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ORIGINAL ARTICLE

Comparison of Prophylactic Versus Regular Use of Antibiotics in C-Section

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ABSTRACT

Objective: The purpose of this study is to compare the effectiveness of prophylactic versus regular use of antibiotics.
Study Design: Randomized Control Trial
Place and Duration: In the department of Gynaecology and Obstetrics, Combined Military Hospital, Peshawar for the duration from January 2021 to December 2021.
Methods: Total 116 pregnant women had age 20-48 years were included. All the patients were admitted to hospital and underwent for c-section. We have taken informed written consent of all females for detailed demographics included age, BMI, gestational age and parity. Patients were equally divided in two different groups. Group I received prophylactic antibiotic (Cefazolin 1g) and group II received cefuroxime 750 mg. Post-operatively outcomes were compared in terms of surgical site infection, hospitalization and other adverse events among both groups. SPSS 20.0 was used to analyze all data.
Results: Among 116 cases, 58 (50%) females had age 20-30 years, 39 (33.6%) were aged between 31-40 years and 19 (16.4%) had age 41-48 years. 70 (60.3%) cases had BMI >25kg/m^2 and 46 (39.7%) had BMI <25kg/m^2. Majority of the cases 67 (57.8%) were emergency c-sections and 49 (42.2%) were elective cases. Mean gestational age of the females in group I was 37.2±11.91 weeks and in group II was 36.11±8.45 weeks. Mean parity in group I was 2.7±4.13 and in group II was 1.9±6.8.We found that frequency of SSI was lower in group I 3 (5.2%) as compared to group II in 7 (12.1%). Mean hospitalization in group I was lower 3.6±4.16 days as compared to group II 7.5±6.17 days. Febrile illness and endometritis was also higher in group II with p value <0.04.
Conclusion: We concluded in this study that prophylactic antibiotic was affective and useful among patients undergoing c-section in terms of minimum SSI, hospital stay and adverse events as compared to regular antibiotics.
Keywords: C-section, Prophylactic, Antibiotics, Adverse Events

INTRODUCTION

When it comes to postpartum infections, having a caesarean birth (CD) is a major risk factor. Women who have a caesarean section (CD) have a 5-20 times higher risk of infection than women who give birth vaginally [1]. Antibiotic prophylaxis aims to prevent surgical infection (SSI) by lowering the number of microorganisms present at the incision site before, during, and after surgery [1]. Antibiotic prophylaxis is proven to be an effective method of preventing SSI [2].

Antiseptic precautions before, during, and after surgery, together with prophylactic antibiotics, are called for [3, 4]. Antibiotics administered 30 minutes to 1 hour before skin incision have been shown to increase the systemic concentration of bactericidal molecules, allowing for more effective inoculation. Antibiotic prophylaxis works by eliminating germs and decreasing protease synthesis, which keeps bacteria from attaching to mucosal surfaces. If antibiotics are given before to, or simultaneously with, the peak of microbial infection and tissue stress, they have the highest therapeutic efficacy.

Although antimicrobials during caesarean section have been reviewed extensively and usually concluded to be effective in infection prevention, polling suggests the inconstant and variable application of suggestions for its use.[5] In sub-Saharan Africa, a multiple-day regimen of antibiotics is commonly used for infection prevention.[6] In contrast, many high-income countries only use a single preventative dose of antibiotics .[7]Convenient dose schedules, 100% compliance, and time savings from not having to administer antibiotics for as long are just some of the advantages of shorter regimens that have been shown to be just as effective as long-term preventive regimens .[8]

There is a trade-off between the potential risks and benefits of using antibiotics during pregnancy, since only a select few are regarded safe and effective [9]. Antibiotics in developing nations like Benin are acquired via either doctor's prescriptions or over-the-counter drugstore purchases. The potential of obtaining antibiotics without a doctor's prescription, in addition to the low quality of antibiotic prescriptions in patients [10], has been found to have serious effects in terms of antimicrobial resistance. Prophylactic antibiotics are also given to women who would be having caesarean sections. Definition of Antibiotic Prophylaxis: "a short course of an antibiotic agent begun prior to surgery to minimise perioperative microbiological load to a level that would not overwhelm human defence and result in infection" [11].

Generally speaking, there are five requirements for antibiotic prophylaxis [12]: indication, selection of molecule, dosage, timing, and duration. Antibiotic prophylaxis has two main goals: first, to ensure sufficient levels of antibiotics in the tissue prior to the invasive procedure to prevent successive bacterial growth in the event of wound contamination by bacteria; and second, to achieve sufficient levels of antibiotics in the tissue prior to any potential wound contamination by bacteria. Infection rates following surgical procedures may be reduced using antibiotic prophylaxis [13]. Despite the widespread dissemination of information on antibiotic prophylaxis, studies have revealed that surgery teams have a poor record of adhering to these guidelines [14]. There is no data on how well suggestions are followed in Benin. Compared to natural childbirth, the risk of infection to the mother is five times higher with a caesarean section. Antibiotic prophylaxis is an important part of lowering the risk of infection after a caesarean section [15], especially for uterine infections, surgical site infections and UTIs. Antibiotic prophylaxis in accordance with guidelines decreases the negative outcomes associated with cesarean delivery, such as longer hospital stays, methodical antibiotherapy going to lead to over use of or improper use of antimicrobials and the development of resistant bacteria, additional costs, and social and psychological impacts [15].

We conducted this study to determine the effectiveness of two antibiotics prophylactic and cefuroxime in patients undergoing c-section.

MATERIAL AND METHODS

This randomized control trial was conducted in the department of Gynaecology and Obstetrics, Combined Military Hospital, Peshawar for the duration from January 2021 to December 2021

and comprised of 116 pregnant females. We have taken informed written consent of all females for detailed demographics included age, BMI, gestational age and parity. Women who had a temperature of greater than 38.0 degrees Celsius, maternal sepsis, an allergy to cephalosporins, antibiotic exposure within the last week of pregnancy, persistent membrane rupture (greater than 24 hours), or chorio-amnionitis were not included in this study.

Included females had age 20-48 years. Women who were at least 37 weeks along in their pregnancies and had a CD choice made for them (elective or emergency) were included. Patients were equally divided in two different groups. Group I received prophylactic antibiotic (Cefazolin 1g) and group II received cefuroxime 750 mg twelve hourly. Each mother in Group I received 1 gramme of IV Cefazolin between 30 minutes and 1 hour before skin incision, as determined by chance. In the OT, the anaesthetist appropriately gave the medications according to the randomization after the randomization covers containing the blinded substances were unsealed. To estimate the neonate's antibiotic levels, cord blood was obtained from every eighth baby. In the moments following delivery, 5 ml of cord blood was drawn into a blood collection tube, centrifuged, and the serum was stored in the fridge until it was time for testing. In the clinical pharmacology unit, Cefazolin concentrations were analysed using a UV-protected High Pressure Liquid Chromatography (HPLC) technique that had been developed and validated. Researchers, patients, and Labor Room staff were all kept in the dark about the medication being administered.

Post-operatively outcomes were compared in terms of surgical site infection, hospitalization and other adverse events among both groups. SPSS 20.0 was used to analyze all data.

RESULTS

Among 116 cases, 58 (50%) females had age 20-30 years, 39 (33.6%) were aged between 31-40 years and 19 (16.4%) had age 41-48 years.(figure 1)

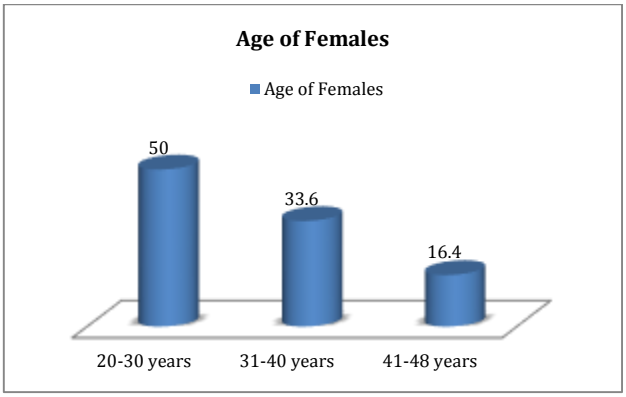

Figure-1: Females with age distribution

We found that 70 (60.3%) cases had BMI >25kg/m^2 and 46 (39.7%) had BMI <25kg/m^2. Majority of the cases 67 (57.8%) were emergency c-sections and 49 (42.2%) were elective cases. Mean gestational age of the females in group I was 37.2±11.91 weeks and in group II was 36.11±8.45 weeks. Mean parity in group I was 2.7±4.13 and in group II was 1.9±6.8.(table-1)

Table-1: Females with detailed demographics

Variables	Group I (58)	Group II (58)
BMI		
<25kg/m^2	23 (19.8%)	23 (19.8%)
>25kg/m^2	35 (30.2%)	35 (30.2%)
C-section type		
Elective	34 (29.3%)	33 (28.4%)
Emergency	24 (20.7%)	25 (21.6%)
Mean gestational age (weeks)	37.2±11.91	36.11±8.45
Mean Parity	2.7±4.13	1.9±6.8

We found that frequency of SSI was lower in group I 3 (5.2%) as compared to group II in 7 (12.1%) with p value <0.002.(figure 2)

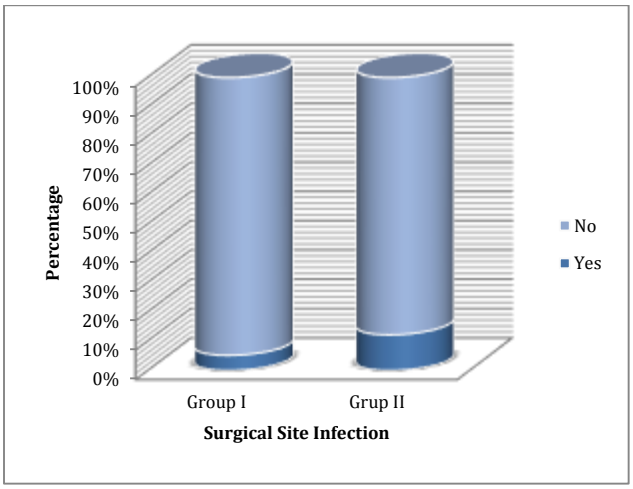

Figure-2: Post-operatively comparison of SSI

Mean hospitalization in group I was lower 3.6±4.16 days as compared to group II 7.5±6.17 days. Febrile illness and endometritis was also higher in group II with p value <0.04.(table 2)

Table-2: Outcomes among both groups

Variables	Group I	Group II
Mean Hospital stay (days)	3.6±4.16	7.5±6.17
Febrile illness		
Yes	2 (3.4%)	5 (8.6%)
No	56 (56.4%)	53 (91.4%)
Endometritis		
Yes	3 (5.2%)	6 (10.3%)
No	55 (94.8%)	52 (89.7%)

Post-operative frequency of nausea, vomiting and dizziness among patients of group II was higher but difference was non-significant.(table 3)

Table-3: Post-operative comparison of adverse events

Variables	Group I	Group II
Adverse Events		
nausea	4 (6.9%)	6 (10.3%)
vomiting	6 (10.3%)	7 (12.1%)
dizziness	10 (17.2%)	12 (20.7%)

DISCUSSION

Mother-related infectious morbidity, especially endomyometritis and wound infection, is still a major source of postoperative problems. A significant cost on society is posed by infectious morbidity following CD, which continues to rank among the top five causes of maternal death globally [16].

In current study, 58 (50%) females had age 20-30 years, 39 (33.6%) were aged between 31-40 years and 19 (16.4%) had age 41-48 years. 70 (60.3%) cases had BMI >25kg/m^2 and 46 (39.7%) had BMI <25kg/m^2. These results were comparable to the previous researches.[17,18] We found that frequency of SSI was lower in group I (prophylactic) 3 (5.2%) as compared to group II (regular antibiotic) in 7 (12.1%) with p value <0.002. Owens et al[19] .'s findings of a decline in SSI are consistent with our own, whereas our findings on the prevalence of endometritis are not. When compared to the other group, who did not receive antibiotics before skin incision, those who did saw a statistically meaningful (p = 0.03) decrease in the prevalence of wound infections (3.9%) and endometritis (3.6%) [19]. Total infectious morbidity was reduced in

the study group by 45% (RR = 0.4, 95% CI = 0.18 to 0.87) in a trial including 357 women by Sullivan et al. [20]. There was no increase in infant sepsis (P = 0.99), sepsis work up (P = 0.96), or length of hospital stay (P = 0.17), and the chance of developing endometritis was reduced in the pre-incision group as well. In our study, mean hospitalization in group I was lower 3.6±4.16 days as compared to group II 7.5±6.17 days. Febrile illness and endometritis was also higher in group II with p value <0.04.

Preoperative medication was linked with a substantial 41% decrease in the risk of endometritis relative with intra operative administration, as reported by Baasqee et al. [21] in their study of 2313 mothers and 2345 babies. In contrast, the post-discharge result in previous research was greater than the 36% post-discharge number in the Beattie et al.[22] trial on risk variables for wound infection following caesarean surgery. It also highlights the necessity for better post-discharge monitoring in post-natal care and the issue of post-discharge wound behaviours.

Overuse of antibiotic for prevention was facilitated by the lengthy intravenous treatment regimen. Antibiotic prophylaxis that must be administered for an extended period of time puts a strain on nursing staff [23]. This is because the Benin user fee deductible policy does not cover patients' postoperative expenses related to infections, and patients must pay again for extra needed and given medication outside of the package in order to finish the antibacterial drugs prophylaxis duration due to the delay in timing and the long duration of prophylaxis. Based on the findings of a randomised research conducted in other low-income countries, the World Health Organization (WHO) now advises a single dosage of antibiotic [24].

In a unit where regular prophylactic medicines are not given to women undergoing an elective caesarean section because of the extremely low risk of infection, a cost-effective analysis could theoretically be performed to identify women at greater risk of infection for whom prophylaxis may be expense. However, at the present time, such an approach has no supporting evidence. Since there is certain to be some degree of regional variation in both practice and women, it's probable that the findings of such a study would only be relevant to a specific organization.[17]

CONCLUSION

We concluded in this study that prophylactic antibiotic was affective and useful among patients undergoing c-section in terms of minimum SSI, hospital stay and adverse events as compared to regular antibiotics.

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