ISSN: 0975-1556

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2021; 13(5); 293-297

Original Research Article

Pattern of Usage of Antibiotics in Rural Tertiary Care Education Institution for Surgical Prophylaxis: An Observational Research

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Received: 11-05-2021 / Revised: 05-06-2021 / Accepted: 20-07-2021

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Conflict of interest: Nil

Abstract

Aim: To study the pattern of antibiotics use for surgical prophylaxis in a rural tertiary care teaching institution. **Methods:** The cross sectional, observational study was conducted in the Department of Pharmacology, Darbhanga Medical College, Laheriasarai, Darbhanga, Bihar, India from June 2019 to December 2020. After permission from the authorities, the record sheets were accessed from the record section of the institution and analysed regarding age, gender, demographic data, date of admission, date of discharge, chief complaint of the patient, diagnosis, surgical procedure, and the drugs administered. **Results:** Total 200 record sheets were included in the study. 102 (51%) patients were males and 98 (49%) were females. Maximum number of patients was from age group 35-45 years. The mean age +/- SD of patients was 39.97+/-15.87. 150 patients stayed in hospital from 1 to 10 days, 28 from 11 to 20 days, 10 from 21 to 30 days, 3 more than 30. No antibiotic was used in 10 cases; used for less than 24 hours in 10 cases and for more than 24 hours in 180 cases. 150 patients were given the same antibiotic pre- and post-operatively. In 50(25%) patients antibiotics were changed immediately after surgery. Cefuroxime in 42 patients (22.11%), Metronidazole in 35 (18.42%), amoxicillin + clavulanate in 30 (15.79%), ceftriaxone in 25 (13.16%), Ofloxacin + ornidazole in 15 (7.89%), Ceftriaxone + sulbactum in 10 (5.26%), piperacillin + tazobactum 6 (3.16%), ciprofloxacin 2 (1.05%), cefoperazone + sulbactum 3 (1.58%), amikacin 2 (1.05%), others 186 (12.28%) which included 39 different other antibiotics. A total of 49 choices of antibiotics/ FDCs were used. **Conclusion:** The prescribers should be educated about the national antibiotic policy and sensitised about the impending catastrophe of antibiotic resistant infections.

Keywords: Antibiotic, Prescription, Infection

Introduction

Surgical site infection (SSI) is an infection that happens within 30 days of operation or after 1 year if the implant is placed at or near the surgical incision [1]. It accounts for 17% of all healthcare associated infections and are the second most common hospital-acquired infections in study conducted in Ethiopia [2] and especially during post-operation period [3]. Globally, SSI rates have been found to be from 2.5 to 41.9%. In Africa, SSIs were the leading infections in hospitals (pooled cumulative incidence of 5.6 per 100 surgical procedures), strikingly higher than proportions recorded in developed countries [1] as 13, 20.6, 10.9 and 10.9–75% rate of SSIs were reported in Nigeria[4], Cameron[5], Tanzania[6] and Ethiopia [2,7] studies respectively.

The extent of microbial contamination at an incision site, host factors (such as age, nutritional status, life- style, co morbidities, immune-competency and coexisting infections), the length of the preoperative hospital period, preoperative procedures and the duration and performance of the operation contribute to increased risks of SSIs [8]. Patient characteristics possibly associated with increased risk of SSIs include coincident remote site infections or colonization, diabetes, cigarette smoking, systemic steroid use, obesity (> 20% ideal body weight), extremes of age, poor nutritional status, and peri-operative transfusion of certain blood products [9].

SSIs can have a devastating impact on the patient’s course of treatment and is associated with increased treatment intensity, prolonged length of stay and higher costs.10 A study in the United States of America suggested that programs that reduce the incidence of surgical site infections can substantially decrease morbidity and mortality and reduce the economic burden for patients and hospitals [11]. Despite improvements in operating room practices, instrument sterilization methods, better surgical technique and the best efforts of infection prevention strategies, SSIs remain a major cause of hospital-acquired infections and rates are increasing globally even in hospitals with most modern facilities and standard protocols of preoperative preparation and antibiotic prophylaxis [1]. Another well-documented approach is to use pre and postoperative antimicrobial prophylaxis. From patients that received antimicrobial prophylaxis 30–90% are inappropriate; most antimicrobials are either given at the wrong time, wrong dosage and wrong strength which results in increased antibiotic usage, increased costs, prolonged hospitalization, super infection, antimicrobial resistance and reduction of surgical antimicrobial prophylaxis (SAP) used [12,13].

Material and methods

The cross sectional, observational study was conducted in the Department of Pharmacology, Darbhanga Medical College, Laheriasarai, Darbhanga, Bihar, India from June 2019 to December 2020, after taking the approval of the protocol review committee and institutional ethics committee.

Inclusion criteria

Record of all the patients discharged during the period

Exclusion criteria

Incomplete/illegible records.

Methodology

After permission from the authorities, the record sheets were accessed from the record section of the institution and analysed regarding age, gender, demographic data, date of admission, date of discharge, chief complaint of the patient, diagnosis, surgical procedure, and the drugs administered.

Table 1: Gender and age distribution of patients

Gender	Number of patients	%
Male	102	51
Female	98	49
Age mean	39.97+/-15.87	

Total 200 record sheets were included in the study. 102 (51%) patients were males and 98 (49%) were females. Maximum number of patients was from age group 35-45 years. The mean age +/- SD of patients was 39.97+/-15.87 (Table 1).

Table 2: Period of antibiotic use

No. of days	No. of cases	Percentage
0 (Not used)	9	4.5
1	10	5
2 to 10	140	70
11to20	28	14
21-30	10	5
>30	3	1.5

150 patients stayed in hospital from 1 to 10 days, 28 from 11 to 20 days, 10 from 21 to 30 days, 3 more than 30. No antibiotic was used in 10 cases; used for less than 24 hours in 10 cases and for more than 24 hours in 180 cases. 150 patients were given the same antibiotic pre and post-operatively. In 50 (25%) patients antibiotics were changed immediately after surgery (Table 2).

Table 3: Pattern of Antibiotic use

Antibiotics	Number	%
Cefuroxime	42	22.11
Metronidazole	35	18.42
Amoxicillin+Clavulanate	30	15.79
Ceftriaxone	25	13.16
Ofloxacin+Ornidazole	15	7.89
Ceftriaxone+Sulbactum	10	5.26
Piperacillin+Tazobactum	6	3.16
Ciprofloxacin	2	1.05
Cefoperazone+Sulbactum	3	1.58
Amikacin	2	1.05
Others	30	15.79

Average number of antibiotics used per patient was 2.13. Cefuroxime in 42 patients (22.11%), Metronidazole in 35(18.42%), amoxicillin+clavulanate in 30 (15.79), ceftriaxone in 25(13.16%), Ofloxacin+ornidazole in 15(7.89%), Ceftriaxone+sulbactum in 10(5.26%), piperacillin+tazobactum 6(3.16%), ciprofloxacin 2(1.05%), cefoperazone+sulbactum 3 (1.58%), amikacin 2 (1.05%), others 186 (12.28%) which included 39 different other antibiotics. A total of 49 choices of antibiotics/ FDCs were used (Table 3).

Discussion

The demographic analysis showed nearly equal proportion of patients of either gender. Most common surgical intervention was for cholelithiasis in 110 patients (70 females and 40 males). Most common surgical indication in males was inguinal hernia (22 patients). Most common age group of patients was 35 to 45 years. All the preoperative prophylactic antibiotics were given within 60 min pre surgery. Cefuroxime was the most commonly used antibiotic, though not recommended by various guidelines, which recommend cefazolin, cefoxitin, cefotetan, ceftriaxone, ampicillin–sulbactam were used less commonly [14-17].

Total number of choices of antibiotics used was 41 which show wide variability in choice of antibiotics used and non-adherence to guidelines. This may lead to multidrug resistance

Most of the patients were discharged within ten days of admission which may be the result of good infection control, use of wide spectrum antibiotics and low rate of postoperative complications.

In 50 (25%) patients antibiotics were changed immediately after surgery. This may be partially the result of changed surgical wound contamination status but also due to indifference of the prescriber to the use of same antibiotic both pre and post operatively. An 7% increase in the use of metronidazole and 3% increase in the use of Piperacillin tazobactam post operatively is quite reasonable which is an indicator of stepping up antibiotic coverage for changed surgical wound contamination status during surgical procedure. In few cases (5%) no antibiotic was used which is representative of awareness of the prescriber to rational use of antibiotics and guidelines of antibiotic prophylaxis. But lack of confidence in asepsis may be the reason for high number of patients receiving prophylactic antibiotics.

Conclusion

The hospital should frame an antibiotic policy and guidelines, based on culture sensitivity reports of samples collected from its wards and operation theatres, so that surgeons feel confident to follow a rational antibiotic usage pattern and decrease the use of newer broad-spectrum antibiotics. The prescribers should be educated about the national antibiotic policy and sensitised about the impending catastrophe of antibiotic resistant infections. Also, the preventive measures to combat surgical wound infection should be made a habit by involving and sensitizing all the health care personnel interacting with patients. Recognizing good infection control practice by giving public appreciation and feedback for lapses in infection control to the health professionals may be helpful in decreasing the infection rate among surgical patients and thus improving antibiotic use behaviour.

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