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Drug Utilization Study On Parenteral Antibiotics In Tertiary Care Teaching Hospital

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ABSTRACT

The aim of this study was to assess the drug utilization pattern of parenteral antibiotics in medicine units. A prospective and observational study was done on patients admitted in medicine indoor. Information regarding patient demographic details, patient medication history, and reason for admission, medication details and lab investigations. Patient drug therapy details such as diagnosis, clinical condition, therapy details such as name of the antibiotics, dose, route, frequency, duration of treatment were collected and recorded in performa. Rationality was assessed by using standard guidelines, micromedex, and NFI. Drug interactions and ADR were assessed by using standard text books like stockley drug interactions text book 8th edition. And Micromedex. A 310 patients received parenteral antibiotics in the medicine units was found to be 12.54%. amongst incidence of use of parenteral antibiotics was highest in medicine unit B (42.12%). Cephalosporins (64.54%) were the most frequently prescribed class of parenteral antibiotics. ceftriaxone (53.63%) was the frequently used antibiotic. Cefriaxone is commonly prescribed for viral fever. 43% of major drug interactions were identified. It is essential that appropriate guidelines on the use of parenteral antibiotics are implemented to prevent irrational use of antibiotics.

Keywords*:* parenteral antibiotics, drug utilization study, and irrational drug use.

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INTRODUCTION

WHO defines drug utilization as the marketing, distribution, prescription use of drugs in Society with special emphasis on the resulting medical, social and economic consequences" it is an on-going, authorised and systematic quality improvement process which is designed to review drug use and prescribing pattern provide feedback of results to clinicians and other relevant groups.[1] Drug utilization study has recommended as a method for identifying inappropriate or unnecessary drug use that monitor, evaluate, and promote rational drug therapy. Antibiotics are chemical substance derived from living micro-organisms, which inhibits or completely stops growth or kill bacteria when present in very minute concentrations, those are mostly metabolites produced by micro-organism which antagonises microbial growth itself if present in very low concentrations.[3] Several studies reported that about one third of all hospitalized patients receive at least one antibiotic during hospitalization in that 80% of antibiotics administered Parentrally.[4] The reason for increasing usage of systemic antibiotic in hospitalized patients is due to rapid action than oral antibiotics in treating an infection during hospital stay and the other reason is non-availability of few antibiotics in oral dosage form.[5] Antibiotics are considered as safer drug when administered rationally. However, like all the other drugs, they also show some ADR's in various patient conditions.[9] Studies reported that antibiotics caused more than 44.5% of the adverse drug reactions in hospitalized patients.most commonly involved antibiotics are fluroquenolones and beta-lactom antibiotics, and most of the ADRs are related to gastrointestinal tract and dermatological reactions[10]. That drug interactions with antibiotics usage ranges from 3% to 30%. The over all prevalence of DIs is 50-60% in the U S A. it is estimated that DIs cause up to 3% of all hospitalizations.[8]

The safety of drug prescribing has become a highly visible topic in medicine,[11] there for the rational use of antibiotics is important, it requires the patient receive medication appropriate their clinical needs, in doses meet their own individual requirements for an adequate period of time, and at the lowest cost to them and their community. Successful use of antibiotics definitely help to mankind to fight the disease and the illness for better tomorrow.[12] Rational drug prescribing has been shown to reduce the cost of treatment, adverse drug reactions. various studies indicate that around 50% of antimicrobials agents are not needed, or in wrong doses. The fear of physician whether he is missing any hidden infection also make him to use antibiotic. "umbrella" purpose for protecting him and his patient.[13] A drug utilization study considered to be one of the most effective method to analyse drug prescribing pattern and monitor the treands in drug utilization.[14] There for the purpose of this study is to evaluate the drug utilization pattern of parenteral antibiotics in an tertiary care teaching hospital.

MATERIALS AND METHOD

Study Site:

The present study was conducted in the medicine units of Adichunchanagiri Hospital and research center, B.G.Nagara. for a period of 9 months.

Study Design:

The study was a prospective and observational study.

Study Approval :

Ethical clearance was obtained from the Institutional ethical committee, AH&RC, B G Nagara.

Inclusion criteria:-

- All in patients of either sex above 18 years receiving parenteral antibiotics in medicine units
- Patients prescribed with parenteral antibiotics on in patient bases but transferred to other units due to associated co-morbidity condition

Exclusion criteria

- Patient not willing to participate
- Out patients prescribed with parenteral antibiotics
- The patient who are less than 18 years

Data collection:

A suitably designed data collection form was used (Annexure 2) to record all the necessary data including patient demographic details, patient medication history, and reason for admission, medication details and lab investigations. Patient drug therapy details such as diagnosis, clinical condition, therapy details such as name of the antibiotics, dose, route, frequency, duration of treatment were collected.

RESULTS AND DISCUSSION

Antimicrobials are one of the most common groups of drugs prescribed in hospital. Along with groups of drugs prescribed in hospital. Along with the extra ordinary therapeutics effects of antimicrobials, there is some problems of antimicrobial resistance, irrational prescribing. By increasing in the usage of parenteral antibiotics may rise antimicrobial resistance. There for antibiotic utilization studies will help to fight against such problems. Drug utilization study of antimicrobials is an effective way of reflecting appropriateness of antimicrobial use. [5]

Of the 2471patients admitted in the medicine, the incidence use of parenteral antibiotics were found to be 12.54%. In our study majority of the patients presented with conditions like respiratory tract infections, viral fever, and poisons,(Table no1) etc. A total 310 patients were included, the no of male patients (52.58%), were comparatively more than the no of females

(47.41%), the above observation was similar to the study conducted by **B. chitra et al**.[2] The use of parenteral antibiotics is higher 105(33.87%) in the age group of 46-65 years. While it was least in patients aged more than 75 years (10%),(Table no 2) similar findings were observed by **Badar A V et al** [15] on that the mean age of the patient was 50 years. In our study majority of patients were hospitalized for a time period between 5-7 days.(Table no 3) The study conducted by **Shankar P R et al** [16] showed that majority of patients were hospitalized for a time period between 4-7 days.

Up on evalution it was observed that cephalosporin class (64.54%) of antibiotics was widely used, followed by, penicillines (25.75%), quinolones (4.25%),(Fig no 1) in the study conducted by **Gaudanavar P et al**[1] found that cephalosporins were the most frequently prescribed parenteral antibiotics in medicine. Our study found that there was no significant difference in the pattern of use of parenteral antibiotics in various medicine units. Cephalosporines were used most commonly in all the medicine units. The reason for increasing usage of cephalosporins antibiotics was because of its wide coverage. And also influence the individual prescribing habits.

Among the parenteral antibiotics used ceftriaxone 177(53.63%) was widely used especially In the treatment of viral fever. And respiratory tract infections while, Amoxicillin+potassium clavunate (20%) was the second mostly used parenteral antibiotics in the treatment of RTI.(Table no 4) The study conducted by **Meher B R et al** [7] stated that out of 200 patients who were prescribed with antimicrobials ceftriaxone 112(30.03%) were most commonly prescribed cephalosporin antibiotics.

By evaluating the prescriptions it was observed that the respiratory tract infections 121(39.03%), were the most common clinical condition in hospital for which parenteral antibiotics were prescribed, followed by fever 93 (30%), poison 26 (8.38%),(Table no 1) the study being conducted by **Ahamad A et al**[17] showed the similar result.

The appropriates of use of parenteral antibiotics was assessed by considering parameters such as indication, dose, duration, and frequency, the appropriatness of use of parenteral antibiotics in medicine for indication, dose, frequency and duration was found to 218(70.30%), 204(65.80%), 208 (67.09%) and 205 (66.12%) respectively.(Fig no 2) The similar result observed in the study conducted by **B Rajalingam et al**[6]

Out of 310 prescriptions reviewed a total of 61 interactions were identified on that (42.62%) were major, 27.86% were moderate, 29.5% was minor. The incidence of parenteral antibiotics causing ADR was found to 3% the reported ADR were mild. Amoxicillin +Pot. Clavunate were cause diarrhea in 6 patient's. No severe ADR was reported during the study.

Table 1: The various parenteral antibiotics prescribed in different clinical conditions

Antibiotics/ infections	Rti	Viral fever	GIT infections	Poisons	Neurological infections	UTI	Others infections
Ceftriaxone	54	67	2	20	11	7	17
Amoxicillin+pot.clavunate	53	5	2	1	1	0	3
Cefotaxim	8	15	0	4	1	1	6
Ciprofloxacin	0	3	8	1	0	0	0
Metronidazole	1	1	4	1	1	0	3
Piperacilin +tazobactom	6	5	0	0	1	2	5
Gentamycin	1	0	0	0	0	0	1
Levofloxacin	2	0	0	0	0	0	0
Meropenam	2	0	0	0	1	0	1
Clindamycin	1	0	0	0	0	0	0
Cefozone	0	0	0	0	1	0	0

Table 2: Demographic distribution of Patients

Age	Frequency(n)	Percentage
18-30	47	15.16
31-45	74	23.87
46-65	105	33.87
66-75	53	17.07
>75	31	10
Sex		
Male	163	52.58
Female	147	42.41

Table 3: Duration of Treatment

Duration	Frequency (n)	Percentage
1-3 days	39	12.58%
5-7 days	260	83.87%
> 7 days	11	3.54%

Table 4: Usage pattern of individual parenteral antibiotics

Antibiotics	Frequency (N)	Percentage
Ceftriaxone	177	53.63
Amoxicillin+pot.clavunate	66	20
Cefotaxim	35	10.6
Ciprofloxacin	12	3.63
Metronidazole	11	3.33
Piperacilin +tazobactom	19	5.75
Gentamycin	2	0.6
Levofloxacin	2	0.6
Meropenam	4	2.72
Clindamycin	1	0.3
Cefozone	1	0.3

Table 5: Drug interactions

Drug interactions	Frequency	Percentage
Major	26	42.62
Minor	18	29.5

Modarate	17	27.86
Total	61	

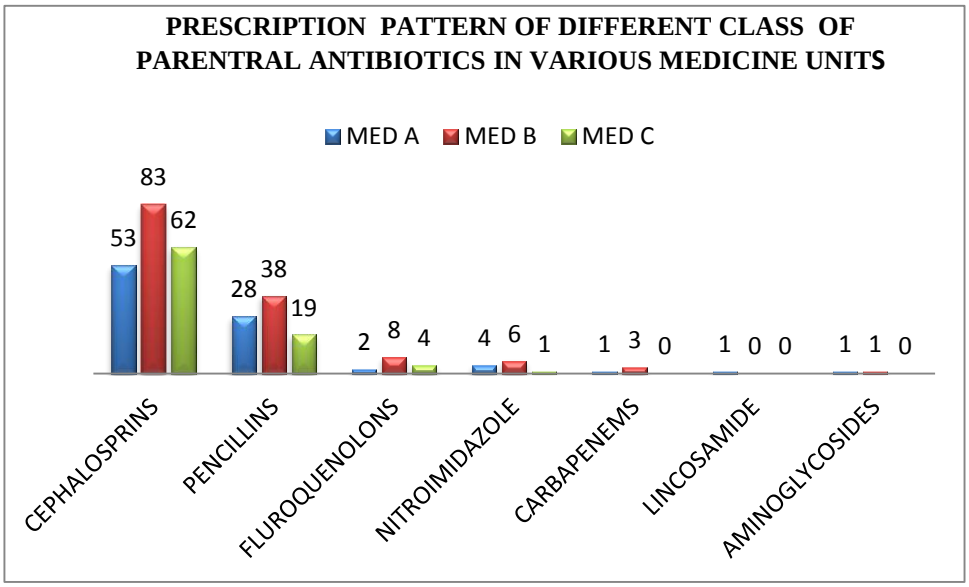

Figure 1: Prescription pattern of different class of parenteral antibiotics in various units

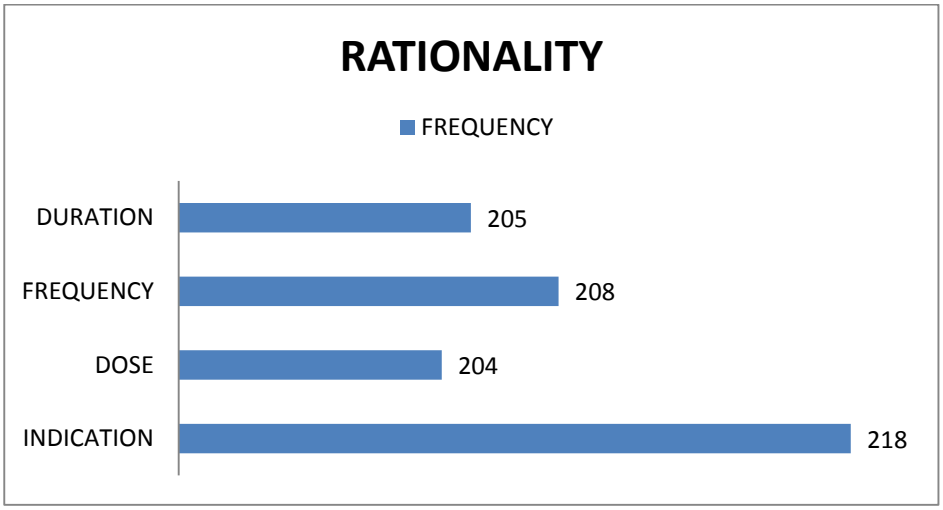

Figure 2 Rationality of parenteral antibiotics

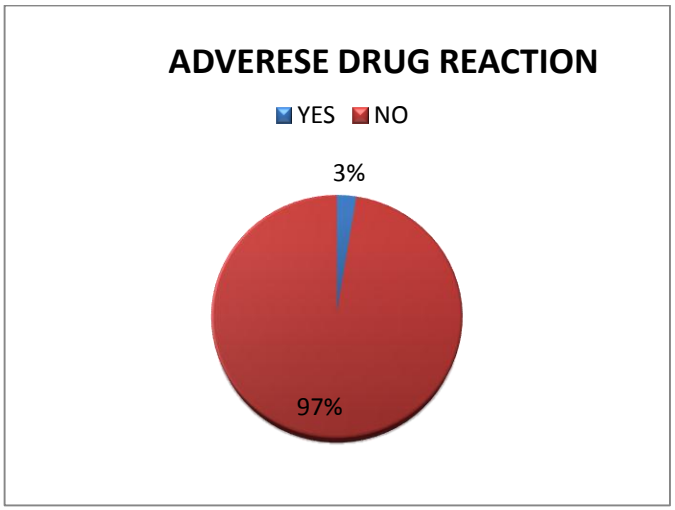

Figure 3: Adverse drug reactions

CONCLUSION

Most of the patients with parenteral antibiotics were found to be the age between 46-65. Male patients are more than the female patients . the common condition for which parenteral antibiotics were prescribed for respiratory tract infections and fever, poison. The commonly prescribed class of parenteral antibiotics were cephalosporins and penicilines and the most commonly prescribed parenteral antibiotic was ceftriaxone and amoxicillin +pot . clavunate. The use of parenteral antibiotics were more in medicine unit B. The maximum duration of parenteral antibiotic treatment was fund to be 5-7 days.

Limitations

- Non availability of culture sensitivity reports.
- The study was conducted in a short period i.e 9 months , even this study can be extended
- The sample size included in the study with parenteral antibiotics was less.

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