

Effects of Ceftriaxone and Gentamicin for Antibiotic Prophylaxis of Cesarean Section

*Khatun M,¹ Sultana S,² Khandkar HH,³ Hamid T,⁴ Hasan MN⁵

This retrospective interventional study was conducted from January 2010 to December 2010 in five private hospitals in Rangpur. One hundred and seventy patients underwent Cesarean section were assigned to receive either ceftriaxone plus cefuroxime (G-A) or gentamicin plus flucloxacillin (G-B) after cord clamping. Post-operative infection morbidity, duration of hospital stay and average hospital costs were compared between the two groups. The incidence of post-operative infections, duration of hospital stay, there were no significance difference between two groups. But average anti-microbial cost in ceftriaxone group was 840±57.40 Taka and in gentamicin group was 230 ±45.30 Taka and this difference was highly significant (p<0.001)

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Introduction

Cesarean section is a commonly performed surgical procedure in obstetric practice. Cesarean delivery is the single most important risk factor for post-partum infections. The prevalence of cesarean section has risen steadily over the past two decades and varies from country to country.^{1,2} The rate of cesarean section of all hospital delivery in Bangladesh was 1,8. 68 % in 2002.³

The most common infection morbidities associated with post operatively are febrile illness, dysuria, offensive lochia and abdominal wound infection. The frequency of infections varies from 5% to 85% where prophylactic antibiotics were not used and the rising infection rate results in a longer hospital stay and imposing a burden on financial resources.^{4,5} Use of the antibiotic

prophylaxis in women who undergo cesarean delivery 60% to 70% reduction in endometritis and 30-65% reduction in wound infection.⁵ Enkin et al showed that the risk of infections after cesarean section significantly reduced by prophylactic use of antibiotics.⁶ However extensive studies shown about the effective use of antibiotic prophylaxis but till now administrative regimens are inappropriate in cesarean section. Cost of treatment is an essential factor to be considered and is much more important for developing country like Bangladesh. In Bangladesh the government is spending only 7% of total drug expenditure and rest has to be born by the individual from his or her own pocket.⁷ Some investigators considered the economical aspect of antibiotic therapy as an important cost component of cesarean section.⁹

1. *Dr. Maksuda Khatun, Professor of Pharmacology, Rangpur Medical College
2. Dr. Sarmin Sultana, Assistant Professor of Gyne and Obs, Rangpur Medical College
3. Dr. Hamidul Haque Khandakar, Professor of Orthopedics and Principal Dinajpur Medical College, Dinajpur.
4. Dr. Tamanna Hamid Assistant Professor (C.C), community Medicine, Rangpur Medical college
5. Dr. Md. Nurul Hassan, Lecturer of Pharmacology & Therapeutics, Rangpur Medical College.

*For correspondence

Therefore, the present study has been designed to compare the usefulness, cost effectiveness of two antibiotic regimens in order to reduce the post cesarean infectious morbidities in women undergone cesarean section.

Methods

The retrospective interventional study was carried out in five private hospitals in Rangpur, from January 2010 to December 2010 for a period of one year. In this study a total number of 170 women underwent both elective and emergency Cesarean section with age ranged from 22 to 34 years, Hb% not below 55% were included. Those having history of infections prior to operations or allergic to any of the antibiotic used, or an antibiotics in last 24 hours were excluded.

Patients were permitted in labour room to receive either of the two sets of antibiotics. The drugs used in Group-A ceftriaxone 1 gm was administered intravenously after cord clamping and repeated after 24 hours for the first 3 days followed by oral tablet cefuroxime 250 mg 6 hourly for 4 days. Group-B received injection gentamicin 80 mg intravenously and repeated 8 hourly for the first 3 days followed by capsule flucloxacillin 500 mg 6 hourly for 4 days. No other antimicrobial agents were given unless post-operative infections was diagnosed.

All cesarean section were done by standard technique. Each patient was examined daily and post operative infectious morbidity noted till the date of discharge from the hospital. A complete blood count and urine analysis were performed if necessary on 3rd post-operative day. High vaginal swab or wound swab for culture and sensitivity were sent where indicated.

The following post partum complications were noted:

Febrile morbidity-Temperature above 38⁰c at least 4 hours apart for two or more occasions excluding first 24 hours after delivery.

Wound infection-Presence of purulent or serous discharge from the wound with induration, warmth and tenderness.

Urinary tract infection-Significant bacteria 100,000 organism/ ml on urine analysis

Endometritis- Offensive purulent lochia from genital tract.

These infectious morbidities were treated according to their respective protocol. In addition economic status of the patient were collected from the interview of the patient or her attendant. Cost of the antimicrobial was also calculated according to the present market price of the prescribed drugs. The significance of differences between the two groups were calculated using z test.

Results

A total of about 170 patients were included into the study, 83 patients received ceftriaxone plus cefuroxime (G-A) and 83 received gentamicin plus flucloxacillin (G-B). The demographic data for the patient with ceftriaxone therapy were compared with those of the women received gentamicin (Table I). Two groups were similar with respect to age, parity and gestational age.

Table I: Demographic characteristics

Variable	Group A (Ceftriaxone) N=83	Group B (Gentamicin) N= 87
Age (Years) (M ± SE)	26.42 ± 4.52	25.15 ± 5.65
Parity (numbers) (M ± SE)	1.65 ± 2.02	170 ± 1.55
Gestational Age (weeks) (M±SE)	381.12 ± 1.85	37.75 ± 2.02

Table II: Infections Morbidity

Outcome	Group A (Ceftriaxone) N= 83	Group B (Gentamicin) N= 87	P Value
Fever	9.64 (8/83)	11.49 (10/87)	P> 0.05
Urinary tract infection	12.05 (10/83)	13.79 (12/87)	P>0.05
Wound infection	4.8%(4/83)	6.8%(6/87)	P>0.05
Purulent lochia	6.03%(5/83)	8.05(7/87)	P>0.05

The frequencies of infectious morbidities in both groups are shown in table II. Analysis of the results of two antibiotic groups did not show any statistical significant difference in post-operative infectious morbidities ($p>0.05$). The incidence of wound infection and purulent lochia were 4.8% and 6.03% in ceftriaxone group and 6.03% and 8.05% in gentamicin group.

Table III shows that among the patients with economic status I, the highest percentage of them 75.86 % with gentamicin (G-B) and among the patients with economic status III the highest percentage of them with ceftriaxone (G-A) which was 74.09%. That relation of the economic status with treatment plan was highly significant between status I and II of both groups ($p < 0.001$).

Table III: Relationship between treatment plans with economic status of patients

	Group A (Ceftriaxone) N= 83	Group B (Gentamicin) N= 87	P
Economic status I	9.67 % (8/83)	75.86 (66/87)	P<0.001
Economic status II	15.67 (13/83)	13.79 (12/87)	P>0.05
Economic status III	74.09% (62/83)	10.35% (9/87)	P<0.001

Economic status I= Monthly income below 5000 taka

Economic status II= Monthly income 5000-10,000 taka

Economic status III= Monthly income above 10000 taka

The average cost of antibiotic therapy shown in table IV of the patients of ceftriaxone group was 840 ± 57.40 taka and those of with gentamicin was 230 ± 45.30 taka and this difference was highly significant ($p < 0.001$).

Average duration of antimicrobial therapy in hospital was 7.6 ± 4.5 days in ceftriaxone group and was 8.2 ± 2.1 days in patients those received antibiotic gentamicin (Table IV). The difference was not significant ($p > 0.05$).

Table IV: Outcome of prophylactic antimicrobial use

Outcome	Group A N= 83	Group B N=87	P
Average duration of antimicrobial therapy (M \pm SE)	7.6 \pm 4.5	8.2 \pm 2.1	P>0.05
Average cost of antimicrobial therapy (M \pm SE)	840 \pm 57.4	230 \pm 45.3	P<0.001

Discussion

In present study it was observed that the rate of post-operative infectious morbidities were effectively reduced by prophylactic use of ceftriaxone and gentamicin. The results of our study strongly correlates with the findings of other previous investigators.^{5,6,8}

The study was also observed routine antimicrobial use not only effective in reducing the incidence of infectious morbidities in women after cesarean section also reducing the average antimicrobial treatment cost. These are also in well agreement with other observers who conduct similar type of studies.^{9,10}

It is therefore obvious from this study that both ceftriaxone and gentamicin are equally effective in reducing the post operative infections after Cesarean section but the average cost of prophylactic ceftriaxone

group was significantly higher than gentamicin group.

Conclusion

Our calculations suggest that a policy of routine prophylaxis with antibiotic is not only effective in reducing the incidence of post operative infections after cesarean section, also likely to reduce average hospital cost. The country like Bangladesh where per capital income is low therefore, the clinicians should use effective antimicrobials to reduce post operative infectious morbidities.

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