Comparison of Short Term and Long Term Antibiotic Prophylaxis in Elective Lower Segment Cesarean Section

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Abstract

Objectives: To compare efficacy of short term and long term antibiotic prophylaxis in terms of wound infection in patients undergoing elective LSCS.

Methods: A comparative study was conducted in Department of obstetrics and Gynecology, Allied Hospital, Faisal Abad. Study duration was one year from January 1, 2012 to December 31 2012. A total 626 patients (313 in every group) were enrolled in the study. Group A received single dose of 3rd generation cephalosporin (cefriaxone) preoperatively as intravevous infusion 30 min before incision. Group B was given two doses ceftriaxone 12 hrly for 24hrs followed by 1st generation cephalosporin (cephradine) 500mg 8 hours by oral antibiotic therapy for 5 days. Efficacy was compared between two group using chi-square test of independence. Data analysis was done on SPSS version 10.

Results: A total of 65 out of 313(20.9%) patients showed fever/wound infection in group A and 64/343 (20.4%) patients had fever /wound infection in group B. In Group A ,37 patients began showing fever/wound infection during hospital stay and 28 patients had fever/wound infection after discharge from hospital . In Group B, 35 patients had wound infection during four days of hospital stay and 29 had wound infection after discharge.

Conclusion: The short term and long term prophylaxis were equally effective in reducing morbidity, assessed by postoperative temperature and wound infection.

Keywords: Elective LSCS, short term antibiotic, long term antibiotic

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Introduction

Surgical site infections (SSI) after a cesarean section (CS) can occur in approximately 3-20% of cases. The infection rate can vary based on several factors including the cleanliness of the operating room, the health of the patient, and the effectiveness of infection control measures.[1] More than one in five (21%) pregnancies globally are now delivered via CS, according to recent data from the World Health Orga-nisation (WHO). This number is anticipated to increase over the following ten years, with caesarean delivery of nearly a third (29%) of all babies anticipated by 2030.[2] With the increasing rate of caesarian birth in most developed countries, postpartum infectious mor-bidity will become a more alarming issue. The important area of concern is that prophylactic measures must be adopted for decreasing post-partum infectious morbidity. Several strategies are employed to reduce the risk of SSI after a CS, such as pre-operative antibiotic prophylaxis, proper sterilization of surgical instruments, maintaining aseptic techniques during the procedure, and ensuring a clean and controlled surgical environment.[3] Additional measures to prevent infection include the use of sterile gloves and drapes, appropriate hand hygiene by healthcare providers, timely removal of sutures or staples, and patient education on wound care post-operatively. It is important for healthcare providers to closely monitor patients after a CS for signs of infection, such as fever, increased pain, redness, swelling,

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discharge from wound or malodorous lochia. Any suspected infection should be promptly evaluated and treated with appropriate antibiotics.

While efforts are made to prevent SSIs, it is crucial for healthcare providers to have proactive infection control practices in place to minimize the risk of post-operative infections after a CS. Only two studies, one from the United States and one from China, directly address the costs of antimicrobial prophylaxis in elective CS.[4,5] According to the American study, there was a 2% overall cost per CS cost reduc-tion. In contrast, the Chinese study revealed that the use of antibiotic prophylaxis increased the cost of each caesarean surgery by 12%.

This means that in order to prevent an extended hospital stay, a prophylactic antibiotic regimen should be chosen so that it both lowers the cost of CS by reducing the number of days spent in the hospital and does not outweigh the cost of antibiotic treatment.

Antibiotic prophylaxis is used in clean procedures to reduce the incidence of surgical site infection. This incidence is used as a measure of quality of care in hospitals.[6] Around 30 -90% of antibiotic prophylaxis is inappropriate because either it is given at wrong time or continued for a long period.[7]

Wound infection was defined as partial or total dehiscence or the presence of purulent discharge from the wound with localized swelling, warmth and tenderness with or without microbiological evidence. Postoperative fever was defined by temperature of greater than 38°C at least 4 h apart on two or more occasions, excluding the first 24h after caesarean section.[8]

Rationale of my study is to see the effect of short term prophylaxis vs long term prophylaxis in elective LSCS in preventing wound infection and fever. If efficacy of short term anti-biotic prophylaxis is found to be equal to long term antibiotic prophylaxis then this may help to establish a proper protocol for prophylactic antibiotic and will decrease treatment cost, hospital stay, patients' risk of drug toxicity and emergence of resistant bacterial strains.

Material and Methods

A comparative study was conducted in Department of obstetrics and Gynecology, Allied Hospital, Faisalabad. Study duration was one year from January 1, 2012 to December 31 2012. A total 626 patients (313 in every group) were enrolled in the study. Group A received single dose of 3rd generation cephalosporin (cefriaxone) preoperatively as intravevous infusion 30 min before incision. Group B was given two doses ceftriaxone 12 hrly for 24hrs followed by 1st generation cephalosporin (cephradine) 500 mg oral antibiotic therapy for 5 days. The size of sample was calculated by software formula recommended by CPSP.

Prevalence p1=2%7
Prevalence p2=9%7
Power of study=90%
Level of significance=0.01
Sample size = 626 (313 per group)

Consecutive non probability sampling technique was used in data collection. Based on inclusion criteria pregnant females admitted for elective LSCS, patients with negative hepatic viral marker screening and patients with operative time less than 45 mins were selected. Patients with systemic illness i.e anemia, diabetes, hypertension, anti HCV +ve, Patients with preterm pre-labor rupture of membranes and pre-labor rupture of membranes, obesity and corticosteroid use were excluded.

Informed consent was obtained for all newly admitted patients who met the inclusion criteria. After the college ethics committee gave its approval and after explaining the process, risks, and advantages to them, they were then chosen to be part of the research. Confounding variables were limited by following the exclusion criteria strictly.

Group A received single dose of 3rd generation cephalosporin (cefriaxone) preoperatively as intravenous infusion 30 min before incision. Group B was given two doses ceftriaxone 12 hrly for 24hrs followed by 1st generation cephalosporin (cephradine) 500mg 8 hours by oral antibiotic the-rapy for 5 days.

In post-operative period, 4hrly temperature record was kept for 4 days and wound was examined for signs of wound infection as per operational definition on daily basis till 4th post op day. Patients with no fever or wound infection were discharged after 4th post op day and followed on phone for symptoms of wound infection till 7th post op day. On 7th post op day patients were called for removal of stitches.

A questionnaire was completed for each patient containing age, date of admission, date of operation, prophylactic antibiotic given, wound condition and date of discharge.

Entry and analysis of data was done on SPSS version 10. Descriptive statistics was calculated for all variables. Mean and standard variation was calculated for quantitative variables like age. Frequency and percentage was calculated for all qualitative variables like wound

infection and chi-square test of independence was applied to compare two groups.

Results

During the study period of one year total 626 patients were included in this study (313 in each group A and B as described in methods). In group A and group B mean age was 28.91±3.7 and 28.15±4.9, respectively. (Table 1). In group A, 31.2% and group B , 35.3% were para 1-2, in group A , 53.3% and group B 51.0% were para 3-4. Para 5 or more belonged to 15.5% from group A and 13.7% from group B. A total number of 65 out of 313 (20.9%) patients showed fever/wound infection in group A and 64/313 (20.4%) patients had fever/ wound infection in group B. In Group A, 37 patients began showing fever/wound infection during hospital stay and 28patients had fever/wound infection after discharge from hospital. In Group B, 35 patients had wound infection during four days of hospital stay and 29 had wound infection after discharge.

Discussion

Cesarean birth is a common surgical procedure worldwide, with a WHO recommendation of 5-15%. Infectious morbidity, such as surgical site infection and endomyometritis, complicates 3-15% of cesarean deliveries. In 2009-2010, 23% of surgical site infections were nosocomial.[2,9]

When compared to vaginal delivery, the risk of infection after an elective CS is multiplied by ten. A large no of infectious complications can occur after caesarian birth that includes, endomyometritis, urinary tract infection, pelvic abscess, septic shock, septic pelvic thrombophlebitis, necrotizing fasciitis, and pneumonia other than wound infections. Antibiotic prophylaxis may lower endometritis by 62% and superficial wound infection by 38% following elective CS, accor-ding to a Swedish study.[13]

Table 1: *Distribution of wound infection in different age groups post elective LSCS*

Age	Group A	Group B
Less than 20 years	28(9%)	35(11.1%)
21-30 years	203(65%)	196(62.7%)
31- 40 years	48(15.2%)	51(16.3%)
More than 41 years	34(10.8)%	31(9.9%)

Table 2: *Frequency of fever/wound infection during and after discharge post elective LSCS*

Fever +Wound infection			
Admitted Patients	Group A	Group B	P-value
	37	35	>.05
Post discharge from hospital	28	29	>.05

The American College of Obstetricians and Gynecologists (ACOG) recommends that a single antibiotic dose, preferably first-generation cephalosporin, be given before the surgical incision except for cases where the woman is already receiving appropriate antibiotic treatment. In addition, a single antibiotic dose is as efficient as a number of doses and lowers the cost.[10] One of the debatable issue now a days is the choice, route and duration of prophylactic antibiotic. First-generation cephalosporins are the first choice for prophylaxis during caesarean delivery, according to the American College of Obstetricians and Gynaecologists (ACOG; 2018), the Infectious Diseases Society of America (2013), and the Canadian Society of Obstetrics and Gynaecology (2017).[11] We studied single dose of 3rd generation cephalopsporin (ceftriaxone) in group A preoperatively as intravevous infusion 30 min before incision. Group B was given two doses ceftriaxone 12 hrly for 24hrs followed by 1st generation cephalosporin (cephradine) 500 mg 8 hours by oral antibiotic therapy for 5 days. A total number of 65 out of 326 (19.9%) patients showed fever/wound infection in group A and 64/343 (19.6%) patients had fever / wound infection in group B. My result is similar to a study con-ducted by Westen. Six women (6.7%) in the intervention group (n = 89) and nine (10.3%) in the control group (n=87) had wound infections, respectively (difference 3.60; 95% CI 4.65 to 11.85); p = 0.40). Thus, it was demonstrated that in low-resource nations, a single dose of prophylactic ampicillin and metronidazole is just as effective at preventing post-csection infectious mor-bidity as a multi-day regimen. Without raising the risk of maternal infection, the reduced requirement for pro-phylactic antibiotics will result in cost savings.[12] This study in the Region Örebro County health care system demonstrates that even in situations, where postoperative infections are uncommon, antibiotic prophylaxis in elec-tive caesarean sections is cost-effective as it reduces hos-pital stay.[13] There is also no proof that using prophylactic antibiotics increases the danger of developing antibiotic resistance, hence their use in this medical setting is justified because it would result in reduced pain for the women undergoing elective caesarean sections.[14] In a similar study conducted in Department of Obstetrics and Gynaecology of the Federal Medical Centre, Keffi, Nigeria the rate of fever/wound infection in single dose antibiotic prophylaxis was 18.4% and in multiple dose

was 18.5%.[8] Another study similar to ours divided the preoperative patients of cesarean section into three groups. Group A received single dose of cefuroxime 2g, group B received cefuroxime pre operatively and for three days following cesarean and group C received antibiotics only post operatively. Group A had the shortest postoperative hospital stay and lowest hospitalisation expenditure.[15]

Conclusion

The short term and long term prophylaxis were equally effective in reducing morbidity, assessed by postoperative temperature and wound infection. So we should make recommendations regarding use of single dose antibiotic prophylaxis in order to reduce cost.

Conflict of Interest *None*
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Authors Contribution

RA, SJ: Conceptualization of Project
RA: Data Collection
AB: Literature Search
RA: Statistical Analysis
AS: Drafting, Revision
RA: Writing of Manuscript