

# CHEMOPROPHYLAXIS IN CAESAREAN SECTION

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## ABSTRACT

*Objective* To determine the usefulness of two different regimens of antibiotics on post caesarean infectious morbidities.

*Study design* A comparative study drug trial.

*Place & Duration of study* Department of Obstetrics and Gynaecology Lyari General Hospital and private hospitals of Karachi, from January 2009 to June 2009.

*Methodology* Patients who underwent caesarean section were recruited. The patient were divided into two groups of 74 each. Group A received triple antibiotic therapy including injection cephradine, aminoglycoside and metronidazole for first 48hours followed by oral therapy for 5 days. Group B received injecton ceftriaxone and metronidazole for first 48 hours followed by oral therapy for 5 days. In both groups therapy was started before skin incision. Those who had established infection prior to surgery or who received antibiotics in last 24 hours or allergic to any of the antibiotics used, were excluded. Patients were assessed post operatively for infectious complications including febrile illness, dysuria, offensive lochia and abdominal wound infection.

*Results* No significant difference was found between the two groups. Complications found were febrile morbidity (23.0% Vs 18.7%), urinary tract infection (13.3% Vs 16.0%) wound infection (14.7% Vs 10.7%) and lochia (6.7% Vs 8.0%) respectively in Group A and Group B. There was a significant difference in terms of cost effectiveness of 3<sup>d</sup> generation cephalosporin that was more.

*Conclusion* Both first and third generation cephalosporins are equally effective in caesarean section as prophylaxis.

*Key words* Cesarean section, Prophylactic antibiotic, Infectious morbidity.

## INTRODUCTION:

Caesarean section is a commonly performed surgical procedure on women globally. Over the past two decades the prevalence of caesarean section has risen steadily.<sup>1</sup> The most common infectious morbidities associated post operatively are endometritis and wound infection. The frequency of infection varies from 5% to 85% with a mean incidence of 35% to 40% in most cases where prophylactic antibiotics were not used.<sup>2</sup> The rising

infection rate results in a longer hospital stay and is a proven burden on financial resources.<sup>3</sup>

Antibiotic prophylaxis in women who undergo caesarean delivery is beneficial in decreasing infectious morbidities in both high risk like in women after rupture of membranes and low risk groups.<sup>4</sup> A 60%-70% reduction in endometritis and 30%-65% reduction in wound infection rate prompted the Cochrane library to recommend prophylactic antibiotic to women who undergo caesarean section in both elective and non elective caesarean delivery.<sup>4</sup> The objective of antibiotic prophylaxis is to achieve sufficient antibiotic tissue concentration before possible wound contamination. So there is strong evidence that antibiotic prophylaxis for caesarean delivery should be given before skin incision rather than after cord clamping. This decreases the incidence of

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postpartum endometritis and total infectious morbidities without affecting neonatal outcome.<sup>5,6,7</sup> Beside strong recommendation for the prophylactic use of antibiotic in caesarean section there is no consensus on which antibiotic to be used.

To date penicillin, ampicillin, coamoxiclav, metronidazole, clindamycin, gentamycin, cephalixin, ceftriaxone and others have been used for caesarean section prophylaxis and all have demonstrated efficiency either alone or in combination with others. But still there a need exists to identify the suitable antibiotic regimens to cover all organism responsible for infectious morbidity and mortality. This study was designed to compare the usefulness of two antibiotic regimens in order to decrease the post operative infectious morbidities in women undergoing caesarean section.

#### METHODOLOGY:

This was a clinical drug trial conducted from January 2009 to June 2009 at Obstetrics and Gynaecology ward VI Lyari General Hospital & Dow University of Health Sciences and some private hospitals of Karachi. This study compared triple therapy comprising of cephadrine, metronidazole and aminoglycoside with ceftriaxone and metronidazole as prophylactic antibiotic for caesarean section.

All women who underwent both elective and emergency caesarean sections were recruited. Those having history of infection prior to surgery or allergic to any of the antibiotics used, or on antibiotics in last 24 hours were excluded. Patients were allocated in labour room to receive either of the two sets of antibiotics. The drugs used in group A were cephadrine 500 mg, metronidazole 500mg, gentamycin 80mg. These were administered intravenously before skin incision by anaesthetist and repeated after 8 hour for the first 48 hours followed by oral cephadrine and metronidazole for 5 days. Group B received injection ceftriaxone 500gm and injection metronidazole 500mg intravenously prior to skin incision and repeated 8 hourly for first 48 hours followed by cefixime (400mg) and metronidazole (400mg) orally for 5 days. No other antimicrobial agents were given unless post operative infection was diagnosed.

All caesarean section were performed using standard technique. Post operative care followed standard clinical practice. The occlusive dressing applied in theater removed after 48 hours. In both groups bladder catheter was removed after 24 hours. A complete blood count and urine analysis was mandatory on 3<sup>rd</sup> postoperative day. High vaginal swab or wound swab for culture and sensitivity were sent where indicated. Each patient was examined daily and post operative infectious morbidity noted till the date of discharge from the hospital.

The following post partum complications were noted:  
1) Febrile morbidity: Temperature above 38 °C at least 4 hours apart on two or more occasions excluding the first 24 hours after delivery.

2) Wound infection: Partial or total dehiscence or presence of purulent or serous discharge from the wound with induration, warmth and tenderness were considered as wound infection.

3) Urinary tract infection: Diagnosis only made when urinary symptoms associated with significant bactiuria 100,000 organisms/ml on mid stream urine analysis.

4) Offensive purulent lochia from genital tract for endometritis.

All infectious morbidities were treated according to their respective protocol. Wound morbidity was managed by toileting and cleaning with normal saline and pyodine. Wound swabs sent for culture and sensitivity where indicated. Likewise high vaginal swab and urine samples for culture and sensitivity were sent where they were indicated and treated accordingly. SPSS version17 was used for statistical analysis.

#### RESULTS:

A total of about 148 patients were recruited into the study; 74 each to triple therapy antibiotic group (Group A) and double therapy group (Group B). The demographic data for the women receiving triple antibiotic therapy were compared with those of the women receiving ceftriaxone group (Table I). Two groups were similar with respect to age, parity and gestational age.

**Table I. Demographic characteristics**

	Triple Therapy (Group A)	Double Therapy (Group B)
Age (Years)	27.49 + 4.56	28.15 + 5.71
Parity	1.76 + 2.07	1.80 + 1.75
Gestational Age weeks	38.11 + 1.88	37.88 + 1.51

The indications for caesarean section in both groups were similar (Table II). Various intra operative risk factors for postoperative infectious morbidity were evaluated (table III). No statistically significant differences between the two groups were observed with regard to preoperative haemoglobin and duration of surgery. The frequencies of infectious morbidities in both groups are shown in table 4. Analysis of the results of the two antibiotic groups did not demonstrate any statistical significant difference in post operative infectious

morbidity. The incidence of wound infection was 14.7% in triple therapy group and 10.7% in double therapy group.

**Table-II: Indications for Caesarean Section**

	Group A	Group B
Previous CS	11 (14.7)	13 (17.3)
Previous 2 CS	8 (10.7)	10 (13.3)
NPOL	8 (10.7)	7 (9.3)
PIH	7 (9.3)	9 (12.0)
Breech	7 (9.3)	4 (5.3)
Fetal Distress	6 (8.0)	4 (5.3)
PROM	5 (6.7)	4 (5.3)
CPD	4 (5.3)	2 (2.7)
Previous 3 CS	4 (5.3)	3 (4.0)
APH	2 (2.7)	3 (4.0)
Twin	2 (2.7)	1 (1.3)
GDM	2 (2.7)	0 (0)
Good size baby	2 (2.7)	2 (2.7)
Placenta Previa IV	1 (1.3)	3 (4.0)
Failed induction	1 (1.3)	1 (1.3)
Obstructed Labour	1 (1.3)	3 (4.0)
Manchester Repair	1 (1.3)	0 (0)
Brow presentation	1 (1.3)	1 (1.3)
Transverse lie	1 (1.3)	0 (0)
BOH	0(0)	3 (4.0)

## DISCUSSION:

The value of prescribing prophylactic antibiotic for the prevention of serious infectious and febrile morbidity after caesarean section has been well documented.<sup>8</sup> Such benefits seem to be applicable for both elective and emergency caesarean sections. There is sufficient data available that recommends antibiotic prophylaxis before skin incision. But one of the major issues is the choice of antibiotic to be used for prophylaxis. In post caesarean infections, the most common pathogens are group B streptococcus, anaerobic streptococcus, E coli, staphylococcus aureus and bacteroids. A large no of studies were conducted to determine the suitable regime that covers all these organisms responsible for post-caesarean infectious morbidities but none of the studies showed result that favours specific antibiotic regimens over the other for prophylaxis.<sup>9, 10, 11</sup>

Keeping this in mind, we compared the 1<sup>st</sup> and 3<sup>rd</sup> generation of cephalosporins to find out the best suitable regimens for prophylaxis. Most patients included in this study had one or other risk factors for surgical site infection like prolonged labour, prolonged rupture of membranes, frequent vaginal examination and also systemic illness like anaemia, obesity and diabetes. Success of the antibiotic prophylaxis depends not only on the appropriate dosing of the antibiotic regimens but also on the appropriate timing of antibiotic administration. Evidence suggests that prophylactic antibiotic should be administered preoperatively to result in the lowest risk of surgical wound infection.<sup>5,6</sup> The initial dose was 500 gm for both groups of antibiotics prior to skin incision in our study.

**Table-III. Operative Characteristics**

		Group A	Group B	
Cesarean section	Elective	19(25.7)	20(27.0)	
	Emergency	55(74.3)	54(73.0)	
Anesthesia	Spinal	63(85.0)	66(89.2)	
	G/A	11(14.9)	8(10.8)	
Surgeon	PG	48(64.9)	51(68.91)	
	Consultant	26(35.1)	23(31.08)	
Haemoglobin	Preop Hb	Postop Hb	Preop Hb	Postop Hb
Mean	9.63g/dl	8.75g/dl	10.00g/dl	8.8g/dl
SD	1.28	1.29	1.54	1.41
Duration of surgery				
Mean	34.59min		30.81min	
SD	5.04		2.03	

**Table - IV Infectious Morbidity**

Outcome	Group A	Group B	X2	P value
Fever	17(23.0)	14(18.7)	0.306	0.580
Urinary tract infection	10(13.3)	12(16.0)	1.617	0.204
Wound infection	11(14.7)	8(10.7)	1.566	0.211
Purulent Lochia	5(6.7)	6(8.0)	1.018	0.313

In this comparative analysis our results more or less were similar with what observed in previous studies.<sup>12</sup> Figueroa Damiau R et al concluded in their study that there was no significant statistical difference in terms of post operative infection when first and 3<sup>rd</sup> generation cephalosporins were used for caesarean antibiotic prophylaxis. In the present study we did not find a difference between the two groups in rates of endometritis, wound infection and other infectious morbidities. Wound infection was the most important complication occurring in 11 women (14.7)% in triple therapy group and 8 women (10.7)% in double therapy group. The difference was not statistically significant. Similarly the study showed no significant advantage of triple therapy over two drugs as far as fever, purulent vaginal discharge and dysuria were concerned.

It is therefore obvious from this study that both groups are equally effective in reducing post operative infections and are not superior to each other in terms of effectiveness as showed in metaanalysis of 51 antibiotic studies which concluded that ampicillin and first generation cephalosporin antibiotics had similar efficacy profile when compared with second and third generation cephalosporins.<sup>13</sup> However, the few studies that have examined the impact of extended-spectrum regimens on the basis of addition of agents of a different class (such as azithromycin, metronidazole or gentamycin) to the standard (cephalosporin or ampicillin) indicated further reduction in endometritis or wound infection.<sup>10,14,15</sup> However the price of ceftriaxone group is a little higher than triple therapy group may deter its use in low resource settings.

#### CONCLUSIONS:

First generation cephalosporin has been found as effective in reducing post operative infectious morbidity as third generation cephalosporin in caesarean section prophylaxis but the cost of double therapy is high than the triple therapy group. We suggest that the country like ours where per capita income is low clinician should use cost effective therapy to reduce post operative

infectious morbidity.

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