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Original Article

Prophylactic administration of intravenous Ceftriaxone before incision or after cord clamping during Caesarean Section A comparative study

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Abstract

Background: Prophylactic antibiotic is recommended to reduce infection-related complication following caesarean section. There is a current debate on the timing of administration of prophylactic antibiotic in caesarean delivery

Objectives: To assess the impact of timing of antibiotic prophylaxis at caesarean section before skin incision versus after cord clamping on clinically detectable maternal and neonatal infectious morbidity.

Study design: Prospective randomized trial.

Methods: One twenty pregnant women who underwent emergency and elective caesarean section were randomly assigned into 2 groups. Group A (n=60) patients received 1 gm ceftriaxone intravenously 30 minutes before skin incision and group B (n=60) received 1 gm ceftriaxone intravenously after umbilical cord clamping and delivery of the baby. Both groups received ceftriaxone 1 gm intravenously daily for 3 days followed by oral tablet cefuroxime 250 mg 12 hourly for next 2 days. Both groups were observed regarding maternal febrile morbidity, endometritis, wound infection, and urinary tract infection (UTI); the neonates were observed for low APGAR score, jaundice, clinically detectable neonatal sepsis and admission to neonatal ward.

Results: Both groups were comparable regarding maternal age, body weight, gestational age, parity and indications of cesarean section. The number of cases who had febrile morbidity, endometritis, wound infection, and UTI were almost similar between two groups and these differences were not statistically significant (p= 0.27, 0.21, 0.37 and 0.17 respectively).

No difference was found between both groups regarding low APGAR score, jaundice, clinically detectable neonatal sepsis and admission to neonatal ward (p= 0.17, 0.41, 0.21, 0.53 respectively).

Conclusion: There were no differences in maternal infectious morbidity and neonatal outcome after administration of prophylactic antibiotic ceftriaxone pre-incision or post-clamping of the umbilical cord for caesarean delivery.

Key words: Antibiotic prophylaxis, Caesarean section, Ceftriaxone.

Introduction

There is an increase in the incidence of caesarean section and has risen steadily over the past two decades.[1] Now it is the most commonly performed major surgical procedure.[2] Infectious morbidity is the most common complication following caesarean section with reported rates ranging from 18%-83%.[3-6] Women undergoing caesarean delivery have significant incidence of many infectious complications; including fever, bactaraemia wound infection, endometritis, urinary tract infection and pelvic abscess.[7] Antibiotic prophylaxis for caesarean section has been a general practice because it significantly reduces postoperative infections.[8] Generally prophylactic antibiotics is recommended to be administered prior to surgical incision.[9] Prophylactic antibiotic for caesarean section are commonly used worldwide in most institutions generally after clamping of the umbilical cord and it prevents unnecessary foetal antibiotic exposure, masking of foetal infections in neonatal septic word and emergence in resistant bacterial strains. Thus, there is a

debate on the time of prophylactic antibiotic in caesarean section whether giving antibiotic prophylaxis pre-incision or after delivery of the baby and clamping of the umbilical cord. Cephalosporin second or third generation has been evaluated as prophylactic antibiotic in caesarean section with emerging results.[10] Ceftriaxone, a third generation cephalosporine has shown an excellent profile against infecting organisms related to surgery.[11]

This current study was conducted to investigate the impact of timing of prophylactic antibiotic for caesarean section before skin incision versus cord clamping on maternal and neonatal infectious morbidity.

Materials and Methods

This comparative study was performed at Combined Military Hospital, Rangpur in one calendar year from July 2013 to June 2014. After departmental approval and obtaining informed written concepts from the patients, 120 patients who were scheduled for elective and emergency cesarean section were enrolled in the study. Women were excluded from the study if they had severe anaemia, diabetes mellitus, impaired glucose test, twin pregnancy, received antibiotics within two weeks prior to the operation, if any visible infection at any site, fever at the time of operation or unwilling to participate in the study.

Women were randomly distributed in two groups of 60 each. In group A patients received 1 gm of ceftriaxone intravenously 30 minutes pre-incision and group B received 1 gm of ceftriaxone intravenously after delivery of the baby and umbilical cord clamping. Both groups received inj ceftriaxone 1 gm intravenously daily for 3 days followed by oral tablet cefuroxime 250 mg 12 hourly for next 2 days.

All caesarean 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 third post-operative day.

Febrile morbidity: Oral temperature above 38°C on two or more occasions at four apart excluding first 24 hours after cesarean section.

Endometritis: Fever, uterine tenderness and purulent lochia.

Wound infection: Cellulitis, fever and exudates.

Urinary tract infection (UTI): Fever and positive urine analysis.

These infectious morbidities were treated according to their respective protocol.

The neonate was observed immediately postnatal and during the 1st week to evaluate the neonatal outcome; the incidence of low APGAR score (<8) at 1 minute, jaundice, clinically detectable neonatal sepsis and admission to neonatal ward.

All results were expressed in mean + SD or percentage as applicable. Statistical analyses were carried out using Statistical Package for Social Science (SPSS) for Windows Version 17.0. Results were considered statistically significant if P value less than 0.05.

Results

Table I: Demographic characteristics

Variables	Group A (n=60)	Group B (n=60)	P value	Result
Age (year)	27.53±5.21	26.43±5.21	0.13	NS (student 't' test, unpaired)
Weight (kg)	64.41±6.21	65.17±5.91	0.41	NS (student 't' test, unpaired)
Parity	1.65±1.21	1.71±1.34	0.11	NS (student 't' test, unpaired)
Gestational Age (week)	38.11±0.92	37.87±1.13	0.78	NS (student 't' test, unpaired)

Values are expressed in Mean + SD and Percentage. NS–Not significant

Two groups were similar and fairly comparable with respect to age, body weight, parity and gestational age and differences were statistically not significant.

Table II: Indications for caesarean section

Indication	Group A (n=60)	Group B (n=60)	P value	Result
Previous caesarean section	33(55%)	34(56.67%)	0.97	NS (chi square test)
Breech presentation	8(13.33%)	7(11.67%)	0.47	NS (chi square test)
Failure to progress labour	5(8.34%)	6(10%)	0.31	NS (chi square test)
Bad obstetric events	6(10%)	5(8.33%)	0.38	NS (chi square test)
Foetal distress	3(5%)	4(6.66%)	0.52	NS (chi square test)
Others	5(8.33%)	4(6.67%)	0.41	NS (chi square test)

Values are expressed in Percentage. NS-Not significant

There were no significant differences of indications of caesarean section in both groups.

Table III: Maternal infectious morbidity

Outcome	Group A (n=60)	Group B (n=60)	P value	Result
Febrile morbidity	3(5%)	4 (6.67%)	0.27	NS (chi square test)
Endometritis	2 (3.33%)	1 (1.67%)	0.21	NS (chi square test)
Wound infection	2 (3.33%)	3 (5%)	0.37	NS (chi square test)
UTI	1 (1.67%)	2 (3.33%)	0.17	NS (chi square test)

Values are expressed in Percentage. NS-Not significant.

Incidences of febrile morbidity was 3(5%) in group A and 4(6.67%) in group B . Endometritis was found 2(3.33%) in group A and 1(1.67%) in group B and difference was statistically not significant. Wound infection was observed 2(3.33%) in group A and 3(5%) in group B. The incidence of UTI was 1(1.67%) in group A and 2(3.33%) in group B.

Table IV: Neonatal outcome

Outcome	Group A (n=60)	Group B (n=60)	P value	Result
Low APGAR sore (<8 in one minute)	1 (1.67%)	2 (3.33%)	0.17	NS (chi square test)
Jaundice	5 (8.33%)	4 (6.67%)	0.41	NS (chi square test)
Clinically detectable sepsis	2 (3.33%)	1 (1.67%)	0.21	NS (chi square test)
Admission to neonatal ward	7 (11.67%)	6 (10%)	0.53	NS (chi square test)

Values are expressed in Percentage. NS-Not significant.

Neonatal outcomes in both groups were shown in table IV. Low APGAR score (<8 in one minute) was observed 1(1.67%) baby in group A and 2(3.33%) in group B. Jaundice was found 5(8.33%) babies in group A and 4(6.67%) babies in group B. Clinically detectable neonatal sepsis observed 2(3.33%) babies in group A and 1(1.671) baby in group B.. Seven (11.67%) babies of group A and 6(10%) babies of group B were admitted in neonatal ward due to jaundice, low birth weight, sepsis and routine check up.

Discussion

The present study shows no statistically significant difference as regards demographic characteristics, maternal characteristics in obstetrical history, and about indications of caesarean section. Concerning the indications of cesarean section, the present study findings revealed that, the previous caesarean section were found 33 (55%)in group A and 34 (56.67%)in group B. This findings were consistent with one study who showed that repeated caesarean section was the primary indication for caesarean section.[12]

In this study, the number of post-operative febrile morbidity, endometritis, clinically detectable wound infection and UTI were almost same in both pre-incision antibiotic versus after umbilical cord clamping antibiotic groups and differences were not statistically significant. These results were similar with a study on ninety laboring women who had caesarean section and found no differences in maternal infectious morbidity whether antibiotic prophylaxis was administered preoperatively or after cord clamping.[13] Another study on a change in policy from post cord clamping administration of prophylactic antibiotics to pre-incision administration showed no differences in incidences of endometritis and wound infection in the two groups of women, who received cefazolin post cord clamping versus pre-incision.[14] On the the contrary to these findings some other studies showed that the antibiotic prophylaxis before skin incision is better than after cord clamping in lowering the rates of both wound infection and endometritis.[15,16,17] The major infective morbidities associated with cesarean section are endometritis and surgical site infections; rates of incidence vary, depending on whether the surgery was scheduled or emergency, but there are also disparities in reporting of rates owing to variations in practice of post-discharge surveillance among institutions.[8,17,18]

The current debate of prophylactic antibiotics commonly used for caesarean section is that antibiotics rapidly transferred to the newborn and the foetal exposure to antibiotics might mask infection in the neonate and the possibility of emergence of resistant organisms.[19] Regarding neonatal outcomes in this study, there were no differences of statistical significance between pre-incision antibiotic group and cord clamping group in the occurrences of low APGAR score, jaundice, clinically detectable neonatal sepsis and admission to the neonatal ward. These findings were consistent with some recent studies regarding neonatal outcome.[18,20,21]

The limitations of the study were small sample size, cost was not investigated and there was no other type of antibiotic used as control.

Conclusion

There were no differences in maternal infectious morbidity and neonatal outcome after administration of prophylactic antibiotic ceftriaxone pre-incision or post-clamping of the umbilical cord for caesarean delivery. Both pre-incision and post umbilical cord clamping administration of ceftriaxone, were effective prophylactic for caesarean section.

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