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A STUDY ON PRESCRIBING PATTERNS AND EFFICACY OF ANTIBIOTICS IN ORTHOPAEDIC DEPARTMENT IN A TEACHING HOSPITAL

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ABSTRACT

In Orthopaedic department, surgery constitutes the major manipulations and requires guided antibiotic prescription. Programs designed to encourage appropriate antibiotic prescriptions in health care institutions are an important element in quality of care, infection control. The irrational prescription of antimicrobial agents leads to resistance and economic burden that requires serious attention for the better compliance. *Objectives*: To assess the prescription pattern and efficacy of commonly prescribed antibiotics in Orthopaedic department. *Materials and Methods:* A prospective observational study which was carried out for a period of six months at Orthopaedic department of Basaveshwara Medical College Hospital, Chitradurga. A total of 119 subjects were included as per study criteria. *Results:* Among 119 subjects 73.94% were males and 26.06% females. Maximum number of subjects, 37.81% were found between 41-60 years. Prescription patterns of antibiotics shows that 38.07% of Cephalosporins followed by Aminoglycosides 34.40%, Penicillins 15.13%, Flouroquinolones 4.12%, Oxizolidinones 4.12%, Nitriimidazoles 3.66% and Macrolide 0.45%. The efficacy status shows that 44.53% subjects being continued with primary complaints after second follow-up. *Conclusion:* The research concludes that Cephalosporins and Aminoglycosides takes part more in the current prescription market of Orthopaedic subjects. Efficacy of antibiotics is good in 55.47% of the study population.

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INTRODUCTION

In hospitals, antibiotics are often classified by their use for treatment of documented infection, empiric therapy, and antibiotic prophylaxis (ABP). In addition to the usual nosocomial infections that commonly occur in surgical wards, specific septic diseases such as osteomyelitis, osteitis, spondylodiscitis, septic arthritis and prosthetic joint infection represent the worst complications because their outcome can be devastating, resulting in total loss of joint function, re-operative intervention, amputation and occasionally death.[1]

Antibiotic resistance is not a new challenge, but has been around for many decades.[2] In this regards, many experts deemed that inappropriate and overuse of antibiotics must be reduced if we are going to lessen the prevalence of bacterial resistance.[3] Antibiotics are frequently prescribed medicine in orthopaedics unit. The antibiotics are prescribed both as prophylactically (before orthopaedics surgery etc.) or to treat current infection (septic arthritis, osteomyelitis etc.)[4] The aim of surgical prophylaxis is to reduce rates of surgical site and healthcare-associated infections and so reduce surgical morbidity and mortality. [5] However, systemic antibiotics should be used with restraint because of the possibility of allergic reactions, toxicity, side effects and the development of resistant strains of microbes. [6]

According to WHO, the rational use of drugs is the use of the right drug, right dosage at the right cost. "Rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, at the lowest cost to them and their community."[7] ***Objectives*** of the study are to assess the prescription pattern and efficacy of commonly prescribed antibiotics in Orthopaedic department.

Potential harms of indiscriminate antibiotic prescribing include allergic reactions, adverse reactions and drug interactions. [8] The study of prescribing pattern seeks to monitor, evaluate and suggest modifications in practitioners prescribing habits to make medical care rational and more effective. Study of prescribing pattern provides information on the rational use of the drug as rational use of the drug based on rational prescribing. [9]

METHODOLOGY

A prospective observational study was conducted at Orthopaedic department of Basaveshwara Medical College Hospital & Reaserch Centre, Chitradurga. The study was conducted over a period of six months. Patients who are prescribed with antibiotics both prophylactically and therapeutically in Orthopaedic department and patients who are visiting both In-patients and Out-patient Orthopaedic department of both genders are included in the study.

Patients who are not treated with antibiotics in Orthopaedic department and patient who are with severe injuries in Orthopaedic department are not included in the study. Sources of Data collected from demographic data of the patients in Orthopaedic department medical records of In-patients and prescription of Out-patients in Orthpaedic department.

The prescriptions from the Orthopaedics department at Basaveshwara Medical College Hospital & Reaserch Centre were reviewed, entered in a self- designed proforma. The demographic data were collected from the medical records. Prescriptions containing antibiotics are documented in an ethically approved specialized data collection proforma it includes:

- Demographic profile: Name, Age, Gender, IP No and Date of prescription.
- Reason for admission or clinical condition for which antibiotic is prescribed.
- Patient history, Physical examination, Laboratory investigations, Diagnosis etc.
- Details of antibiotic prescription: Brand/Generic name, Class, Dosage, Route and Frequency.
- Follow up details of the patient after 3 to 4 days of starting of the antibiotic to assess its efficacy.

Descriptive method of statistics by using Microsoft Excel 2010 is used for the analysis.

RESULTS

A total of 119 prescriptions were collected from the Orthopaedic ward with patients on antibiotic therapy.

Distribution According to Age

In our study, patients were divided into five groups based on different age. Out of 119 patients, 37.81% were from 41-60 years followed by 10.08%, 27.73% and 23.53% selected from 0-20 years, 21-40 years and 61-80 years respectively. Only 1 patient was enrolled from 81-100 years of age as shown in figure 1.

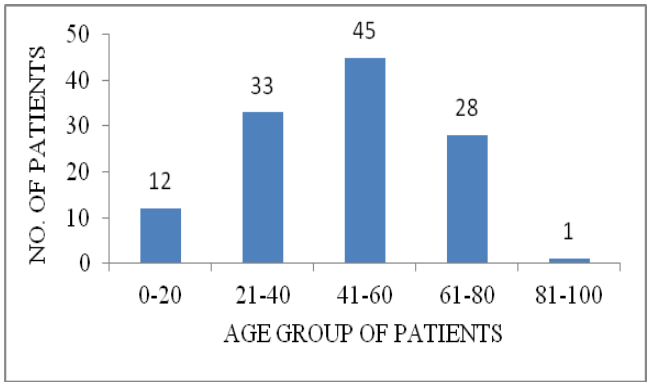

Figure1:- Distribution According to Age.

Distribution According to Gender

In the study population, 73.94% were males and 26.06% were females as shown in figure 2.

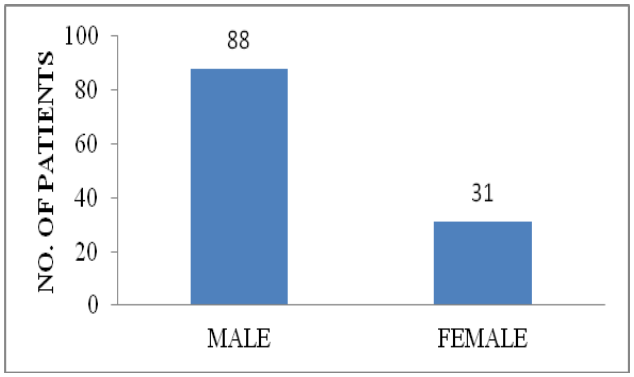

Figure 2:- Distribution According to Gender.

Distribution of Patients According to Diagnosis

In the study population 72.26% had fracture, followed by 5.88% having abression or wound and 4.2% of implant removal cases. Also 2.58% of arthritis and PIVD diagnoses were found. Several cases of dislocation, LBA and lipoma were found in a small percent of 1.68. Only 1 patient each of amputation, diabetic foot, gangrene, HIV with infiltrate, instability, olecranon bursitis, osteomyelitis, post OP infection and wedging cases were observed as shown in table 1.

Table 1:- Distribution of Patients According to Diagnosis.

Sl. No	Reason for Admission	No. of Patients	Percentage (%)
1	Abrassion or Wound	7	5.88
2	Amputation	1	0.84
3	Arthritis	3	2.52
4	Diabetic Foot	1	0.84
5	Dislocation	2	1.68
6	Fracture	86	72.26
7	Gangrene	1	0.84
8	HIV with Infiltrate	1	0.84
9	Implant Removal	5	2.52
10	Instabilty	1	0.84
11	LBA	2	1.68
12	Lipoma	2	1.68
13	Olecranon Bursitis	1	0.84
14	Osteomyelitis	1	0.84
15	PIVD	3	2.53
16	Post OP Infection	1	0.84
17	Wedging	1	0.84
	Total	119	100

Distribution According to Route of Administration

In the study population, 72.67% had received antibiotics through intravenous route and 27.33% received through oral route as shown in table 2.

Table 2:- Distribution According to Route of Administration.

Sl. No	Routes of Drug Administration	No. of ROA	Percentage (%)
1	Intravenous	117	72.67
2	Per Oral	44	27.33
	Total	161	100

Pattern of Antibiotic Prescription

Mostly prescribed antibiotics in our study were Cephalosporins (38%) followed by Aminoglycosides (34%), Penicillins (15%), Flouroquinolones (4.12%), Oxizolidinones (4.12%), Nitroimidazoles (3.66%) and Macrolide (0.45%). Graphical representation of Antibiotic use pattern is also shown in figure 3.

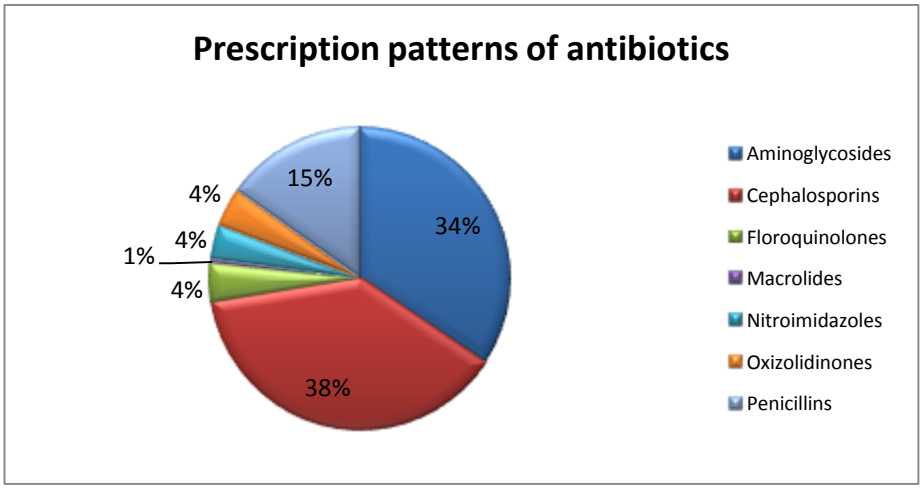

Figure 3:- Pattern of Antibiotic Prescription.

Antibiotics Used in Orthopaedic Department

Mostly prescribed antibiotics in our study were Cefaperazone (24.33%) followed by Amikacin (21.29%), Ceftriaxone (13.68%), Amoxicillin (12.16%), Gentamycin (7.22%), Cefotaxime (7.22%), Ofloxacin (3.80%), Linezolid (3.42%), Metronidazole (3.04%), Piperacillin (1.53%) and Cefixime (1.14%). Levofloxacin, Cefuroxime and Azithromycin were prescribed in a very low percentage of 0.38. Among 119 patients, one antibiotic was prescribed to 34 (28.57%) patients, two antibiotics for 44 (36.97%) patients and three antibiotics for 41 (34.46%) patients as shown in figure 4.

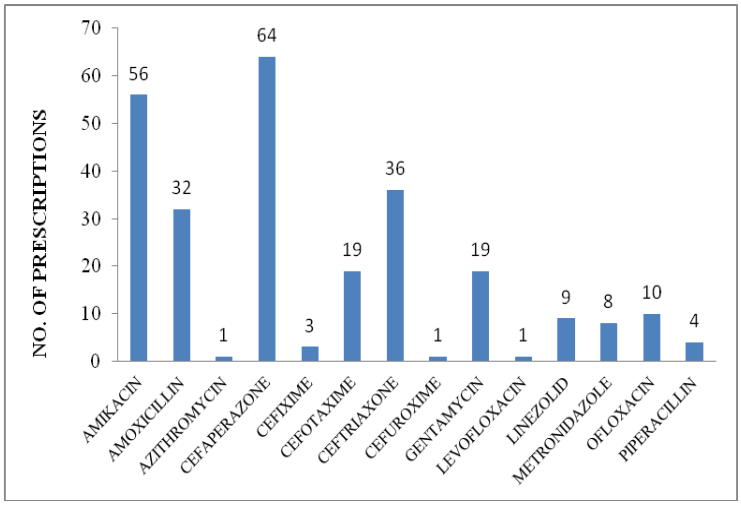

Figure 4:- Antibiotics Used in Orthopaedic Department.

Efficacy of Antibiotics

Figure 5 shows that 119 patients had experienced pain in the first visit, and 42 of them still experienced the pain during the follow up too. Also 77 patients had recovered from the pain. 40 of the enrolled individuals had been wound up in the first visit, of which 13 still had the wound in the follow up. About 25 of the patients were still undergoing the healing process. 103 patients had experienced swelling in the first visit, and 41 of them still experienced the swelling during the follow up. Also 62 patients had recovered from the swelling. Out of 119 subjects, who had visited the hospital for any orthopaedic disorder, 53 still continued to have the complaints (pain, swelling, wound etc.). Also, the remaining 66 had fully recovered from the complaints on admission.

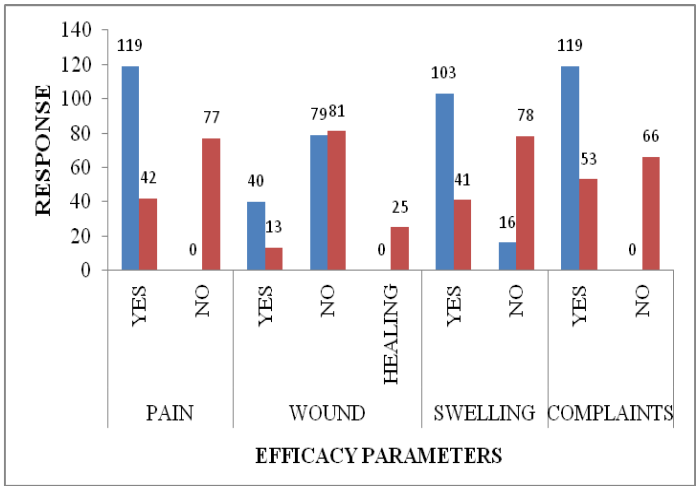

Figure 5:- Efficacy of Antibiotics.

DISCUSSION

Vivekkumar SP *et al.*, conducted a study on the topic "Antimicrobial Drugs Usage in a Tertiary Care Hospital – a Descriptive Study." and a similar result was observed in distribution on patients based on age group. [10] In my study, patients were divided into five groups based on different age. Out of 119 patients 45(37.81%) were from 41-60 years. It shows that 41-60 years aged patients are more prone to get Orthopaedic disorders.

In the study population, 73.94% patients were males and 26.06% were females, a similar result was observed in a study done by Rajarathna K *et al.*, on the topic "Evaluation of WHO Prescribing Indicators among Orthopaedic Inpatients at a Tertiary Care Hospital".[11] Majority of the patients were males as was also seen in another study by Ahmed M *et al.*,.[12] This can be attributed to the prevalence of gender inequality as a result of which males are preferentially taken to tertiary care institutes for treatment as compared to females with a similar severity of illness.[13]

In the study population 72.26% had fracture, followed by 5.88% having abrassion or wound and 4.2% of implant removal cases. Elsy MI *et al.*, conducted a study on Prescribing Pattern of Analgesics in Orthopaedic Department of an Indian Tertiary Care Teaching Hospital in Kerala. And their results found that fracture, injuries, LBA etc. are common reason for admission in orthopaedic department.[14] Rajarathna K *et al.*, conducted a study on Evaluation of WHO Prescribing Indicators among Orthopaedic Inpatients at a Tertiary Care Hospital. They found that common orthopaedic diagnoses were fractures, surgeries and joint dislocations. [11]

In the study population, 72.67% had received antibiotics through intravenous route and 27.33% received through oral route. Goel RK *et al.*, conducted a study on Prescribing pattern of drugs in the outpatient department of a tertiary care teaching hospital in Ghaziabad, Uttar Pradesh. They found that the intravenous dosage form given more than oral dosage forms.[15] And same results found in Baktygul K *et al.*, conducted a study on Assessment of Antibiotics Prescribed at the Secondary Health Care Level in the Kyrgyz Republic.[16]

Mostly prescribed antibiotics in our study were Cephalosporins followed by Aminoglycosides. 38.07% of antibiotics prescribed were cephalosporins which include Cefaperazone 64(24.33%), Ceftriaxone 36(13.68%), and Cefotaxime 19(7.22%). The 34.40% of aminoglycoside antibiotics were Amikacin 56(21.29%) and Gentamycin 19(7.22%). In the study done by Syed MHN *et al.*, on Prescription Patterns of Antibiotics in Acute Medical Care Unit of a Tertiary Care Hospital in India, the result obtained was, cephalosporin were maximally prescribed followed by aminoglycosides which is also the trend seen in another study done by Mistry V AA *et al.*, on Use of Antimicrobial Prophylaxis in Clean Elective Orthopedic Surgical Procedures and Identifying Common Infective Organisms. [17], [18]

Among the total of 119 patients, one antibiotic was prescribed to 28.57% patients, two antibiotics for 36.97% patients and three antibiotics for 34.46% patients. Hitesh Mishra *et al.*, study on Prescription pattern of antimicrobial drugs in paediatrics outpatient department of a tertiary care teaching hospital of North India shows a similar result. [19] Woldu MA *et al.*, conducted a Retrospective study of the pattern of antibiotic use in Hawassa University the frequently of single antibiotic prescription was consistent with other studies and the WHO guidelines.[20]

In the study population 33.61% of the enrolled individuals had been wound up in the first visit, of which 10.92% still had the wound in the follow up. About 21.01% of the patients were still undergoing the healing process. Out of 119 subjects, who had visited the hospital for any orthopaedic disorder, 44.53% still continued to have the complaints (like pain, swelling, wound etc.). Also, the remaining 55.47% had fully recovered from the complaints on admission. Same results found in the study on Prescribing Patterns in Outpatient department of Orthopaedics in a Tertiary Care Hospital in Navi Mumbai, by Satpathy A *et al.*, [21]

CONCLUSION

The present study provides us patterns of antibiotic usage in patients admitted in Orthopaedic ward. This can be attributed to the prevalence of gender inequality as a result of which males are preferentially taken to tertiary care institutes for treatment as compared to females with a similar severity of illness. Third generation Cephalosporins were prescribed more frequently Majority of the drugs were given by intravenous route followed by the oral route. Antibiotic prescription in the patients who acutely needed was prescribed appropriately, where it proved to be beneficial. Efficiency of antibiotics can be identified by using the parameters like pain, swelling, wound shows the activity of antibiotics. Antibiotics are more efficient in the case healing the wounds. Recommend for future Research.

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Conflict of interest:
None declared

Ethical approval:
The study was approved by the Institutional Ethics Committee

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