

PRESCRIPTION PATTERN OF ANTIBIOTICS IN PRE-OPERATIVE AND POST-OPERATIVE SURGICAL PATIENTS IN REGIONAL HOSPITALS: A PROSPECTIVE OBSERVATIONAL STUDY

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ABSTRACT

Introduction: Antibiotic is a substance produced by microorganisms, which has the capacity of inhibiting the growth or even destroying other microorganisms. The first antibiotic discovered was called penicillin by Alexander Fleming in 1929. Antimicrobial drugs are the greatest contribution of the 20th century to therapeutics. **Aim:** The aim of this study was to investigate and evaluate the current prescribing trends of most common used antibiotics in pre-operative and post-operative surgery departments in SVS and Sushrutha hospitals. **Methods:** A prospective observational study was carried out at surgical departments in SVS and Sushrutha people's hospitals. Patient's medication charts were used to obtain demographic,

medication and clinical information in both pre and post operative patients. **Results:** A total of 96 patients were included in the analysis. The most commonly prescribed antibiotics in pre and post-operative were ceftriaxone and metronidazole. The most common therapy used in pre-operative was one drug therapy and in post-operative were two drug therapies and recommended dosage form in both was IV dosage form. **Conclusion:** The study indicated that antibiotics prescribed were more before and after surgeries. Antibiotics combination therapy was common instead of using one drug, two drug therapies. Most of the prescriptions include multi drug combination therapy which is not necessary in many conditions.

KEYWORDS: Prescription pattern, antibiotics, Pre-operative, post-operative, combination therapy.

INTRODUCTION

Antimicrobial drugs are the greatest contribution of the 20th century to therapeutics.^[1] Antibiotic is a substance produced by microorganisms, which has the capacity of inhibiting the growth or even destroying other microorganisms (Waksman, 1945). The term antibiotic was first used in 1942 by Selman Waksman. The first antibiotic discovered was called penicillin by Alexander Fleming in 1929.^[2]

The 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 and at the lowest cost to them and their community.^[1]

Antibiotic misuse refers to overuse of antibiotics, with potentially serious effects on health. It is a contributing factor to the development of antibiotic resistance, including the creation of multidrug-resistant bacteria, informally called "super bugs": relatively harmless bacteria can develop resistance to multiple antibiotics and cause life-threatening infections.^[3]

Antibiotic misuse also occurs when patients take shorter than prescribed course of antibiotics, and if a patient takes a reduced number of doses and/or at irregular timings. Recent study shows evidence that low serum drug levels may be 10 associated with an increased risk of selecting resistant mutants for a variety of bacteria.^[4]

Surgical antibiotic prophylaxis is defined as the use of antibiotics to prevent infections at the surgical site. The antibiotic selected should only cover the likely pathogens. It should be given at the correct time. A single dose of antibiotic is usually sufficient if the duration of surgery is four hours or less. Inappropriate use of antibiotics for surgical prophylaxis increases both cost and the selective pressure favouring the emergence of resistant bacteria.^[5]

Prescription pattern analysis issued to determine the prescribing frequency of commonly used antibiotics. Rational drug prescribing is defined as the use of the least number of drugs to obtain the best possible effect in the shortest period and at a reasonable cost.^[6]

The study of prescribing patterns seeks to monitor, evaluate and if necessary, suggest modifications in prescribing patterns so as to make medical care rational and cost effective.^[7]

MATERIALS AND METHODS

A prospective observational study was carried out for a period of 6 months at SVS medical college and hospital & Sushrutha people's hospital. The study pattern includes inpatients of department of surgery diagnosed with surgical illnesses. Study Materials used are Informed consent form, Patient data collection form, Patient case note/prescription.

RESULTS

A total of 96 cases were included in the study, and the cases were divided depending upon the type of surgery.

Table 1.1: Types of Surgeries

Sl.no	Type of surgery	Total number of cases	Percentage
1.	Fractures	30	31.25%
2.	Renal calculus	23	23.95%
3.	Appendicitis	19	19.79%
4.	Hernia	14	14.58%
5.	Diabetic foot	5	5.2%
6.	Ovarian cyst	5	5.2%

A total of 96 cases were observed, among them maximum number of cases i.e 30 were fractures (orthopedic), 23 cases were renal calculus, 19 cases were appendicitis, 14 cases were hernia, 5 cases were diabetic foot and 5 cases of ovarian cyst respectively.

Table 1.2: Prescribing Pattern

Sl.no	Prescribing Pattern	No. of Prescriptions		Percentage %
		Pre-operative	Post-operative	
1.	One drug therapy	54	30	87.5%
2.	Two drug therapy	21	40	63.54%
3.	Three drug therapy	6	13	19.7%
4.	More than three drug therapy	0	5	5.2%

Pre operative: 54 prescriptions contain pre-operative mono drug therapy, 21 prescriptions contain two drug therapy and 6 prescriptions contain three drug therapy.

Post operative: 30 prescriptions contain post operative mono drug therapy, 40 prescription contain two drug therapy. 13 prescription contain three drug therapy and only 5 prescription contain four drug therapy.

Table 1.3: Gender Wise Distribution of Cases

Sl.no	Gender	Number of patients	Percentage of patients
1.	Female	39	40.62%
2.	Male	57	59.37%

The study shows: 39 (40.62%) were female and 57 (59.37%) were males.

Table 1.4: Age Wise Distribution of Cases

Sl.no	Age group	Number of cases	Percentage of cases
1.	1-15 years	6	6.25%
2.	16-30 years	23	23.95%
3.	30-60 years	49	51.04%
4.	>60 years	18	18.75%

Maximum no. Of cases i.e 49 were in the age group of 30-60yrs, followed by 23 cases in 16-30yrs group, 18 cases in >60yrs group and 6 cases in 1-15yrs group.

Table 1.5 Percentages of Drugs of Other Categories Used In Pre-Operative and Post-Operative Surgeries

Sl.no:	Other categories of drugs prescribed	Total number of times prescribed	Percentage
1.	Anti-ulcers	150	23.84%
2.	analgesics	137	21.7%
3.	NSAID'S	84	13.35%
4.	Vitamins	48	7.63%
5.	Anti-infective	41	6.51%
6.	Vaccines	25	3.97%
7.	Sedatives	21	3.33%
8.	Anti-emetics	10	1.58%
9.	Others	113	17.96%

Total number of times the drugs prescribed are: antiulcer 150 (23.84%), analgesics 137 (21.7%), NSAID'S 84 (13.35%), vitamins 48(7.63%), Anti-infective 41(6.51%), vaccines 25 (3.97%), sedatives 21(3.33%), anti-emetics 10 (1.58%) and others found to be 113(17.96%) respectively.

Table 1.6 Most Commonly Prescribed Dosage Forms in Pre and Post-Operative Surgeries

Sl.no	Type of dosage form prescribed	Pre-operative	Post-operative
1.	IV	228	278
2.	Oral	159	204
3.	IM	29	37

Total number of times IV dosage form prescribed in pre-operative surgeries was 228 (54.8%), oral 159(38.2%), IM 29 (6.97%). And in post-operative surgeries IV dosage form prescribed was 278(53.56%), oral 204 (39.30%), IM 37 (7.12%) respectively.

Table 1.7 Most Commonly Prescribed Pre-Operative Antibiotics

Sl.no	Mostly prescribed antibiotics	Number of times prescribed	Percentage
1.	Ceftriaxone	36	28.57%
2.	Metronidazole	21	16.66%
3.	Cefotaxime	21	16.27%
4.	Cefoperazone+Salbactum	15	11.905
5.	Amoxicillin+Clavulanic acid	11	8.73%
6.	Amikacin	10	7.93%
7.	Piperacillin +Tazobactum	6	4.76%
8.	Linezolid	2	1.58%
9.	Ciprofloxacin	2	1.58%
10.	Clarithromycin	1	0.79%
11.	Ofloxacin	1	0.79%

Out of 96 prescriptions, metronidazole 21(16.66%) was found to be mostly prescribed antibiotics in pre-operative, followed by Cefotaxime 21(16.27), ceftriaxone 19(15.07%), Amikacin 19(7.93%). In combination Cefoperazone+Salbactum (zostum) 15(11.90%) was mostly prescribed followed by Amoxicillin+Clavulanic acid (augmentin) 11(8.73%).

Table 1.8. Most commonly prescribed post-operative antibiotics

Sl.no	Mostly prescribed antibiotics	Number of times prescribed	percentage
1	Ceftriaxone	55	29.41%
2	Metronidazole	29	15.50%
3	Amikacin	21	11.22%
4	Cefoperazone+ Salbactum	23	12.29%
5	Amoxicillin+ Clavulanic acid	34	18.18%
6	Cefotaxime	8	4.27%
7	Piperacillin +Tazobactum	7	3.74%
8	Levofloxacin	4	2.12%
9	Ciprofloxacin	2	1.58%
10	Ofloxacin	3	1.60%
11	Cefixime	2	1.06%
12	Clarithromycin	1	0.53%

Out of 96 prescriptions ceftriaxone 55 (29.41%) was most commonly prescribed post - operative antibiotic, followed by metronidazole 29(15.50%), Amikacin 21(11.22%) and

mostly used combination were Amoxicillin+ Clavulanic acid 33(17.64%), Cefoperazone+ Salbactam 23(12.29%).

DISCUSSIONS

In our study male preponderance was seen. Majority of patients were of the age group of 31-60 years which is almost similar to a study by Sharma *et al*^[8], Who stated that majority of cases in his study were between the age group of 30 and 40 years and in other study by Khade A *et al*^[9] who stated that majority of cases were between the age group of 21 and 50 years and one of the plausible reason for this is that it is the productive age group that is actively involved in socioeconomic activities and this might be making them vulnerable to diseases, which may need surgical interventions.^[10]

In the previous study, the most common diagnosis in the postsurgical unit was fracture (n=49) and head injury (n=21).^[11] In study by Bangari *et al*^[12] majority of the patients had appendicitis. The most common diagnosis in our study was fracture (31.25%), renal calculus (23.95%) and appendicitis (19.79%).

In our study Ceftriaxone was the most commonly prescribed as both pre and post-operative antibiotic followed by metronidazole, cefotaxime (preoperative) and amikacin (post-operative). While Amoxicillin - Clavulanic acid was the most commonly prescribed combination. The most common drugs other than antibiotics were antiulcer (tab/inj. ranitidine and inj. pantop) 150 (23.84%), analgesics (tab/inj. Paracetamol and tab/inj. tramadol) 137 (21.7%), NSAID'S(tab. diclofenac) 84, (13.35%), vitamins 48(7.63%), Anti-infectives (tab/inj. metronidazole) 41(6.51%), vaccines 25 (3.97%), sedatives 21(3.33%), anti-emetics 10 (1.58%) and others found to be 113(17.96%) respectively.

In study by Bhansali NB *et al*.^[13] The Most commonly prescribed drugs were Tablet Diclofenac sodium (89.72%), Tablet Ranitidine (68.47%), Tablet Cefixime (64.44%), Injection Ringer's Lactate (63.75%), Injection Dextrose with Normal Saline (63.75%), Injection Dextrose 5% (59.72%), Injection Diclofenac (56.11%), Injection Ondansetron (50.14%). When compared these findings with the study conducted by Salman MT *et al*^[14], which showed that Injection Ceftriaxone was the most common drug used in postoperative patients, followed by Diclofenac sodium in its various forms 35.

In a study by Sapna Patil *et al*^[15], they found the average number of drugs prescribed were 2.5 ± 3.02 . In current study, **Pre operative:** In total 96 prescriptions, 54 prescriptions contain pre-operative mono drug therapy, 21 prescriptions contain two drugs therapy and 6 prescriptions contain three drug therapy. **Post operative:** out of 96 prescriptions, 30 prescriptions contain mono drug therapy, 40 prescription contain two drug therapy, 13 prescriptions contain three drug therapy and only 5 prescription contain four drug therapy.

In study Tripathi *et al*^[16], 2055 antimicrobials were prescribed with 75.91% parenteral formulation. Use of higher number of antimicrobials and parenteral formulations is related to indication, general condition of the admitted patients for midline laparotomy. The most common empirical regimens were Ceftriaxone + Metronidazole and Ceftriaxone + Metronidazole + Amikacin in contrast to Ampicillin + Cloxacillin and Ampicillin + Cloxacillin + Gentamicin in previous reported study.^[8] Ceftriaxone + Sulbactam was most commonly prescribed FDCs in contrast to Ampicillin + Cloxacillin in other study.^[17] In our study, Piperacillin + Tazobactam, Amoxicillin + Clavulanic acid, Meropenem, Linezolid, Vancomycin, Moxifloxacin was used as second line antimicrobials.

In the present study, the total number of times IV dosage form prescribed in pre-operative surgeries was 228 (54.8%), oral 159(38.2%) of same group, IM 29 (6.97%). And in post-operative surgeries IV dosage form prescribed was 278(53.56%), oral 204 (39.30%), IM 37 (7.12%) respectively.

CONCLUSION

In our study, a total of 96 cases were collected and from that we conclude that the mostly prescribed antibiotic in pre-operative was ceftriaxone 36(28.57%), and in post-operative also ceftriaxone 55(29.41%).

The most common type of surgery was orthopaedic 30(31.23%) and the most commonly prescribing pattern in pre-operative was one drug therapy and in post-operative therapy was two drug therapy.

Regarding gender males 57(59.37%) percentage was found to be more than female 39(40.62%) while the patients in age group 30-60 were more 49(51.04%).

Regarding other category of drugs used in pre-operative and post-operative surgeries was found to be antiulcer 150(23.84%), while analgesics were 137 (21.7%), NSAIDS 84(13.35%),vitamin supplements 48(7.63%), anti-infective 41(6.51%) were prescribed.

The most common prescribed dosage form was IV dosage form both in pre-operative and post-operative surgeries as compared to oral.

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