

# Frequency of Adverse Perinatal Outcome in Women Undergoing Emergency Lower Segment Cesarean Section at Term Due To Non-Reassuring CTG at Tertiary Care Hospital

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## ABSTRACT

**Objective:** To determine the frequency of adverse perinatal outcome in women undergoing emergency lower segment cesarean section at term due to non-reassuring CTG at Tertiary Care Hospital.

**Study Design:** Descriptive case series-longitudinal.

**Study Setting:** Study was conducted at Department of Gynaecology and Obstetrics, Aga Khan University Hospital.

**Duration of Study:** Six months from 1<sup>st</sup> July, 2018 till 31<sup>st</sup> December 2018.

**Subjects and Methods:** Data was prospectively collected from patients after taking a consent. A total of 211 patients were included. Demographic data was presented as simple descriptive statistics giving mean and standard deviation and qualitative variables were presented as frequency and percentages. Post stratification chi square test was applied taking p-value of  $\leq 0.05$  as significant.

**Results:** Mean age in group A and B was  $33.56 \pm 3.91$  and  $34.71 \pm 4.01$  years respectively. Adverse fetal outcome showed that birth weight  $< 2500$  gm (20.4% vs 12.3%), APGAR score  $< 7$  (16.6% vs 12.3%), Umbilical cord pH  $< 7.1$  (14.2% vs 9%), NICU admission (11.8% vs 8.5%) and still birth patients (4.3% vs 1.9%) who were in decision to delivery group of  $< 30$  minutes and  $> 30$  minutes respectively.

**Conclusion:** This study showed that there are still avoidable delays in emergency caesarean section. Improving health care delivery so as to eliminate the identified causes would go a long way in reducing these delays. But given the results of this study, adverse fetal outcomes appears to be less in DDI  $> 30$  minutes group when compared with DDI  $< 30$  minutes group.

**Keywords:** Elective lower segment cesarean section, decision to delivery time, birth weight, APGAR score, NICU admission, umbilical ph and still birth.

## INTRODUCTION

Pakistan is a developing country with limited resources and a very high maternal and perinatal mortality.<sup>1</sup> Seventy percent of Pakistani women, mostly from rural areas, do not receive antenatal care, which directly contributes to adverse perinatal outcome.<sup>2</sup> World Health Organization estimated the number of perinatal deaths worldwide to be greater than 7.6 million, with 98% of these deaths occurring in the developing countries.<sup>3</sup> The perinatal mortality rate for Pakistan is estimated to be 95 per 1000 births.<sup>4</sup> A multicentre survey in Pakistan gave the perinatal mortality rate as 92 per 1000 births with majority of deaths (72%) due to stillbirths.<sup>4</sup> Reduction in perinatal mortality can be achieved by providing good perinatal services.<sup>5</sup> Achieving Millennium Development Goals (MDGs) probably remains a dream in our setup and to achieve MDG-4 perinatal mortality ratio (PNMR) needs to be reduced.<sup>6</sup> Two thirds of the neonatal deaths occur in first week of life and of these, two third occur in first 24 hours.<sup>7</sup>

Suspected fetal distress detected by cardiotocography (CTG) has been the most common indication for cesarean section (CS) for the past few decades.<sup>8</sup> Another important issue is the decision to delivery (DD) interval for emergency CS after fetal distress is diagnosed.<sup>9</sup> When an urgent caesarean section is performed, it is widely advocated that the interval between the decision to operate and delivery of the baby should be less than 30 minutes. In clinical practice, adherence to this 30-minute timeframe often seems unachievable, or at least, is often not achieved.<sup>10-11</sup> It has been suggested that longer decision-to-delivery times arise because a multitude of tasks has to be completed in a coordinated fashion by a relatively large multidisciplinary team before the caesarean can take place, thus, staff shortages, poor training, and lack of appropriate facilities all have the potential to slow the process.<sup>12-13</sup> Roy et al. in the study showed adverse perinatal mortality and compared in groups with decision-delivery interval  $\leq 30$  min and  $> 30$  min respectively and found that, birth weights of babies  $< 2500$  g (13.2% vs 11.4%), Apgar score of  $< 7$  at 5 minute

(14.8% vs 15.6%), umbilical cord pH  $< 7$  (6.6% vs 5.2%), NICU admission (21.4% vs 7.2%) and still birth (0.8% vs 0%).<sup>14</sup>

## MATERIALS AND METHODS

This descriptive-case series study was conducted at Department of Gynaecology and Obstetrics, Aga Khan University Hospital. Duration was six months from 1<sup>st</sup> July, 2018 till 31<sup>st</sup> December 2018. Total 211 patients with gestational age  $\geq 37$  weeks (assessed by LMP and dating scan) undergoing emergency lower segment cesarean section at term due to non-reassuring CTG. Patients with singleton pregnancy with ages 18 to 45 years were included. Non-consenting patients, women with preexisting medical disorders such as type II diabetes mellitus, thyroid disease, essential hypertension, thrombophilia, chronic liver disease, cardiac disease, intrauterine growth restricted fetus and unbooked cases were excluded.

Booked patients admitted in Labor and Delivery room undergoing emergency lower segment cesarean section fulfilling the inclusion criteria will be enrolled in the study. Time from decision for emergency cesarean section to delivery was noted. Adverse perinatal outcome was assessed and compared in both group A and B in terms of Birth weights of babies  $< 2500$  gm, Apgar score of  $< 7$  at 5 minute, umbilical cord pH  $< 7$ , NICU admission, and Stillbirth by the researcher. The findings of quantitative variables (maternal age, gestational age height, weight and BMI) and qualitative variable (parity, BMI, family monthly income, educational status and adverse perinatal outcome) as mentioned above will be entered in performa attached as annexure.

Data was analyzed on SPSS Version 16. Mean and standard deviations for the quantitative variables like maternal age, gestational age height, weight and BMI was calculated. Frequencies and percentages for the qualitative variables like gestational age, parity, BMI, family monthly income, educational status and poor perinatal outcome (birth weight  $< 2.5$  kg, Apgar score of  $< 7$  at 5 minute, umbilical cord pH  $< 7$ , NICU admission, and

still birth) will be calculated. Chi-square was used to compare two groups for frequency. Effect modifiers was controlled through stratification of maternal age, gestational age, parity, BMI, family monthly income and educational status to see the effect of these on outcome variables (adverse perinatal outcome). Post stratification chi square test was applied taking p-value of  $\leq 0.05$  as statistically significant.

**RESULTS**

Out of 211 patients in group A minimum age of the patient was 24 while maximum age of the patients was 38 years. Mean age in our study was 33.56 years with the standard deviation of  $\pm 3.91$ . Mean gestational age, height, weight and BMI of group A in our study was 37.69 $\pm$ 0.78, 145.41 $\pm$ 11.47 cm, 121.84 $\pm$ 23.02 kg and 31.28 $\pm$ 2.56 kg/m<sup>2</sup> respectively. Similarly, out of 211 patients in group B minimum age of the patient was 24 while maximum age of the patients was 38 years. Mean age in our study was 34.71 years with the standard deviation of  $\pm 4.01$ . Mean gestational age, height, weight and BMI of group B in our study was 37.21 $\pm$ 0.54, 138.04 $\pm$ 14.51 cm, 110.84 $\pm$ 28.57 kg and 31.72 $\pm$ 2.31 kg/m<sup>2</sup> respectively. As shown in Table 1.

Table 1: Descriptive Statistics Group A And B

Variable	Mean	Standard Deviation	Min-max
Maternal age group a (years)	33.56	$\pm 3.91$	24-38
Maternal age group b (years)	34.71	$\pm 4.01$	24-38
Gestational age group a	37.69	$\pm 0.78$	37-39
Gestational age group b	37.21	$\pm 0.54$	37-39
Bmi (kg/m <sup>2</sup> ) group a	31.28	$\pm 2.56$	27-34
Bmi (kg/m <sup>2</sup> ) group b	31.72	$\pm 2.31$	27-34
Height (cm) group a	145.41	$\pm 11.47$	120-180
Height (cm) group b	138.04	$\pm 14.51$	120-180
Weight (kg) group a	121.84	$\pm 23.02$	52-154
Weight (kg) group b	110.84	$\pm 28.57$	52-154

Frequency distribution of birth weight < 2500 gm showed that out of 211 patients in group A, 43 (20.4%) and 168 (79.6%) had and did not have birth weight < 2500 gm respectively. Similarly, out of 211 patients in group B, 26 (12.3%) and 185 (87.7%) had and did not have birth weight < 2500 gm respectively. No significant difference was observed between both groups with P-value >0.05. (Table No 2)

Table 2: Comparison of Low Birth Weight between Group A and B

Birth Weight (gm)	Group A	Group B	P-Value
<2500	43 (20.4%)	26 (12.3%)	N/S
>2500	168 (79.6%)	185 (87.7%)	N/S

Frequency distribution of APGAR score showed that out of 211 patients in group A, 35 (16.6%) and 176 (83.4%) had APGAR score < 7 and > 7 respectively. Similarly, out of 211 patients in group B, 26 (12.3%) and 185 (87.7%) had APGAR score < 7 and > 7 respectively. There was no significant difference found between both groups with p-value >0.05. (Table 3)

Table 3: Comparison of APGAR Score between Group A and B

APGAR Score	Group A	Group B	P-Value
<7	35 (16.6%)	26 (12.3%)	>0.05
>7	176 (83.4%)	185 (87.7%)	N/S

Table 4: Comparison of Umbilical ph between Group A and B

Umbilical ph	Group A	Group B	P-Value
<7.1	30 (14.2%)	19 (9%)	0.068
>7.1	181 (85.8%)	192 (91%)	N/S

Frequency distribution of umbilical ph < 7.1 showed that out of 211 patients in group A, 30 (14.2%) and 181 (85.8%) had umbilical ph < 7.1 and > 7.1 respectively. Similarly, out of 211 patients in group B, 19 (9%) and 192 (91%) had umbilical ph < 7.1

and > 7.1 respectively. In Group A the frequency of umbilical ph <7.1 was high as compared to Group B but the difference was not statistically significant (p-value 0.068). (Table 4)

Frequency distribution of NICU admission showed that out of 211 patients in group A, 25 (11.8%) and 186 (88.2%) had and did not have NICU admission respectively. Similarly, out of 211 patients in group B, 18 (8.5%) and 193 (91.5%) had and did not have NICU admission respectively. In Group A the frequency of NICU admission was high as compared to Group B but the difference was not statistically significant (p-value 0.086). (Table 5)

Table 5: Comparison of NICU Admission between Group A and B

NICU Admission	Group A	Group B	P-Value
Yes	25 (11.8%)	18 (8.5%)	0.086
No	186 (88.2%)	193 (91.5%)	N/S

Frequency distribution of still birth showed that out of 211 patients in group A, 9 (4.3%) and 202 (95.7%) had and did not have still birth respectively. Similarly, out of 211 patients in group B, 04 (1.9%) and 207 (98.1%) had and did not have still birth respectively. In Group A the frequency of still birth was high as compared to Group B but the difference was not statistically significant (p-value >0.05). (Table 6)

Table 6: Comparison of Still Birth between Group A and B

Still Birth	Group A	Group B	P-Value
Yes	9 (4.3%)	04 (1.9%)	>0.05
No	202 (95.7%)	207 (98.1%)	N/S

Overall frequency of adverse perinatal outcomes was high in group A patients as compared to group B but the difference was not statistically significant.

**DISCUSSION**

The frequency of cesarean section births continues to steadily rise worldwide. Even though the cesarean procedure has become very safe over the years, it is still associated with high rates of maternal and perinatal mortality and morbidity. A nonreassuring fetal heart rate during labour is considered a major indicator for prompt delivery via an emergency CS procedure. The decision-to-delivery time interval (DDI) indicates the period of time between the clinical decision to carry out a CS procedure and the delivery of the baby.

Out of a total of a 211, mean age in group A and B was 33.56 $\pm$ 3.91 and 34.71 $\pm$ 4.01 years respectively. Adverse fetal outcome showed that birth weight < 2500 gm (20.4% vs 12.3%), APGAR score < 7 (16.6% vs 12.3%), Umbilical cord ph < 7.1 (14.2% vs 9%), NICU admission (11.8% vs 8.5%) and still birth patients (4.3% vs 1.9%) who were in decision to delivery group of < 30 minutes and > 30 minutes respectively.

Roy et al showed that out of 3148 patients delivered at > or = 36 weeks, 217 (6.8%) patients underwent cesarean section during labor primarily for non-reassuring fetal heart. The most common fetal heart abnormality was persistent bradycardia in 106 (48.8%) cases followed by late deceleration in 38 (17.5%) cases and decreased beat to beat variability in 17 (7.8%) cases. In 33 (15.2%) babies the 5 minutes Apgar score was <7 out of which 13 (5.9%) babies had cord thornH <7.10. Thirty three (15.2%) babies required NICU admission for suspected birth asphyxia. Rest 184 (84.7%) neonates were born healthy and cared for by mother. Regarding decision to delivery interval of < or =30 minutes versus >30 minutes, there was no significant difference in the incidence of Apgar score <7 at 5 minutes, cord pH <7.10 and new born babies requiring immediate ventilation. But the need for admission to NICU in the group of D-D interval < or = 30 minutes was significantly higher compared to the other group where D-D interval was >30 minutes.<sup>15</sup>

Kamotho et al. study showed that the main indications for caesarean section was obstructed labour (18.5%) for mothers and foetal distress (6.4%). Though 74% of the mothers gave consent to be operated within the 30-minute guideline, only 3% were prepared

for operation within this period. Only 24% of the caesarean sections were conducted within one hour after the decision was made for the operation. About 38% of the women, and 30% of the babies developed complications after the caesarean section. Haemorrhage was the leading complication in mothers while the main complication for babies was babies with an Apgar score of 5 and below. Decision- to incision interval and foetal post-operative outcomes: The data given in Figure 5 shows that overall close to ¾ (71.2%) of the infants were born with no complications. Twenty-three (7%) of the infants died. The main complication was babies with an Apgar score of 5 and below (9.4% of the babies). The other complication was the need for ventilation which affected about 4.5%. The total number of foetal deaths was 24. The leading causes of foetal deaths were asphyxia and intra-uterine death.<sup>16</sup>

Another study showed that the mean DDI was 183.24 minutes for all 275 cases and was 122 ± 89min for category I caesarean sections (crash caesareans). The major cause of delay was non availability of operation theatres due to long list of waiting caesareans sections. When the mean DDI exceeded 75 minutes, there was a 4.6 fold increase in the risk to the life of neonate while the maternal outcome was not significantly affected.<sup>17</sup>

DDI of 30 minutes is difficult to achieve even for urgent caesarean sections in a developing nation, therefore a more reasonable time frame of 60-75 min may be justified for emergency caesarean sections under similar set up.

## CONCLUSION

The study showed decreased prevalence of adverse fetal outcome on DDI of > 30 minutes. A decision delivery interval of 30 minutes or less may not be applicable to all emergency CS, but when faced with acute or catastrophic fetal or maternal conditions, expedited delivery is warranted and any purposeful delay is unjustified.

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