Section: General Surgery

Original Research Article

EVALUATION OF PRESCRIPTION PATTERN OF ANTIBIOTICS USED POSTOPERATIVELY IN PATIENTS UNDERGOING OBSTETRICAL, GYNECOLOGICAL AND GENERAL SURGERIES AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: The advent of antibiotics has significantly transformed the landscape of surgical procedures by effectively managing and preventing complications arising from infections. The present study was conducted to evaluate prescription pattern of antibiotics used postoperatively in patients undergoing obstetrical, gynecological and general surgeries.

Materials and Methods: The study encompassed the case records of all patients over the age of 18 who were admitted to the wards of the Gynecological, Obstetrical (OBG) and General Surgery departments for surgeries. Data collected included patient age, surgical indications, prescribed antibiotics, and their usage patterns. The results were documented in a Microsoft Excel spreadsheet and subsequently analyzed statistically using SPSS software.

Results: A total of 200 patients were evaluated. Among them, 100 were enrolled who was admitted to OBG department and 100 who were admitted to surgery department. Among gynecological patients, Ceftriaxone, Ceftriaxone with sulbactam, Gentamycin, Amikacin, Metronidazole, Amoxycillin and clavulanic acid, Amoxycillin and other drugs were used in 31 percent, 19 percent, 28 percent, 6 percent, 39 percent, 15 percent, 9 percent and 5 percent of the patients respectively. among surgery patients, Cefuroxime, Metronidazole, Amoxycillin and clavulanic acid, Amoxycillin, Gentamicin, Clindamycin, Amikacin, Ciprofloxacin and Piperacillin-tazobactam were prescribed in 33 percent, 41 percent, 18 percent, 12 percent, 27 percent, 18 percent, 15 percent, 15 percent and 12 percent of the patients respectively.

Conclusion: It is advisable to explore the fundamental causes behind the prescription of antibiotics for diagnoses that do not warrant such treatment, alongside the formulation and execution of antibiotic stewardship programs, as these strategies are essential for enhancing antibiotic prescribing practices.

Keywords: Gynecological, Surgery, Antibiotics.

INTRODUCTION

Globally, antibiotics are the most frequently prescribed medications. By definition, antibiotics are substances produced by microorganisms that effectively inhibit or destroy other microorganisms at remarkably low concentrations.[1] Antibiotics play a vital role in healthcare facilities, particularly in high-risk departments where surgical procedures are performed. They are crucial for treating infections and preventing healthcare-associated infections (HAIs) as perioperative prophylaxis. In obstetrics and gynecology (OBGY) departments, antibiotics are essential for managing common and severe

infections before, during, and after delivery, preventing maternal and neonatal complications. Additionally, they are used as prophylaxis for surgical procedures like caesarean sections and uterine prolapse operations, as well as treating post-operative wound infections.[2]

However, the overuse and misuse of antibiotics have severe consequences, including the rise of antibiotic resistance, escalated treatment costs, and increased morbidity, mortality, and adverse effects.[3] The overuse and misuse of antibiotics have accelerated the emergence of antimicrobial resistance (AMR), a growing threat to global health. As microorganisms adapt and evolve, they become resistant to previously effective treatments, making infections harder to treat and increasing the risk of disease spread, severe illness, and death. Alarmingly, several high-risk pathogens, including Acinetobacter, Pseudomonas, Escherichia coli, Klebsiella pneumoniae, Salmonella enterica, Staphylococcus aureus, and Streptococcus pneumonia, have developed resistance to widely used antimicrobials, highlighting the urgent need for responsible antibiotic stewardship.[4] This highlights the vital importance of rational antibiotic use. Rational use involves prescribing the right drug, in the right dose, formulation, and duration, tailored to each patient's needs. As defined by the WHO, rational drug use ensures patients receive appropriate, individualized treatment that balances efficacy with affordability, minimizing costs for individuals and communities.[3] Hence; the present study was conducted to evaluate prescription pattern of antibiotics used postoperatively in patients undergoing obstetrical, gynecological and general surgeries.

MATERIALS AND METHODS

The present study encompassed the case records of all patients over the age of 18 who were admitted to the wards of the obstetrical, gynecological and General Surgery departments. Patients under 18 years of age and those with incomplete case records were excluded from the analysis. Data which was collected and analyzed included patient age, surgical indications, prescribed antibiotics. The results were documented in a Microsoft Excel spreadsheet and subsequently analyzed statistically using SPSS software.

RESULTS

A total of 200 patients were evaluated. Among them, 100 were admitted to gynecological department and 100 were admitted to surgery department for surgeries. Indication of surgery among obstetrical department included full term pregnancy- normal delivery, cesarean section, fibroid uterus, chronic cervicitis and ovarian cyst were the diagnosis in 55 percent, 35 percent, 2 percent, 2 percent and 1 percent of the patients respectively. Among gynecological patients, ceftriaxone, ceftriaxone with sulbactam, gentamycin, amikacin, metronidazole, amoxycillin and clavulanic acid, amoxycillin and other drugs like (linezolid, cefuroxime, piperacillin-tazobactam and others) were used in 31 percent, 19 percent, 28 percent, 6 percent, 39 percent, 15 percent, 9 percent and 5 percent of the patients respectively. Combination of ceftriaxone and metronidazole, ceftriaxone, metronidazole & gentamicin, ceftriaxone, sulbactam and metronidazole, ceftriaxone, sulbactam, metronidazole and gentamycin, ceftriaxone, sulbactam, metronidazole and amikacin, & ceftriaxone, metronidazole and amikacin were prescribed in 5 percent, 18 percent, 5 percent, 6 percent, 3 percent and 4 percent of the patients respectively. Out of 100 patients of the general surgery department, appendicectomy, cholecystectomy, hernia repair and colorectal surgery were the diagnosis in 23 percent, 24 percent, 34 percent and 10 percent of the patients respectively. Cefuroxime, metronidazole, amoxycillin and clavulanic acid, amoxycillin, gentamicin, clindamycin, amikacin, ciprofloxacin and piperacillin-tazobactam were prescribed in 33 percent, 41 percent, 18 percent, 12 percent, 27 percent, 18 percent, 15 percent, 15 percent and 12 percent of the patients respectively. Combination of cefuroxime and metronidazole, amoxycillin and clavulanic acid and metronidazole, gentamicin and metronidazole and cefuroxime, gentamicin and metronidazole was prescribed in 8 percent, 10 percent, 9 percent and 7 percent of the patients respectively.

Table 1: Diagnosis of obstetrical surgery patients (n=100)

Diagnosis	Number	Percentage
Full term pregnancy- normal delivery	55	55
Caesarean section	35	35
Fibroid uterus	2	2
Chronic cervicitis	2	2
Ovarian cyst	1	1
Others	5	5

Table 2: Frequency of antibiotics used in Gynecological surgery patients

Antibiotics	Number	Percentage
Ceftriaxone	31	31
Ceftriaxone with sulbactam	19	19
Gentamycin	28	28

Amikacin	6	6
Metronidazole	39	39
Amoxycillin and clavulanic acid	15	15
Amoxycillin	9	9
Others (like linezolid, cefuroxime, piperacillin tazobactam)	5	5

Table 3: Antibiotics prescribed as multidrug regime used in in Gynecological surgery patients

Antibiotics in combination	Number	Percentage
Ceftriaxone and Metronidazole	5	5
Ceftriaxone, Metronidazole & gentamicin	18	18
Ceftriaxone, sulbactam and Metronidazole	5	5
Ceftriaxone, sulbactam, Metronidazole and gentamycin	6	6
Ceftriaxone, sulbactam, Metronidazole and amikacin	3	3
Ceftriaxone, Metronidazole and amikacin	4	4

Table 4: Diagnosis of general surgery patients

Diagnosis	Number	Percentage
Appendicectomy	23	23
Cholecystectomy	24	24
Hernia repair	34	34
Colorectal surgery	10	10
Others	9	9

Table 5: Frequency of antibiotics used in General surgery patients

Antibiotics	Number	Percentage
Cefuroxime	33	33
Metronidazole	41	41
Amoxycillin and clavulanic acid	18	18
Amoxycillin	12	12
Gentamycin	27	27
Clindamycin	18	18
Amikacin	15	15
Ciprofloxacin	15	15
Piperacillin-tazobactam	12	12

Table 6: Antibiotics prescribed as multidrug regime used in in General surgery patients

Antibiotics in combination	Number	Percentage
Cefuroxime and metronidazole	8	8
Amoxycillin and clavulanic acid and metronidazole	10	10
Gentamicin and metronidazole	9	9
Cefuroxime, Gentamicin and metronidazole	7	7

DISCUSSION

Recognizing and understanding the nuances of postoperative infections in obstetrical, gynecological and general surgeries is crucial for healthcare providers to develop effective preventive strategies and management approaches.[5-8] The rise in antimicrobial resistance (AMR) poses a significant global challenge. Projections indicate that by the year 2050, around 10 million individuals may succumb to AMR-related complications each year, predominantly in regions such as Africa and Asia. The combination of increasing AMR and a lack of new antibiotic discoveries necessitates urgent action to confront this issue. A key factor contributing to the development of AMR is the inappropriate use of antibiotics. In response, the Indian Council of Medical Research (ICMR) released guidelines in 2017 aimed at combating AMR and has since implemented antimicrobial stewardship initiatives across India.[9] Hence; the present study was conducted to evaluate prescription pattern of antibiotics used postoperatively in patients undergoing obstetrical, gynecological and general surgeries.

A total of 200 patients were evaluated. Among them, 100 were admitted to gynecological department and 100 were admitted to surgery department. Indication of surgery among Gynaecology department included full term pregnancy- normal delivery, Caesarean section, Fibroid uterus, Chronic cervicitis and Ovarian cyst were the diagnosis in 55 percent, 35 percent, 2 percent, 2 percent and 1 percent of the patients respectively. Among gynecological patients, ceftriaxone, ceftriaxone with sulbactam, gentamycin, amikacin, metronidazole, amoxycillin and clavulanic acid, amoxycillin and other drugs were used in 31 percent, 19 percent, 28 percent, 6 percent, 39 percent, 15 percent, 9 percent and 5 percent of the patients respectively. Combination of ceftriaxone and metronidazole, ceftriaxone, metronidazole & gentamicin, ceftriaxone, sulbactam and metronidazole, ceftriaxone, sulbactam, metronidazole and gentamycin, ceftriaxone, sulbactam, metronidazole and amikacin, & ceftriaxone, metronidazole and amikacin were

prescribed in 5 percent, 18 percent, 5 percent, 6 percent, 3 percent and 4 percent of the patients respectively. Sawhney N et al1 assessed the prescribing pattern of the antibiotics in postoperative patients admitted in gynaecology and obstetrics. The case sheets of all post operated patients above eighteen years of age admitted were studied and analyzed. Total of 1807 case sheets were analyzed and showed that 4245 antibiotics were prescribed with an average of 2.3 antibiotics prescribed. Oral cefuroxime (17.3%) was maximally prescribed in patients who delivered normal presentation with episiotomy and injection ceftriaxone along with metronidazole and gentamycin were prescribed (58.4%) where caesarean section was done. While injection ceftriaxone and sulbactum along with metronidazole and gentamycin (17.09%) was prescribed in patients who were operated for gynaecological diseases. Maximum (80%) of the antibiotics were prescribed under brand name. Cephalosporin's are commonly prescribed antibiotic and in eighty percent brand names were prescribed. Results underscore that antibiotic in generic name should be encouraged.[1]
In the present study out of 100 patients of the general surgery department, appendicectomy, Cholecystectomy, Hernia repair and Colorectal surgery were the diagnosis in 23 percent, 24 percent, 34 percent and 10 percent of the patients respectively. Cefuroxime, metronidazole, amoxycillin and clavulanic acid, amoxycillin, gentamicin, clindamycin, amikacin, ciprofloxacin and piperacillin-tazobactam were prescribed in 33 percent, 41 percent, 18 percent, 12 percent, 27 percent, 18 percent, 15 percent, 15 percent and 12 percent of the patients respectively. Combination of cefuroxime and metronidazole, amoxycillin and clavulanic acid and metronidazole, gentamicin and metronidazole and cefuroxime, gentamicin and metronidazole was prescribed in 8 percent, 10 percent, 9 percent and 7 percent of the patients respectively. Ravi G et al assessed the utilization pattern of antimicrobials (AMs) in a tertiary care hospital in northern India. A prospective observational study was conducted over a period of one year in seven departments of a tertiary care hospital in hilly Himalayan region. A total 700 prescriptions were analyzed in the present study. Injectable antibiotics (71%) followed by oral (29%) were most commonly prescribed. Beta lactams (79%) were the most frequently used antibiotic class. Most commonly prescribed AM was ceftriaxone (30%). Majority of the time AMs were given empirically (44.8%), where most common indication was respiratory infections (42%). Culture and sensitivity tests were done for guiding curative therapy in 34.71% cases. The average duration of patient hospital stay was 8.81 days in the study population. The mean duration of prescribed antimicrobial treatment was 5.12 days. On an average 1.93 AMs were prescribed per patient. AMs were prescribed by International nonproprietary name (INN) in 62.19% of the admissions. The most common AM related adverse drug reaction was gastritis (96%) and skin rash (4%) with Amoxicillin + clavulanic acid being the most common causative agent. Total antimicrobial consumption was 148.24 DDD/100 bed days with Medicine department showing the highest consumption (36.25/100 bed days).[10]

CONCLUSION

Third generation cephalosporins were commonly used in postoperative patients as these drugs are highly potent and have wide spectrum active against both gram positive and gram-negative microorganisms. To combat antibiotic resistance, it is crucial to address the fundamental causes driving unnecessary prescriptions. Healthcare providers must explore why antibiotics are being prescribed for diagnoses that do not warrant such treatment. Meanwhile, designing and executing robust antibiotic stewardship programs is equally important. By tackling these issues simultaneously, providers can promote evidence-based prescribing manner, improve patient outcomes, and reduce the risks of antibiotic resistance.

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