

# Single Dose Antibiotic Prophylaxis in Emergency Caesarean Section

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## ABSTRACT

**Objectives:** To determine the outcome of single dose of injectable antibiotics in preventing post operative complications in women undergoing emergency caesarean section.

**Study design:** Descriptive case series.

**Setting:** This study was conducted for a period of six months at the department of Gynaecology and Obstetrics, Fatima Memorial Hospital, Lahore from June 2011-November 2011.

**Results:** Majority of patients (46.18%) were recorded between the age group of 26-30 years while 23.64% (n=65) were found with 31-35 years, mean and s.d was  $28.32 \pm 4.24$ , 52% (n=143) were recorded between 36 -39 weeks of gestation, while 28.73 (n=79) were between 39-41 weeks only 19.27% (n=53) between 32-36 weeks, most common indication was with previous II in Labor in 30.54% (n=84), endometritis was controlled in 92.36% (n=254) wound infection was found in only 13.82% (n=38) while febrile morbidity was recorded in 6.18% (n=17).

**Conclusion:** The use of single dose injectable antibiotic in preventing postoperative complications in women undergoing emergency caesarean section is effective.

**Key words:** Caesarean section, post operative complications, wound infection, endometritis, febrile morbidity, prophylactic antibiotics, single dose.

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## INTRODUCTION

Caesarean delivery is the most commonly performed surgery in the United States, with nearly 1.2 million procedures performed in 2004<sup>1</sup>. Infectious morbidity, consisting primarily of endomyometritis and wound infection, remains a leading cause of postoperative complications.<sup>2</sup> Estimates of post-caesarean infection rates range from 7% to 20% depending on demographic and obstetric variables<sup>3</sup>.

Infection following caesarean delivery results in not only increased hospital stay but also increases the cost of care. For example diagnosing and treating a single case of endometritis is estimated to cost \$815<sup>4</sup>.

The potential for prophylactic antibiotics to decrease the incidence of maternal infectious morbidity following caesarean section has now been systematically investigated<sup>5</sup>. Although clear evidence exists to support this practice, it appears that in clinical practice antibiotic prophylaxis for caesarean section is utilized in an inconsistent manner. Both the rate of utilization and the choice of agent for prophylaxis are known to vary<sup>6</sup>.

Antibiotic prophylaxis has been shown to reduce the risk of febrile morbidity, endometritis, wound infection, urinary tract infection<sup>6</sup> and other serious post-operative complications (including septic shock,

pelvic abscess, and septic pelvic vein thrombophlebitis). It has been demonstrated that is a reduction in the relative risk of endometritis and wound infection for women having elective (planned) caesarean section as well as those having emergency procedures<sup>7</sup>.

The protocol of antibiotic prophylaxis for emergency caesarean section varies in different centers. Studies show the single dose antibiotics prophylaxis to be effective in Emergency Caesarean Sections. Incidence of infectious morbidity (endometritis- fever, uterine tenderness and abnormal lochia and wound infection- fever, cellulitis and exudates) is 16.27% and febrile morbidity (axillary temperature of 38° C on two occasions, at least four hours apart, excluding the first 24 hours) is 4.65% with single dose antibiotic prophylaxis. Shortening the duration of antibiotic prophylaxis reduces medical cost and microorganism resistance.<sup>8</sup> Single dose prophylaxis for emergency caesarean section if proven to be effective will be greatly beneficial as it is easier to administer and will also prove to be economical and will decrease the side effects of antibiotics and microorganisms resistance.

This study was planned with the view to find out that single dose antibiotic prophylaxis in women undergoing emergency caesarean section is effective and economical so that a better therapeutic strategy can be opted in our setup.

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## MATERIALS AND METHODS

This descriptive case series study was carried out in the Department of Obstetrics & Gynaecology, Fatima Memorial Hospital, Lahore for a period of six months to determine the outcome of single dose of injectable antibiotic in preventing post-operative complications in women undergoing emergency caesarean section. Outcome was determined in terms of infectious morbidity (endometritis-fever, uterine tenderness, abnormal lochia and wound infection- fever, signs of inflammation discharge from wound) and febrile morbidity. Women undergoing emergency caesarean section with indications such as failure to progress, failed induction, non-reactive CTG other than cause due to meconium aspiration, previous II LSCS in labour, previous III LSCS in labour and breech presentation undergoing emergency caesarean section were included in the study. Women with history of rupture membranes, history of receiving antibiotics 2 weeks prior to caesarean section, infection (Sore throat, UTI, gastroenteritis), History of allergy to ceftriaxone, meconium aspiration (vaginal Examination + Observed Intra-operatively) and women with medical disorders e.g., Diabetes (Fasting Blood Sugar >100 mg/dl) and Anemia (Hb% <9 g/dl) were excluded from study.

**Data collection:** 275 pregnant women admitted to hospital for emergency caesarean section were included in the study. An informed consent for using their data in research was obtained. Patient's characteristics including age and indication for emergency caesarean were recorded. Physical examination was done. Patients were given single dose of injectable Ceftriaxone (1gm) 30 min before surgery followed by oral course of Ceftriaxone 400mg 1 capsule daily for 5 days. All caesarean section followed standard clinical practice. In post-operative periods in 4 days of hospital admission infectious morbidity (endometritis and wound Infection) febrile morbidity were recorded. If any patient with single dose antibiotic prophylaxis developed any of above mentioned complications, they were started on antibiotic cover as per condition. The collected data was then analyzed to determine the outcome of single dose antibiotic prophylaxis in women undergoing emergency caesarean sections.

**Data analysis:** The collected information was entered in the SPSS version 10 and analyzed through its statistical package. The quantitative variables including age and duration of pregnancy was presented as mean and standard deviation. The qualitative variables including infectious morbidity (endometritis and wound infection) and febrile morbidity were presented as percentages and proportions.

## RESULTS

In this study, a total of 275 patients were recruited after fulfilling the inclusion/ exclusion criteria to determine the outcome of single dose of injectable antibiotic in preventing post-operative complications in women undergoing emergency caesarean section.

Table 1 shows the age distribution of the subject of this study, which shows, most of the patients were recorded between age group of 26-30 years of age i.e. 46.18% (n=127), 30.18% (n=83) were recorded between 20-25 years of age while 23.64% (n=65) were found with 31-35 years, mean and standard deviation was recorded as 28.32±4.24.

Table 1:

Duration ( in weeks)	n=	%age
32-36	53	19.27
36-39	143	52
39-41	79	28.73
Total	275	100

Table 2: Duration of pregnancy is described in Table No. 2, where majority of the patients 52% (n=143) were recorded between 36-39 weeks of gestation, while 28.73% (n=79) were recorded between 39-41 weeks and only 19.27% (n=53) subjects were recorded between 32-36 weeks of gestation.

Table 2:

Age (Years)	n=	%age
20-25	83	30.18
26-30	127	46.18
31-35	65	23.64
Total	275	100
Mean & S.D.	28.32±4.24	

Table 3: We recorded the indications of emergency caesarean section, most of the patients 30.54% (n=84) were recorded with previous II in Labour, 22.55% (n=62) were found with previous III in Labour, 20.36%(n=56) were found with Breech Em LSCS, 15.64% (n=43) due to failure to progress and only 10.91% (n=30) were operated due to failed induction.

Table 3:

Indications	n=	%age
Previous II labour	84	30.54
Previous III in labour	62	22.55
Breech EmLSCS	56	20.36
Failure to progress	43	15.64
Failed induction	30	10.91
Total	275	100

Table 4: Endometritis was controlled in 92.36% (n=254) and it was recorded positive in 7.64% (n=21).

Endometritis	n=	%age
Yes	21	7.64
No	254	92.36
Total	275	100

Table 5 shows another post operative complication i.e. wound infection, which was found in only 13.82% (n=38) while it was not found in 86.18% (n=237).

Endometritis	n=	%age
Yes	38	13.82
No	237	86.18
Total	275	100

Table 6: In this study febrile morbidity was recorded in 6.18% (n=17) while it was not found in 93.82% (n=258).

Febrile morbidity	n=	%age
Yes	17	6.18
No	258	93.83
Total	275	100

## DISCUSSION

Over the past decade, caesarean rates increased sharply for women of all ages, all race/ethnic groups, and all periods of gestation. Caesarean rates are highest for women with ages 35 and over. Sixty percent of the increase in the caesarean rate from 1996 to 2004 was the result of increases in the primary caesarean rates. Based on the trend in the repeat caesarean rate, a first caesarean delivery now virtually guarantees that subsequent deliveries will be caesarean deliveries. Repeat caesarean deliveries are associated with significantly higher maternal and neonatal morbidity and mortality compared with caesarean or vaginal deliveries for women who do not have a prior caesarean<sup>9,10-12</sup>.

Surgical site infection is a common problem in our setup and can significantly increase morbidity including hospital stay, thus making patient further susceptible to infection from within the hospital<sup>13</sup>.

The protocol of antibiotic prophylaxis for emergency caesarean section varies in different centers. Studies show the single dose antibiotic prophylaxis to be effective in emergency caesarean sections. Shortening the duration of antibiotic prophylaxis reduces medical cost and microorganism resistance<sup>14</sup>.

However the current study was designed to determine that single dose antibiotic prophylaxis in women undergoing emergency caesarean section is effective and economical, so that a better therapeutic strategy can be opted in our setup.

A randomized, prospective study compared the use of a 1-g dose of cefazolin with no prophylaxis in 307 low risk patients undergoing caesarean delivery<sup>15</sup>. The outcomes investigated were endometritis, wound infection, febrile morbidity and use of antimicrobials for presumed or confirmed infection. The study showed significantly low febrile morbidity and therapeutic antimicrobial use in the treatment group, although the sample was not large enough to enable a significant reduction in endometritis and wound infection to be detected.

A large scale prospective study in more than 1800 low-risk women who underwent caesarean delivery was conducted from 1980 to 1982<sup>16</sup>. Although prophylaxis was uncontrolled, endometritis and wound infection rates were significantly lower (0.7% and 0.2% respectively in the group receiving prophylaxis than the group not receiving prophylaxis (2.1% and 2%, respectively)<sup>17</sup>. A case control study, including the prospective data and women at high risk, determined that patients undergoing a first-time caesarean delivery were five times more likely to develop endometritis than those who had had a caesarean delivery in the past. On the basis of certain assumptions, the investigators calculated that more than \$9 million could be saved annually by administering prophylaxis to low-risk patients. The cost of adverse effects was considered negligible. Thus antimicrobial prophylaxis may be appropriate for low risk caesarean deliveries.

However, ACOG considers the use of prophylaxis to be controversial in low-risk patients<sup>18</sup>. ACOG does not routinely recommend prophylaxis in low-risk patients because of concerns about adverse effects, development of resistant organisms, and relaxation of standard infection-control measures and proper operative technique.

There have been more than 40 placebo-controlled, prospective trials evaluating the efficacy of prophylactic antimicrobials in caesarean delivery, most of which have been carried out in high-risk populations. A meta-analysis of these data, which combined high and low-risk patients undergoing both emergency and elective caesarean deliveries, suggests that the rate of serious infections and endometritis is 75% lower and the rate of wound infections 65% lower among antimicrobial – treated patients than control patients<sup>19</sup>.

In our study, after the administration of single dose endometritis was controlled in 92.36% (n=254), wound infection was found in only 13.82% (n=38) while febrile morbidity was recorded in 6.18% (n=17). These results are comparable with a study conducted by Vukomanovic Predrag and workers<sup>20</sup> with the view to evaluate the effectiveness of single dose antibiotic prophylaxis versus common five day

combination antibiotic therapy in decreasing the infectious morbidity, following elective caesarean section and found the incidence of infectious morbidity 16.27% and febrile morbidity only 4.65% with single dose antibiotic prophylaxis and concluded that five-day combined antibiotic use is absolutely unjustified and irrational prophylaxis modality, since the antibiotic prophylaxis lasts three days at the most. Postoperative infectious morbidity rate is not lower than other acceptable modalities of antibiotic prophylaxis.

Most recent trials of antimicrobial prophylaxis for caesarean delivery have assessed the efficacy of a single dose versus multiple doses (usually up to 24 Hours). Early studies used regimens that lasted as long as five or six days. Two prospective, randomized studies found that a five day course of cephalosporin was no more efficacious than a 24 hour course<sup>21,22</sup>.

Though we did not compare the different regimens of doses but in view of the studies conducted previously, in the current study it become very clear that single dose use of prophylactic antibiotic in high risk patients is effective and cost effective as well. The limitation of this study was that we didn't analyze any side effect of the drug but no significant side effect/complication of the drug was found.

## CONCLUSION

The use of single dose injectable antibiotic in preventing complications in women undergoing emergency caesarean section is effective.

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