IJLSR (2015), Vol. 1, Issue 6 **Research Article**

IJLSR INTERNATIONAL JOURNAL OF LIFE SCIENCES AND REVIEW

Received on 13 May 2015; received in revised form, 23 June 2015; accepted, 28 June 2015; published 30 June 2015

A STUDY ON PRESCRIPTION PATTERN OF CEFTRIAXONE IN GENERAL MEDICINE DEPARTMENT OF A SOUTH INDIAN TEACHING HOSPITAL

C. Suhas Reddy * [1], Binai K. Sankar [1], H. Ambujakshi [2], Rajat Rana [1], Nawaz Mohammed [1] and Uma Maheshwari [3]

Department of Pharmacy Practice [1], Department of Pharmacognosy [2], Acharya & B. M. Reddy College of Pharmacy, Hessaraghatta, Bangalore - 560107, Karnataka, India.
Department of Pharmaceutical Analysis [3], Teegala Rami Reddy College of Pharmacy, SaroorNagar, Hyderabad - 500079, Telangana, India.

ABSTRACT: A prospective observational study was conducted to assess the prescribing pattern of ceftriaxone and to determine the indication for which ceftriaxone prescribed in a general medicine department of a south Indian teaching hospital. A total of 200 prescriptions were collected, collated, and analyzed from the general medicine department for 6 months. Out of 200 study population included in the study, the majority are males. The frequent condition for hospitalization and for which the ceftriaxone was prescribed was respiratory tract infection. The defined daily dosage was proper for 182 patients, and average DDD of ceftriaxone was 2.06. The average total cost incurred for Ceftriaxone per patient was found to be Rs.654.64, for an average of 2.32 days. The prescriber should follow the standard treatment guidelines for improving rational use and to prevent the development of resistance. The specificity of the prescribing pattern of ceftriaxone was more; it means specific therapy was more than empirical therapy. The hospital was largely in compliances with WHO DDDs. The duration of use of ceftriaxone is according to the guidelines.

Keywords: Average cost, Ceftriaxone, Defined daily dose, Prescription pattern

Correspondence to Author:
Dr. C. Suhas Reddy

Department of Pharmacy Practice, Acharya & B. M. Reddy College of Pharmacy, Hessaraghatta, Bangalore - 560107, Karnataka, India.

E-mail: suhasreddy1989@gmail.com

INTRODUCTION: Ceftriaxone is a third generation Cephalosporins, with the bactericidal mechanism of action, which is inhibition of bacterial cell wall synthesis [1]. Due to its high antibacterial activity, the extensive spectrum of activity and low potential for toxicity ceftriaxone is one of the most widely used antibiotics [2].

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.IJLSR.1(6).217-21

The article can be accessed online on www.ijlsr.com

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.IJLSR.1(6).217-21

Given its advantages, preserving the sensitivity of Ceftriaxone is important. The 3rd generation of Cephalosporins class of drugs was introduced in the 1980s, which is high activity against gram-negative Enterobacteria. Some agents in this class also inhibit *Pseudomonas*. Ceftriaxone is a member of the 3rd generation of Cephalosporins and is used widely to treat various bacterial infections, including bronchitis, pneumonia, bone infections, abdominal infection, skin infections, and urinary tract infections. In spite of its wide field use, there is a large tendency to misuse ceftriaxone. Antibiotic evaluation is an elementary measure for assessing the appropriate usage of antibiotics [3]. Infections continue to remain the most common

cause of morbidity and mortality in developing countries. While antibiotics have helped us in reducing this morbidity and mortality due to communicable and infectious diseases, the rampant misuse and overuse of these antibiotics have increased antibiotic resistance [4]. Irrational use of medicine also results in serious morbidity & mortality and also an additional economic burden on patients. This leads to a decrease in the quality of drug use, and thereby wastage of resources, increased treatment cost, the augmented risk for adverse drug reaction, and the emergence of resistance [5].

The most frequently seen irrational use of medicine is the extreme use of antibiotics. As the consumption of antibiotic rises, the resistance to antibiotics becomes the main risk to public health. Present evidence suggests that there is an underlying association between the use of antimicrobial in the hospital and its resistance [6]. The annual cost for inappropriate use of ceftriaxone in the world is estimated at about $4 - $5 million, due to antibiotic resistance of bacteria [7, 8]. Close monitoring of the prescribing pattern of ceftriaxone is very important to preserve its susceptibility.

Objectives: The main objective is to determine the frequency of prescribing of ceftriaxone, to study the indications for which ceftriaxone was prescribed, to analyze the DDD and cost of ceftriaxone in prescription.

MATERIALS AND METHODS:

Study Type: A prospective observational study.

Source of Data: Data for the study was collected by scrutinizing the inpatient case sheet in general medicine department.

Methods of Collection of Data: The study was conducted over 6 months in 200 hospitalized patients by scrutinizing the inpatient case sheet. The data was collected by using self-designed patient data collection forms.

Study Design: Patients were enrolled in the study based on inclusion and exclusion criteria. All the patients enrolled in the study are aged ≥18 years.

Study Criteria:

Inclusion Criteria:

- Patients of either sex aged ≥18 years. Patients receiving ceftriaxone admitted in the General Medicine Department.

Exclusion Criteria:

- Patients of either sex aged <18 years of age.
- Patients admitted to departments other than General Medicine.
- Patients who are not enthusiastic about contributing to the study.

Statistical Analysis: All the data was subjected to analysis using various statistical methods, mean, average, standard deviation (SD) for assessing the deviation and also comparing DDD with the WHO's standard DDD.

Ethical Consideration: The study was approved by Dr. B. R. Ambedkar medical college and hospital Ethics committee. Permission letter was then secured from Medical director office. The confidentiality of the data collected was preserved. Name and address of patient and prescriber were omitted from the data collection format.

RESULTS: Out of 200 Patients from the general medicine department, 134 (67%) patients were male, and 66 (33%) patients were females. The number of male patients was significantly high, the information given in **Table 1**.

TABLE 1: GENDER WISE DISTRIBUTION OF PATIENTS

Gender	Number of patients	Percentage (%)
Male	134	67%
Female	66	33%

In general medicine department, antibiotics were often used empirically or following specific evidence of infection. In a study population of 200 patients from the general medicine department, 162 (81%) patients are getting disease-specific therapy; remaining information is given in **Table 2**.

TABLE 2: SPECIFICITY OF TREATMENT DURING HOSPITAL STAY

Treatment	Number of Patients	Percentage (%)
Specific	162	81%
Empirical	38	19%

The most frequently occurred disease condition in hospitalized patients for which the ceftriaxone was

prescribed respiratory tract infection, which accounts for a total of 29%, remaining were given in **Table 3**.

TABLE 3: INDICATIONS FOR WHICH CEFTRIAXONE WAS PRESCRIBED

S. no.	Frequency	No: of cases	Frequency (%)
1	Respiratory tract infections (RTI)	58	29%
2	Urinary tract infections (UTI)	30	15%
3	Fever	27	13.5%
4	Miscellaneous	23	11.5%
5	Gastro Intestinal Diseases (GI)	19	9.5%
6	Generalized Infections	18	9%
7	Pneumonia	14	7%
8	Hepatic Infections	11	5.5%

Parenteral were widely used in the study patients. Out of 200 study patients, 189 (94.5%) received through parenteral route in general medicine; information gives in **Table 4**. Combination of drugs prescribed are very less, which are, Ceftriaxone + Tazobactum (17.5 %) & Ceftriaxone +Salbactum (5%), information regarding frequency given in **Table 5**.

TABLE 4: COMPARISON OF PRESCRIPTION PATTERN OF DIFFERENT DOSAGE FORMS OF CEFTRIAXONE

Type of formulations	No. of patients	Percentage (%)
Oral	11	5.5
Parenteral	189	94.5
Total	200	100

TABLE 5: FREQUENTLY COMBINATION DRUGS WITH CEFTRIAXONE

Drugs	Frequency (number)	Frequency (Percentage)
Ceftriaxone + Salbactum	10	5
Ceftriaxone + Tazobactum	35	17.5

TABLE 6: DEFINED DAILY DOSES IN GENERAL MEDICINE DEPARTMENT

S. no.	Drugs	ATC Code	WHO DDD	DDD			AVG DDD
				Normal	Exceed	Below	
1	Ceftriaxone	J01DD04	2	140	11	2	2.06
2	Ceftriaxone+Salbactum	J01DD54	2	17	0	0	2
3	Ceftriaxone+Tazobactum	J01DD54	2	25	2	3	2.01

Out of 200 study patients, the overall defined daily doses (DDD) in general medicine have been increased for 13 patients and decreased for 5 patients. The information regarding average DDD for ceftriaxone is given in **Table 6**.

TABLE 7: RELATIONSHIP BETWEEN PATIENT DEMOGRAPHICS AND PRESCRIPTION PATTERN

S. no.	Age Distribution	Total no. of doses (%)
1	18-20	8
2	21-30	22
3	31-40	21.5
4	41-50	18.5
5	51-60	11
6	61-70	14.5
7	71-80	3
8	81-90	1.5
	Total	100

TABLE 8: TREATMENT COST IN GENERAL MEDICINE DEPARTMENT

S. no.	Parameter	General medicine department Cost (Rs)
1	Average hospital cost per day	71.30
2	Average Hospital Stay(days)	2.32
3	Total Cost (Rs)	654.64
4	The average duration of use (days)	5
5	The minimum duration of use (days)	1
6	The maximum duration of use (days)	16

In general medicine, the age group between 21-30 years of patients was prescribed more with ceftriaxone when compare with others; the remaining age group details are given in **Table 7**. The ceftriaxone treatment cost incurred by the patients during the hospital stay and per day, as shown in **Table 8**.

The average total cost incurred for ceftriaxone per patient in a general medicine ward was found to be Rs 654.64, for an average of 2.32 days. The average total cost per each day for a patient was found to be Rs 71.30. The average duration of use of ceftriaxone s in general medicine was 5 days. In general medicine department minimum to a maximum duration of use is 1 to 16 days respectively.

DISCUSSION: Out of 200 study population included in the study, Majority of members 134 (67%) are male and female were 66 (33%), similar to study conducted by Kaliamoorthy K *et al.*, and reported that female patients were 61.81%, males were 38.19% [9]. The rate of rational use of ceftriaxone was 162 (81%) and it was statistically higher in those patients from whom specimens had been taken for culture *i.e.*, patients receiving

specific therapy, were as empirical use was 38 (19%). This is in line with Tunger O *et al.,* where they reported the rational use was 45.7% [10]. Rational therapy is considered as compliance with WHO DDD.

This study observed that cephalosporine were mostly prescribed for Respiratory Tract Infections (58, 29%). This confirms the observations of Steinmann MA *et al.,* reported 63% of patients with ARTI and 51% with URTI [11]. Out of 200 study patients, the most preferred route of administration was, parenteral route 189 (94.5%) and oral account for only 11 (5.5%) in both general medicine wards, for its quick action parenteral was preferred.

Ceftriaxone Defined Daily Dose (DDD) was compared with standard DDD prescribed by WHO. In general medicine, the hospital partially adhered to the standard DDD (WHO) for, Ceftriaxone, Ceftriaxone + tazobactum and completely adhered for ceftriaxone + salbactum. The DDD is below the normal limit in- ceftriaxone- 2, Ceftriaxone + tazobactum - 3 cases, Overall DDD was above normal in 11 cases of ceftriaxone and 2 cases of ceftriaxone + tazobactum.

This confirms the observation of Ravesh D *et al.,* who reported a total of 8.6% was above the limit [12]. With regarding to relationship, the patient demography & prescription pattern in general medicine, the age group between 21-30 years received high (22%) of ceftriaxone.

The average total cost incurred for ceftriaxone per patient in a general medicine ward was found to be Rs 654.64, for an average of 2.32 days. The average total cost per each day for a patient was found to be Rs 71.30 in general medicine. The average duration of use of ceftriaxone in general medicine was 5 days. This is in line with the observation of Shankar RP *et al.,* where the average duration of use was 5 days [13]. In general medicine department, minimum to a maximum duration of use is 1 to 16 days respectively.

This study was conducted in a small population, for a small duration of time, which would not take into consideration any seasonal variations and carried out only in the general medicine department. Establishing a prescription pattern of ceftriaxone studies in the other departments and other class cephalosporins used at a South Indian Teaching Hospital. Establish prescribing guidelines so that only the appropriate dose of ceftriaxone used.

CONCLUSION: From our study, we are concluded that the majority of the study population were males than females in the hospital. The specificity of the prescribing pattern of ceftriaxone was more; it means specific therapy was more than empirical therapy. The indication for which the ceftriaxone was mostly prescribed was Respiratory tract infection in the department. Parenteral route of administration was the most preferred route of administration. Defined Daily Doses evaluation was conducted for all the study population prescribed with ceftriaxone. The hospital was largely in compliances with WHO DDDs.

Relationship between the patient demography & prescription pattern in general medicine the age group between 21-30 years received high (22%) of ceftriaxone. The cost is of too high, which account for about Rs 654.64 for just an average of 2.32 days. The duration of use of ceftriaxone is according to the guidelines.

ACKNOWLEDGEMENT: The authors are sincerely thankful to the principal, Dr. Divakar Goli and my guide, Binai K Sankar of Acharya and B. M. Reddy College of Pharmacy and Dr. B. R. Ambedkar Medical College and Hospital, a Tertiary Care Teaching Hospital, Bangalore. For providing necessary facilities to carry out this research project. The authors are also grateful to all the staff and doctors who supported during this project work.

CONFLICT OF INTEREST: Nil

REFERENCES:

1. Tripathi KD: Essentials of medical pharmacology. Jaypee Brothers Medical Publishers; New Delhi, Edition 6th, 2009: 667, 703-7.
2. Food, Medicine and Health Care Administration and Control Authority (FMHACA), Ethiopia. Antimicrobial use, resistance and containment baseline survey, syntheses of findings, Addis Ababa, Ethiopia, 2009.
3. Hyuck I: Evaluation of ceftriaxone utilization at multi-center study. Korean J Intern Med 2009; 24(4): 374-30.
4. American Society of Health System Pharmacists, ASHP. Guideline on medication use evaluation. Am J Health System Pharma 1996; 53: 1953-5.
5. Bhartiy SS, Shinde M, Nandeshwar S and Tiwari SC: The pattern of prescribing practices in Madhya Pradesh, India. Kathmandu Univ Med J (KUMJ) 2008; 6(1): 55-9.

6. Rogues AM, Placet Thomazeau B, Parneix P, Vincent I, Ploy MC and Marty N: Use of antibiotics in hospitals in southwestern France. J Hospital Infect 2004; 58: 187-92.
7. The Academy of Managed Care Pharmacy's, concepts in managed care pharmacy. Drug use evaluation. Alexandria, 2008. Access date: 12/08/ 2011. http://www.amcp.org/ workarea/downloadasse.aspxid=9296.
8. WHO: Drug and therapeutic committee, a practical guide to drug use evaluation; Drug use evaluation (Drug utilization review) 2003; 155.
9. Kaliamoorthy K, Sankaralingam R, Punniyakotti S, Janardhan V and Cheekala UMR: Drug utilization evaluation of third generation cephalosporine using core drug use indicators. J Pharm Sci 2012; 25: 339-42.
10. Tunger O, Dinc G, Ozbakkaloglu B, Atman U and Algün U: Evaluation of rational antibiotic use. Int J Antimicrob 2000; 15(2): 131-5.
11. Steinman MA, Landefeld SC and Gonzales R: Predictors of broad-spectrum antibiotic prescribing for acute respiratory tract infections in adult primary care. Journal of American Medical Association 2003; 289: 719-25.
12. Raveh D, Muallem Zilcha E, Greenberg A, Wiener-Well Y, Schlesinger Y and Yinnon AM: drug utilization evaluation of broad-spectrum antimicrobials. Q J Med 2006; 99: 397-406.
13. Shankar RP, Partha P, Shenoy Nk, Easow JM and Brahmadathan NB: Prescribing pattern of antibiotics and sensitivity patterns of common microorganisms in the Internal medicine wards of a teaching hospital in Western Nepal: a prospective study. Annals of Clinical Microbiology and Antimicrobials 2003; 2: 1-9.

How to cite this article:
Reddy CS, Sankar BK, Ambujakshi H, Rana R, Mahammed N and Maheshwari U: A study on prescription pattern of ceftriaxone in General Medicine Department of a South Indian Teaching Hospital. Int J Life Sci & Rev 2015; 1(6): 217-21. doi: 10.13040/IJPSR.0975-8232.IJLSR.1(6).217-21.