

**PRESCRIBING PATTERN OF ANTIBIOTICS IN SURGICAL  
DEPARTMENT IN A TERTIARY CARE TEACHING HOSPITAL**

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**ABSTRACT**

**Background:** Antibiotics are the recurrently prescribed drugs among hospitalized patients especially surgical department. Extensive and random use of broad spectrum antibiotics has contributed to the emergence of resistance. **Aim:** To assess the prescribing pattern of antibiotics in a surgical department of tertiary care teaching Hospital. **Materials And Methods:** This prospective study was carried out in various surgical departments at Rajiv Gandhi Institute of Medical Science, Kadapa. Data was collected from the patient chart review method which is well suited to identify the prescribing pattern of drugs for surgical patients and their susceptibility pattern. **Results:** In our study, among the total group of 234 patients, 130 (55.55%) were

females and 104(44.44%) were males. The majority of the patients were between the age of 30-40 years. Assessment that, most prescribed antibiotics in surgical department were ceftriaxone. We assessed that a total of 234 patients 38(16.23%) were not received appropriate antibiotic prophylaxis and the patient after surgery, post-operative treatment were not given for 30(12.82%) patients. We have done susceptibility test on 234 cases, in which most of the organism were shown resistance to ceftriaxone and the most prevalent organism in this region were found to be *Staphylococcus aureus*. **Conclusion:** It is necessary to emphasize the rational use of antimicrobials to minimize the misuse of available antimicrobials. In addition, regular antimicrobial susceptibility surveillance is essential for area-wise monitoring of the resistance patterns.

**KEYWORDS:** Antibiotics, Antimicrobial resistance, Surgical prophylaxis, susceptibility test.

## INTRODUCTION

Antibiotic are the substance produced by microorganisms is one of the backbone of modern medical care and become the highly abused drugs, plays a major role in the treatment of surgical department<sup>[1,2,3,4,5]</sup> Surgical management cannot be finalized without the use of antimicrobial, because infection at surgical sites is one of the most common causes of postoperative morbidity and mortality<sup>[6,7,8,9]</sup> Inappropriate /indiscriminate usage of antibiotics used in hospitals leads to ineffective and unsafe treatment, prolongation of illness, disease exacerbation, distress, harm and the emergence of multi drug resistance.<sup>[10,11]</sup>

Antibiotic therapy exterminates not only pathogenic organisms but also the protective normal flora which results colonization of bacteria that are resistant to the original therapy and can also lead lesser outcome.<sup>[12,13]</sup> Antibiotics resistance will reduce the effectiveness of the treatment and increase the risk of public health by reducing their quality of life.<sup>[14,15]</sup> Now a days the patient admitted in hospitals are older, and more immune compromised required appropriate antimicrobial therapy.<sup>[16,17]</sup>

The chance of infection in surgical department is more.so it is important to identify the exact pathogen causing infection before and after the surgery and to check the antibiotic is appropriate/ in appropriate, it will affect the bacterial natural balance by exacting selective pressure and there by driveaj resistance. Some of the possible harms of undiscerning antibiotic prescribing include allergic reactions, adverse reactions and drug interactions.<sup>[18,19]</sup>

Therefore the efforts are required to counteract the rising problem of anti-microbes. So it is extremely imperative to evaluate and monitor the prescribing pattern of antimicrobials from time to time for assisting suitable modifications in prescribing patterns; to increase the therapeutic benefits and also to decrease the resistance pattern for optimizing the quality of life<sup>[20]</sup> So this study was planned as to assess the prescribing pattern of antibiotics in surgical department and the resistance pattern.

## MATERIALS AND METHODS

A prospective study was carried out in surgical department of Rajiv Gandhi Institute of Medical Science (RIMS), Kadapa for a period of 12 months (December 2014-November 2015).

### Study population

Total of 234 patients were included.

### Study design

Prospective study.

### Inclusion criteria

Patients who are willing to participate in the study and who are admitted in various departments i.e., General Surgery, Orthopedics, Ophthalmology, gynecology, ENT were included in the study.

### Exclusion criteria

Patients infected with burns and surgical patients with community acquired infections such as furuncle and patients with infections of an episiotomy will be excluded from the study.

Data was collected from the patient chart review method which is well suited to identify the prescribing pattern of drugs for surgical patients. All the necessary and relevant baseline information were collected on a patient data collection proforma, which include patient demographics like age, educational status, past and present medical/medication history, lab investigation data, Physician medical order sheet. After collection of data, by using sterile gauze, the sample were collected from the patient after surgery and pathogen has identified by using gram staining method, then susceptibility test was performed by using Kirby-Bauer technique, at last zone of inhibition was measured.

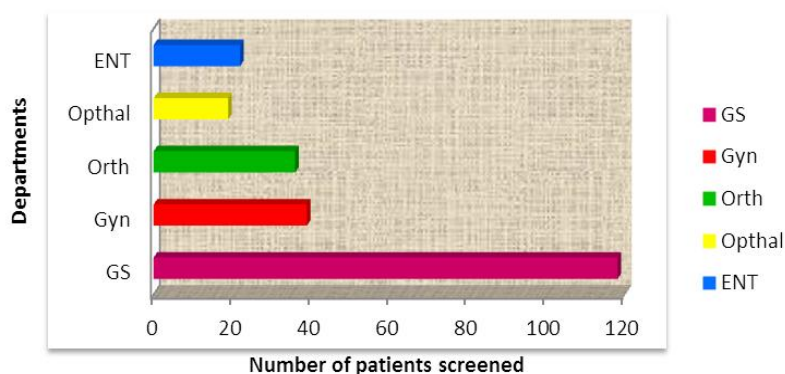
## RESULTS AND DISCUSSION

**Table:-1 Demographic details of the patient in surgical department.**

Variables	Value (%)
Gender	
Female	130(55.55%)
Male	104(44.44%)
Age	
>20	37(15.81%)

20-30	48(20.51%)
30-40	56(23.93%)
40-50	44(18.80%)
<50	49(20.94%)

Figure:-1 Categorization of patients based on various departments



Note: ENT: Eyes Nose Throat, Opthal- ophthalmology, Orth-orthopedics, Gyn-Gynaecology, GS-General Surgery.

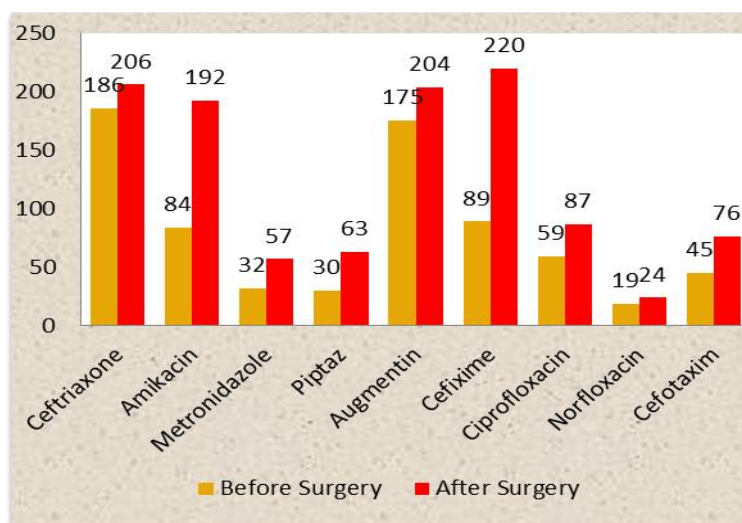


Figure:-2 Frequently prescribed antibiotics before and after surgery.

#### Key Before surgery

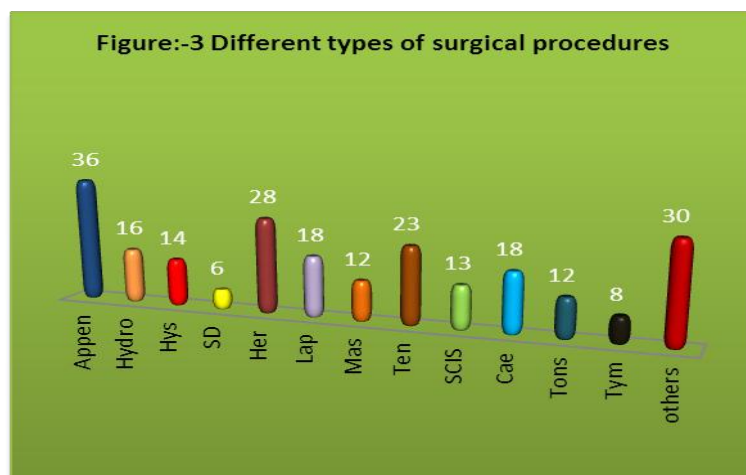
Ceftriaxone > Augmentin > Cefixime > Amikacin > Ciprofloxacin > Cefotaxim > Metronidazole > Piptaz > Norfloxacin.

#### After surgery

Cefixime > Ceftriaxone > Augmentin > Amikacin > Ciprofloxacin > Metronidazole > Piptaz > Norfloxacin.

Table:-2 Antibiotic prophylaxis and treatment in pre and post- operative department.

Preoperative antibiotic prophylaxis	Total number of patients	percentage
Given	196	(83.76%)
Not given	38	(16.23%)
Postoperative antibiotic treatment		
Given	204	(87.17%)
Not given	30	(12.82%)

**Key**

Appen: Appendicitis, Hys: Hydrocelectomy, Hys- Hysterectomy, SD-Surgical debridement, Her-Herniotomy, Lap-Laparoscopy, Mas-Mastectomy, Ten-Tendon repair, SICS (small incisional cataract surgery), Cae-Caesarian, Tons-Tonsillectomy, Tym-Tympanoplasty, others (Ophthalmology and gynecology surgeries)

Table:-3 Antimicrobial susceptibility pattern of bacterial pathogens.

Organism	Antimicrobial Agents								
	Pattern	Cef	Ami	Ge	Am	Cipro	Cefta	Pen	Metro
Staphylococcus n= 51	R	32	17	12	7	25	13	28	35
	S	19	34	39	44	26	38	23	16
Streptococcus n= 22	R	12	16	3	9	15	9	6	NT
	S	10	6	19	13	7	13	16	
E. coli n= 47	R	12	15	19	22	25	9	45	NT
	S	35	32	28	25	22	38	2	
Klebsiella n= 31	R	9	15	6	21	12	4	11	NT
	S	22	16	25	10	19	27	20	
Pseudomonas n= 25	R	21	13	6	4	15	6	16	NT
	S	4	12	19	21	10	19	9	
Pneumococci n= 16	R	13	9	6	3	0	7	6	NT
	S	3	7	10	13	16	9	10	
Gonococci n= 4	R	2	3	0	3	2	1	0	NT
	S	2	1	4	1	2	3	4	

Proteus n= 38	R S	22 16	20 18	13 25	28 10	17 21	14 24	9 29	NT
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**Key**

Cef-ceftriaxone, Ami-Amikacin, Ge-Gentamicin, Am-Ampicillin, Cipro: Ciprofloxacin, Ceft-Cefotaxim, Metr-Metronidazole, R-Resistance, NT- not tested. S-Sensitive, n- number.

A prospective observational study was carried out in 750 bedded hospitals. The study was undertaken to assess the prescribing pattern of antibiotics in various surgical department and the resistance pattern. In our study, among the total group of 234 patients, 130 (55.55%) were females and 104(44.44%) were males. In India, It is notified that female population are reluctant to utilize health care system because of their ill condition and especially their lower socioeconomic status were shown same result in Masterton RG et.al.<sup>[21]</sup> The majority of the patients were between the age of 30-40 years shown in ( Table:-1) It reveals that almost half of the disease was above the age of 30-40 years . Controversial to our study Seheli et.al.<sup>[22]</sup> also stated the same.

We had recruited patients from various department such as General surgery (118), Gynecology(39), Orthopaedics(36), Opthamology(19), ENT(22) departments. In that we assessed that general surgery patients were more when comparing to other department shown in (Figure:-1).The common reason for admitting in general surgery is appendicitis, hydrocele and hernia.

In our study, by analyzing the prescription of antibiotics before and after surgery, the results shown that the most prescribed antibiotics before and after surgery were ceftriaxone followed by Augmentin, Cefixime, Amikacin, Ciprofloxacin, Cefotaxim, Metronodazole, Piptaz, Norfloxacin in (Figure:-2). In the study conducted by Bosu et.al,<sup>[23]</sup> the second most prescribed drug in is cephalosporins.

We assessed that a total of 234 patients admitted in surgical department, pre- operative prophylaxis given patients were 196(83.76%). And 38(16.23%) were not received appropriate antibiotic prophylaxis. The patient after surgery, post-operative treatment were given for 204(87.17%) patients and not given for 30(12.82%) patients shown in (Table:2) . According to Fonseca, the choice of antibiotics correctly choosen were 78.9% and only 29.8% of cases, the antibiotic were appropriate in post -operative period. A study by Maki DG et al<sup>[24]</sup>, reported that 3rd generation cephalosporins (particularly ceftriaxone and

cefotaxime) were the commonly prescribed antibiotics (80%) for all surgeries. In Almomany study<sup>[25]</sup>, 39.4% of patients received antimicrobial prophylaxis for a total duration of 48 hours.

In our study, surgeries done in hospitals during the study period were Appendectomy(39), Hydrocelectomy(16), Hysterectomy(14), Surgical debridement(6), Herniotomy(28), Laparoscopy (18), Mastectomy(12), Tendon repair(23), SICS+PCIOL(13), Caesarian(18), Tonsillectomy (12), Tympanoplasty (8) and others(30). Majority of the patients who are admitting the reason of appendicitis followed by Hydrocelectomy etc shown in (Figure:-3).

We have done susceptibility test on 234 cases, in which most of the organism were shown resistance to ceftriaxone. By assessing susceptibility pattern of 8 antibiotics, the most prevalent organism in this region were Staphylococcus followed by E-coli, Proteus, Klebsillae, pseudomonas, streptococcus, pneumococci, Gonococci in (Table:-3). A similar study conducted in Nigeria by Christopher Ayo Egbe et al<sup>[26]</sup>, supported the result, as staphylococcus aureus was the most commonly isolated bacteria and the study conducted by Mercy J N et.al<sup>[27]</sup>, shown that the most prevalent organism in their country were E-coli.

Majority of patients who were administered ceftriaxone got resistance to 52.56% and the second most one shown resistance were penicillin 51.70% followed by ciprofloxacin 47.44%,Amikacin 46.15%,Gentamicin 28.20%,Cefotaxim 26.92% and Metronidazole were not tested. In other study Acheampong Franklin et al<sup>28</sup>, had observed that ciprofloxacin and metronidazole were the most commonly prescribed antibiotics before and after surgery. Another study reported by Peripi SB et. al<sup>29</sup>,that Aminoglycosides were the most prescribed antibiotics .In the same way Ramesh et .al<sup>30</sup>, reported in their study that beta-lactams were the mostly prescribed drug.

In each area the antibiotic sensitivity pattern may varies depending on the environmental condition and the life style. So it is imperative to check the susceptibility of each antibiotic.

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## CONCLUSION

- ▶ The most commonly prescribed antibiotics in pre and post-operative were third generation cephalosporins, shown resistance to some of the organisms .Penicillin also shown resistance to some of the organism in our study. Antimicrobial pattern will varies from patient to patient, so it requisite of standard antibiotic therapy in surgical department.
- ▶ It is necessary to emphasize the rational use of antimicrobials to minimize the misuse. In addition, regular antimicrobial susceptibility surveillance is essential for area-wise monitoring of the resistance patterns.

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