ORIGINAL ARTICLE

Comparison of Efficacy of Ceftriaxone Alone or Combination with Metronidazole in Prevention of Wound Infection in Elective Cesarean Section

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ABSTRACT

Background: Wound infection is a common complication after cesarean section. However, certain antibiotics, if given before closing wound, the Wound infection can be prevented. So we conducted this trial to determine the benefit of two antibiotics in prevention of post-cesarean wound infection.
Aim: To compare the efficacy with prophylaxis ceftriaxone versus ceftriaxone plus metronidazole in patients undergoing planned cesarean section.
Methods: This Randomized controlled trial (experimental study) was done at Department of Obstetrics and gynecology, Aziz Bhatti Shaheed Teaching Hospital, Gujrat for 6 months. The patients were recruited by applying non-probability consecutive sampling technique. The patients were divided randomly in 2 groups of equal number of cases. In group A, patients were given IV ceftriaxone as single dose of 1g before skin incision. In group B, patients were given IV ceftriaxone 500mg plus IV metronidazole 500mg before skin incision. Then patients underwent cesarean section under spinal anesthesia. Patients were followed-up for 10 days. If there was no sign of infection at wound site, then efficacy was labeled.
Results: In ceftriaxone group, average age of patients was 30.36±6.84 years and in combination group, patients had mean age of 29.10±6.95 years. All patients presented within 38-42 weeks of gestation. Efficacy was achieved in 84% cases with ceftriaxone while in 78% in combination group. Statistically there was no significant difference detected between both groups i.e. (p 0.279).
Conclusion: Thus, there is no difference in efficacy in both groups, so we can implement the use of ceftriaxone alone instead of combination with metronidazole.
Keywords: Wound infection, Lower segment cesarean section, Prophylaxis, Ceftriaxone, metronidazole.

INTRODUCTION

Cesarean section is demarcated as the delivery of baby by giving an incision in the lower abdominal wall as well as incision in the uterine wall. It is very common and very important surgical procedure performed to save the life of a patient and her neonate. The number of cesarean deliveries has been increased and increasing every year. Evidently, it will also cause a rise in surgery related complications.[1] Infectious morbidities after a cesarean section are the significant source of complication and high risk of death.[2] Antibiotic prophylaxis is the application of antibiotics to prevent postoperative infectious complications. It can be a primary, secondary (suppression) and eradicating one.[3] It has been shown in previous trials that antibiotics prophylaxis given before cesarean section can decrease the chances of postoperative infectious complications. There are numerous antibiotics available which can reduce incidence of postoperative wound infection in significant number of cases[4].

The reduction in wound infections validates the strategy for recommending the antibiotic prophylaxis to the pregnant patients who are planned to undergo cesarean section either elective or non-elective.[5] Several trials have been conducted before to confirm the effectiveness of antibiotic prophylaxis in decreasing the infectious complications of cesarean. But, there are only few randomized trials done before, leaving a debate for surgeons that which antibiotic or regimen is better and more effective[2]. In a study, with ceftriaxone alone, the frequency of wound infection was reported in 0.7% cases and effective in controlling wound infection in 99.3% cases[6]. But in another study it was reported that with ceftriaxone, the frequency of efficacy was 99% (wound infection in 1% only)[7]. While one more study showed that with ceftriaxone alone, the frequency of efficacy was 93% (wound infection was 7%)[8]. And in one more study, with ceftriaxone alone, the frequency of efficacy was 83% (wound infection was 17%)[9]. Another study showed that with combination of ceftriaxone and metronidazole, the frequency of efficacy was 90% (wound infection was 10%)[10].

So this study was planned to compare the frequency of efficacy with prophylaxis ceftriaxone versus ceftriaxone plus metronidazole in patients undergoing planned cesarean section. Ceftriaxone has controversial results regarding its efficacy and in prevention of wound infection. While no more study has been conducted on combination of ceftriaxone and metronidazole for cesarean section. Furthermore no comparative trial has been found in literature which compare ceftriaxone alone versus its combination with metronidazole. So that the dispute can be clarified that which regimen is more effective in preventing wound infection. This will help in implementation of more

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beneficial regimen, as additional drugs like metronidazole may cause gastrointestinal effects in post-surgical patients.

The objective of the study was to compare the efficacy of ceftriaxone versus ceftriaxone plus metronidazole in preventing post-cesarean wound infection after elective cesarean delivery.

MATERIALS AND METHODS

This Randomized Controlled Trial (experimental study) was done at Department of Obstetrics & Gynecology, Aziz Bhatti Shaheed Hospital, Gujrat of 6 months i.e., 2-11-2016 to 2-5-2017. Sample size was 200 cases (100 patients in each group) by using power of study=80%, significance level=5% and proportion of efficacy i.e. ceftriaxone=99%[7] and ceftriaxone plus metronidazole=90%[10]. All the patients were included through non probability consecutive sampling technique. Patients of age 18-40 years of parity <5 presenting at gestational age >38 weeks for elective cesarean were included. While patients having diabetes, anemia, BMI >30kg/m^2, preoperative fever, antibiotics use within 1 week, allergic to ceftriaxone or metronidazole, HIV, patients with ruptured membranes and chorioamnionitis were excluded.

Informed consent and demographics were obtained. Then patients were divided randomly into 2 equal groups by using lottery method. Patients in group A were given ceftriaxone 1g intravenously before incision and then 12 hourly for 48 hours. Patients in group B were given injection ceftriaxone 1g plus injection metronidazole 500mg intravenously prior to skin incision and then 1g ceftriaxone 12 hourly +500mg metronidazole 8hourly for 48 hours. Then patients underwent cesarean section under spinal anesthesia. The indications for elective cesarean section include: Previous I cesarean section with one other indication, previous ≥2 cesareans, breech presentation, transverse lie, contracted pelvis, placenta previa, good size baby, multiple pregnancies with mal presentation. After delivery, patients were shifted in the wards and were followed-up for 48-72 hours postoperative and at 10th day (skin suture removal). If there was no sign of infection at wound site, then efficacy was labeled (if there was no wound infection i.e. no purulent discharge at wound site, or erythema>1cm at wound site during 10 days after cesarean).

RESULTS

The mean age of patients was 30.36±6.84 years in ceftriaxone group while 29.10±6.95 years in ceftriaxone + metronidazole group. Mean gestational age at delivery was 39.93±1.42weeks in ceftriaxone group while 40.04±1.47 weeks in ceftriaxone + metronidazole group. Mean BMI of patients was 25.18±3.19kg/m^2 in ceftriaxone group while 24.74±3.03kg/m^2 in ceftriaxone + metronidazole group. In ceftriaxone group, 27 were primiparous, 25 had parity 1, 22 had parity 2, 13 had parity 3 and 13 had parity 4. In ceftriaxone + metronidazole group, 27 were primiparous, 29 had parity 1, 22 had parity 2, 12 had parity 3 and 10 had parity 4. In ceftriaxone group, 29 patients had previous h/o CS while 71 delivered through SVD. In ceftriaxone + metronidazole group, 31 patients had previous h/o CS while 69 delivered through SVD. The patients who delivered through CS in previous pregnancy, in ceftriaxone group, 14 patients had 1 CS, 9 had 2 CS while 6 had 3 CS. In ceftriaxone + metronidazole group, 14 patients had 1 CS, 12 had 2 CS while 6 had 3 CS (Table 1).

Efficacy was achieved in 84(84%) patients with ceftriaxone while in 78(78%) patients with ceftriaxone + metronidazole. There was insignificant difference observed in both groups (P >0.05) (Table 2).

Table 1: Demographics

		Group	
		Ceftriaxone	**Ceftriaxone + metronidazole**
N		100	100
Age (Years)		30.36±6.84	29.10±6.95
Gestational Age (weeks)		39.93±1.42	40.04±1.47
BMI		25.18±3.19	24.74±3.03
Parity	Primi	27 (27.0%)	27 (27.0%)
	1	25 (25.0%)	29 (29.0%)
	2	22 (22.0%)	22 (22.0%)
	3	13 (13.0%)	12 (12.0%)
	4	13 (13.0%)	10 (10.0%)
Previous CS	Yes	29 (29.0%)	31 (31.0%)
	No	71 (71.0%)	69 (69.0%)
Number of previous CS	1	14 (48.3%)	14 (45.2%)
	2	9 (31.0%)	12 (38.7%)
	3	6 (20.7%)	5 (16.1%)

Table 2: Comparison of efficacy in both groups

		Group		Total
		Ceftriaxone	**Ceftriaxone + metronidazole**	
Efficacy	Yes	84 (84.0%)	78 (78.0%)	162 (81.0%)
	No	16 (16.0%)	22 (22.0%)	38 (19.0%)
Total		100 (100.0%)	100 (100.0%)	200 (100.0%)

DISCUSSION

Delivery though cesarean section is the most important risk factor of post-operative wound infection for a patient. The patients who undergo delivery via cesarean section have 5-20 times higher chances of postoperative infection than vaginal delivery. The average of delivery through cesarean section is >20% higher in developed counties, which is similar for normal vaginal deliveries in developing countries. Wound infections that develop after cesarean section are very important and significant cause of maternal morbidity and mortality as well as cause the significant increase in the hospital stay[11]. Post-cesarean wound complications are comprised of fever, wound infection, bactaremia, endometritis, others like “pelvic abscess, septic shock, necrotizing fasciitis & septic pelvic vein thrombophlebitis” and also the urinary tract infection[12-15].

Antibiotic prophylaxis, for pregnant patients before undergoing cesarean delivery, is advantageous as it can reduce the infectious complications in patients either are high risk i.e. patients with ruptured amniotic membranes or at low risk. There is 60-70% reduction in post-operative endometritis and 30-65% reduction in surgical site

infection. This provoked the Cochrane library to recommend the antibiotic prophylaxis before caesarean section either elective or emergency[5].

While, it is verified that prophylactic antibiotics is advantageous in reducing the risk of post-cesarean wound infection, but it is still unclear that which regimen is more effective and can be a drug of choice. Several antibiotic regimens have been testified as effective in reducing the post-cesarean infectious complications. Uptil now, ampicillin, metronidazole, penicillin, mezlocillin, ticarcillin, imipenam, piperacillin, tobramycin, clindamycin, cefazolin, gentamicin, ceforanide, cephalothin, cefuroxime, cefonicid, cefoxitin, ceftazidime, cephradine, cefamandole, cefotetan & cefotaxime were applied before undergoing cesarean delivery and all of above showed high efficacy rate either alone or in combination with other antibiotics or drugs[16].

In our study, efficacy was achieved in 84(84%) patients with ceftriaxone while in 78(78%) patients with ceftriaxone + metronidazole. There was insignificant difference observed in both groups (P>0.05). In a study, with ceftriaxone alone, the frequency of wound infection was reported in 0.7% cases and effective in controlling wound infection in 99.3% cases[6]. But in another study it was reported that with ceftriaxone, the frequency of efficacy was 99% (wound infection in 1% only)[7].

While one more study showed that with ceftriaxone alone, the frequency of efficacy was 93% (wound infection was 7%)[8]. And in one more study, with ceftriaxone alone, the frequency of efficacy was 83% (wound infection was 17%)[9]. One study conducted with ceftriaxone plus metronidazole combination, efficacy was reported in 90% (wound infection was 10%)[10]. One more study showed that with combination of ceftriaxone and metronidazole, the frequency of efficacy was 99.3% (wound infection was 0.7%)[17]. Another trial showed that with ceftriaxone alone, there was insignificant difference reported for the incidence of wound infections (7% versus 8%). Thus, a single dose of ceftriaxone is as effective as combination of ceftriaxone with metronidazole for prevention of post-cesarean infection or wound complications[8].

CONCLUSION

Thus, we have got the local evidence and there is no difference in efficacy in both groups, so we can implement the use of ceftriaxone alone instead of combination with metronidazole, as additional drug like metronidazole may cause gastrointestinal effects in post-surgical patients.

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