Antibiotics Using Pattern in Surgery Department of a Maternity and Children Hospital

Nehad J. Ahmed1* and Abdulrahman G. Alharbi2

1Department of Clinical Pharmacy, College of Pharmacy, Prince Sattam Bin Abdulaziz University, Alkharj, Saudi Arabia.
2Pharmacy Department, AlKharj Maternity and Children Hospital, Alkharj, Saudi Arabia.

Authors’ contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Aim: This study aimed to identify antibiotics using pattern in surgery department of a maternity and children hospital in Alkharj.

Methodology: This is a retrospective review of the drugs that were prescribed in maternity and children hospital in Alkharj from January 2018 to August 2020.

Results: The most prescribed antibiotics by emergency department for surgery patients were metronidazole (45.59%) and ceftriaxone (42.65%). Metronidazole IV was the most commonly prescribed antibiotic (38.73%) by inpatient department for surgery patients followed by ceftriaxone (38.73%). Vancomycin vial (43.75%) was the most commonly prescribed antibiotic by critical care unit for surgery patients. The most commonly prescribed antibiotic outpatient department and day case unit for surgery patients by was fusidic acid ointment (35.00%).

Conclusion: The study showed that the most commonly prescribed antibiotics for surgery patients were metronidazole and ceftriaxone. Continuous monitoring for antibiotics prescribing is vital to increase the judicious use of these medications and more educational programs and awareness workshops for surgeons are needed.

*Corresponding author: E-mail: n.ahmed@psau.edu.sa, phamdnadjaser@yahoo.com;
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1. INTRODUCTION

Since the availability of antibiotics in 1940s, its role has been expanded from the management of severe infectious diseases to preventing nosocomial infections and used in surgery patients either as a prophylaxis or as therapy in addition to its use in protecting immuno-compromised patients [1].

Antibiotics are substances, which are obtained from one microorganism and prove fatal for other microorganism at low concentration and can be either a bactericidal or bacteriostatic agents [2]. Surgical patients are in general high consumers of antibiotics [3]. Antibiotics have two indications in surgery either to prevent postoperative infections or to treat established infections.

Bacterial infections could be treated with antibiotics. Nevertheless, there is an increase in the rate of antibiotic-resistant infections [4-7]. Incorrect use of antibiotics will result in microorganisms becoming resistant to the antibiotic, thus causing the antibiotics to lose their functions [4-7]. Several studies showed that antibiotics are used incorrectly in surgery department [8-10]. Several interventions could be used to improve antibiotic use in surgery department that includes broad, pharmacy driven and infection and syndrome specific interventions [11].

The administration of antibacterial agent wisely is important to reduce infection-related morbidity and mortality rate [1]. It is important to identify the antibiotic prescribing patterns in order to improve antibiotic prescriing and use. Therefore, this study aimed to identify antibiotics using pattern in surgery department of a maternity and children hospital in Alkharij.

2. METHODOLOGY

This is a retrospective review of the drugs that were prescribed in maternity and children hospital in Alkharij from January 2018 to August 2020.

The study included the patients who received antibiotic from the hospital pharmacy. The exclusion criteria included the patients who didn’t receive antibiotics or who received it before January 2018 or after August 2020.

The data included number of antibiotics that were prescribed during the study period in outpatient department, emergency department, day case unit, in critical care unit and inpatient department.

3. RESULTS AND DISCUSSION

The present study included the number of antibiotics prescribed for surgery in the maternity and children hospital. Table 1 shows the antibiotics prescribed by emergency department (ER) for surgery patients. The most prescribed antibiotics were metronidazole (45.59%) and ceftriaxone (42.65%).

Table 2 shows the antibiotics prescribed by inpatient department (IPD) for surgery patients. Metronidazole was the most commonly prescribed antibiotic (mainly as an IV infusion 500 mg Bottle or Bag 38.73%) followed by ceftriaxone sodium 1 gm vial (38.73%).

Table 3 shows the antibiotics prescribed by critical care unit for surgery patients. Vancomycin Hcl 500 mg vial (43.75%) was the most commonly prescribed antibiotic followed by ampicillin sodium 500 mg vial (25.00%).

| Antibiotic | Number of orders N(%) |
|------------|-----------------------|
| Amoxicillin Trihydrate + Clavulanate Potassium 125 mg + 31 mg / 5 ml 100 ml Suspension | 8 (2.35%) |
| Cefuroxime Sodium 750 mg Vial | 27 (7.94%) |
| Fusidic Acid 2% 25-30 Gm / Tube Cream | 1 (0.29%) |
| Gentamicin Sulfate 80 mg Ampoule Or Vial | 4 (1.18%) |
| Ceftriaxone Sodium 1 Gm Vial | 145 (42.65%) |
| Metronidazole Iv Infusion 500 mg Bottle or Bag | 155 (45.59%) |
| Total | 340 |
Table 2. Antibiotics prescribed by Inpatient Department (IPD) for surgery patients

| Antibiotic                                                                 | Number of orders N(%) |
|---------------------------------------------------------------------------|-----------------------|
| Amoxicillin Trihydrate + Clavulanate Potassium 125 mg + 31 mg / 5 ml 100 ml Suspension | 19 (3.17%)            |
| Amoxicillin Trihydrate + Clavulanate Potassium 500 mg + 100 mg Vial       | 2 (0.33%)             |
| Amoxicillin Trihydrate + Clavulanate Potassium 500 mg + 125mg Tablet      | 2 (0.33%)             |
| Amoxicillin Trihydrate 250 mg / 5 ml 100 ml Suspension                    | 1 (0.17%)             |
| Ampicillin Sodium 1 Gm Vial                                              | 1 (0.17%)             |
| Azithromycin 200 mg / 5 ml 15 ml Suspension                               | 4 (0.67%)             |
| Cefuroxime 250 mg / 5 ml Suspension                                       | 3 (0.50%)             |
| Cefuroxime Sodium 750 mg Vial                                            |                       |
| Ciprofloxacin 500 mg Tablet                                              | 2 (0.33%)             |
| Erythromycin Lactobionate or Gluceptate 1 Gm Vial                       | 7 (1.17%)             |
| Fusidic Acid 2% 10 - 15 Gm/ Tube Ointment                                | 18 (3.00%)            |
| Fusidic Acid 2% 25-30 Gm / Tube Cream                                    | 13 (2.17%)            |
| Gentamicin Sulfate 20 mg Ampoule Or Vial                                | 1 (0.17%)             |
| Gentamicin Sulfate 80 mg Ampoule Or Vial                                | 6 (1.00%)             |
| Vancomycin Hcl 500 mg Vial                                              | 6 (1.00%)             |
| Ceftriaxone Sodium 1 Gm Vial                                            | 232 (38.73%)          |
| Metronidazole 125 mg/5 ml 100 ml Suspension                              | 4 (0.67%)             |
| Metronidazole 500 mg Tablet                                              | 2 (0.33%)             |
| Metronidazole Iv Infusion 500 mg Bottle or Bag                          | 232 (38.73%)          |
| Total                                                                    | 599                   |

Table 3. Antibiotics prescribed by Critical Care Unit for surgery patients

| Antibiotic                                                                 | Number of orders N(%) |
|---------------------------------------------------------------------------|-----------------------|
| Ampicillin Sodium 500 mg Vial                                            | 4 (25.00%)            |
| Clindamycin Phosphate 300 mg Ampoule                                     | 3 (18.75%)            |
| Fusidic Acid 2% 25-30 Gm / Tube Cream                                    | 1 (6.25%)             |
| Meropenem 500 mg Vial                                                    | 1 (6.25%)             |
| Vancomycin Hcl 500 mg Vial                                              | 7 (43.75%)            |
| Total                                                                    | 16                    |

Table 4. Antibiotics prescribed by outpatient department and day case unit for surgery patients

| Antibiotic                                                                 | Number of orders N(%) |
|---------------------------------------------------------------------------|-----------------------|
| Cefuroxime Sodium 750 mg Vial                                            | 5 (25.00%)            |
| Gentamicin Sulfate 80 mg Ampoule Or Vial                                 | 3 (15.00%)            |
| Ceftriaxone Sodium 1 Gm Vial                                             | 2 (10.00%)            |
| Metronidazole Iv Infusion 500 mg Bottle or Bag                           | 3 (15.00%)            |
| **Antibiotics prescribed by Day Case Unit**                              |                       |
| Fusidic Acid 2% 10 - 15 Gm/ Tube Ointment                               | 7 (35.00%)            |
| Total                                                                    | 20                    |

Table 4 shows antibiotics prescribed by outpatient department and day case unit for surgery patients. The most commonly prescribed antibiotic was fusidic acid 2% 10 - 15 gm/ tube ointment (35.00%) followed by cefuroxime sodium 750 mg Vial (25.00%).

Table 5 shows the total number of antibiotics orders prescribed for surgery patients. Overall, the most commonly prescribed antibiotic for surgery patients was metronidazole (40.62%) followed by ceftriaxone (38.87%).
The results of the present study showed that the most commonly prescribed antibiotics for surgery patients were metronidazole and ceftriaxone. This result is rational because for the majority of the surgeries one of the cephalosporin antibiotics is used if the expected causative bacteria is aerobic or cephalosporin and metronidazole if the expected causative bacteria is anaerobic. But usually first generation cephalosporin is recommended particularly cefazolin [12,13]. In the present study, although cefazolin is used frequently but in the electronic records there were no data about the use of cefazolin.

The most commonly prescribed antibiotics were metronidazole (40.62%) and ceftriaxone (38.87%). This result is consistent with previous studies elsewhere. Wokuma and Dedefo reported that among Patients Who Undergone Major Surgery at Nekemte Referral Hospital, West Ethiopia, the most frequently prescribed antibiotics drugs were ceftriaxone (52.88%) and metronidazole (29.58%) for treatment and ceftriaxone (71.96%) and metronidazole (17.56%) for prophylaxis [14]. Abula and Kedir stated that in surgical in-patients of a teaching hospital, northwest Ethiopia, frequently prescribed antibiotics or their combinations were ampicillin, chloramphenicol and gentamicin [15]. Ahmed reported that regarding medications’ prescribing pattern in the general surgery outpatient department, antibiotics and analgesics were the most commonly prescribed drug classes and that the most prescribed medication was paracetamol (21.32%) followed by amoxicillin/clavulanic acid (12.85%), ciprofloxacin (12.85%), and metronidazole (6.27%) [16]. Moreover, Bediako-Bowan et al stated that in surgical units of selected hospitals in Ghana, the most frequently prescribed antibiotics across all levels of facilities were nitroimidazoles (metronidazole) (25.6%), 2nd and 3rd generations cephalosporins (cefuroxime and ceftriaxone respectively) (20.0%) [17].

Sane et al. [2] stated that in surgical wards, the percentages of antibiotics used for these surgeries were cefotaxime 44%, amikacin 88%, ceftriaxone 52%, metronidazole 30%, and cefixime 54%. Herawati et al. [18] reported that in the Surgery Department of Bangil Regional General Hospital, Pasuruan, the 3 most-used antibiotics are ciprofloxacin (11.8 DDD / 100 patient-days), ceftazidime (6.7 DDD / 100 patient-days), and cefixime (4.3 DDD / 100 patient-days). Hadi et al. [19] informed that in two governmental teaching hospitals in Indonesia all but 20 of 487 of cephalosporins prescribed belonged to the third generation and that most cephalosporins were administered in the department of surgery; 16.4 DDD / 100 patient days. Furthermore, Maheshwari et al reported that regarding prescribing patterns of antibiotics in post-operative patients of surgery department, most common antimicrobial administered was ceftriaxone’s (40%) [20]. Saito et al stated that the most common prescribed antibiotic agents during hospitalization were a combination of ceftriaxone and metronidazole, followed by a single regimen of ceftriaxone [21]. They also reported that regarding pattern of peri-operative antibiotic use among surgical patients in a regional referral and teaching hospital in Uganda, the combination of ceftriaxone and metronidazole was more common in the obstetrics and gynecology department whereas other combination regimens were more common in the surgical department [21].
4. CONCLUSION

The study showed that the most commonly prescribed antibiotics for surgery patients were metronidazole and ceftriaxone. Continuous monitoring for antibiotics prescribing is vital to increase the judicious use of these medications and more educational programs and awareness workshops for surgeons are needed.

5. LIMITATION

The main limitation in the study was that there were no indications (type of surgery not written). The second limitation was that there were no data about the use of cefazolin in the electronic records.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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ETHICAL APPROVAL

The study was approved by the central IRB committee with an IRB log number of 20-011E. After approval of the study, the data were collected and represented as numbers.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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