

# Evaluation of Prescription Pattern of Antibiotic for Surgical Prophylaxis Use in a Tertiary Care Hospital

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## ABSTRACT

**Objectives:** The aim of this study was to evaluate the utilization pattern of antibiotics for surgical prophylaxis in patients undergone surgery at Government District Headquarters Hospital, Virudhunagar. **Materials and Methods:** This study was conducted for 6 months (May- October 2021). Patients who were more than 18 years of age admitted in general surgical, orthopedic and gynecology wards receiving at least one dose of any class of antibiotics orally or intravenously were included in this study. **Results:** A total of 180 patients were undergoing post operative care during the study period in surgery ward of Government Headquarters Hospital, Virudhunagar. Among 180 patients 34% (62) patients were aged between 31 to 45, 32% (58) patients were aged between 46-60, 18% (32) patients were aged between 18-30, 13% (24) patients were between 61-75, 2% (4) patients were aged between 76-90. **Conclusion:** Reduction of surgical site infections decreases the post-operative morbidity, mortality rate. Combination therapy of antibiotic use gives more success in treat infection when compared with monotherapy use of antibiotics.

**Keywords:** Surgical site infection, Antibiotics, Surgical prophylaxis, Cefotaxime.

## INTRODUCTION

A surgical site infection is an infection that occurs within 30 days after surgery in the part of the body where the surgery took place. Surgical site infections can sometimes be superficial infections involving the skin only. Other surgical site infections are more serious and an involve tissues under the skin, organs, or implanted material.<sup>1-3</sup> Post operative SSI is an important health care associated (HAI) infections to increase morbidity rate in surgical patients. Surgical antimicrobial prophylaxis is one of the pillar to prevent SSI complications by administering an effective antimicrobial agent prior to exposure to contamination during surgery. The major aim of this retrospective study was to investigate the utilization and evaluation pattern of antibiotics for surgical prophylaxis in surgery department of Head Quarters Government Hospital, Virudhunagar. It also aims, to study the Incidence of surgical

site infection, to evaluate the prescription pattern of antibiotics, to evaluate the rational antibiotic use and to assess the surgical site infection develop after surgery.<sup>4,5</sup> Infections after surgery are caused by germs. The most common of these include the bacteria *Staphylococcus*, *Streptococcus*, and *Pseudomonas*. Germs can infect a surgical wound through various forms of contact, such as from the touch of a contaminated caregiver or surgical instrument, through germs in the air, or through germs that are already on or in your body and then spread into the wound.<sup>6</sup> The goal is to prevent the infection and disease of the micro-organism. Patient who are not infected or not developed disease after infection given with prophylactic therapy. Targeted monotherapy of effective and non-toxic drug is given.<sup>7-9</sup>

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## MATERIALS AND METHODS

This study was conducted for 6 months (May- October 2021). The reference number of ethical committee certificate provided for conducting this study was R.NO 110 / HS / GHQH - VNR / SEP 2019. Patients who were more than 18 years of age from general surgical, orthopedic and gynecology wards after surgery receiving at least one dose of antibiotics either orally or intravenously were included in this study. Patient who were less than 18 years of age from ENT post-operative ward, pregnant women and patients receiving antibiotics without undergoing any surgical procedure in surgery department were excluded. The data from the patients were collected using a designed patient profile form or proforma, using which data like age, sex, chief complaints past medical history, past medication history, lab investigation reports, provisional diagnosis, preoperative procedure, surgery details, post-operative follow up data of a patient was collected. Then these data were entered, documented and analysed using Microsoft Excel 2010 and results were discussed.

## RESULTS

Among 180 patients 82 (45.55%) patients were identified as male and 98 (54.44%) patients were identified as females. These findings were shown below in Table 1.

A total of 180 patients were undergoing post operative care during the study period in surgery ward of government headquarters hospital, Virudhunagar. Among 180 patients 34% (62) patients were aged between 31-45, 32% (58) patients were aged between 46-60, 18% (32) patients were aged between 18-30, 13% (24) patients were between 61-75, 2% (4) patients were aged between 76-90.

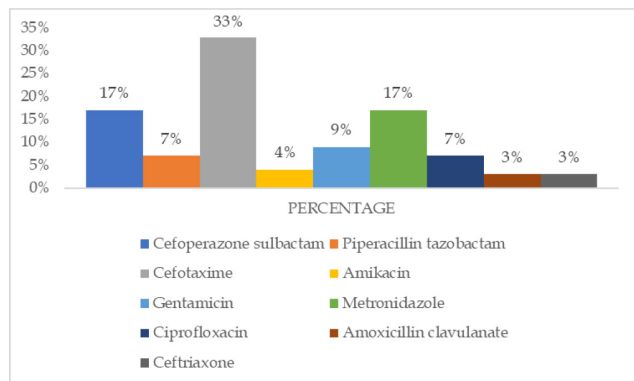
Table 2 and Figure 1 emphasize about the number of antibiotics given for the prophylactic antibiotics used. Among this 180 patients, 33% of study participants receive cefotaxime, 17% receive cefoperazone/sulbactam and metronidazole 7% of patient receive piperacillin/tazobactam, 3% patient receive ceftriaxone and 4% patient receive amikacin and 9% of patient gentamicin and 7% of patient receive ciprofloxacin and 3% of patient

**Table 1: Gender wise distribution to patients on post-operative care.**

Gender	Gender wise distribution	Percentage(%)
Male	82	45.55%
Female	98	54.44%
<b>TOTAL</b>	<b>180</b>	<b>100%</b>

**Table 2: Distribution Based on Surgical Antibiotic Prophylaxis among The Surgical Patients.**

Sl. No.	Name of prophylactic antibiotics used	No. of Prophylactic antibiotics used	Percentage %
1.	Cefoperazone + sulbactam	30	17%
2.	Piperacillin + tazobactam	12	7%
3.	Cefotaxime	60	33%
4.	Amikacin	8	4%
5.	Gentamicin	16	9%
6.	Metronidazole	30	17%
7.	Ciprofloxacin	12	7%
8.	Amoxicillin + clavulanate	6	3%
9.	Ceftriaxone	6	3%



**Figure 1: Distribution Based on Surgical Antibiotic Prophylaxis among the Surgical Patients.**

receive amoxicillin clavulanate.

The comparison between patients receiving monotherapy, poly-therapy and combination therapy were enlisted in Table 3 and Figure 2. 180 patients, 22% of patient receive monotherapy, 52% of patient receive combination therapy, 26.6% of patient receive Poly-therapy.

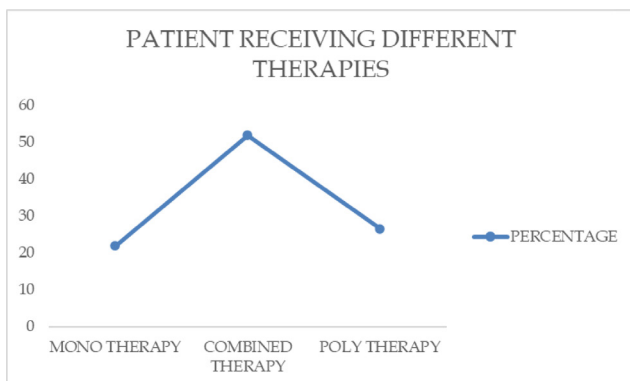
The distribution of antibiotics shown 180 patients 53% of patient receive cephalosporin antibiotics, 13% of patients receive aminoglycosides and 17% of patients receive nitroimidazoles and 7% of fluoroquinolones 10% of penicillin antibiotics were used.

The drugs were classified according to their route of administration; Majority of prophylaxis antibiotic 90% were administered by intravenous route and only 10% were prophylaxis antibiotic given by oral routes.

Correlation between administration of prophylaxis antibiotic and surgical site infection is studied and the results are Table 4.

**Table 3: Comparison between Patient Receiving Mono- Therapy, Combination-Therapy and Poly-Therapy.**

Type of therapy	Name of surgeries	Percentage%
Monotherapy Cefotaxime	ORIF, ICD,	22%
Cefoprazone+Sulbactam	Hemiarthoplasty, TURP	
Combinationtherapy	Repair with graham patch Cholecystectomy	52%
Piperacillin+tazobactam+Metronidazole		
Cefoprazone+Sulbactam+Metronidazole	Anatomises	
Cefotaxime+Gentamicin	B/L Herinoplasty, TKR hydroceleotomy.	
Ceftriaxone+Metronidazole	Haemorrhoidectomy	
Metronidazole+Ciprofloxacin	Fistulectomy	
Cefotaxime+Metronidazole	Vaginal hysterectomy Myomectomy	
	Laparoscopiccystectomy	
Polytherapy	ORIF/TBW	26.6%
Cefoperazone+Sulbactam+Metronidazole+Amoxicillin		
Clavulanate		
Cefoperazone+Sulbactam+Metronidazole+	Appendectomy	
Ciprofloxacin		
Cefoperazone+sulbactam+Metronidazole +Amikacin	Open mesh plasty Open mesh repair	
Cefotaxime+Metronidazole+Amikacin	Appendectomy	



**Figure 2: Comparison between Patient Receiving Mono-Therapy, Combination-Therapy and Poly-Therapy.**

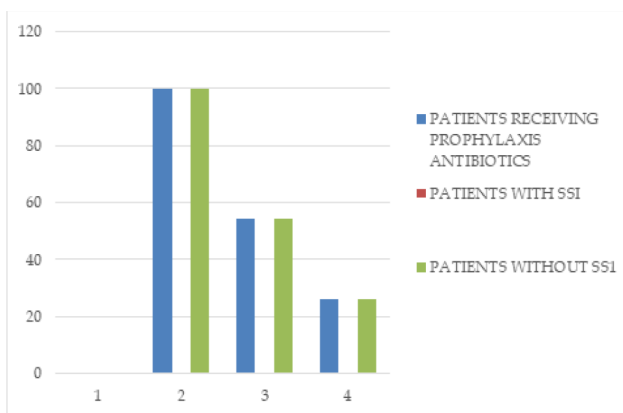
The distribution of patients with and without SSI is given in Table 4 and Figure 3.

**DISCUSSION**

This study aims to evaluate the utilization pattern of antibiotics as prophylaxis in patients undergone surgery. The usage of prophylactic antimicrobial agents has significantly reduced the mortality and morbidity in the post-operative patients. Standard antibiotic prophylactic guidelines recommended the use of these agents prior to surgery. Nowadays, it has been made mandatory to use these drugs to minimize the surgical risk due to infection.<sup>10</sup> The present study was done, to find out the pattern of prophylactic antimicrobial agents that were used in the departments of general surgery, orthopaedics and gynaecology. In this study a total of 180 patients undergoing post-operative care were included.<sup>11-14</sup> In gender wise distribution 98 (54.44%) patients were

**Table 4: Distribution Based on Surgical Site Infections.**

Type of surgery	No. Of patients	Patients receiving prophylaxis antibiotics	Patients with SSI	Patients without SSI
General surgery	100	100	0	100
Orthopaedics	54	54	0	54
Gynaecology and obstetric	26	26	0	26



**Figure 3: Distribution Based on Surgical Site Infections.**

identified as females and are predominant than male. Distribution of patients according to their surgical type and procedure shows the majority of subjects were from general surgery. By this distribution 50% of surgical cases were gastrointestinal.<sup>15</sup> Appendicitis and Hernia are the most common gastrointestinal

diagnosis (48/90) followed by colorectal cases (20/90) and other gastro duodenal procedures (12/90). Majority of prophylaxis antibiotic (90%) was administered by intravenous route and only 10% was administered by oral route.<sup>16</sup> According to the class of antibiotic usage 53% of patient receives cephalosporins. 13% patients receive aminoglycosides and 17% of patients receive nitroimidazoles, 7% patients receive fluoroquinolones and 10% patients receive penicillins.<sup>17</sup> Hence this study shows the prophylactic use of antibiotic in surgery patients to prevent the event of surgical site infection is effective. Mostly antibiotics are prescribed as combined therapy whereas monotherapy is also effective.<sup>18,19</sup> No surgical site infection was reported by any patients during their stay in post-operative wards.<sup>20,21</sup> Joshi DK *et al.* (2017), also studied the evaluation of prescription pattern of antibiotics for surgical prophylaxis, which shown same result as our study without any surgical site infection while using prophylactic antibiotics.<sup>22,23</sup>

## CONCLUSION

Surgical antibiotic compliance was fair below guideline recommendation. Surgical prophylaxis Antibiotic prevent this surgical site infection in both general, orthopaedic and gynaecology surgery 100% prevent surgical site infection after surgery by using prophylactic antibiotics has been observed in this study. Reduction of surgical site infections decreases the post-operative morbidity, mortality rate. Combination therapy of antibiotic use gives more success in treat infection when compared with mono-therapy use of antibiotics.

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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## ABBREVIATIONS

**HAI:** Hospital acquired infection; **SSI:** Surgical site infection; **ENT:** Ear Nose Throat.

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