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A STUDY ON DRUG UTILIZATION OF ANTIBIOTICS IN SURGICAL WARD OF A TERTIARY CARE HOSPITAL

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ABSTRACT
Surgical Site Infections [SSIs] are the second most common cause of Nosocomial Infections. Antibiotic Prophylaxis is one component of preventive strategy against SSIs that is based on a good surgical technique, strict asepsis in the operating theatre and control of infections within the hospital. The higher rate of SSIs are associated not only with a higher morbidity and mortality, but also with increased medical costs. A prospective study in 150 patients admitted in the medical surgical unit. The relevant was collected from the surgical unit and also from the inpatient medical records. All the prescriptions and the details collected during the particular hospital stay were reviewed. To evaluate the drug prescribing pattern a specially designed proforma containing patient demographic, clinical data and drug data was used. Drugs prescribed, dosage, route, frequency of administration were collected as per proforma. The data was subjected to descriptive analysis using Microsoft Excel. Utilization of different classes of drug as well as individual drugs were analysed and presented as percentage. Out of 150 patients included for the study, 96[64%] were males and 54[36%] were females. The common reason for admission in the general surgery department was found to Appendicitis [27%], followed by Hernia [14%] and Fibroadenoma [8%]. Higher utilization of Cephalosporins [90%] and Aminoglycosides [57%] was noticed. Among the study population 85% received antimicrobial combinations. 68% patients received three drug combinations. ASHP guidelines adherence rate pertaining to the antibiotic uses in surgical prophylaxis was 49% case.

KEYWORDS: Antibiotics, Surgical site infections, Prophylaxis.

INTRODUCTION
Surgical site infections (SSI's) are the second most common cause of Nosocomial Infections. Infections developing at the site of invasive surgical procedures are frequently referred to as *surgical site infections*. Surgical site infection occurs when pathogenic micro-organisms contaminate a surgical wound, multiply and cause tissue damage.

Risk factors
Procedure-related factors. Ex: Implantation of foreign bodies, degree of trauma to host tissues and experience of surgeon. Microbial factors (tissue adherence and invasion).[1]

Table 1: Risk factors of surgical site infection

Patient risk factors	Operative risk factors
Advanced age	Tissue ischaemia
Malnutrition/obesity	Lack of haemostasis
Concurrent infection	Tissue damage (ex: crushing by surgical instruments)
Diabetes mellitus	Presence of necrotic tissue
Prolonged pre-operative stay	Presence of foreign bodies including surgical materials.
Liver and renal impairment	
Immune deficiency state	
Blood transfusion	
Smoking	

Antibiotic Prophylaxis is one of the component of preventive strategy against SSI's that is based on a good surgical technique, strict asepsis in the operating theatre and control of infection with in the hospital or general practice. Prophylactic administration of antibiotics decreases the risk of infection after many surgical procedures and represents an important component of care for this population.[2]

Drug utilization has been defined by WHO as the Marketing, Distribution and Use of drugs in a society with special emphasis on resulting medical, social and economic consequences. A prescription based survey is considered to be one of the most effective methods to evaluate the prescribing attitude of physician and dispensing practice of pharmacists.[3]

Therefore, we have conducted a Study on pattern of antibiotic usage, distribution of antibiotics in surgical ward/unit of tertiary care hospital.

The present study will be analysing the antibiotics drug utilization of a special population of patients admitted to the medical surgical unit of a super-speciality setting.

MATERIALS AND METHODS

Study site: MNR general hospital – Fasalwadi, Sangareddy.
Study design: A Prospective, Cross – section study.
Study duration: Six months from December 2016 to May 2017.

Inclusion criteria

- Any age.
- Patients of either sex.
- Patients who have been through a surgery.
- Patients to whom Antibiotic were prescribed in post operative ward.
- Patient with co-morbid condition.
- Patient operated in emergency

Exclusion criteria:

- Pregnant women.
- Patient who were failing to for a follow up days since the day of discharge.
- Out patients.

Statistical analysis

- The data was subjected to descriptive analysis using Microsoft Excel.
- Drugs were classified into different groups based on WHO-ATC classification.
- Utilization of different classes of drugs as well as individual drugs was analyzed and presented as percentage.

RESULTS AND DISCUSSION

Table 2: Gender Categorization.

No. of male patients	No. of female patients	Total No. of patients
96	54	150

Table 3: Age Group Distribution.

Age Groups(yrs)	No. of patients
0-10	4
10-20	32
20-30	36
30-40	24
40-50	18
50-60	18
60-70	13
70-80	4
80-90	1

Table 4: Disease Pattern Reported.

Diagnosis	No. of patients	% of patients
Appendicitis	41	27
Hernia	22	14
Fibroadenoma	13	8
Hydrocele	12	8
Breast cancer	7	4

Table 5: Distribution of Antibiotics according to Class.

Name of the antibiotic class	No. of patients	% of patients
Cephalosporins	135	90
Aminoglycosides	86	57
Nitroimidazole	83	55
Fluoroquinolones	32	21
Penicillins	24	16

Out of 150 patients included for study, 135(90%) patients were prescribed with Cephalosporins followed by 86(57%) patients were prescribed with Aminoglycosides. 83(55%) patients were prescribed with Antibiotic(Metronidazole- Antiprotozoal). 32(21%) patients were prescribed with Fluoroquinolones. 24(16%) patients were prescribed with Penicillins.

Table 6: Distribution of Antibiotics in study population.

Name of the antibiotic	No. of patient	% of patient
Cefotaxime	133	88
Amikacin	84	56
Metronidazole	83	55
Ceftriaxone	71	47
Gentamycin	30	20
Ciprofloxacin	25	16
Amoxicillin+ clavulanate	19	12

Out of 150 study patient population, most of them were under treatment with Cefotaxime(n= 133 with a percentage of 88%) followed by Amikacin (n= 84 with a percentage of 56%). Other Antibiotics include Metronidazole 83(55%), Ceftriaxone 71(47%), Gentamycin 30(20%), Ciprofloxacin 25(16%) and amoxicillin+ clavulanate 19(12%).

Table 7: Pattern of use of Antibiotics in surgery patients during study period

Prescribing pattern	No.of prescriptions	% of prescriptions
Monotherapy	22	14
Two Drugs Combinations	26	17
Three Drugs Combinations	102	68

Majority of the study participant were prescribed with more than 2 antibiotics or polypharmacy. Out of 150 prescriptions included for the study, 22(14%) prescriptions had antibiotic monotherapy. 26(17%) prescriptions had 2 antibiotic drug combinations. 102(68%) prescriptions had 3 antibiotic drug combinations.

Table 8: Dosage forms used in the study.

Dosage forms	No. of prescriptions	Percentage (%)
Oral	14	9
Intravenous	98	65
Capsules	11	7
Oral+ Intravenous	45	30

In our study we have also taken an account of different antibiotic dosage forms used by the patient population. Out of 150 prescriptions included for the study, most of the patient n= 14(9%) were administered by oral antibiotics. Followed by IV antibiotics n= 98(65%) and capsules were given to n= 11(7%) followed by Oral+IV were given to n= 45(30%).

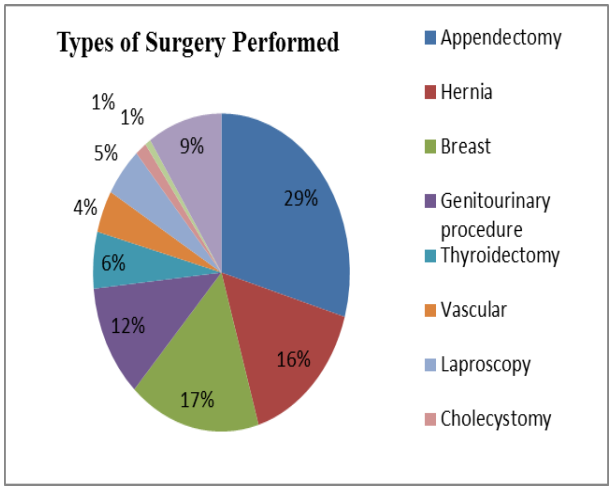

Figure 1:Types of Surgery Performed.

In our study, we have taken account of different types of surgery performedin the patient population. Out of 150 patients, 41(27%) underwent Appendectomy, 22(14%) underwent Hernia followed by 23(15%) underwent Breast related surgeries, 16 (10%) underwent Genitourinary procedure, 8(5%) underwent Thyroidectomy, 6(4%) underwent Vascular, 7(5%) underwent Laproscopy, 2 (1%) underwent.

Table 9: Inappropriate Antibiotic Regimen, Dosage in patients admitted in Surgery Department.

Deviations from Standard treatment guidelines	No.of prescriptions	Percentage(%)
Not recommended as per ASHP guidelines.	73	48.6
Inappropriate antibiotic regimen	60	78
Inappropriate Dosage	11	15

73(48.6%) prescriptions were not recommended as per ASHP guidelines. Out of which 60(78%) were Inappropriate antibiotic regimen and 11 (15%) were Inappropriate dosage.

DISCUSSION

In this study, data suggests that male patients (64%) undergone surgery more than the females and received prophylaxis. Similar results were observed in the study conducted by Rehan HS et al[16]

Higher utilization of Cephalosporins 135 (90%) and aminogylcosides 86 (57%) was noticed, differed from Shankar et al[19]

In our study, third generation Cephalosporins were prescribed to 38% of all the patients who received pre-operative antibiotics, which was inappropriate as per SIGN and ASHP guidelines.

75% of study participants received cefotaxime and 24% received ceftriaxone prior to their surgery.

Over - use of third generation cephalosporins in surgical prophylaxis is alarming and has led to Methicillin - resistant *Staphylococcus aureus* (MRSA) outbreaks.

For surgical prophylaxis it is important to select an antibiotic with narrowest antibacterial spectrum to reduce the emergence of resistance and also because broad spectrum antibiotics may be required later if patient develops serious sepsis.

Therefore, it is recommended that the use of third generation cephalosporins such as cefotaxime and ceftriaxone can be avoided in surgical prophylaxis. Among the study population 85% received antimicrobial combinations. Although the use of two or more antimicrobials in combination may have a certain rationale, their indiscriminate use can have Potentially harmful aspects such as

- emergence of resistant bacteria
- super-infection
- risk of toxicity and allergic reactions
- increased cost of therapy.

Further 20 patients undergoing hernia repairs received pre-operative antibiotics while no such prophylaxis is recommended as per SIGN guidelines.

Metronidazole was commonly used in hepatobiliary and Gastrointestinal surgery, which was inconsistent with the national guideline.

It was noticed that most of the antimicrobial agents were prescribed by brand name which requires revision of current prescribing pattern.

Extensive polypharmacy (100%) that is more than three drugs were prescribed in all the patients. It is difficult to treat patients in the general surgery with multiple co-morbidities with less number of drugs as they require drugs for treatment of specific conditions as well as for prophylaxis, but it is also essential to keep a balance between the number of drugs and effective pharmacotherapy.

CONCLUSION

- In Conclusion, a wide spectrum of clinical diagnoses and a variety of drugs were utilized from various drug classes. Overall, scope for improving Rational use of Antibiotics exists.
- The present study on antibiotics drug prescribing patterns in medical surgical unit can provide a framework for continuous prescribing audit in the surgical unit.
- Pharmacoeconomic studies in the surgical units can encourage cost effective antibiotics drug therapy. This will help in rationalizing prescribing practices based on the feedback from these studies.
- Our study suggests that there is a considerable scope for improving prescribing pattern among the practitioners and minimizing the use of antibiotics in order to reduce the risk of antibiotic resistance of microbes. Providing Education to prescribers and Hospital formulary is required.
- The development of an institutional antibiotic guideline could be more favourable and might gain better acceptance and agreement among surgeons as it would be suited to the local setting.
- In addition, clinical pharmacists should interact with health care professionals to develop and implement a surgical prophylaxis guideline to achieve optimal care for patients.

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