



A STUDY ON RATIONAL USE OF ANTIBIOTICS FOR PRE AND POST SURGICAL MANAGEMENT

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ABSTRACT

Objective: A study on rational use of antibiotic for pre and post-surgical management. **Methods:** prospective clinical observational study was conducted from a period of six months. Data of our study was collected on the basis of inclusion and exclusion criteria. Data collection forms are used for data entry and analysis after ethical clearance for our study. During the study period, 223 patients were covered, males(152) were receiving more antibiotics compared to females(71) and particularly the age group belongs to 51-70years. Commonly complaining surgical conditions were Appendicitis(22.87%) and Hernia(19.73%) and receiving more antibiotics. Commonly prescribed antibiotics were Cefotaxime155(34.91%) and metronidazole 134(30.18%) in the prescription. Combination antibiotics were Amoxicillin+clavulanic acid (48.73%) and Piperacillin+Tazobactam(46.15%) were mostly prescribed. In dosage forms injection and tablets were more prescribed. Patient who stay in hospital about <5 days are 113 patients(50.67%), about 5 days are 25 patients(11.21%) and >5days are 85 patients(38.17%).**Conclusion:** In our study 444 antibiotics were analyzed and it was found that the most commonly prescribed antibiotic in surgical department was Cefotaxime. The most commonly complaining case in our hospital was Appendicitis. Antibiotic prescription was rational regarding their dose, frequency, time of administration and indication. Clinical pharmacist and clinicians need to play vital role in minimizing the antibiotic associated problems by conducting continuous awareness programs regarding up-to-date prescribing guidelines in the hospital and also can contribute for minimizing the antibiotic resistance.

Key Words:-Antibiotics, Surgery, Appendicitis, Cefotaxime, Metronidazole,

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INTRODUCTION

Infection is defined as an invasion of the tissue by pathogenic microorganism. A pathogenic organism is

one that can establish itself in a host, multiply and result in tissue damage due to release of toxic substances.¹

SUPER INFECTION: The appearance of a new infection as a result of antibiotic therapy use of most antibiotics causes some alternations in the normal microbial flora of the body. Super infections are more common when host defense is compromised.

TYPES OF INFECTIONS:

- 1)PRIMARY INFECTION : Initial infection with organism in host constitute primary infection.
- 2)RE-INFECTION: subsequent infection by same organism in a host is called re-infection
- 3)SECONDARY INFECTIONS: when in a host whose resistance is lowered by pre-existing infectious disease, a new organism setup an infection.

4) FOCAL INFECTION: it is a condition where due to infection at localized sites like appendix and tonsil, general effects are produced.

5) CROSS INFECTION: when a patient suffering from disease and new infection is set up from another host or external source.

6) NOSOCOMIAL INFECTION: cross infection occurring in hospital is called nosocomial infection.

7) SUBCLINICAL INFECTION: it is one where clinical effects are not apparent².

SURGERY is defined as the branch of medicine that employs operations in the treatment of diseases or injury. Surgery can involve cutting, abrading, suturing, or otherwise physically changing body tissues and organs.

TYPES OF SURGICAL WOUNDS

CLEAN: clean wounds are primarily closed and, if necessary, drained with closed drainage. Operative incisional wounds that follow non-penetrating (blunt) trauma should be included in this category if they meet the criteria. **CLEAN-CONTAMINATED:** Specific operations involving the biliary tract, appendix, vagina, and oropharynx are included in this category, provided no evidence of infection or major breaking technique is encountered. **CONTAMINATED:** open, fresh, accidental wounds. In addition, operations with major breaks in serial techniques or gross spillage from the gastrointestinal tract, and incisions in which acute, non-purulent inflammation is encountered including necrotic tissue without evidence of purulent drainage are included in this category. **DIRTY OR INFECTED:** include old traumatic wounds with retained devitalized tissue and those that involve existing clinical infection or perforated viscera. This definition suggests that the organisms causing post-operative infection were present in the operative field before operation.

SURGICAL SITE INFECTION it is defined as the infection at the surgical site. It represents a significant burden in terms of patient morbidity, mortality, and hospital costs which can be prevented using prophylaxis.

CLASSIFICATION OF SURGICAL SITE INFECTIONS: SSI are further classified by the CDC based on their anatomic involvement relating to surgical wounds. 1. Superficial incisional SSI. 2. Deep incisional SSI. 3. Organ/space SSI.

RISK FACTORS FOR SSI

PATIENT RELATED: Extremes of age, Poor nutritional state, Obesity (>20% ideal body weight), Diabetes mellitus, Smoking, Co-existing infections at other site, Bacterial colonization (e.g. nares colonization with *S.aureus*), Immunosuppression (steroid

or other immunosuppressive drug use), Prolonged post-operative stay.

OPERATION RELATED: length of surgical scrub, Skin antisepsis, Pre-operative shaving, Pre-operative skin preparation, Length of operation, Anti-microbial prophylaxis, Operating theater ventilation, Inadequate instrument sterilization, Foreign material in surgical site, Surgical drains, Surgical techniques including homeostasis, poor closure, tissue trauma, Post-operative hypothermia.

ANTIBIOTIC DEFINITION

An antibiotic is a type of antimicrobial substance active against bacteria and is the most important type of antibacterial agent for fighting bacterial infection. Antibiotic medications are widely used in the treatment and prevention of such infections. They may either kill or inhibit growth of bacteria.

GUIDELINES FOR THE USE OF ANTIBIOTICS

- Start or use antibiotics if there is evidence of infection or only when indicated.
- In starting antibiotics it is better not to use any of the new ones, if you are not familiar with their use.
- Antibiotics should not be started in response to patient pressure.
- No antibiotics for viral infection like common cold or diarrhea to satisfy the patients.
- Antibiotics when used given for sufficient long period. Inadequate duration and dose of therapy should be discouraged.
- Do not change an antibiotic before giving the current antibiotic a fair trial.
- Single dose antibiotic therapy for fever without localizing signs should not be given.
- Cost effectiveness of therapy should be considered especially while changing the antibiotics, calculating for the full duration of treatment.
- Wherever possible, culture sensitivity of the sample should be sent before antibiotic treatment started.
- Get a full drug history and history of allergy to the chosen antibiotics, before starting the antibiotics.
- Where possible and indicated, Example: poor response to therapy, repeat culture sensitivity.
- Reserve new antibiotics for situations where serious infections have not or are unlikely to respond to conventional agents.

METHODOLOGY

A prospective clinical observational study conducted in a period of six months by considering the inclusion and exclusion criteria. The data collected from surgical wards of VIMS, Ballari.

The total 223 patients are enrolled in this study. Ethical approval was obtained from the institutional ethics committee of the T.V.M College of pharmacy, Ballari. The data was collected inpatient medical records would be assessed and analyzed.

RESULTS:

A prospective , clinical observational study was conducted in Vijayanagara Institute of Medical sciences regarding rational use of antibiotics for pre and post surgical management over a period of six months.

A total 223 patients were analyzed among them 152 patients were male and 71 were females. Here males more predominant than females. Majority of the study subjects who received more antibiotics were belongs to the age group of 51-70years (68 patients) followed by 13-30years (62 patients) and

31-50 years (57patients). Out of 223 prescriptions cephalosporin class of antibiotics were prescribed more. Andin combination of antibiotics Amoxicillin and Clavulanic acid were prescribed more. Out of 223 patients 113 patients stayed in hospital less than 5 days and 85 patients stayed in hospital more than 5 days .

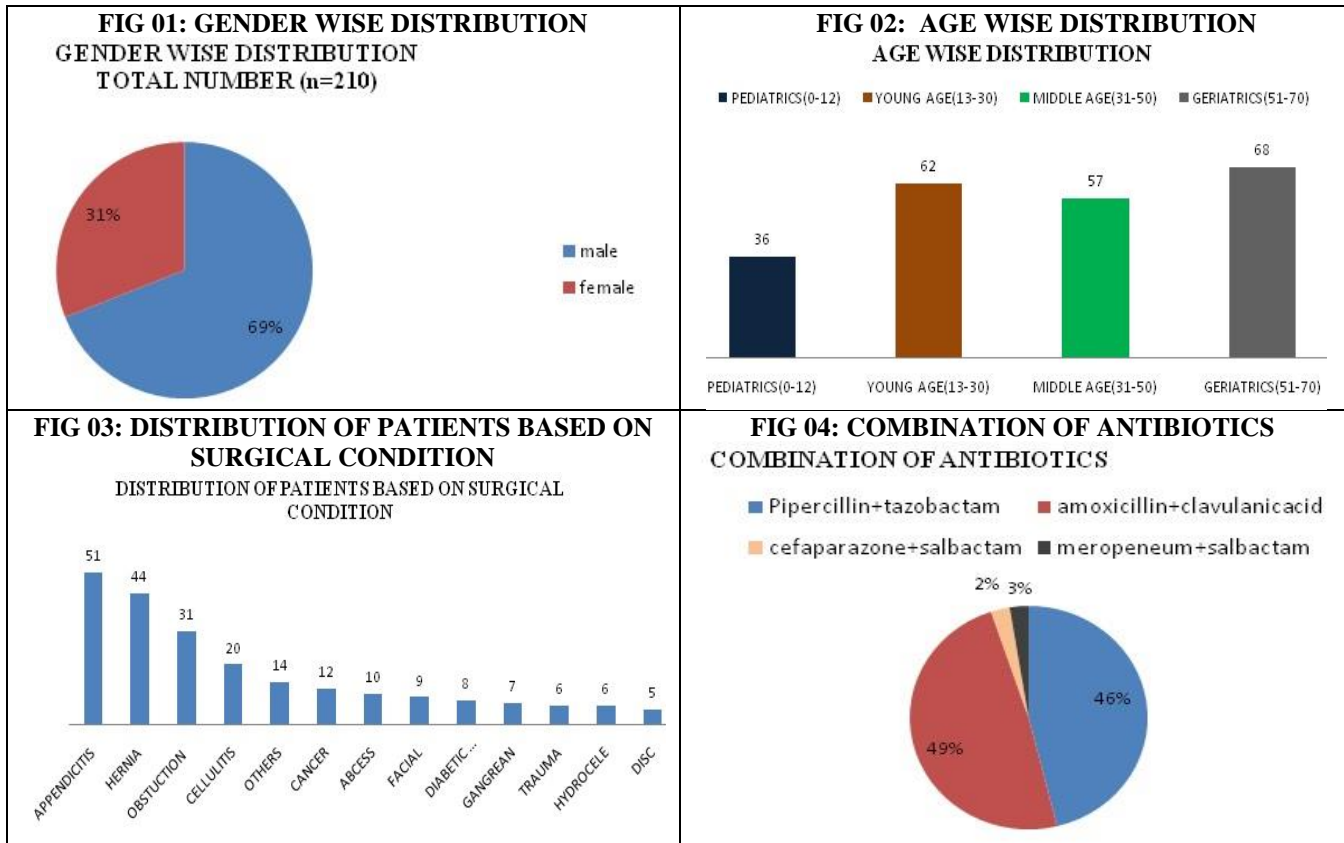


TABLE 01: CATEGORIZATION OF ANTIMICROBIALS

ANTIBIOTIC CLASS	DRUG NAME	NO:OF PRESCRIPTIONS (444)	PERCENTAGE
Cephalosporins	Cefotaxime	155	34.91%
	Ceftriaxone	22	4.95%
	Cefoparazone	1	0.23%
Nitroimidazoles	Metronidazole	134	30.18%
Betalactamaze inhibitors	Tazomac	15	3.38%
	Salbactam	3	0.68%
	Amoxiclav	16	3.60%
	Pipercillin+Tazobactam	16	3.60%
Aminoglycosides	Amikacin	44	9.91%

Fluroquinolones	Ciprofloxacin	19	4.28%
	Levofloxacin	1	0.23%
	Moxifloxacin	2	0.45%
Carbapenem	Meropenem	10	2.25%
Penicillins	Amoxicillin	5	1.13%
Glycopeptides	Vancomycin	1	0.22%

TABLE 02: DISEASE WISE DISTRIBUTION WITH TREATMENT

SURGICAL CONDITION	NO: OF PATIENTS	Percentage	ANTIBIOTICS PRESCRIBED
APPENDICITIS	51	22.87%	Metronidazole(100%),Cefotaxime(70.59%),Ciprofloxacin(27.45%), Amoxicillin+clavulanic acid(9.8%), Amikacin,(9.8%), Piperacillin+Tazobactam(9.8%),Tazomac(9.8%),Ceftriaxone(5.88%).
HERNIA	44	19.73%	Cefotaxime(97.73%),Amikacin(40.91%),Metronidazole(9.09%), Amoxicillin (9.09%), Ciproflaxacin (4.55%), Amoxicillin+clavulanic acid (2.27%), Salbactum(2.27%).
INTESTINAL OBSTRUCTION	31	13.90%	Cefotaxime(83.87%),Metronidazole(80.65%), Amikacin(32.26%)Ceftriaxone(25.81%), Piperacillin+Tazobactam (12.90%), Amoxicillin+clavulanic acid (3.23%), Tazomac(3.23%),Meropenem(3.23%), Vancomycin(3.23%).
CELLULITIS	20	8.97%	Metronidazole(85%)Cefotaxime(50%), ceftriaxone(15%), Piperacillin+Tazobactam(15%), Amoxicillin+clavulanic acid (10%), Amikacin,(10%),Amoxicillin(5%), Ciprofloxacin(10%), Levofloxacin(5%)
CANCER	12	5.38%	Cefotaxime(100%),Metronidazole(41.67%), Piperacillin+Tazobactam (8.33%),Ceftriaxone(8.33%)
ABCESS	10	4.48%	Metronidazole(70%),Cefotaxime(40%), Amoxyclav(30%),Amikacin,(30%),Ciprofloxacin (10%),Ceftriaxone(10%),Tazomac(10%) Meropenem(10%)Cefoperazone(10%)Salbactum(10%)
FACIAL	09	4.04%	Metronidazole(55.56%),Cefotaxime(44.44%) Ceftriaxone(44.44%),Amikacin(22.22%), Piperacillin+Tazobactam (11.11%).
DIABETIC FOOT	08	3.59%	Cefotaxime(62.5%),Metronidazole(50%), Tazomac(50%) .Amoxicillin+clavulanic acid (12.5%) Amikacin(12.5%), Piperacillin+Tazobactam (12.5%),Ceftriaxone(12.5%)

GANGRENE	07	3.14%	Metronidazole(100%),Meropenem(85.71%) Cefotaxime(42.86%),Amikacin(14.29%), Ceftriaxone(14.29%).
TRAUMA	06	2.69%	Cefotaxime(66.67%),Metronidazole(50%), Tazomac(33.33%),Moxifloxacin(33.33%), Amoxicillin+clavulanic acid (16.67%), Pipercillin+Tazobactam (16.67%),
HYDROCELE	06	2.69%	Cefotaxime(100%),Metronidazole(50%), Amikacin(16.67%), Ciproflaxacin(16.67%)
DISC	05	2.24%	Cefotaxim(40%),Tazomac(40%),Amikacin(20%), Amoxicillin(20%),Metronidazole(20%)
OTHERS	14	6.28%	

TABLE 03: COMBINATION OF ANTIBIOTICS

COMBINATION OF ANTIBIOTICS	NUMBER OF DRUGS PRESCRIBED	PERCENTAGE
Amoxicillin + Clavulanic acid	19	48.73%
Pipercillin + Tazobactam	18	46.15%
Cefaparazone + Salbactam	1	2.56%
Meropenem + Salbactam	1	2.56%

TABLE 04: DURATION OF HOSPITAL STAY

NO:OF DAYS	TOTAL NO:OF PATIENTS(n=223)	PERCENTAGE
<5	113	50.67%
5	25	11.21%
>5	85	38.17%

TABLE 05: DOSAGE FORM OF ANTIBIOTICS

DOSAGE FORM	NO:OF DRUGS	PERCENTAGE
Injections	425	97.48%
Tablets	8	1.83%
Syrup	2	0.46%

DISCUSSION:

The present study is to identify the rational use of antibiotics for pre and post surgical management in order to achieve the objectives of the study with the advent of antibiotics and their wide spread use, the incidence of wound infection has come down remarkably. Pre operative administration of antibiotics to prevent post operative infection represents the corner stone in modern medicine. Infections can be prevented when effective concentrations of the drugs are present in the blood and the tissue during and shortly after the procedure. Therefore antibiotic prophylaxis should give just before operation (60min). A single dose of prophylaxis before the surgery was found to be sufficient. If surgery is delayed or prolonged often a second dose is advised if an antimicrobial agent with short life is used. In our study,

out of 223 patients 152 were male (68.16%) and 71 were females (31.84%). Post operative infections were more common within the age group of 51 to 70 years (30.49%) old in our study. Hence age plays an important role in developing infection. Post operative wound infection reflects the hospital stay, in our study average hospital stay was between 5 to 10 days, the patients who stay in hospital about less than 5 days is about 25 patients (11.21%) and the patient is who stays in hospital more than 5 days is about 85 patients (38.17%). In young adults wound healing increase due to their autoimmunity and may be due to infection and co morbidities free and this make them length of hospital stay decrease to 5 days are even less than 5 days. Whereas in geriatric people the wound healing was drastically decreases due to various clinical conditions like immune suppressed and co

morbidities like diabetics, cancer, neuropathic conditions. So the geriatrics patients length of hospital stay may be more than 5 days depends upon the patients surgical conditions. In our hospital most commonly complaining cases were Appendicitis, followed by hernia cases. The commonly prescribed antibiotics to the patients were cefotaxim 155 (34.91%) followed by metronidazole 134 (30.18%). In our study among of all prescribed 444 antibiotics the most prescribed class of antibiotics were cephalosporin 178 (40.09%) followed by metronidazole 134 (30.18%) and beta lactamase inhibitors 50 (11.26%) . Amoxicillin + clavulanic acid 19 (4.27%) and piperacillin + tazobactam 18 (4.05%) were most prescribed antibiotic combination to the operated patients in our study dosage form were prescribed in following order injections 425 (87.48%), tablets 8 (1.83%), syrups 2(0.46%) and capsules 1 (0.23%) were prescribed to the patients.

CONCLUSION:

Antibiotic plays a crucial role inevitable prophylaxis of surgical management . It is necessary to

prescribe antibiotic according to standard guidelines .in our current study 444 antibiotics were analyzed and it was found that most commonly prescribed antibiotic in surgery department were cefotaxime. The most commonly complaining case in our hospital was Appendicitis. Antibiotic prescription were rational regarding their dose, frequency, time of administration and indication. Clinical pharmacist and clinicians need to play vital role in minimizing the antibiotic associated problems by conducting continuous awareness programs regarding up-to-date prescribing guidelines in the hospital and also can contribute for minimizing the antibiotic resistance. They must be aware of the prevalence of various pathogens as well as resistant species in hospital and exercise good judgement in appropriate selection of antibiotic. So measure to be taken to avoid the inappropriate use of antibiotics. Drug utilization review program must be carried out to study reassure the rational use of antibiotics. The usage of standard guidelines should be reinforced for prescribing prophylactic use of antibiotic in surgical ward.

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