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Original Research Article

A Hospital Based Comparative Assessment of Two Different Antibiotic Prophylaxis Regimes in Patients Undergoing for Elective Caesarean Section

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Abstract

Aim: The objectives of the study were to audit and implement the use of prophylactic antibiotics in women undergoing elective caesarean section.

Methods: This comparative, prospective, hospital-based study was conducted in the Department of Obstetrics and Gynaecology, JLNMCH, Bhagalpur, Bihar, India for the period of 12 months.

Results: Mean age was 24.6±3.7 years in group A & 23.7±3.2 years in group B. BMI at the time of admission was 27.3±6.4 kg/m² & 28.2± 5.5 kg/m² in group A & B respectively. Mean duration of surgery was 43.7±7.3 min in group A & 46.4±5.5 in group B. Average blood loss in both groups was comparable. Mean days of hospitalisation was 4.8±3.7 days & 5.7±2.9 days in group A & B respectively. History of previous laparotomy like LSCS, ectopic surgery, etc. was present in 70 & 64 patients from group A & B respectively. Most common indication for elective LSCS was previous LSCS followed (40 % and 38.34%) by primi with CPD (23.34% v/s 21.66%). In the group A prophylactic antibiotic prophylaxis was given to 24 women (40%) and was not given to 36 women (60%). In group B, out of 60 women of this 54 (90%) of women received prophylactic antibiotic before elective LSCS. Out of 24 women who received antibiotic in group A, 41.66% received antibiotic within 1 hour and 14 cases (58.34%) received more than 1 hour before procedure. Out of 54 women in group A, 45 (83.34%) women received antibiotic within 1 hour, 8 received more than 1 hour (14.81%). In the group A, majority of the women received amoxicillin clavulanic 1.2 gm IV /Inj cefotaxime based on the policy formulated based on the antibiogram of the hospital.

Conclusion: This study showed single dose antibiotic prophylaxis is as effective as conventional multi dose antibiotic therapy. It is cost effective, antibiotic resistance of microorganisms can be prevented, reduces patient side effects, nursing staff work.

Keywords: prophylactic antibiotic, caesarian delivery, ceftriaxone, ampicillin and metronidazole

Introduction

Infectious morbidity is the most common complication following caesarean section with reported rates ranging from 18% to 83% [1], while that for vaginal delivery is less than 10%. [2] The potential of antibiotic prophylaxis has been studied extensively since the first controlled trial, reported by Miller and Crichton. [3]

Following elective surgery, wound infection in patients who receive peri-operative antibiotics (within three hours following skin incision) occurs in 1.4% compared with 0.6% in those who receive antibiotics within two hours prior to skin incision. [4,5] Prophylactic antibiotics reduce the incidence of SSIs [6-8] and evidence-based guidelines recommend their use prior to incision as opposed to during or after the procedure. [6,7,9,10] Antibiotic prophylaxis is well established for gynecologic procedures such as abdominal hysterectomy [11] and a single pre-operative antibiotic is recommended for abdominal and vaginal hysterectomy.

Women undergoing caesarean section have an increased risk of postoperative infection and infectious morbidity compared with women giving birth vaginally. [12] Caesarean sections have been shown to have nearly five times the risk of postpartum infection as vaginal births (and this is with a policy of antibiotics at caesarean section) and just over 75% occur after hospital discharge. [13] Infectious morbidity for the mother, consisting

primarily of endomyometritis and wound infection remains a leading cause of post-operative complications. [14] Prophylactic antibiotic treatment is use of antibiotics before, during, or after a diagnostic, therapeutic, or surgical procedure to prevent infectious complications. A Cochrane review from 2014 [15] compared antibiotic prophylaxis with no prophylaxis and concluded that antibiotic prophylaxis decreased the risk for postpartum wound infection, endometritis and severe infectious complications by 60–70%. Prophylactic antibiotics are expected to work in conjunction with the antiseptic measures taken before and during surgery.

Around 40%–60% of SSIs can be prevented with the use of proper antibiotic prophylaxis. The most commonly used types of antibiotics are penicillins, cephalosporins, fluoroquinolones,

tetracyclines and macrolides, with each class including many drugs. [16] Furthermore, two recently published randomised trials [17,18] consisting of 320 and 120 women respectively, also found no evidence of decreased postoperative morbidity and questioned the use of prophylactic antibiotics for women undergoing elective caesarean section.

The objectives of the study were to audit and implement the use of prophylactic antibiotics in women undergoing elective caesarean section.

Matrials and Methods

This comparative, prospective, hospital-based study was conducted in the Department of Obstetrics and Gynaecology, JLNMCH, Bhagalpur, Bihar, India for the period of 12 months (May 2020 to April 2021)

Inclusion criteria –

- Patients posted for elective LSCS, BMI <30, willing to participate in study & follow up for 3 months.
- The caesarean was considered elective when the procedure was performed in the absence of labor and before rupture of membrane.

Exclusion criteria

- Women who had known or suspected hypersensitivity to cephalosporins
- Any co-existing diseases like diabetes mellitus, hypertension or cardiac problem that will require multi dose antibiotics
- Surgical procedure exceeding more than 90 minutes and if blood loss was more than 1500ml.

Patients received information about objective of present study prior to surgery and a written informed consent was obtained. Baseline assessment including vital signs, general physical, systemic and obstetric examination were performed. Routine blood (CBC, RBS, RFT) and urine analysis & if required urine culture and sensitivity, high vaginal swab culture and sensitivity were carried out. Patients were randomly divided on alternate number basis in 2 groups (Group A and Group B) each consisted of 120 patients.

Group A - patients received injection Ceftriaxone 1gm. intravenous stat at the time of induction of anesthesia.

Group B - patients received intravenous ampicillin and metronidazole for 1 day followed by oral for next 4 days.

Temperature monitoring, vital signs, abdominal, perineal examinations were performed daily till 7days. If body temperature was more than 1010 F on 2 occasions 4 hours or more apart, excluding the night of surgery, it was considered as febrile morbidity and appropriate investigations were performed including urine culture, blood culture, high vaginal swab culture before starting appropriate multi dose antibiotics. Wound was inspected for superficial or deep infection, any pus discharge, surgical site abscess formation, wound dehiscence, vault haematoma and pelvic abscess. At discharge, patients were instructed to contact if they have any signs and symptoms of infection. All patients were followed up to 3 months at monthly intervals. Incidence of postoperative morbidity (febrile morbidity and infectious morbidity such as wound infection, chest infection, UTI, pelvic abscess and dehiscence of scar) was primary outcome.

Data was collected in pre-designed proforma & entered in SPSS for descriptive and analytical study. A p value of <0.05 was considered significant.

Results

Table 1: Characteristics of patients in two groups

	Group A	Group B
Mean age in years	24.6±3.7	23.7±3.2
BMI in kg/m²	27.3±6.4	28.2± 5.5
Mean duration of surgery (min)	43.7±7.3	46.4±5.5
Mean blood loss (ml.)	632±58	655±65
Mean days of catheterisation	1	1

Mean days of hospitalisation (days)	4.8±3.7	5.7±2.9
History of previous laparotomy	70	64

Mean age was 24.6±3.7 years in group A & 23.7±3.2 years in group B. BMI at the time of admission was 27.3±6.4 kg/m² & 28.2± 5.5 kg/m² in group A & B respectively. Mean duration of surgery was 43.7±7.3 min in group A & 46.4±5.5 in group B. Average blood loss in both groups was comparable. Mean days of hospitalisation was 4.8±3.7 days & 5.7±2.9 days in group A & B respectively. History of previous laparotomy like LSCS, ectopic surgery, etc. was present in 70 & 64 patients from group A & B respectively.

Table 2: Indication for CS

Parameters	Group A	Group B
Previous LSCS	24 (40%)	23 (38.34%)
CPD	14 (23.34%)	13 (21.66%)
BREECH	6 (10%)	6 (10%)
Fetal distress	7 (11.66%)	7 (11.66%)
PROM	7 (11.66%)	7 (11.67%)
Others	2 (3.32%)	4 (6.67%)

Most common indication for elective LSCS was previous LSCS followed (40 % and 38.34%) by primi with CPD (23.34% v/s 21.66%).

Table 3: Antibiotic prophylaxis and Antibiotic prophylaxis type and duration

Categories	Group A	Group B	P Value
Received antibiotics	24 (40%)	54 (90%)	<0.00001
Did not receive antibiotics	36 (60%)	6 (10%)	
Antibiotic prophylaxis type and duration			
Within 1 hour 15	10 (41.66%)	45 (83.34)	<0.00001
More than1hour	14 (58.34%)	8 (14.81%)	
Inj amoxicillin -clavulanic acid/ inj cefotaxime	13 (54.16%)	48 (88.88%)	
Others	11 (45.84%)	6 (11.11%)	

In the group A prophylactic antibiotic prophylaxis was given to 24 women (40%) and was not given to 36 women (60%). In group B, out of 60 women of this 54 (90%) of women received prophylactic antibiotic before elective LSCS. Out of 24 women who received antibiotic in group A, 41.66% received antibiotic within 1 hour and 14 cases (58.34%) received more than 1 hour before procedure. Out of 54 women in group A, 45 (83.34%) women received antibiotic within 1 hour, 8 received more than 1 hour (14.81%). In the group A, majority of the women received amoxicillin clavulanic 1.2 gm IV /Inj cefotaxime based on the policy formulated based on the antibiogram of the hospital.

Discussion

Caesarean section is one of the commonly performed obstetric procedures. Following caesarean delivery (CD), maternal mortality and morbidity may result from a number of infections including endometritis, urinary tract infection (UTI) and surgical site infection (SSI). [19] The use of prophylactic antibiotics in women undergoing cesarean section reduced the incidence of wound infection, endometritis and serious infectious complications by 60% to 70%. [20] ACOG has recommended that antibiotic be given within 1 hour before the caesarean section for maternal benefit. [21] In spite of the guidelines several studies have shown that the hospital practices varies from no preoperative antibiotic to various different classes of antibiotics. The timing of the antibiotic also varied depending on physician preference with no uniform protocols across hospital. [22,23]

Mean age was 24.6±3.7 years in group A & 23.7±3.2 years in group B. BMI at the time of admission was 27.3±6.4 kg/m² & 28.2± 5.5 kg/m² in group A & B respectively. Mean duration of surgery was 43.7±7.3 min in group A & 46.4±5.5 in group B. Average blood loss in both groups was comparable. Mean days of hospitalisation was 4.8±3.7 days & 5.7±2.9 days in group A & B respectively. History of previous laparotomy like LSCS, ectopic surgery, etc. was present in 70 & 64 patients from group A & B respectively. Most common indication for elective LSCS was previous LSCS followed (40 % and 38.34%) by primi with CPD (23.34% v/s 21.66%). Across the globe, SSIs are associated with increased morbidity and mortality; sequelae include revision surgeries, poor quality of life, prolonged antibiotic treatment and rehabilitation, and associated lost work and productivity. Moreover, SSIs are associated with a

substantial economic burden to the healthcare system as a result of increased length of hospital stay and increased risk of readmission. [24] Current strategies aimed at preventing SSIs include improved hygiene, aseptic surgical techniques, carrier screening, decolonization, application of antibiotics to the surgical site prior to wound closure, and intravenous antibiotic prophylaxis. [25]

Most common indication for elective LSCS was previous LSCS followed (40 % and 38.34%) by primi with CPD (23.34% v/s 21.66%). In the group A prophylactic antibiotic prophylaxis was given to 24 women (40%) and was not given to 36 women (60%). In group B, out of 60 women of this 54 (90%) of women received prophylactic antibiotic before elective LSCS. Out of 24 women who received antibiotic in group A, 41.66% received antibiotic within 1 hour and 14 cases (58.34%) received more than 1 hour before procedure. Out of 54 women in group A, 45 (83.34%) women received antibiotic within 1 hour, 8 received more than 1 hour (14.81%). In the group A, majority of the women received amoxicillin clavulunic 1.2 gm IV /Inj cefotaxime based on the policy formulated based on the antibiogram of the hospital. Single dose antibiotic prophylaxis is well-established for abdominal and vaginal hysterectomy and cumulative meta-analysis data indicate the same. Perioperative antimicrobial prophylaxis has been advocated in surgical procedures, but recent guidelines and publications showed that single dose antibiotic prophylaxis is equally effective in clean, and clean contaminated surgical procedures. Following elective surgery, wound infection in patients who receive perioperative antibiotics (within 3 hours following skin incision) occurs in 1.4% compared to 0.6% in those who receive antibiotics within the 2 hours before skin incision. [26]

The randomized, non-blinding clinical trial of 500 eligible participants compared IV single dose of gentamicin (3 mg/kg) plus metronidazole (500 mg) 30-60 minutes prior to CS with same regimen prior to the operation but continued for 24 hours. Pre-operative single dose antibiotic prophylaxis for emergency caesarean showed a lower cumulative incidence of surgical-site infection, a reduced staff workload and a minimized medication cost compared to multiple doses till 24 hours. [27] While one meta-analysis, which was based solely on elective cesarean delivery, did not find a risk reduction for any maternal outcome in favor of preoperative in comparison with postoperative antibiotic prophylaxis. [28]

Conclusion

This study showed single dose antibiotic prophylaxis is as effective as conventional multi dose antibiotic therapy. It is cost effective, antibiotic resistance of microorganisms can be prevented, reduces patient side effects, nursing staff work. Further knowledge of antibiotic susceptibility and resistant strains is to be considered while choosing antibiotic.

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