International Journal of Pharmaceutical and Clinical Research
Online ISSN: 2664-7605; Print ISSN: 2664-7591; Impact Factor: RJIF 5.44
Received: 04-01-2020; Accepted: 21-01-2020; Published: 09-02-2020
www.pharmaceuticaljournal.in
Volume 2; Issue 1; 2020; Page No. 06-10

A perioperative antimicrobial used in different types of surgery: A prospective approach

Aarti[1], Kamal Saini[2*], Rajveer Singh[3], Ashish Sharma[4], Vartika Jain[5], Shambaditya Goswami[6]
[1,3,4,6] Department of Pharmacy Practice, NIMS Institute of Pharmacy, NIMS University, Jaipur, Rajasthan, India
[2-5] Clinical Pharmacist, NIMS HOSPITAL, NIMS University. Jaipur, Rajasthan, India

Abstract
Background: The irrational use of drugs is more likely used now a day in medical practices and its bad impact include ineffective treatment, development of resistance to antibiotics, adverse effects and pharmaco-economic burden on patients and society.
Objective: The Various Antimicrobial agents used as surgical prophylaxis in different types of surgeries.
Methods: The prospective study was carried out using a data collection form and patient consults form on the in-patients undergoing surgery. A total of 66 were enrolled during this period of study.
Result: A total out of 66 patients, 25 were male and 41 were female patients. The Age of Patients was in between 51-60 year. Cephalosporin antibiotics were more often prescribed in the surgery than other anti-microbial and Amikacin was second most prescribed.
Conclusion: Ceftriaxone was mostly prescribed antibiotic in the surgery and is the drug of choice in the hospital. Most of the surgery cases occurred in the surgery ward was cholestasis, in which ceftriaxone was used because of its pharmaco-economic value as well its efficacy.

Keywords: drugs, surgical prophylaxis, antimicrobial agents, antibiotics, rational use

Introduction
Now-a-days, the irrational use of drugs is an obstacle in clinical practices. The consequences include ineffective treatment, development of antibiotic resistance, adverse drug reactions, drug-drug, drug-food or drug-other chemical interactions and pharmaco-economic burden on patients and society. Even though, there are some awareness programs on rational use of drugs conducted by EM of WHO which are being promoted by various national and international agencies working in health sectors such as MSF, INRUD, Ecumenical MN, DSPRUD, CSRUISM, EDM Department of WHO, etc., but irrational application of drugs is still a common practice [1]. Antibiotics are the most commonly prescribed drugs among hospitalized patients, especially in the patients of the surgical department [2]. Appropriate antibiotic prophylaxis has been shown to be effective in reducing the incidence of surgical site infections [3]. Prophylactic antibiotic treatment decreases the risk of infection after many surgical procedures and represents a vital integrant for the care of this population [4]. Surgical antimicrobial prophylaxis is an initial administration of an antimicrobial agent prior to surgery in order to prevent surgical site infections [5]. It has been reported that approximately 5% of patients undergoing a surgical procedure developed by Kirkland [6]. Surgical antibiotic prophylaxis (SAP) is defined as the use of antibiotics to prevent infections at the site of surgery. Selection of antimicrobial agents depends on the pathogen most likely to cause of an infection. The selected antibiotic should only cover the likely pathogens. It should be given at the accurate time, dose and frequency [7]. SAP is in some cases unable to prevent infections that may lead to sepsis, organ failure, and death during hospital stay. In spite of huge advances in antiseptic measures, antibiotics, and preoperative precautions, surgical site infection (SSIs) still have the high probability of morbidity and mortality [8].

Surgical site infections are defined as infections that occur near or at a surgical incision within 30 days of the surgery, and are a major cause of morbidity in patients that have undergone surgery [9]. Surgical antibiotic prophylaxis refers to the short-term administration of antibiotics prior to surgery, and has clearly been shown to reduce the incidence of surgical site infections [10]. Prophylaxis with antibiotics has been shown to be effective in many procedures, including gastrointestinal, oropharyngeal, vascular, open heart, obstetric and gynecological, orthopedic. The clear recommendations and guidelines are available for prophylactic antibiotic therapy [11]. This prophylactic therapy is very essential in operations in which minimal microbial contamination of the surgical site is expected, e.g., clean Class I surgical wounds [12-13]. General principles of antibiotic prophylaxis indicate that the first dose should be given before the incision, the antibiotic should be effective for the causative organism of the potential infection, a full therapeutic dose should be administered, and antibiotics should be continued no longer than 24 h after the procedure is completed [14].

Principle of surgical antibiotic prophylaxis
- The antibiotics chosen for prophylaxis can be those used for active treatment of infection.
- Patients with a history of anaphylaxis or urticaria or rash

occurring immediately after penicillin therapy are at increased risk of immediate hypersensitivity to penicillin and should not receive prophylaxis with a β-lactam antibiotic.

- Prophylaxis should be started preoperatively in most circumstances, ideally within 30 minutes of the induction of anesthesia.
- Antibiotic prophylaxis should be administered immediately before or during a procedure.
- Prophylactic antibiotics for surgical procedures should be administered intravenously.
- The single dose of antibiotic for prophylactic use is, in most circumstances, the same as would be used therapeutically.
- An additional dose of prophylactic agent is not indicated in adults, unless there is blood loss of up to 1500 ml during surgery or hemodilution of up to 15ml/kg.

Materials and methods

The present prospective and observational study was carried out using a self-prepare data collection form and patient consults form on the inpatients undergoing surgery who are admitted to the surgery departments of a tertiary care teaching hospital of Jaipur District. The study was carried out for a period of 6 months based on following inclusion and exclusion criteria.

Inclusion criteria

- Patient's undergone surgery in surgery department.
- Patients of age above 10 years of either gender.
- Patients who were willing to participate in the study.

Exclusion criteria

- Lactating and pregnant women.
- Patient of age below 10years.

Data collection

All the data regarding the Demographics, chief complaints, current diagnosis, medical history, type of surgery, dose, time and duration of surgery, Antimicrobial prescribed (dose, dosage form, time of, frequency administration route and duration of treatment) was collected in a suitably designed patient profile form.

Source of Data

- Medical case sheets
- Patient medication record
- Nursing charts
- Surgery notes
- Investigation reports

Statistical analysis

Study had done to view and record the data; prospective study had done to check the outcome and descriptive statistics had applied on the study to collect the data using Microsoft excel SPSS software; and the results were applied in percentage.

Result

Table 1: Frequency of age group

Age Group	Frequency
11-20	3
21-30	5
31-40	4
41-50	10
51-60	24
61-70	13
71-80	5
81-90	1
Total	66

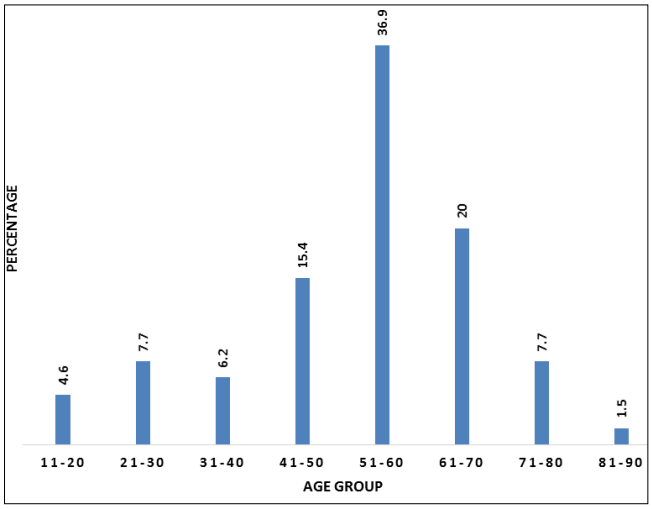

Fig 1: Percentage of age group

Result: As reported in table no.1, the maximum numbers of patients enrolled in this study at surgery department were found to be in the age group of 51 to 60

Table 2: Frequency of surgery

S no.	Name of Surgery	Frequency
1	Acute Appendicitis	1
2	Acute Appendicitis renal calculi	1
3	Acute Cholecystitis	2
4	Acute Epididymitis	1
5	Appendicitis	5
6	CA of right breast	1
7	Cholelithiasis	20
8	Cholelithiasis with Appendicitis	1
9	Chronic pancreatitis	7
10	Colloid goiter	2
11	Epididymitis	3
12	Hemorrhoids	2
13	Hernia	8
14	Hypothyroidism	1
15	Liposarcoma	2
16	Lump breast	1
17	Lymphoma	1
18	Ulcer in leg	5
19	Scrotum surgery	1
20	Osteomyelitis	1

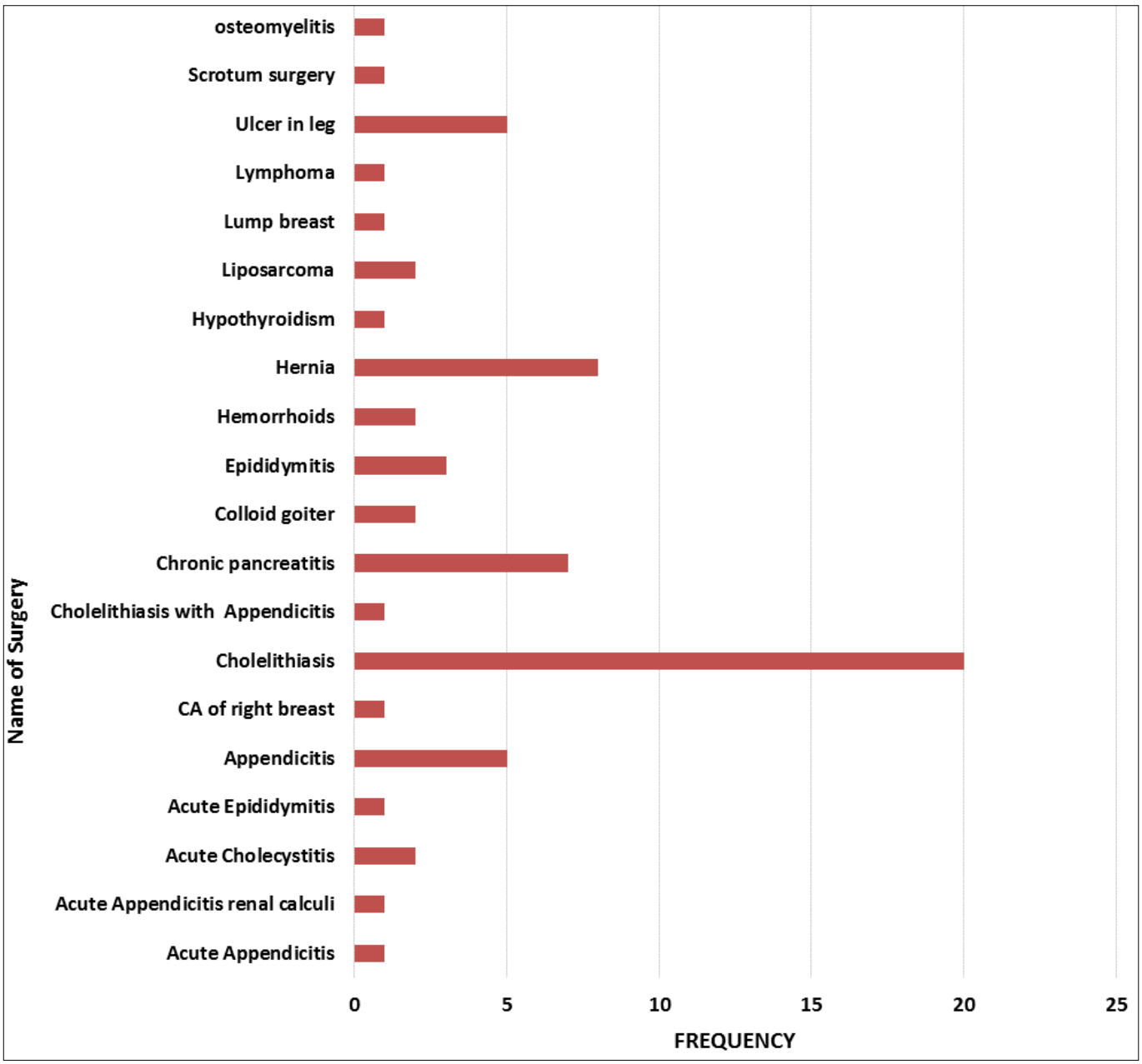

Fig 2: Frequency of surgery

Result: As shown above, out of total sixty-six patients the frequency Of the cholelithiasis surgeries were found to be more as compared to other surgeries.

Table 3: Frequency of antibiotics

Acetaminophen	1
Amikacin	18
Cefexime	2
Cefoproxacin	1
Cefotaxime	1
Cefoxitin	1
Ceftriaxone	33
Cephalosporin	3
Cloxacillin	1
Diosomine	1
Levofloxacin	1
Linezolid	1
Metronidazole	1

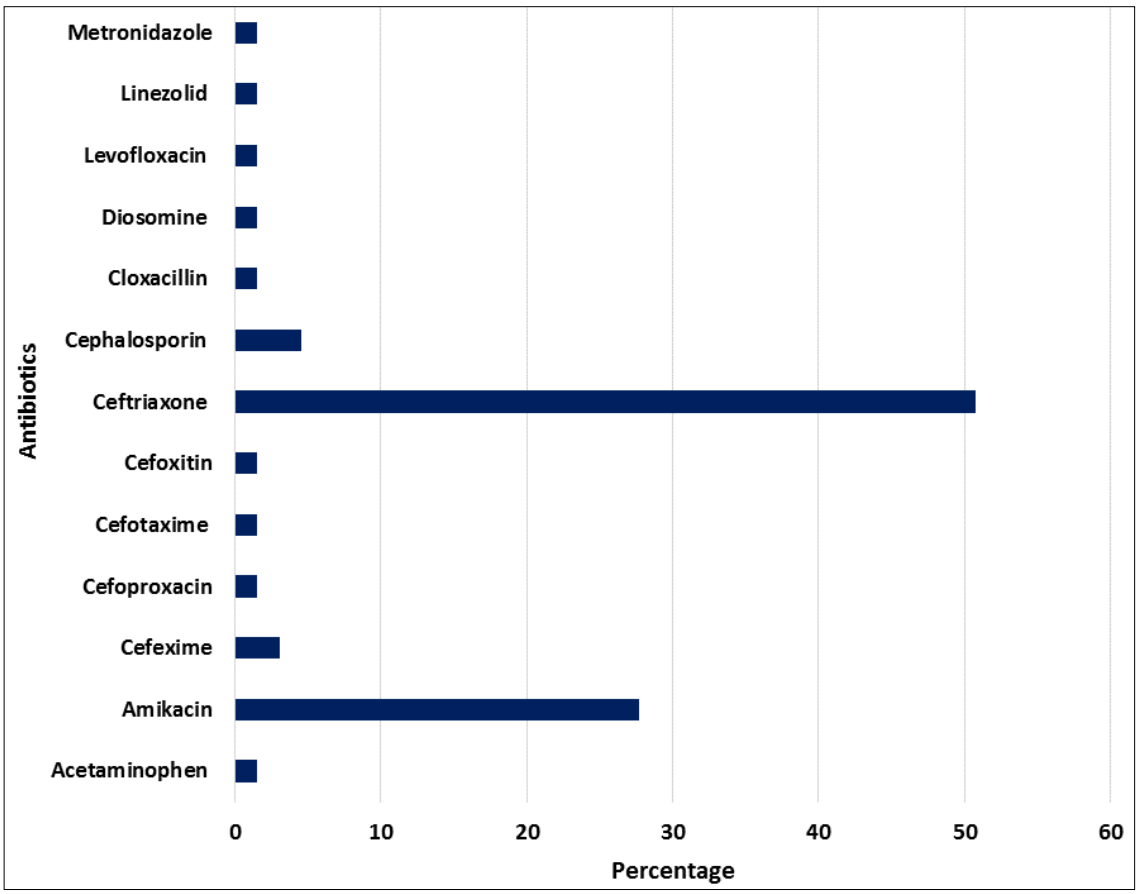

Fig 3: Percentage of antibiotics

Result: On the basis of above data ceftriaxone were found to be prescribed more in the surgery department and Amikacin antibiotics were found to be second most prescribed medicine in the surgery department in the NIMS tertiary care teaching hospital.

Discussion

The total numbers of sixty-six Patients were enrolled in this study out of which forty-one were female and twenty-five were male. The most of Patients were in an age group of 51-60 years in which the Cholelithiasis surgeries were found to be more.

As per National guidelines for Antimicrobials prophylaxis, the ceftriaxone was found to be most prescribed antibiotics and Amikacin was second most prescribed in tertiary care teaching hospital. General principles of antibiotic prophylaxis indicate that the first dose should be given before the incision; the antibiotic should be effective for the causative organism of the potential infection.

Conclusion

The study conducted at Department of Surgery ward, National Institute of Medical Science and Research among the 66 patients out of which 41 were found to be female and 25 were male and most of patients were in age group of 51-60 years. As per national guideline, ceftriaxone was found to be the first most prescribed antibiotics and amikacin were second prescribed antibiotics in the surgery department and cholelithiasis surgeries were found to be more in this department.

Acknowledgement

The authors are thankful to management and principle of NIMS University for giving us a chance to explore in the world of research and support to carry out the research work in this University.

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