



DRUG UTILIZATION STUDY OF THE ANTIBIOTICS IN POST-OPERATIVE SURGICAL PATIENTS IN A TERTIARY CARE HOSPITAL JODHPUR (WESTERN RAJASTHAN)

Pharmacology

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ABSTRACT

Surgical management cannot be completed without the use of antimicrobial and analgesic drugs because infection at surgical sites is one of the most common causes of postoperative morbidity and mortality but Irrational prescription of drugs leads to unproductive and risky treatment and poses a major risk in present day with favouring the emergence of resistant bacteria. Our main objective was to evaluate the prescribing pattern of antibiotics among post-operative general surgical patients and analysis of these prescriptions, so that such information would help in improving the quality of care provided. A total of 300 patients of either sex and adult age group, who fulfilled inclusion criteria were included in this prospective observational study. Data of patients matching inclusion criteria were recorded after getting informed consent. Data like name, age, sex, diagnosis, ongoing treatment were recorded from patient's case file. These data were recorded in previously prepared Case Record Form (CRF). It was found that Most common surgeries performed were appendicectomy and Inj. Amikacin were maximum prescribed antibiotic. Average number of antibiotics per prescription was 3.64. Average duration of post-operative antibiotic use was 5.77 days and average duration of hospital stay was 8.85 days

KEYWORDS

Antibiotics, Post operative surgical management, Indoor Patients

I. INTRODUCTION

Surgical management cannot be completed without the use of antimicrobial and analgesic drugs because infection at surgical sites is one of the most common causes of postoperative morbidity and mortality.^[1] Irrational prescription of drugs leads to unproductive and risky treatment and poses a major risk in present day medical practice.^[2] Many drugs are used before, during and after surgery in indoor hospital setting.

Surgical site infection (SSI) is the most common post-operative complication and increases the chances of patient morbidity and mortality, it also raises the cost of health services and affect the pharmacoecconomy. SSIs are also the second commonest nosocomial infection accounting for approximately one quarter of 2 million hospital acquired infections in USA annually.^[3]

Among an estimated 27 million surgical procedures, surgical site infections are reported in up to 5,00,000 cases each year.^[2] It has been estimated that 2-5% of patients undergoing clean extra abdominal surgeries and up to 20% of patients undergoing intra abdominal procedures will develop a SSI.^[4]

Antibiotics are powerful and effective tools for fight against infectious diseases, and have saved millions of lives. Rational use of antibiotics is extremely important, their injudicious use adversely affects the patient, cause emergence of antibiotic resistance and increases the cost of therapy. As per the World Health Organization, rational use of drugs requires that patients receive appropriate medications according to their clinical needs, and in doses that meet their own individual requirements for an adequate period of time, and at the lowest cost to them and their community (WHO, 1987).^[5]

Antibiotic prophylaxis is required to prevent post-surgical wound infection. When employed rationally, a significant decrease in the mortality and morbidity along with saving in resources can be achieved. The purpose of antibiotic prophylaxis is to prevent post-operative infections, which are the main cause for morbidity and mortality in patients undergoing surgery. Aseptic techniques alone can decrease but cannot eliminate bacterial contamination of the surgical field. Therefore, the need for antibiotics to supplement aseptic technique becomes more widely accepted.^{[6],[7]}

There are inadequate data on monitoring of possible use or misuse of antibiotics. There is lack of antibiotics utilization studies in surgical

indoor post-operative patients. Hence, the current study was conducted to assess the antibiotics utilization patterns specially in post-operative patients in the inpatient ward of the Department of General Surgery - tertiary care hospital Jodhpur (Rajasthan).

II. AIMS AND OBJECTIVES

The objective of the present study was to evaluate the prescribing pattern of antibiotics among post-operative general surgical patients and analysis of these prescriptions, so that such information would help in improving the quality of care provided.

III. MATERIALS AND METHODS

The study was an observational, prospective study which was done at Department of General Surgery in Mahatma Gandhi hospital, Dr. S. N. Medical College, Jodhpur, Rajasthan. This study was conducted over a period of one year, after approval of Institutional Ethics Committee. Data of patients matching inclusion criteria were recorded after getting informed consent, from patient's case file. Identity of patient was kept confidential.

The collected data were analyzed as under:

1. Demographic profile of study patients.
2. Types of Surgeries with their mean duration of hospital stay.
3. Frequency of individual antibiotic prescribed.
4. Average duration of post-operative antibiotics used.
5. Average duration of hospital stay.

EPI-INFO version 7, statistical software was used for statistical analysis.

IV. RESULTS AND OBSERVATIONS

1. DEMOGRAPHIC PROFILE

1a. Gender (sex) wise distribution of study patients:

Out of 300 patients 177 (59%) were male and 123 (41%) were female (Figure 1).

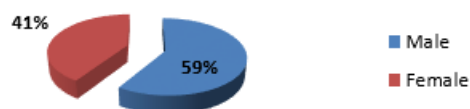


Figure 1 : Gender (sex) distribution of study patients

1b. Age wise distribution of study patients:

Out of 300 patients, maximum patients belonged to age group of 18 to 29 years, i.e. 128 (42.66%), followed by age group 30-39 years- 57 (19%) and age group >59 years- 44 (14.66%). In this study, mean age of male patients was 38.58±16.44 years and female was found 35.90±15.20 years. Mean age of total patients was 37.48±15.97 years (Figure 2).

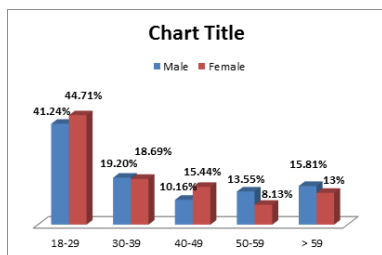


Figure 2 : Age wise distribution of study patients

2. Different Types Of Surgeries With Their Mean Duration Of Hospital Stay

Out of 300 surgeries done, majority of the surgeries were performed for Acute Appendicitis i.e. 78 (26%) in which 56 (18.66%) were open and 22 (7.33%) were Laproscopic Appendectomy. 36 (12%) surgeries were done for Inguinal Hernia in which 27 (9%) were Hernioplasty and 9 (3%) were Herniorrhaphy, 30 (10%) surgeries were performed for Cholelithiasis in which 9 (3%) were open and 21 (7%) were Laproscopic Cholecystectomy. In 27 (9%) patients Exploratory Laprotomy was done. and Other common conditions for which surgeries were performed included Lipoma/Fibroadenoma 18 (6%), Fissure in ano 11 (3.66%), Hydrocele 10 (3.33%), Umbilical Hernia 8 (2.66%).

Mean duration of hospital stay (in days) in decreasing order were 13.11 days for Exploratory Laprotomy, 11.44 days for Open Cholecystectomy, 9.62 days for Umbilical Hernioplasty and 8.28 days for Laproscopic Cholecystectomy. (Table 1, Figure 3)

Table 1: Different types of Surgeries with their mean duration of hospital stay

Type of Surgery		No. of surgeries done	Mean duration of hospital Stay (days)
Appendectomy	Total	78 (26%)	6.37
	Open	56 (18.66%)	6.67
	Lap.	22(7.33%)	5.59
Inguinal Hernia repair	Total	36 (12%)	7.5
	Hernioplasty	27(9%)	7
	Herniorrhaphy	9 (3%)	9
Cholecystectomy	Total	30 (10%)	9.23
	Open	9 (3%)	11.44
	Lap.	21 (7%)	8.28
Exploratory Laprotomy		27 (9%)	13.11
Excision		27 (9%)	7.7
Lord's dilatation		11 (3.66%)	8
Lord's placcation		9 (3%)	7.55
Umbilical Hernioplasty		8 (2.66%)	9.62
Incision & drainage		7 (2.33%)	5
Circumcision		5 (1.66%)	4.4
Trendleburg Procedure		5 (1.66%)	6
Paraumbilical Hernioplasty		4 (1.33%)	9.25
Sabalary Procedure		2 (0.66%)	11
Others		51 (17%)	12.5

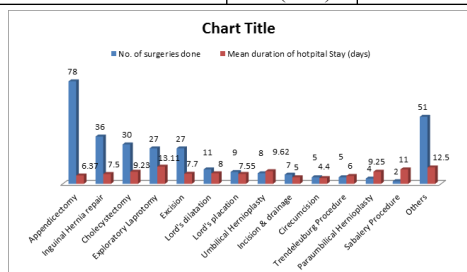


Figure 3: Different types of Surgeries with their mean duration of hospital stay

3. Frequency Of Individual Antibiotic Prescribed

In this study among the different groups of antibiotic used in the postoperative management of surgical patients, Inj. Amikacin were maximum prescribed antibiotic, they were used in 273 patients (91%) followed by ceftriaxone which were used in 182 patients (60.66%), ciprofloxacin 171 patients (57%), metronidazol 165 patients (55%), piperacillin+tazobactam 78 patients (26%) and amoxy-clave 61 patients (20.33%) (Table 2, Figure 4).

Table 2: Percentage wise Distribution of Antibiotics

S.N.	Groups of antibiotics	Number of encounters	Percentage
1. BETA LACTAM			
	Inj. Ceftriaxone	182	60.66 %
	Inj. Piperacillin+Tazobactam	78	26 %
	Inj. Amoxy-Clave	61	20.33 %
	Tab. Amoxy-Clave	20	6.66 %
	Tab. Cefixime	13	4.33 %
	Inj. Meropenam	5	1.66 %
	Inj. Ceftazidime	5	1.66 %
	Tab. Cefadroxil	4	1.33 %
	Inj. Cefoperazone + Sulbactam	4	1.33 %
	Tab. Cefuroxime	1	0.33 %
2. AMINOGLYCOSIDE			
	Inj. Amikacin	273	91 %
	Inj. Gentamycin	8	2.66 %
	Inj. Streptomycin	2	0.66 %
3. QUINOLONES			
	Inj. Ciprofloxacin	171	57 %
	Tab. Ciprofloxacin	9	3 %
	Inj. Levofloxacin	4	1.33 %
	Tab. Ofloxacin	4	1.33 %
4. MACROLIDE			
	Tab. Azithromycin	6	2 %
5. OXAZOLIDINONES			
	Inj. Linezolid	2	0.66 %
7. FIXED DOSE COMBINATION			
	Tab. Ornidazole + Ofloxacin	1	0.33 %
8. ANTIAMOEBIAC			
	Inj. Metronidazol	165	55 %
9. ANTHELMINTIC			
	Tab. Albendazole	2	0.66 %

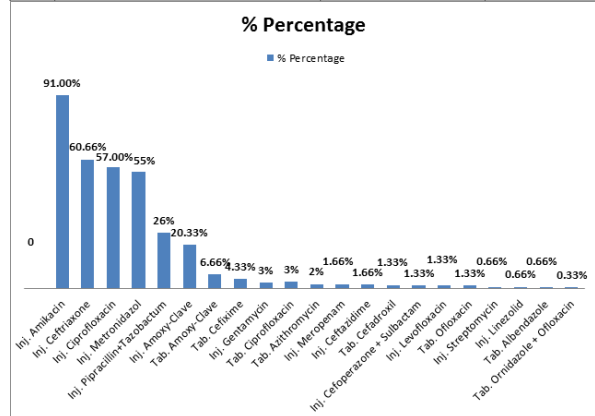


Figure 4: Frequency of individual antibiotic prescribed

4. Average Duration Of Post-operative Antibiotics Used

Majority of patients received postoperative antibiotics for 4 days with a range of 2 to 30 days. Average duration of antibiotic use was 5.77 days (Table 3, Figure 5).

Table 3: Duration of Postoperative Antibiotic

Duration of postoperative antibiotic	Number of encounters	Percentage
2 DAYS	7	2.33%
3 DAYS	35	11.66%
4 DAYS	90	30%
5 DAYS	67	22.33%
> 5 DAYS	101	34.66%

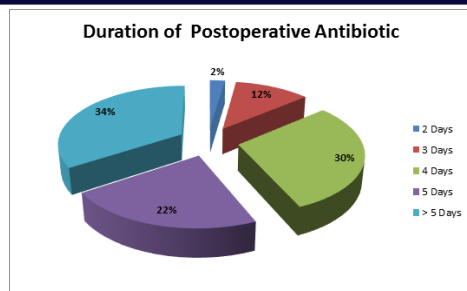


Figure 5: Duration of antibiotic prophylaxis

5. AVERAGE DURATION OF HOSPITAL STAY

Maximum number of postoperative patients (40%) stayed in hospital for 6 to 8 days and the average duration of stay was 8.85 days (Table 4, Figure 6).

Table 4: Average Duration of Hospital stay

Average duration of hospital stay	Number of encounters	Percentage
3 TO 5	78	26 %
6 TO 8 DAYS	120	40 %
9 TO 14 Days	65	21.66 %
> 14 DAYS	37	12.33 %

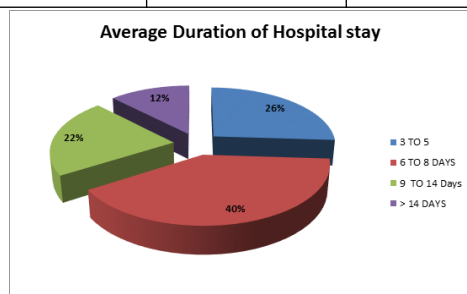


Figure 6: Average Duration of Hospital stay

V. DISCUSSION

We collected data of 300 patients, matching inclusion criteria who underwent surgery and were admitted in postoperative ward, these patients were followed till discharge. Maximum proportion of patients were male 177(59%) which is similar to study done by Kumar et al (61.77%) and Alam et al (63.2%).^{[8],[9]}

In this study 128 (42.66%) patients were in age group of 18 to 29 years. Which is similar to results reported by Patil et al where 62.96% patients were in age group of 18-30 years, whereas in study done by Arshad et al majority of patients were in age group 18-40 years. We found that most of the patients were < 50 years, similar results were reported by Pankaj et al. In contradiction to this, Bhansali et al reported that 57.08% patients were of 40-60 years age group.^{[10],[11],[12],[13]}

The mean duration of post-operative stay was 8.85 days. Maximum patients stayed for 6-8 days with a range of 3 to 37 days. This is similar to study done by Bhansali et al where the mean duration of stay was 8.77 days with a range of 5 to 32 days. Highest duration of stay in our study was seen in patients of Marjolin's ulcer (37 days), Cellulitis (30 days) and Gangrene (31 days). Extended duration of stay represents severity of illness and complications.^[13]

Most common surgery performed was appendicectomy, which was performed in 78 (26%) of patients. This is consistent with study done by Ali et al and Arshad et al, who reported appendicectomy to be the most common procedure in their study i.e. 27.44% and 34.84% respectively.^{[14],[11]}

The second most common surgical procedure done was inguinal hernia repair surgery, which was done in 36(12%) of patients. Study done by Manzar et al, Arshad et al and Sheikh et al reported inguinal hernia surgeries in 9%, 10.63% and 24.13% patients, respectively.^{[15],[11],[16]}

We found that all 300 patients (100%) received antibiotics, Which is similar to studies done by Bhansali et al (100%) and Kumar et al

(100%). The purpose of antibiotics usage in all patients is to prevent postoperative infection at surgical site.^{[13],[8]}

The average number of antibiotics used in our study was 3.64. where as in the studies done by Bhansali et al and Arshad et al, average antibiotics used were 2.95 and 2.0, respectively.^{[13],[11]}

Most common antibiotics used in our study were amikacin (91%), ceftriaxone (60.66%), ciprofloxacin (57%), and metronidazole (55%). These findings are consistent with the findings of various studies conducted by Arshad et al, Sneha et al, Patil et al and Sharma et al respectively. In all these studies antibiotics were also commonly prescribed.^{[11],[17],[10],[18]}

VI. CONCLUSION

The present study was conducted in the Department of Pharmacology in association with the Department of General Surgery in Mahatma Gandhi hospital, Jodhpur (Rajasthan).

Our study gave us a general overview about the use of Antibiotics in post-operative patients in surgical ward.

Most common surgeries performed were appendicectomy (26%), followed by inguinal hernia repair (12%) and cholecystectomy (10%).

Amikacin (91%), ceftriaxone (60.66%), ciprofloxacin (57%), and metronidazole (55%) were the most commonly used Antibiotics.

Average number of antibiotics per prescription was 3.64.

Average duration of antibiotic use was 5.77 days.

Average duration of stay was 8.85 days.

ACKNOWLEDGEMENTS

The authors express their thanks to the Dr. Ajay Malviya, Senior Professor, Department of Surgery, Mahatma Gandhi hospital, Dr. S.N. Medical College, Jodhpur (Rajasthan) for his assistance in conducting the study, wise guidance, critical acumen and timely suggestion.

Funding : No funding sources

Conflict of interest : None declared

REFERENCES :

- Mondal S, Pramanik S, Mallick B, Sengupta M, Niyogi S, Chaudhuri P. A Drug Utilization Study in the Indoor Ward of the Surgery Department of a Tertiary Care Hospital of Eastern India. *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*. 2015 Oct;14(10):42-7.
- Centers for Disease Control and Prevention, National Center for Health Statistics Vital and Health Statistics, Detailed diagnoses and procedures national hospital discharge survey 1994. Vol 127. Hyattsville (MD): Department of Health and Human Services; 1997.
- Martone WJ, Nichols RL. recognition, prevention, surveillance and management of surgical site infections. Introduction to the problem and symposium overview. *Clin Infect Dis* 2001; Suppl 33:67-68.
- Wallace WC, Cinat M, gornick WB, Lekawa ME, Wilson SE. Nosocomial infections in the surgical intensive care unit: a difference between trauma and surgical patients. *Am Surg* 1999; 65:987-990.
- World Health Organization. The World Health Report 1987. Geneva, Switzerland: WHO; 1987.
- Jimoh AO, Etuk EU, Sani Z, Shuaibu HA. The pattern of antibiotic use in a family medicine department of a tertiary hospital in Sokoto, North Western Nigeria. *J Clin Diagn Res*. 2011;5:566-9.
- Talank N, Thomas SM, Koneri R, Arab A. A prospective study on antibiotic utilization in surgery and pediatric department, case study Baptist hospital, Bangalore, Karnataka. *Int J Adv Multidiscip Res*. 2016;3:113-6.
- Kumar R, Kohli K, Sidhu DS, Kaur N, Chandra M, Garg M. An in-depth study of drugs prescribing pattern in the Surgery Department of a Tertiary Care Teaching Institute in Northern India. *Int J Basic Clin Pharmacol*. 2014 August; 3(4):681-6.
- Alam SN, Rehman S, Raza SM, Manzar S. Audit of a general surgical unit: Need for self evaluation. *Pak Journal Surg* 2007; 23:141-4.
- Patil S, Padma L, Veena DR, Shanmukanda P. Drug utilization study of antimicrobials in postoperative wards in a teaching hospital. *Int Res J Pharm App Sci*. 2012; 2:56-9.
- Arshad M, Raghunandan M, Chavan VR, Fayazuddin M. Drug utilization study in post-operative patients in the surgery ward of a tertiary care teaching hospital in south India. *Asian J Pharm Clin Res*. 2018;11(12):124-7.
- Chaudhary P K, Jain A, Maurya A K, Gaurav, Mishra A. usage of antimicrobials in post-operative patients in a tertiary care teaching rural hospital in India. *ejpmr*. 2015;2(4):328-337.
- Bhansali NB, Gosai TR, Dholaria NK. Drug utilization study in post-operative patients in surgical ward of a tertiary hospital attached with medical college. *Der Pharmacia Lettre*. 2013; 5(1):251-7.
- Ali SA, Soomro AG, Tahir SM, Memon AS. Prospective basic clinical audit using minimal clinical data set. *J Ayub Med Coll Abbottabad*. 2010; 22:58-61.
- Manzar S. Inguinal hernias-incidence, complication and management. *J Coll Physician Surg Pak*. 1992; 2:7-9.
- Shaikh R, Jaddi MF, Ali G, Iqbal SA. Patterns of diseases in a surgical unit at Layari general hospital, Karachi. *Med Channel*. 2000; 6:29-31.
- Sneha B, Mathur SK, Sanjay S, Mahesh K, Mukesh S. Auditing of prescription to study the drug utilization pattern in post-operative patients in general surgery wards: A study at a tertiary care hospital. *Int J Pharm Bio Sci* 2016;7:332-8.
- Sharma N, Bhargava M, Mahawar D, Parakh R, Sharma D. Usage of antimicrobials in postoperative patients in a tertiary care teaching hospital in India. *Int J Pharm Res Bio Sci*. 2014; 3:99-105.