

## Caesarean Section For Abnormal Cardiotocography And Perinatal Outcome : A Prospective Study

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### Abstract

**Objective :** To find out perinatal outcome in caesarean section for abnormal cardiotocography.

**Methods :** This prospective observational study was conducted in the Department of Obstetrics and Gynecology at SMS Medical College, Jaipur on 200 women who underwent caesarean section for abnormal cardiotocography and not responding to intrauterine resuscitation. Neonatal outcome was studied with regard to the need for supportive ventilation and admission to NICU.

**Results :** Among 200 women with abnormal CTG, 120 (60%) cases had fetal bradycardia, 42 (21%) had late deceleration, 26 (13%) had variable deceleration, 8 (4%) had tachycardia and 4 (2%) cases had single prolonged deceleration. 25 (12.50%) neonates required immediate resuscitation and were admitted in NICU. Out of different fetal heart rate patterns fetal bradycardia and single prolonged deceleration were associated with poor perinatal outcome.

**Conclusion :** Abnormal fetal heart rate patterns detected by cardiotocography did not correlate well with adverse neonatal outcome and resulted in high incidence of unnecessary caesarean sections.

**Keywords:** Caesarean Section, Cardiotocography, perinatal Outcome

### Introduction

The World Health Organization (WHO) recommends that the cesarean section (CS) delivery rate should not exceed 15% of births in any region, and should only be used in medically indicated circumstances in order to minimize risks to the infant or the mother.<sup>1,2</sup>

The rate of cesarean section delivery is increasing worldwide and is not always performed due to medical necessity.<sup>3</sup> Studies have shown an association between cesarean section and adverse maternal and infant outcomes compared to spontaneous vaginal birth, including higher rates of maternal admittance to the intensive care unit postpartum, and higher incidence of respiratory distress in infants.<sup>4,5</sup> Furthermore, the increase in the cesarean section rate has not coincided with a decrease in perinatal or maternal mortality worldwide. One of the main fetal

indications for emergency cesarean section is fetal distress, which is diagnosed by either meconium staining of the amniotic fluid or an abnormal cardiotocograph (CTG).<sup>6</sup> During labour it is very important to detect early signs of fetal compromise and to intervene immediately to avoid adverse neonatal outcome, but identification of fetus at risk of hypoxia is not always easy.<sup>7</sup> Cardiotocography is a well-established method for monitoring fetal wellbeing. Its underlying principle is that compensatory changes of heart rate patterns can be predictive of fetal hypoxia.<sup>8</sup> Aim of the study was to find out the association of different fetal heart rate patterns on cardiotocography with adverse perinatal outcome in terms of APGAR score, umbilical cord blood pH, NICU admission, supportive ventilation and neonatal resuscitation.

## Methods

This was a prospective observational study conducted in Department of Obstetrics & Gynaecology, SMS Medical College, Jaipur from April 2020 to March 2021. A total of 200 women were studied who underwent caesarean section for fetal distress detected by cardiotocography.

Women with gestational age  $\geq 36$  weeks, singleton live pregnancy with cephalic presentation and non-reassuring fetal heart rate patterns detected by cardiotocography were included in the study. Women with congenital malformed fetus and elective caesarean section were excluded from the study.

Cardiotocography was done for 20 min and baseline fetal heart rate, baseline variability, acceleration and deceleration were recorded. If FHR patterns found non-reassuring, intrauterine resuscitation was done by change in maternal position, oxygen administration and intravenous hydration and CTG was extended to 30 min. If CTG found abnormal then decision was taken for caesarean section. Maternal demographic profile and abnormal fetal heart rate patterns were recorded. APGAR score at 1 minute and 5 minute and cord blood pH were also recorded. Fetal outcome was studied with regard to the need for supportive ventilation and admission to NICU.

## Results

200 women were studied who underwent caesarean section for abnormal cardiotocography. Most of the women were in age group 21-30 years i.e. 181 (90.50%) which coincides with the child bearing age group. The mean age was  $25.23 \pm 3.05$  years. The maximum number of women were from urban area i.e. 161 (80.50%). This indicates increasing awareness among urban population towards institutional deliveries and our hospital is a tertiary care centre. Majority of the women were in middle class i.e. 156 (78%) and literate i.e. 180 (90%). 109 (54.50%) women were primigravida and 91 (45.50%) were multigravida.

The various fetal heart rate abnormalities detected on cardiotocography for which caesarean section was done and associated neonatal outcome are depicted in Table-1.

Most common fetal heart abnormality detected was persistent bradycardia in 120 (60%) cases followed by late deceleration in 42 (21%) cases, variable deceleration in 26 (13%) cases, single prolonged deceleration in 4 (2%) cases and tachycardia in 8 (4%) cases.

**Table-1 Various fetal heart rate abnormalities and associated adverse neonatal outcomes**

Fetal Heart Abnormalities	Adverse Neonatal Outcome								p-value
	Number of Cases		APGAR Score <7 at 5 Min		Cord pH <7.20		NICU Admission		
	No.	%	No.	%	No.	%	No.	%	
<b>Persistent Bradycardia</b>	120	60.00	17	8.50	6	3.00	17	8.50	All not significant
<b>Tachycardia</b>	8	4.00	1	0.50	1	0.50	1	0.50	
<b>Late Decelerations</b>	42	21.00	3	1.50	1	0.50	3	1.50	
<b>Variable Decelerations</b>	26	13.00	2	1.00	1	0.50	2	1.00	
<b>Single Prolonged Deceleration</b>	4	2.00	2	1.00	2	1.00	2	1.00	
<b>Total</b>	<b>200</b>	<b>100.00</b>	<b>25</b>	<b>12.50</b>	<b>11</b>	<b>5.50</b>	<b>25</b>	<b>12.50</b>	

25 neonates had APGAR score <7 at 5 min interval. Out of them 13 neonates had APGAR score <4 at 1 min interval and 3 neonates had APGAR score <4 at 5 min interval who showed severe birth asphyxia. (Table-2)

**Table-2 Distribution of cases according to APGAR Score**

APGAR Score	APGAR Score at 1 Min		APGAR Score at 5 Min	
	No.	%	No.	%
<4	13	6.50	3	1.50
5 - 6	37	18.50	22	11.00
7 & above	150	75.00	175	87.50
<b>Total</b>	<b>200</b>	<b>100.00</b>	<b>200</b>	<b>100.00</b>

Out of different fetal heart rate patterns persistent bradycardia and single prolonged deceleration were associated with poor perinatal outcome.

Out of 200 cases 25(12.50%) neonates were diagnosed with fetal distress subsequently and required immediate resuscitation and admitted in NICU.175(87.50%) neonates did not show any adverse outcome.

In 110 (55%) cases,therewas no associated risk factor while 90 (45%) had associated complicating factors.

19 neonates were admitted in NICU who had associated risk factors and only 6 neonates were admitted with no associated risk factors.

Hence the neonatal outcome was poorer if there were associated risk factors and this was found to be statistically significant using chi-square chest ( $p<0.001$ ).

**Discussion**

Fetal distress is diagnosed by detecting fetal heart rate abnormalities with the help of electronic fetal monitoring, thereby reducing perinatal mortality and morbidity however at the same time causing the rates of caesarean deliveries to rise. Abnormal fetal heart rate tracing or suspected fetal distress with concern for consequent hypoxia and acidemia remains one of the most common indication for the first caesarean section.

In the present study the mean age was  $25.23 \pm 3.05$  years. 109 (54.50%) women were primigravida and 91 (45.50%) were multigravida. Similar to our study Gangwar R et al<sup>9</sup> reported a mean age of women 24.5 years in their study. 74 (50.68%) women were primigravida, 43 (29.45%) were second gravida, while 29 (19.87%) were gravida 3 or more.

In our study it was observed that persistent bradycardia and single prolonged deceleration were associated with poor perinatal outcome. Similarly Gangwar R et al<sup>9</sup> reported that out of 104 cases with persistent bradycardia 12 neonates required NICU admission. Rana P et al<sup>10</sup> reported that 18 neonates needed NICU admission out of 125 cases with persistent bradycardia.

In present study out of 200 cases, 25 (12.50%) neonates had APGAR score <7 at 5 min. Out of them 13 (6.50%) neonates had APGAR score <4 at 1 min and 3 (1.50%) neonates had APGAR score <4 at 5 min interval. Similar findings were seen in study done by Gangwar R et al<sup>9</sup> that 21(14.38%) neonates had APGAR score <7 at 5 min, out of them 12 neonates had APGAR score <4 at 1 min and 3 neonates had APGAR score <4 at 5 min. Rana P et al<sup>10</sup> found in their study that 29(14.50%) neonates had APGAR score <7 at 5 min, out of them 15 neonates had APGAR score <4 at 1 min and 5 neonates had APGAR score <4 at 5 min.

In present study 12.50% neonates were actually distressed implying the limitation of cardiotocography in predicting early neonatal outcomes on the basis of non reassuring fetal heart rate patterns alone. Hence, the prediction of fetal hypoxia and acidosis on the basis of non reassuring fetal heart rate patterns is sufficiently low to have led to the observation that many caesarean section have been done unnecessarily.

**Conclusion**

More number of caesarean sections are being performed for fetal distress. It is concluded from our study that abnormal fetal heart rate patterns detected by cardiotocography did not correlate well with adverse neonatal outcome and resulted in high

incidence of unnecessary caesarean sections. Although lack of adverse outcome could reflect that timely intervention before clinically significant fetal compromise improved perinatal outcome.

## References

1. Appropriate technology for birth. *Lancet*. 1985;2(8452):436-437.
2. Souza JP, Gulmezoglu A, Lumbiganon P, et al. Caesarean section without medical indications is associated with an increased risk of adverse short-term maternal outcomes: the 2004-2008 WHO Global Survey on Maternal and Perinatal Health. *BMC Medicine*. 2010;8:71.
3. Betran AP, Merialdi M, Lauer JA, et al. Rates of caesarean section: analysis of global, regional and national estimates. *Paediatr Perinat Epidemiol*. 2007;21(2):98-113.
4. Lumbiganon P, Laopaiboon M, Gulmezoglu AM, et al. Method of delivery and pregnancy outcomes in Asia: the World Health Organization global survey on maternal and perinatal health 2007-08. *Lancet*. 2010;375(9713):490-499.
5. Karlstrom A, Lindgren H, Hildingsson I. Maternal and infant outcome after caesarean section without recorded medical indication: findings from a Swedish case-control study. *BJOG*. 2013;120(4):479-486; discussion 486.
6. Bahiah AS, Murphy JF, Sharida HE. Fetal distress in labor and cesarean section rate. *Bahrain Med Bull*. 2010;32(2):151-53.
7. Alfirevic Z, Devane D, Gyte GML. Continuous Cardiotocography (CTG) as a form of Electronic Fetal Monitoring (EFM) for Fetal Assessment during Labor. *Cochrane Review* 2009.
8. Lai J, Nowlan NC, Vaidyanathan R, Shaw CJ, Lees CC. Fetal movements as a predictor of health. *Federation of Societies of Obstetrics and Gynecology (NFOG)*. 2016(95): 968–975.
9. Gangwar R, Chaudhary S. Caesarean Section for Foetal Distress and Correlation with Perinatal Outcome. *J Obstet Gynaecol India*. 2016 Oct;66(Suppl 1):177-80. Doi: 10.1007/s13224-015-0831-5. Epub 2016 Jan 28.
10. Rana P, Sharma P, Sharma S, Sharma M, Chouhan P. Caesarean section for foetal distress and correlation with perinatal outcome. *MedPulse – International Medical Journal*. October 2018; 5(10): 97-99.