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A STUDY ON PRESCRIPTION PATTERN OF ANTIBIOTICS USED INPOST OPERATIVE SURGICAL PATIENTS IN A TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

Antibiotics are the most widely prescribed medications in hospitals across the world. However, improper antibiotic administration leads to the development of bacterial resistance, which hastens the establishment and dissemination of resistant germs and has a substantial negative influence on the success of the therapy and speeds up the establishment and spread of resistant germs. This current study is aimed to analyze the prescription pattern of antibiotics in post-surgery patients. The study of prescription pattern is one of the components of medical audit which evaluates the prescribing pattern of health care practitioners as well as it recommends necessary changes in the prescribing pattern to provide best medicine to the patients. Over the course of six months, a total of 150 in patients admitted in the surgery department in a tertiary care hospital were the subjects of this prospective observational, hospital based study. A pre-made proforma was used to collect information on the patient's demographics, diagnosis, medication history and other relevant information. The majority of patients were diagnosed with Hernia, followed by acute cholelithiasis. The highest group of antibiotics prescribed was nitroimidazoles. By understanding the pattern of antibiotic prescriptions, it enables us to utilize antibiotics precisely, which will be a major contribution to the global effort to combat the drug resistance.

KEYWORDS: Prescription pattern, Antibiotic Prophylaxis, Surgical site infection, Antimicrobial resistance.

INTRODUCTION

Antibiotics are the chemicals created by microbes that, at very low concentrations, kill or selectively limit the growth of other germs. Other naturally occurring compounds that inhibit the microorganisms are created by higher forms (such as antibodies) or though by microbes but are required in large concentrations (such as ethanol and lactic acid) are not included in the definition.[1] At the moment, antibiotics are the most often prescribed medications in hospitals around the world. However, improper use of antibiotics promotes bacterial resistance, which has a substantial negative impact on the success of therapy and speeds up the emergence and spread of microorganisms.[3] According to World Health Organization, more than 50% of antibiotics are prescribed, distributed or sold erroneously and as a result, 50% of patients incorrectly ingested their medications. Overuse, underuse and misuse of prescription or over the counter pharmaceuticals are all the examples of irrational medication use. It might also be because of the antibiotic resistance, subpar antibiotic prescriptions, using antibiotics to treat illness that are not caused by bacteria andpoor adherence.[4]

Antibiotic Prophylaxis

A key element of a perioperative infection prevention strategy is systemic antibiotic prophylaxis (AP). The use of antibiotic prophylaxis significantly increases the overall amount of antibiotics administered in hospitals and may contribute to rising antibiotic resistance and medical expenses. Although it is essential in lowering the incidence of surgical site infections, other factors including adherence to fundamental infection control measures, may have a significant impact on these rates.

Surgical Site Infections

An important component of nosocomial infection and a post operative consequence is thesurgical site infection. Operating room, nature, and length of operation, surgical staff, patient physiological conditions and antimicrobial use are all factors that can affect post operative wound infections. Since antibiotics are the most commonly used antimicrobial agents, using these medications wisely is essential to preventing incision infection during surgical procedures.[6] One of the most severe after surgery consequences is surgical site infections (SSI).[7] One significant issue is the increase of infectious

consequences caused by resistant microorganisms. Co-morbidities prior hospitalization with broad spectrum antibiotic treatment, inadequate use and infections with multidrug resistant bacteria are also risk factors. The majority of gram positive bacterial infections can be successfully treated with modern antibiotics.[8]

MATERIALS AND METHODS

In-patients admitted to a tertiary care teaching hospital over a period of six months were the subject of this prospective, observational, and hospital-based study. In a pre-designed proforma, information about the patient's demographics, diagnosis, prescription history, and other characteristics were gathered. The gathered information was evaluated and carefully examined.

Ethical Consideration / Informed Consent Form

The institutional ethics committee gave its clearance before the study could be carried out. After receiving informed consent from the study participants, data was gathered. The collection of samples was done in accordance with moral guidelines.

RESULTS

1. Socio Demographic Details

1.1 Gender wise distribution

Out of 150 patients enrolled in the study, 59 were male patients (39%) and 91 were femalepatients (61%).

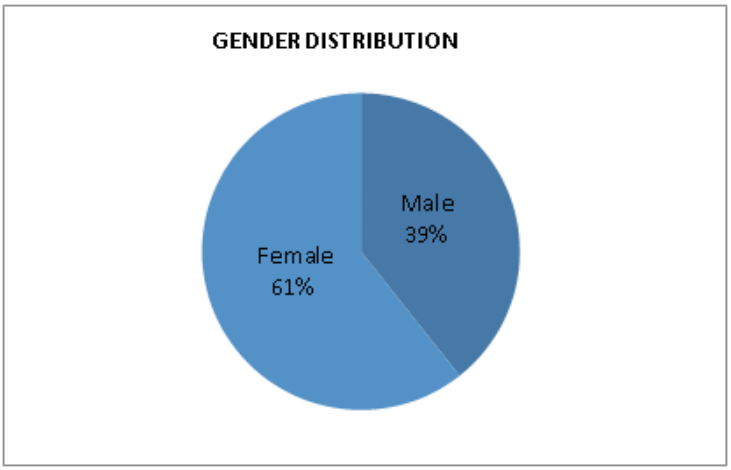

Fig. 1: Gender wise distribution.

1.2 Age wise distribution

Out of 16 patients in the age group of 18-24 years, 10 were female patients and 6 were male patients, 44 female patients and 21 male patients were in the age group of 25-44 years. Out of 44 patients in the age group of 45-60, 24 were female patients and 20 were male patients while 13 female patients and 12 male patients were in the age group of above60 years.

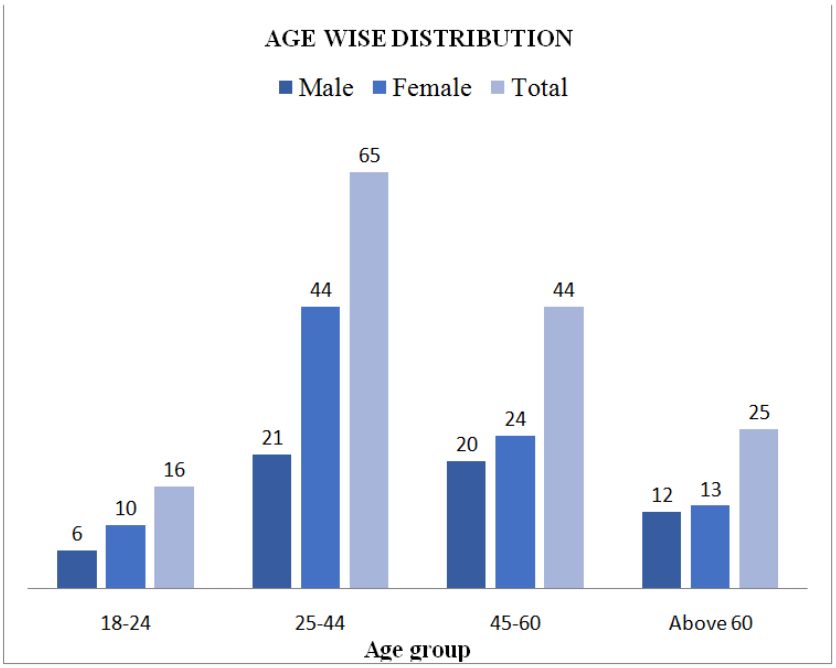

Fig. 2: Age wise distribution.

2. Disease Pattern Reported

Out of 150 patients who were included for the study, 32 patients were diagnosed with hernia, 26 patients had acute cholelithiasis followed by 15 patients with abscess, 13 patients diagnosed with acute appendicitis, 11 patients with carcinoma, 7 with necrotizingfasciitis, 7 with goiter, 6 patients with gangrene, 4 patients with thyroid, 3 patients with peritonitis, 2 patients had Lipoma, 2 patients had carbuncle, 2 with left branchial cyst and 20 patients were included in other diagnosis.

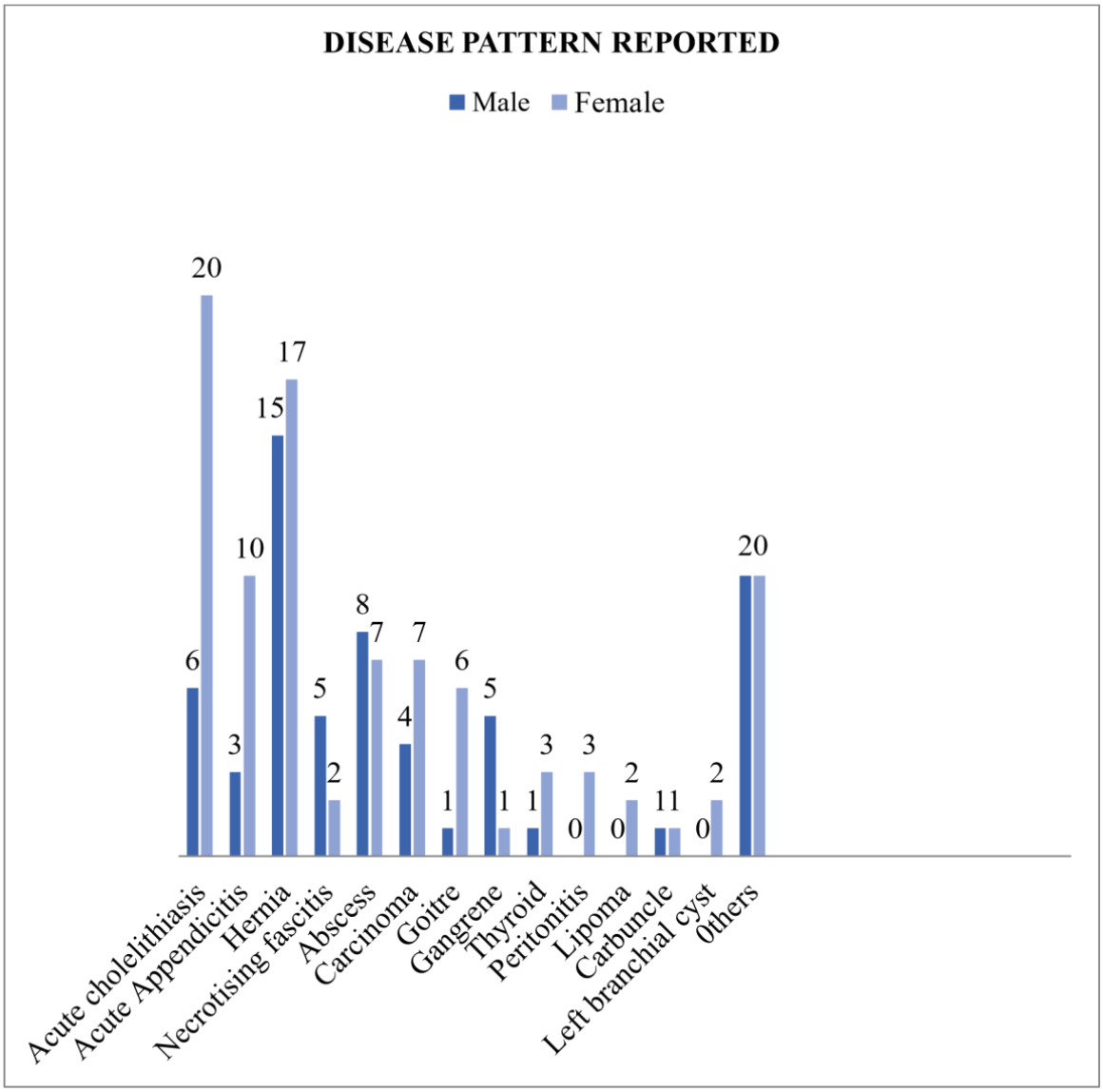

Fig. 3: Disease pattern reported.

3. Surgeries Performed

Among 150 patients, 32 patients had undergone Meshplasty, 26 patients underwent Cholecystectomy, 23 debridement, 15 cases of appendectomy followed by 12 cases of thyroidectomy, 9 patients undergone laparotomy, 5 cases of amputation, 5 cases of radial mastectomy, 4 patients undergone excision, 3 patients undergone dilation under SAB and16 patients underwent other surgeries.

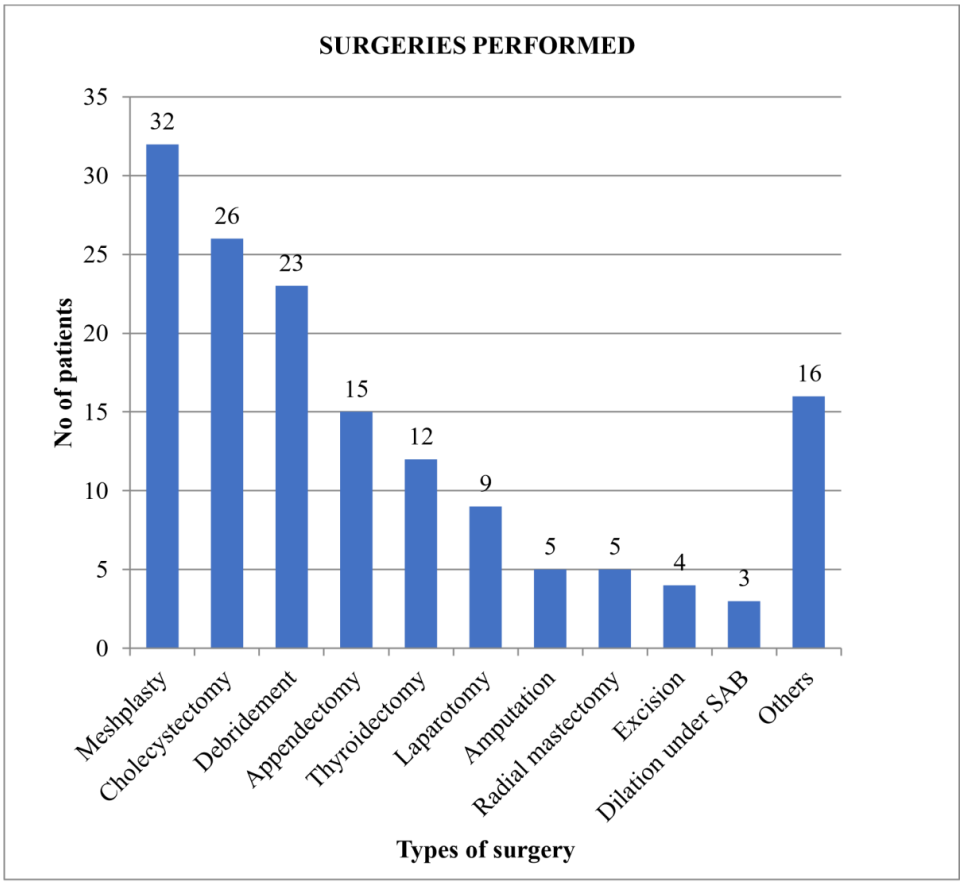

Fig 4: Surgeries performed

4. Antibiotics Prescribed

The highest groups of antibiotics prescribed were Metronidazole (nitrioimidazole). Theprescribing pattern of antibiotics were Metronidazole -95, Piperacillin+ tazobactum-75, cefixime+ ofloxacin- 32, Ceftriaxone-21, ciprofloxacin-10, Amoxicillin + clavulanic acid (Tab) -8, Amikacin-7, cefixime-6, Amoxicillin + clavulanic acid (Inj) - 4,linezolid-2, Ceftriaxone(Tab)- 2, Meropenem-1, and Levofloxacin-1.

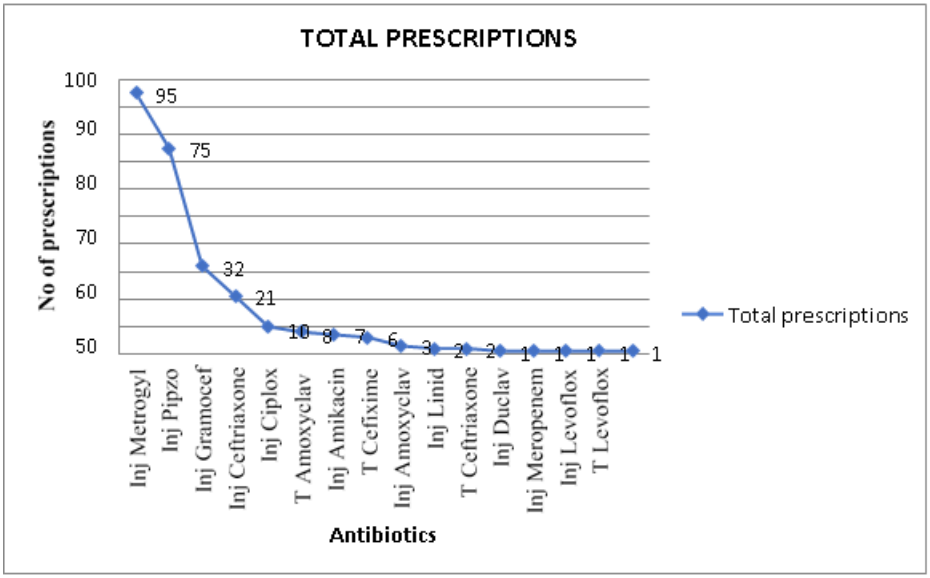

Fig. 5: Antibiotics prescribed.

5. Prescribing Pattern of Antibiotics

Out of 150 prescriptions involved in the study, 108 (72%) drugs were prescribed by brandname and the remaining 42 (28%) drugs were prescribed by generic name.

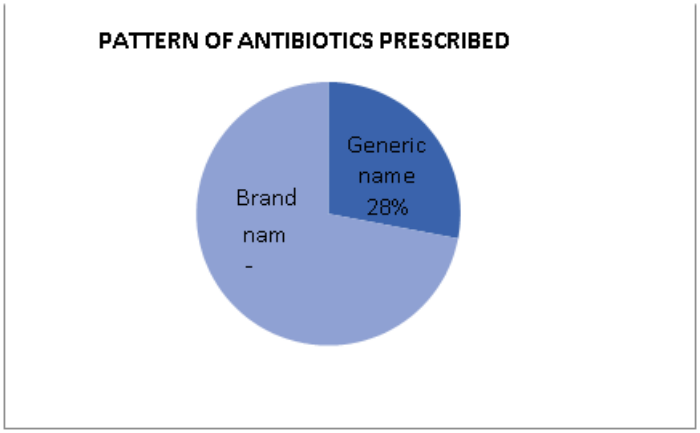

Fig. 6: Prescribing pattern of antibiotics.

6. Dosage Form Used

Out of 150 prescriptions included in the study, 118 antibiotics were prescribed intravenously and 32 antibiotics were of oral use.

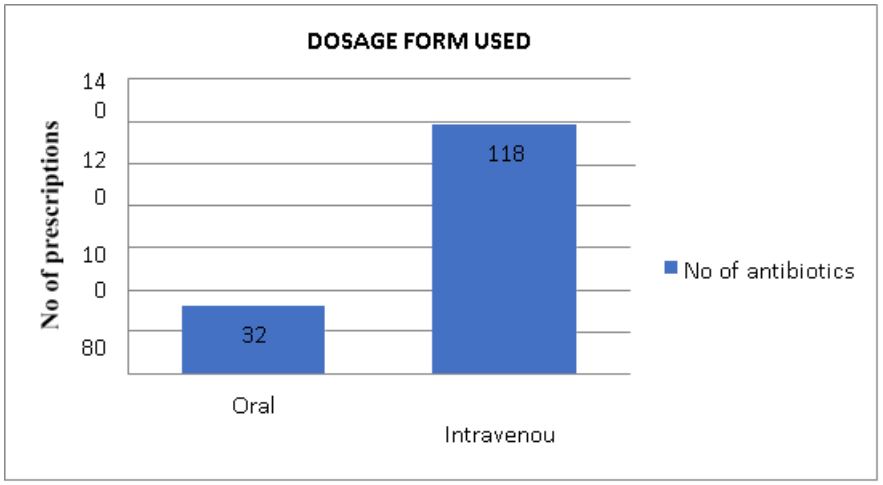

Fig. 7: Dosage form used.

7. Antibiotics Prescribed For More Than 8 Days

Inj linid was prescribed for 10 days in one patient, Inj pipzo was prescribed for 8 days in 13 patients, Tab cefixime was prescribed for 8 days in one patient, Inj metrogyl was prescribed for 8 days in 4 patients and Inj amikacin was prescribed for 8 days in one patient.

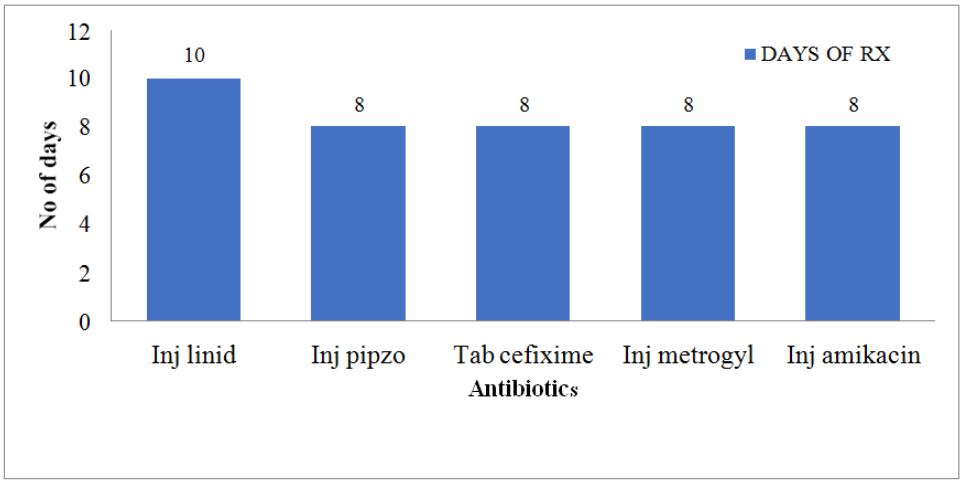

Fig. 8: Antibiotics prescribed for more than 7 days.

8. Use of Antibiotics

Out of 150 prescriptions included for the study, 64 prescriptions had two drugs therapy,42 prescriptions had three antibiotic drugs combination, 34 prescriptions had antibiotic monotherapy and 10 prescriptions were more than three antibiotic combinations.

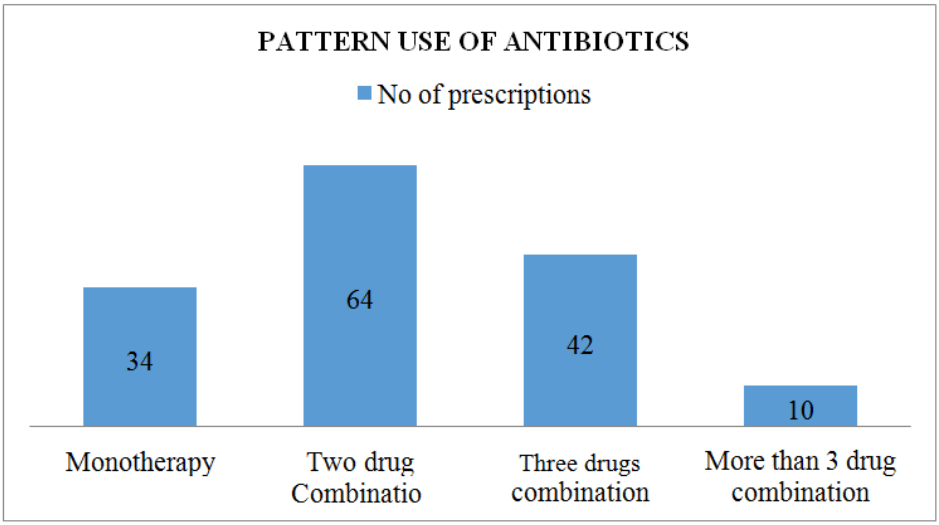

Fig. 9: Pattern use of antibiotics.

9. Common Microorganisms Isolated In Patients Based OnCulture Sensitivity Test

Out of 150 patients in the study, only 25 culture sensitivity tests were conducted. Based on the common organisms isolated in the patients based on culture sensitivity tests, Staphylococcus aureus is the most common isolated organism that caused infection in the population.

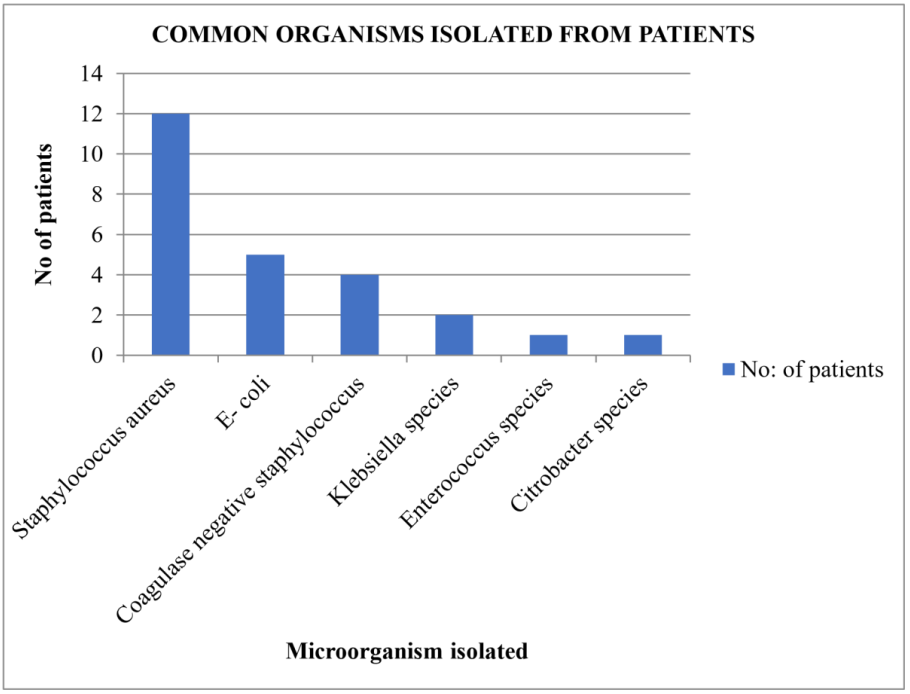

Fig. 10: Common organisms isolated in the patients.

10. Sensitivity Pattern of Isolated Organisms to TestedAntibiotics

Based on the culture sensitivity tests of 25 patients, Amoxicillin is the most sensitive antibiotic in most of the organisms and based on the sensitivity pattern isolated organism to tested antibiotics of Staphylococcus aureus is sensitive to more number of antibiotics.

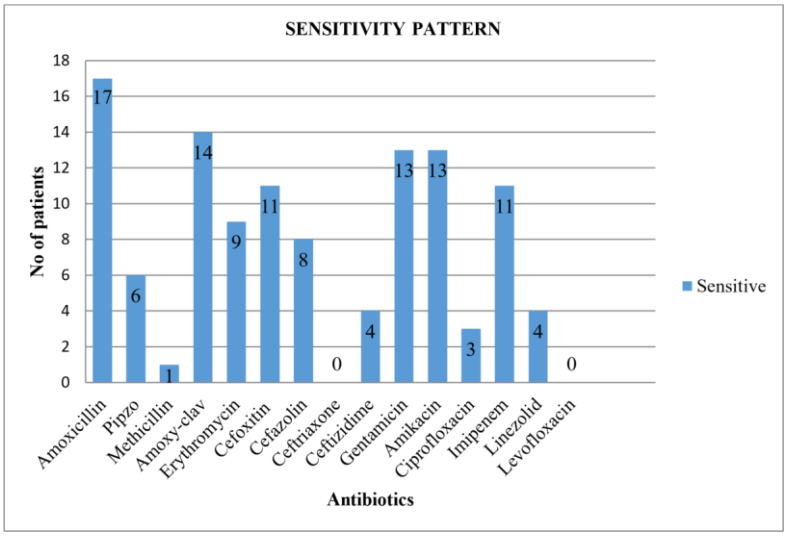

Fig. 11: Sensitivity pattern.

11. Resistant Pattern Of Isolated Organisms To TestedAntibiotics

Based on the culture sensitivity tests, Ciprofloxacin is the most resistant antibiotic in more number of organisms. Based on the resistant patterns, isolated organism tested to antibiotic, E-coli is resistant to more number of antibiotics prescribed. Amp C, beta lactamase producers are resistant to penicillin, 1st, 2nd and 3rd generation cephalosporin.

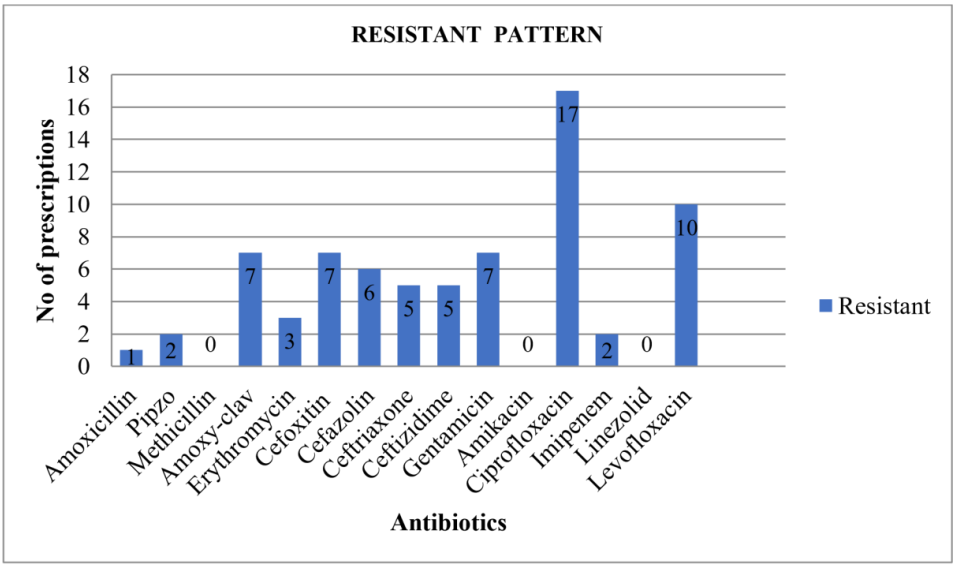

Fig 12: Resistant pattern

DISCUSSION

This prospective study attempts to assess the general pattern of how antibiotics are used in surgical wards. The study was conducted for the duration of 6 months, in which 150 patients were enrolled in accordance to the study inclusion criteria. This study was undertaken to review the prescribing pattern of antibiotics being used after surgical procedures.

In our study most of the hospitalization were due to Hernia i.e., 32 patients (21.3%), followed by Acute cholelithiasis i.e., 26 patients(17.3%), cases of abscess 15 patients (10%) and 13 patients (8.7%) were admitted due to Acute appendicitis and minimum number i.e., 20 (13.3%)patients had other surgeries such as gastritis, Anal stenosis, Baker's cyst, Fistula, Diveticulitis, Chronic pancreatitis. A similar study was conducted by.[16] Asawari Rauti, Tirzah Cherian in the surgery department of a tertiary care hospital showed that out of 160 patients in their study, 33(20.62%) patients had hernia and the minimum number i.e., 11 (6.87%) patients had other surgeries such as goiter, colostomy and intestinal obstruction.

The highest number of surgery performed was Meshplasty (21%) followed by Cholecystectomy (17%), debridement (16%) and appendectomy (10%). The most commonly prescribed antibiotics were Inj metrogyl-

35.84% followed by Inj piperacillin + tazobactum-28.3%. Compared to another study by Asawari Rauti, Tirzah Cherian[16] in the surgery department of a tertiary care hospital, the most commonly prescribed antibiotics were third generation cephalosporin 28.23%, 23.56% penicillin and then 19.95% metronidazole. The average number of drugs per prescription is an important parameter in prescription audit. In our study, the average number of antibiotics prescribed in surgery department was 3 per patients.

Out of 150 prescriptions, 72% of antibiotics were prescribed by brand name and the rest 28% is prescribed by the generic name. Similarly another study conducted by Devesh Kumar Joshi, Mohd Rizwan,[15] (Uttarakhand), out of 100 prescriptions in their study, 88% drugs were prescribed by brand name and 12% drugs were prescribed by generic name. Although it is reasonable and cost-effective to prescribe medications by their generic names, very few antibiotics have actually been done so. Details of antibiotic prescription with respect to mention of dosage, frequency, duration of use and whether such use was based on documented culture sensitivity reports are presented. Inappropriate use of antibiotics are observed in our study that is in a total of 150 patients, for 8 (5%) patients dose were not mentioned, duration was not mentioned for 15(10%) patients and susceptibility pattern was not defined in 125(83%) patients. Only 25 culture sensitivity tests were conducted among 150 patients of which the common organisms isolated in the patients based on culture sensitivity tests was Staphylococcus aureus.[20] Compared to another study conducted by Lalwani T. et.al, most common isolate were klebsiellia followed by S.aureas, E. coli which are resistant to ampicillin, amoxicillin, carbenicillin, ceftriaxone, cefuroxime, ceftazidime and cefotaxime and sensitive to levofloxacine, gatifloxacine and amikacin. The lack of reporting on cultural sensitivity thus emphasizes the fact that most prescribers did not comprehend the significance of de-escalationin the end. This serves as a kind of target for any education-related activities that might later be developed as part of an antibiotic stewardship program.

CONCLUSION

One of the main goals of medical practice is to ensure the appropriate use of antimicrobial medications. When antibiotics are used carelessly and inappropriately, which results in treatment failure and antibiotic resistance develops. Antimicrobial resistance in hospitals should be avoided by implementing interventions such monitoring antibiotic use, assessing prescription pattern trends, and planning and implementing antimicrobial stewardship customized to the particular needs of the institutions. Our investigation revealed patterns of polypharmacy in antibiotic prescriptions. Unsafe prescriptions are avoided by strictly adhering to accepted treatment recommendations. Since more antibiotics were administered under their brand names than their generic names, the prescription pattern needs to be improved. In the surgery department, each patient received an average of 3 antibiotic prescriptions. The most commonly used antibiotic after surgery was metronidazole and piperacillin + tazobactum. It is recommended to enhance the use of culture sensitivity tests since they can be used to determine the organisms that are the source of a patient's infection as well as their susceptibility or resistance to treatment. Our study is a step towards a more thorough and accurate evaluation of the safety and effectiveness of the antibiotic prescription patterns given to post-operative patients in the surgical ward.

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