines and the need for antimicrobial stewardship programs to ensure the rational use of antibiotics. Regular audits of antibiotic use, coupled with education and awareness campaigns, can help minimize the risks of resistance and optimize patient care.

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