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Original Research Article

# Comparative Study of Short-Term and Long-Term Use of Prophylactic Antibiotics in Post-Operative Caesarean Section

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**Abstract**

**Aim:** The aim of the study was to evaluate the effectiveness & reduce the relative efficacy of short-term vs long-term course of prophylactic antibiotics on post-operative caesarean section wound.

**Material & Methods:** A Prospective observational and analytical study was conducted at "Patna Medical College and Hospital, Patna, Bihar, India in the Department of Obstetrics and Gynaecology included 400 participants randomized into two groups. Each group consisting of 200 each. The participants were selected based on the inclusion and exclusion criteria. in between Dec 2019 to Dec 2021 for a period of two years. The women were explained about the nature of the study, the study outcome and written informed consent was obtained. Post operatively both the groups of patients were monitored for infectious morbidity as febrile morbidity, wound induration, wound discharge, wound gaping and any abnormal vaginal discharge.

**Results:** A total of 400 patients were recruited for the study with 200 patients in group 1 and 200 patients in group 2. The result showed that the total patients recruited for the study in group 1 is 200 patients consisting of 129 multi para (64.5%) and 71 primi para (35.5%), and 200 patients were recruited in group 2 which consists of 139 (69.5%) multi para and 61 (30.5%) primi para. In group 1 the Primary LSCS rate was 57.5% (115), Previous 2 LSCS 11.5% (23) and Previous LSCS was 31% (62). In group 2 the Primary LSCS rate was 58.5% (117), Previous 2 LSCS 14.5% (29) and Previous LSCS was 27% (54).

**Conclusion:** The short course (48hrs) of antibiotics that is equally efficacious as the long course (5 or more days) of antibiotics. There was no significant the difference noted between the two groups compared in terms of febrile morbidity, wound induration, serous wound discharge, and purulent wound discharge wound gaping or abnormal vaginal discharge.

**Keywords:** Antibiotics, Cesarean Section, Postoperative, Prophylaxis, Wound Infection.



## Introduction

Cesareans delivery is the most common risk factor for postpartum maternal infections, which occurs at a rate of 18%–38%. [1] Factors that have been associated with an increased risk of infection among women who have a cesarean delivery include emergency cesarean section, labor and its duration, ruptured membranes and the duration of rupture, the use of prophylactic antibiotics or not, the socioeconomic status of the woman, number of prenatal visits, vaginal examinations during labor, anemia, blood loss, obesity, diabetes, general anesthesia, the skill of the operator and the operative technique. [2]

Antibiotic prophylaxis has been documented to reduce the incidence of endometritis after cesarean delivery by as much as 66%–75%.1 Surgical site infections are also reduced by prophylactic antibiotics. [1,3] Although prophylactic antibiotics during cesarean section have been extensively reviewed and generally found to be effective in preventing infection, surveys suggest the inconsistent and variable application of recommendations for its use. [4]

The single most important risk factor for postpartum maternal infection is caesarean section. Bacterial infections around the time of childbirth account for about one tenth of the global burden of maternal death. [5] For most pregnant women, surgical site Infections are not life threatening, yet they have important implications on the length of hospital stay, hospital costs and social implications for the parents and the new born. [6] The most

important source of microorganisms responsible for post c-section infection if the membranes are ruptured are the genital tract. Infections are commonly polymicrobial and the pathogens commonly isolated are E coli, other gram-negative aerobic rods, group b streptococcus, staphylococcus aureus and coagulase negative staphylococci, enterococcus faecalis, Gardnerella vaginalis, anaerobes and genital mycoplasma. Antibiotic prophylaxis refers to administration of antibiotics before, during or after a diagnostic, therapeutic, or surgical procedure so as to prevent infection. Prophylactic antibiotics decrease the bacterial inoculum burden on the skin and make the operative site less hospitable to the growth of bacteria. [7] The benefits of shorter regimens have been found to be equally effective as long‑term prophylactic regimens may include convenient dosing regimens, ensuring full compliance, and saving man‑hours dedicated to the administration of antibiotics in a human resource‑challenged environment.

The frequent and inappropriate use of all newly discovered antimicrobial drugs has led to the development of altered mechanisms in the pathophysiology of the concerned microbes as a survival technique. This leads to treatment failure or ineffective management of such patients.

The aim of the study was to evaluate the effectiveness & reduce the relative efficacy of short-term vs long-term course of prophylactic antibiotics on post-operative caesarean section wound.

**Materials & Methods**

A Prospective observational and analytical study was conducted at "Patna Medical College and Hospital, Patna, Bihar , India in the department of Obstetrics and Gynaecology included 400 participants randomized into two groups. Each group consisting of 200 each. The participants were selected based on the inclusion and exclusion criteria. in between Dec 2019 to Dec 2021 for a period of two years.

**Inclusion Criteria:**

- Elective caesarean sections
- Emergency caesarean sections

**Exclusion Criteria:**

- Patients not giving consent
- Patients with signs or symptoms of preoperative infections
- Duration of surgery> 4 hours
- Patients on steroid therapy
- Immuno-compromised cases
- Patients with PROM, ruptured uterus cases

**Method of Study**

400 women were carefully selected and randomized into two groups.

Each group consisting of 200 women. The study was conducted on patients giving consent, and had observational and analytical in nature. All relevant parameters for deciding healthy healing of wound was taken daily till discharge of the patients. After careful history taking and examination and ruling out any pre-existing medical disorders, history of infections, history of prior hospital admissions and prior antibiotics administration the women were carefully selected and the randomized into two groups. The women were explained about the nature of the study, the study outcome and written informed consent was obtained.

The women in **group 1** were given inj. Cefotaxime/ Ceftriaxone1 gm I.V. twice a day for 5 days, thereafter tablet Cefixime 200mg twice for 3 to 5 days. This was considered as the **long course regime.** The women in **group 2** were given inj. cefotaxime/Ceftriaxone 1 gm I.V. twice a day for 48 hrs, First dose within one hour of commencement of surgery, the dose is repeated if surgery lasted for more than two hours. Another dose is given 12 hours after the 1st dose in same patient. This is considered the **short course regimen.** Post operatively both the groups of patients were monitored for infectious morbidity as febrile morbidity, wound induration, wound discharge, wound gaping and any abnormal vaginal discharge.

**Results**

**Table 1: Age distribution among the two study groups**

| | Group I | | Group II | |
|---|---|---|---|---|
| **Age Group** | **No. of patients** | **% Patients** | **No. of patients** | **% Patients** |
| **Upto 21 yrs** | 43 | 21.5% | 36 | 18.0% |
| **22-25 yrs** | 89 | 44.5% | 89 | 44.5% |
| **26-29 yrs** | 48 | 24.0% | 44 | 22.0% |
| **30 yrs Onwards** | 20 | 10.0% | 31 | 15.5% |
| **Multi** | **129** | **64.5%** | **139** | **69.5%** |
| **Primi** | **71** | **35.5%** | **61** | **30.5%** |

A total of 400 patients were recruited for the study with 200 patients in group 1 and 200 patients in group 2. The above table shows that the total patients recruited for the study in group 1 is 200 patients consisting of 129 multi para (64.5%) and 71 primi para (35.5%), and 200 patients were recruited in group 2 which consists of 139

(69.5%) multi para and 61 (30.5%) primi para.

**Table 2: LSCS Type**

| LSCS Type | Group I | | Group II | |
|---|---|---|---|---|
| | No. of patients | % Patients | No. of patients | % Patients |
| **Previous 2 LSCS** | 23 | 11.5% | 29 | 14.5% |
| **Previous LSCS** | 62 | 31.0% | 54 | 27.0% |
| **Primary LSCS** | 115 | 57.5% | 117 | 58.5% |
| **Total** | **200** | **100.0%** | **200** | **100.0%** |

In group 1 the Primary LSCS rate was 57.5% (115), Previous 2 LSCS 11.5% (23) and Previous LSCS was 31% (62). In group 2 the Primary LSCS rate was 58.5% (117), Previous 2 LSCS 14.5% (29) and Previous LSCS was 27% (54).

**Table 3: Organisms cultured from the wound discharges.**

| Organism Cultured | Group I | | Group II | |
|---|---|---|---|---|
| | No. of patients | % Patients | No. of patients | % Patients |
| **E. coli** | 5 | 2.5% | 3 | 1.5% |
| **Klebsiella** | 2 | 1.0% | 2 | 1.0% |
| **Staph aureus** | 3 | 1.5% | 2 | 1.0% |

Escherichia coli were the common organism cultured among the patients who developed wound discharge.

**Discussion**

Despite the World Health Organization's guidelines that Caesarean section rates should be no greater than 15%, in the developed world Caesarean rates are have already crossed 20%. With increasing Caesarean delivery rates, post-Caesarean delivery infections are likely to become an increasing health and economic burden and their prevention remains a public health priority.[8] Hospital acquired infections caused by multidrug resistant strains are rampant in India. Staphylococcus is the most common organism causing nosocomial infections followed by Pseudomonas, Streptococcus and Escherichia coli. The incidence of Methicillin resistant Staphylococcus aureus in India ranges from 30-70% and it continues to be a major threat. [9]

According to NICE guidelines, 2004: Women having a Caesarean section should be offered prophylactic antibiotics, such as a single dose of first-generation cephalosporin or ampicillin, to reduce the risk of postoperative infections (such as endometritis, urinary tract infection and wound infection), which occur in about 8% of women who have had a CS. [10] According to ACOG antibiotic prophylaxis is recommended for all caesarean deliveries and such prophylaxis should be administered 60 minutes before the start of the caesarean delivery. [11] Staphylococcus is the most common organism causing nosocomial infections followed by Pseudomonas, Streptococcus and Escherichia coli. The incidence of Methicillin resistant Staphylococcus aureus in India ranges from 30-70% and it continues to be a major threat. [9]

A higher number of women developed wound infections while on admission compared to those who had infected wounds after discharge. This was similar to findings from a trial conducted in Tanzania. [12] However, the post discharge figure in this study was higher than the 36% post discharge figure in the Beattie et al. [13] trial on risk factors for wound infection after cesarean section. This raises the question of post discharge wound habits and the need to improve post discharge surveillance in post‑natal care.

In group 1, 14 patients developed fever and in group 2, 11 patients developed a fever. These patients had a temperature of more than 380 C which developed 24 hours after the caesarean section and averagely lasted for 3 to 5 days. Patients had associated abdominal wound infections, wound swab was taken and sent for pus culture and sensitivity. Appropriate antibiotics were changed accordingly. In post-operative period presence of fever, foul smelling discharge, uterine tenderness is suggestive of endometritis, irrespective of status of culture on cervical vaginal swab.

The rate of endometritis, which was comparable in the two groups, is consistent with previous literature. [4] Endometritis is said to occur in about 1%–3% of births and is up to ten times more common after cesarean section. [13,14] The low rate in these studies may be due to the difficulty in diagnosing sub‑clinical endometritis and the fact that patients with increased risks like prolonged rupture of the membrane were excluded from the study.

The most common organism isolated in this study was E. coli with S. aureus as the second most common organism. This was different from findings by other researchers [4,15-17] where S. aureus was the most common bacteriological isolate in post cesarean wound swabs. E. coli is a

major facultative inhabitant of the large intestine. [18,19] As such, it presence in the majority of the infected wounds may have been due to improper sterilization of surgical gowns that may have been soiled earlier as the hospital was using non disposable surgical gowns and drapes at the time the study was conducted. The introduction of disposable gowns and drapes may help in reducing the incidence of these organisms contaminating surgical sites. The post discharge perineal habits of patients may also have played a role in the increased prevalence of E. coli. Good postoperative perineal hygiene has been shown to decrease the incidence of postoperative surgical site infections. [20]

The strength of this study is that unlike other studies comparing short versus long term prophylactic antibiotics, blinding of the patients, which increases the power and credibility of studies were done in this study. Furthermore, the effects of extraneous variables like the state of the membranes and the number of vaginal examinations that might result in misleading interpretations on wound breakdown were controlled for by bivariate analysis.

## Conclusion

From this study, it is concluded that the short course (48hrs) of antibiotics that is equally efficacious as the long course (5 or more days) of antibiotics. There was no significant the difference noted between the two groups compared in terms of febrile morbidity, wound induration, serous wound discharge, and purulent wound discharge wound gaping or abnormal vaginal discharge. Because of the rising antibiotics resistance that has now become a serious threat the usage of lesser antibiotics has become more and more important.

The short regimen is also cost-effective than the long course of antibiotics because the number and duration of antibiotics used are very less. The short course of antibiotics is safe, effective, and convenient and also saves Manpower. Thus, can be used instead of the usual 5 or more days of iv antibiotics followed by an oral antibiotic that is routinely used in a tertiary government centre.

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