



Original Research Article

## Prescribing Pattern of Antimicrobials in Orthopaedic Indoor Patients of a Tertiary Care Teaching Hospital in Jammu

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### ABSTRACT

**Background:** Antimicrobials are among the most frequently prescribed classes of medications used both prophylactically as well as to treat various orthopaedic infections.

**Aim:** To evaluate prescribing pattern of antimicrobial agents in orthopaedic indoor patients of tertiary care teaching hospital in Jammu.

**Materials and Methods:** A prospective study was carried over a period of 4 months in orthopaedic department of a tertiary care hospital. A total of 165 prescriptions of indoor patients were collected, and analysed for most common diagnosis, most common antimicrobial used, drugs used from WHO essential drug list and generic drugs used.

**Results:** The prescribing pattern of antimicrobials was recorded in a preformed proforma. Most commonly prescribed group of antimicrobials was cephalosporins followed by aminoglycosides. Cefoperazone from cephalosporin and Amikacine from aminoglycosides were the most commonly used drugs. Other commonly prescribed drugs were non steroidal anti-inflammatory drugs in 95 % of the patients followed by antacids. The most common indication was bone fractures followed by soft tissue infections. Most of the drugs were from the essential drug list but no drug was prescribed with generic name.

**Conclusion:** This study highlights the common prescribing pattern of antimicrobials in our tertiary care teaching hospital. The drugs should be used appropriately from the WHO essential drug list with frequent update of information. The implementation of antimicrobial policy and treatment guidelines should be according to disease pattern of that particular area and this can be done only with periodic assessment of disease pattern and rational prescribing of the medicine by the clinical pharmacologist in that particular area.

**Key words:** Antimicrobial agents, Non steroidal anti-inflammatory drugs, World health organisation.

### INTRODUCTION

Antimicrobials are the substances or compounds which are used to treat infections caused by microorganism

including bacteria, fungi and parasites and are among the most frequently prescribed classes of medications for prophylaxis and treatment of orthopaedic infections. [1-3] The

inappropriate and indiscriminate use of antimicrobial agents can potentially cause serious morbidity, mortality as well as additional economic burden leading to reduction in the quality of drug and, thereby wastage of resources, increased treatment cost, increased risk for adverse drug reaction and emergence of resistance. [4,5] Existing evidence suggests that there is a causal association between antimicrobial usage in hospital and antimicrobial resistance. [6] Periodic evaluation of their utilization pattern is needed to provide feedback to the prescriber and to promote awareness about their rational usage of drugs. Therefore a study was conducted to study the pattern of antimicrobials usage in Orthopaedic department because a large number of antimicrobials are being used as prophylactic agents or for treatment of various Orthopaedic infections and life threatening drug resistance especially to antimicrobials can result due to irrational use of these medicines. With this background, the present study was planned to evaluate prescribing pattern of antimicrobial agents in indoor patients of Orthopaedic department of government medical college, Jammu.

## MATERIALS AND METHODS

The present descriptive prospective study was planned and carried out over a four month period at tertiary care teaching hospital by the postgraduate department of Pharmacology in collaboration with Orthopaedic department after taking clearance from institutional ethics committee. A total of 486 indoor prescriptions were screened and One hundred and sixty five prescriptions were randomly selected for analysis. The data was collected in a preformed proforma in the following format:

Demographic characteristics of the patient selected for the analysis, route of

drug administration, diagnosis of the patient, indications for the antimicrobial use, common antimicrobial group used, common drug from different antimicrobial group used, drugs used from the WHO essential drug list, fixed drug antimicrobial combinations used, generic drugs used and any other concomitant medication.

## RESULTS

One hundred and sixty five patients were randomly selected from 486 indoor patients of the orthopaedic department. The analysis of the data showed that out of 165 patients 119 were males and 46 were females. The greatest number was in the age group of 20 -30 years. (Table1).The route of drug administration was parenteral in 68% of patients whereas it was oral in 32% of the patients (Table 2).

**Table 1: Demographic Characteristics of the patients**

Age of Patient (in years)	Number of Patients	Percentage
0-10	9	5.45
11-20	27	16.36
21-30	44	26.66
31-40	22	13.33
41-50	30	18.18
51-60	24	14.54
61-70	7	4.24
71-80	2	1.21

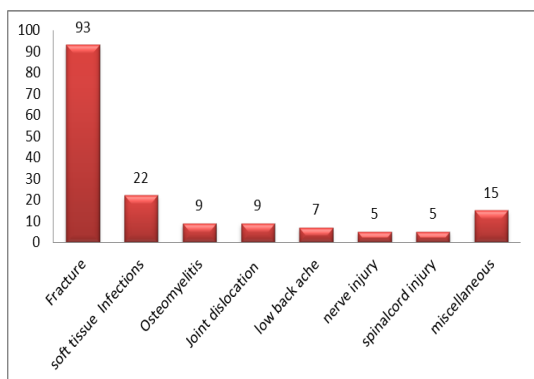
**Table 2: Percentage of males and females patients**

Sex	No. of Patients	Percentage
Males	119	72.14
Females	46	27.87

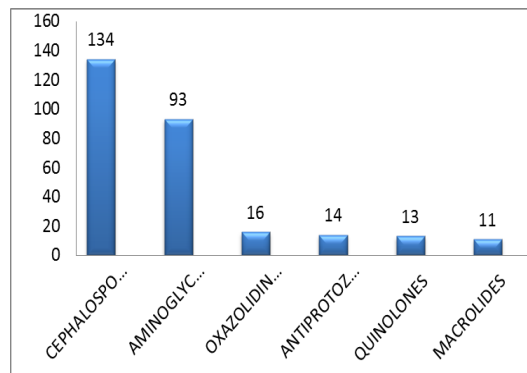
**Table 3: Route of administration**

Route of Administration	No. of patients	Percentage
Parenteral	112	67.87
Oral	53	32.12

The most common indication for antimicrobial prescribing was fracture of bones 56.36% followed by soft tissue infections in 14.54% patients. The various other diagnosis were osteomyelitis in 5.45% patients, joint dislocation with external soft tissue infection in 5.45% patients, low backache in 4.24% patients, nerve injury to 3.03% patients and injury to spinal cord in 3.03% patient. (Graph1)

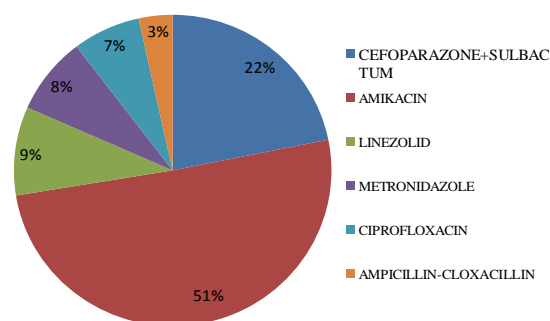


Graph 1: Most common diagnosis among indoor patients



Graph 2: Most common groups of antimicrobials among indoor patients

Cephalosporin group was the commonly prescribed antimicrobial class in 81% patients followed by aminoglycosides in 56% patients, oxazolidindione in 10%, antiprotozoal in 8% patients, quinolones in 8% of patients, macrolides in 7% patients and penicillins in 4% of the patients. (Graph 2) Most commonly prescribed individual drug from different antimicrobials group was amikacin in 51% patients from the aminoglycosides and cefoperazone (22%) from cephalosporin. (Graph 3) The other commonly used antimicrobials were ceftriaxone, ceftazidime, linezolid, metronidazole, ciprofloxacin and ampicillin-cloxacillin. None of the drug was prescribed by generic names. All of the drugs were prescribed with trade names.



Graph 3: Most commonly used drugs from different groups in indoor patients.

The drugs which were from the essential drug list were ampicillin, cloxacillin, ceftriaxone, ceftazidime, ciprofloxacin, metronidazole, and the drugs which were not from WHO essential drug list were cefoperazone, and linezolid; amikacin is a complimentary drug in WHO essential drug list. (Table 3)

Table 3: Antimicrobials used from WHO essential drug list (2013)

Drug class	Drugs	WHO model essential drug list
Pencillins	Ampicilline,cloxacillin	Yes
Cephalosporins	Ceftriaxone ,cetazidime cefoperazine	Yes No
Macrolides	azithromycin	Yes
Antiprotozoal	Metronidazole	Yes
Quinolones	Ciprofloxacin	Yes
Oxazolidindione	Linezolid	No
Aminoglycosides	Amikacin	Yes complimentary drug

The drugs in fixed dose combination were cefoperazone with sulbactam in 22% of the patients, ceftriaxone with sulbactam in 21% patients, ceftazidime with sulbactam

in 21% patients, ampicillin and acloxacillin combination in 3% of the patients and cefuroxime and linezolid in 22% of the patients (Table 4). The other common

categories of drugs prescribed to the patients other than the antimicrobials were non steroidal anti-inflammatory drugs in 156 patients (95%), antacids in 68%, benzodiazepines in 5% patients, steroids in 4% and vitamins in 2% patients (Table 5).

**Table 4. Fixed Drug Combinations of antimicrobials used.**

Fixed combinations	dose	Number of patients	Percentage
Cefoperazone+sulbactam		38	22
Ceftazidime +sulbactam		34	21
Ceftriaxone +sulbactam		34	21
Ampicillin+cloxacilline		6	3
Cefuroxime +linezolid		5	3
Diclofenac +paracetamol		38	22

**Table 5: Concomitant medication along with antimicrobials**

Drugs	Number	Percentage
NSAIDS	156	95
Antacids	112	68
Benzodiazepines	9	5
Steriods	7	4
Vitamins	4	2

## DISCUSSION

Infection in bone and joints is a potentially very serious condition and are difficult to treat and can cause significant morbidity and mortality. Most of the cases needs antimicrobial therapy but the irrational use of antimicrobials leads to a number of consequences in term of cost, drug interactions and hospital stay along with increased probability of bacterial resistance toward the commonly used antimicrobials. The present study was done in orthopaedic department where common diagnosis was fracture of bones and soft tissue infection. This is similar to the study where the fractures and accidental trauma cases were the most common diagnosis. [7] A prospective antimicrobial utilization survey performed in our study showed that the commonest antimicrobial group prescribed was cephalosporins and aminoglycosides. Cefoperazone from cephalosporins in combination with sulbactam and amikacine from aminoglycosides were the most commonly prescribed drugs. [8-10] The other

antimicrobials which were prescribed were metronidazole, linezolid, ciprofloxacin, ampicillin and cloxacillin. This is in accordance to the study where ceftriaxone was prescribed in patients (57%) as initial therapy, where as ampicillin, amoxicillin, metronidazole, ciprofloxacin and crystalline penicillin were the 5 most commonly prescribed antibiotics in the study conducted by Shankar et al. [11]

In concomitant medication NSAIDs were the most commonly prescribed category followed by antiulcers, multi vitamin and mineral preparations. The anti-ulcer drugs in all instances were prescribed to reduce or prevent the gastrointestinal irritation caused by NSAIDs. The parenteral route was the main route of drug administration than the oral route. This was contrast to the study where the use of injectable preparations was lower than this study. [12-14] The choice of drugs and the route chosen were appropriate in the majority of cases. All the drugs prescribed were with trade name which is contrary to the study in which 19.3% of drugs were prescribed by generic name. Generic prescribing is to be encouraged especially in developing countries as it works out to be cheaper for the patient and also they reduces the possibility of drug errors. [15,16] The WHO guidelines recommend 100% generic prescription. [17-19]

Linezolid has been used as first line drug in some patients which is only recommended for multidrug resistant cases as per the guidelines.

The present study had certain limitations. The study was carried out over a four-month period only. Only one hundred and sixty five indoor prescriptions were randomly selected for analysis and these may not have been representative of the patient population. The number of indoor prescriptions was less and Prescriptions pattern of outdoor patients also needs to be

analyzed. The patients' knowledge of the duration of treatment, proper time to take the medication was not ascertain.

Further studies over a longer period of time are required to provide a baseline data of prescribing pattern of drugs in orthopedics because a longer study will have a greater number of patients and the quantitative measurements may be more representative of the population. Such type of studies provides necessary feedback to prescribing registered medical practitioners and may prove useful to formulate antibiotic policy to policy makers.

## CONCLUSION

In the present study males were more than the females. The incidence of fractures and soft tissue infections were the most common diagnosis. The most commonly prescribed group of antimicrobial was cephalosporins. Linezolid was prescribed as a first line drug in many cases which is not recommended as first line drug as per the guidelines.

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