

Original Article

Use of Single Dose Ceftriaxone as Prophylactic Antibiotic during Caesarean section in Dhaka National Medical College Hospital

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Abstract :

Introduction : Caesarean section is a major operation, with great potential benefit, but also with substantial risks for both mother and baby. Inappropriate and prolonged use of antibiotics is a serious problem in caesarean section.

Materials and Methods : This prospective study was done in the Departments of Obstetrics and Gynaecology in Dhaka National Medical College Hospital from 1st July, 2013 to 31st December, 2013. Women undergoing caesarean delivery, both emergency and elective were included. Ceftriaxone was used for antibiotic prophylaxis after separation of baby from mother and were follow up to see any feature of infection during hospitalization.

Results : Present study showed that 36% women between 20 to 25 years of age and families came from urban (42%) and urban slum (31%) underwent caesarean section. Emergency caesarean section constituting 67% cases. The major indication for caesarean section was fetal distress (25%). Febrile morbidity after caesarean section was developed in 8% patients and among them 6% patients had underlying infectious morbidity. Superficial wound infection had occurred in 4% patients and only 2% developed urinary tract infection. Staphylococcus aureus (33.33%), escherichia coli (16.66%), klebsiella (16.66%) were found in wound infection and only escherichia coli (33.33%) was found in urine after caesarean section. Duration of hospital stay commonly was 4 to 5 days and only 4% cases hospital stay was more than 7 days.

Conclusion : Single dose regimen with ceftriaxone as a prophylaxis during caesarean section is effective in preventing surgical infectious morbidities and also reduces duration of hospital stay.

Key Word : Caesarean section .

Introduction :

The rising rates of caesarean section prompted World Health Organization (WHO) in 1985 to state: There is no justification for any region to have a caesarean section rate higher than 10-15%.¹ In Bangladesh, the caesarean section rate increased from 2.7% to 12.2% between 2001-2010. However, data from the recent Bangladesh Maternal Mortality Survey (2010) show that among births occurring in facilities, more than one-half are by caesarean section, and the caesarean section rate reaches 71% for births occurring in private facilities. It also shows that the caesarean section rate is higher in urban (15.9%) than rural areas (5.4%).² Caesarean section is a major operation, with great potential benefit, but also with substantial risks for both mother and baby.³ A caesarean section is indicated when delivery is required and cannot be

performed vaginally because it will take too long or because it will endanger the mother or the foetus.⁴ The single most important risk factor for postpartum maternal infection is caesarean delivery.⁵ Antimicrobial prophylaxis for caesarean delivery has been a general practice because it significantly reduces postoperative maternal infectious morbidity.⁶ Pre-operative antimicrobial prophylaxis has long been advocated in surgical procedures,⁷ but recent guidelines and publications show that single dose prophylaxis is equally effective in clean, and clean contaminated surgical procedures.^{8,9} Inappropriate and prolonged use of antibiotics is a serious problem.¹⁰ It increases the morbidity and mortality of patients and also increases health care costs due to increased antibiotic resistance rates.¹¹ The use of pre-surgical antibiotics to prevent wound infection, in terms of amount and duration of

use, has contributed to the over-whelming rate of antibiotic resistance in Bangladesh and thus, increased in surgical wound infection rates. The aim of this study is to evaluate the effectiveness of single dose prophylactic antibiotic in caesarean section.

Materials and Methods :

This prospective study was done in the Departments of Obstetrics and Gynaecology in Dhaka National Medical College Hospital from 1st July, 2013 to 31st December, 2013. Women undergoing caesarean delivery, both emergency and elective were included. All pregnant women with fever (temperature > 38°C), prolonged or obstructed labor, premature rupture of membranes (rupture of membrane more than 12 hours), features of chorioamnionitis (foul smelling lochia, uterine tenderness associated with fever) and those having history of infections prior to operations or allergic to any of the antibiotic used, or antibiotics in last 24 hours were excluded. Women, who had any co-existing disease like diabetes mellitus, hypertension or cardiac problem that would require antibiotics during the study, were also excluded. Written informed consent was obtained from all selected patients. Before surgery, a baseline assessment was performed that included measurement of vital signs (pulse rate, respiratory rate, blood pressure, and body temperature), general, physical, systemic and gynecological examinations. Ceftriaxone (3rd generation cephalosporin) was used for antibiotic prophylaxis. It is chosen because it is effective against a wide range of wound pathogens, sufficiently long half life and is highly concentrated in wound. All patients were assigned to receive single dose of 2 gm ceftriaxone intravenously after separation of baby from mother. During postoperative period of hospitalization, record of 4 hourly temperatures was maintained along with other vital signs and abdominal examinations were performed daily. If body temperature was greater than 38°C or if there was evidence of wound infection, then appropriate investigations were sent before initiating antimicrobial therapy. At discharge, patients were instructed to contact if they experienced signs and symptoms of infection. The outcome measures were including fever, wound infection, urinary tract infection and other infections. Febrile morbidity was defined by temperature above 38°C at least 4 hours apart on two or more occasion. Wound infection was diagnosed if there was purulent discharge, erythema, and induration of the incision site. Pyelonephritis was diagnosed by maternal temperature, flank pain, and urine culture showing more than 100,000 colonies of uropathogen. The patient was discharged within 4 to 5 days if

there was no sign of infection or complication. The results were expressed in percentages for categorical data.

Results :

Present study included 100 pregnant women with caesarean section and showed that 36% of them were 20 to 25 years of age and most of the families (45%) were middle class and came from urban (42%) and urban slum (31%). Primigravida undergoing caesarean section comprised 59% of pregnant women. Emergency caesarean section constituting 67% of all the operations while elective caesarean section was performed in 33% cases (Table-1).

The major indication for caesarean section was fetal distress (25%). The other common indications included previous caesarean section (21%), oligohydramnios (16%), cephalopelvic disproportion (15%) and breech presentation (10%). Failure to progress, maternal request and placenta previa were relatively low (Table-2). Febrile morbidity after caesarean section was developed in 8% patients and among them 6% patients had infectious morbidity. Superficial wound infection had occurs in 4% patients and only 2% patient developed urinary tract infection (Table-3). Staphylococcus aureus (33.33%), escherichia coli(16.66%), klebsiella (16.66%) were found in wound infection and only escherichia coli (33.33%) was found in urine after caesarean section (Table-4). Duration of hospital stay was following caesarean section most (96%) commonly 4 to 5days and only 04% cases hospital stay more than 7 days who developed wound infection (Table-5).

Table-1. Demographic characteristics of pregnant women with caesarean section.

Characteristics	Case(%) n=100
Age(in Years)	
<20	22 (22%)
20-<25	36 (36%)
>25-<30	25(25%)
>30-35	17 (17%)
Family income per month	
Very Low Income (<10000 Tk)	12 (12%)
Low Income (10000-<20000 Tk)	21 (21%)
Middle Income (20000-30000 Tk)	45 (45%)
High Income (>30000 Tk.)	22 (22%)
Residence	
Urban	42 (42%)
Urban slum	31 (31%)
Rural	27 (27%)
Gravida	

Characteristics	Case(%) n=100
Age(in Years)	
Primi	59 (59%)
2-3	28 (28%)
4-5	13 (13%)
Type of caesarean section	
Emergency	67 (67%)
Elective	33 (33%)

Table-2. Distribution of participants according to indication for caesarean section.

Characteristics	Case(%) n=100
Fetal distress	25 (25%)
Previous caesarean section	21 (21%)
Oligohydraminos	16 (16%)
Cephalopelvic disproportion	15 (15%)
Breech	10 (10%)
Failure to progress	6 (07%)
Maternal request	4 (06%)
Placenta previa	3(03%)

Table- 3. Febrile and infectious morbidity after caesarean section.

Outcome measures of febrile morbidity	Case(%) n=100
Fever	8 (8%)
Infectious fever	
Wound infection	4 (4%)
Urinary tract infection	2 (2%)
Non Infectious fever (breast congestion)	2 (2%)

Table- 4. Organism found during febrile and infectious morbidity after caesarean section (Table 4).

Organism Found	Case(%) n=06
Wound swab for culture sensitivity	
Staphylococcus aureus	2(33.33%)
Escherichia coli	1(16.66%)
Klebsiella	1(16.66%)
Urine for culture sensitivity	
Escherichia coli	2(33.33%)

Table- 5. Duration of hospital stay (days).

Duration of hospital stay (days)	Case(%) n=100
4-5	96 (96%)
7-10	4 (4%)

Discussion :

Caesarean section is a commonly performed surgical procedure in obstetric practice. Present study included 100 pregnant women undergoing caesarean section and showed that 36% of the women were 20 to 25 years of age. Thapa et al¹² found that 42.6% of the women were of 20-24 years of age followed by 31.9% of 25-29 years. Most of women came from urban and urban slum in this study. Every 3 in 5 women delivered in a facility in Bangladesh undergo caesarean section and the rate is twice as high in urban as in rural areas.¹³ Primigravida undergoing more caesarean section comprised 59% of pregnant women in this study. Kumari et al¹⁴ found 53% primigravida undergoing caesarean section but Khanem et al⁵ found in their study that multigravidas were undergoing more caesarean section than primigravida. Present study showed emergency caesarean section constituting 67% of all the operations while elective caesarean section was performed in 33% cases. As our hospital is a tertiary care hospital, there is 24 hours emergency caesarean section service available. This could be because most of the cases were referral cases and these emergency cases probably receive trial labour in low resource setups either by dais, lady health workers and general practitioners. Khanem et al⁵ found in their study that emergency caesarean section was carried out in 64.9% cases. The major indication for caesarean section in this study was fetal distress (25%). Other common indications included previous caesarean section, oligohydraminos, cephalopelvic disproportion, and breech presentation. previa Kaur et al¹⁵ study was comparable with our study where caesarean sections due to fetal distress was 30.77%. Thapa et al¹² found common indication for caesarean section was cephalopelvic-disproportion. Khanem et al⁵ found major indication for caesarean section was breech presentation.

In this study febrile morbidity after caesarean section was developed in 8% patients and among them 6% patients had underlying infectious morbidity. Superficial wound infection had occurs in 4% patients and only 2% patients developed urinary tract infection. Khatun et al¹⁶ observed that the rate of post operative infectious morbidities were effectively reduced by prophylactic use of ceftriaxone and gentamicin. Enkin et al¹⁷ showed that the risk of infections after caesarean section significantly reduced by prophylactic use of antibiotics. ItsKovitz et al¹⁸ was concluded in his study that short course of prophylaxis effectively decreases the febrile morbidity, serious post operative infection and hospital stay. Sadique et al¹¹ found the use of single dose preoperative injection

cefurexime prophylaxis was as effective as multidose regimes for preventing serious infectious morbidity. There was also no post operative respiratory tract or urinary tract infection. Broodt et al¹⁹ reported reduction in the number of urinary tract infection in his study with single dose regimen. In this study, there was obvious reduction in superficial wound infection (4%).

Many study showed that properly administrated prophylactic antibiotic can prevent post operative infection. Appropriate choice, its timing of administration and proper duration of antibiotic therapy are the factors influencing successful prophylaxis²⁰⁻²². Most of the studies in the United State and Europe showed that effective prophylaxis can be achieved by administering a single dose of an appropriate antibiotic intravenously just before incision. As far as the choice of antibiotic is concerned, single dose intravenous ceftriaxone which is generally accepted as an appropriate antibiotic for infection prophylaxis. Present study showed staphylococcus aureus (33.33%), escherichia coli (16.66%), klebsiella (16.66%) were found in wound infection and only escherichia coli (33.33%) was found in urine after caesarean section. Ako-nai et al²³ also found staphylococcus aureus is the most commonly isolated bacteria in wound infection following caesarean section. Jido et al²⁴ found staphylococcus aureus was isolated in 31.8% of the cases. Other researchers isolated more gram negative organisms like escherichia coli, proteus, pseudomonas and klebsiella in caesarean section wound infections.²⁵ Duration of hospital stay was 4 to 5 days in 96% cases and only 4% cases hospital stay more than 7 days in this study. Sadique et al¹¹ found that mean hospital stay was 3.56 days after obstetrics and gynaecological surgeries. Thapa et al¹² found the average length of hospital stay was 6.7 days after caesarean section and commended as duration of hospital stay is recommended as a measure of quality of care rendered.

Conclusion:

Single dose regimen with ceftriaxone as a prophylaxis during caesarean section was effective in preventing surgical infectious morbidities and also reduces duration of hospital stay following caesarean section. Since the data were collected only from one hospital, it had chance of over representation which could not reflect general population and may not represent the similar situation in the whole population of the country. A broad base longitudinal cohort study could be more meaningful and helpful to validate the present study result.

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