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Original Research Article

## Intrapartum fetal monitoring by cardiotocography and its correlation with labour outcome

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### ABSTRACT

**Background:** The intrapartum fetal surveillance has gained significant importance. Avoidance of adverse fetal outcome is the objective of intrapartum fetal monitoring. This study helps in forming the aims to provide simple and clear approach to intrapartum fetal surveillance in high risk population.

**Methods:** In present study 80 laboring patients were analyzed retrospectively who were admitted in GCS Hospital from December 2017 to May 2018. Continuous fetal monitoring was done and results were correlated with maternal and fetal outcome.

**Results:** Cases with high risk (23) had more non-reassuring pattern of 8.7% as compared to low risk which had 5%. With non-reassuring pattern, C-section was done in 38% whereas in reassuring pattern 85% had vaginal delivery. NICU admission in non-reassuring pattern were 7 (63.6%) whereas in reassuring were only 2 (2.89%). This makes false positivity as 36.4%.

**Conclusions:** Predictive value of CTG of reassuring pattern is quite high. In spite of false positives, it is a very effective tool in labor room.

**Keywords:** Fetal Monitoring, Cardiotocograph, Reassuring/non-reassuring pattern

### INTRODUCTION

The ultimate goal of every obstetrician is to deliver a neurologically healthy fetus to a healthy mother. Any result which fails to meet these goals leads to more introspection as far as intrapartum fetal monitoring methods are concerned. Traditionally fetal heart was monitored by intermittent auscultation or by hand doppler. With advent of cardiotocography, CTG machine has become a very important tool in labour room. For low risk patients intermittent auscultation is thought to be adequate but where a slightest chance of fetal hypoxia exists cardiotocography comes in forefront.

Cardiotocography provides an objective and reproducible evidence of fetal hypoxia that usually precedes neurological damage to fetal brain. This technique when

introduced was readily incorporated in clinical practice without adequate clinical trials on large scale but later it also met with criticism for its false positivity.

Objective of our study was avoidance of adverse fetal outcome with intrapartum fetal monitoring. This study also helps in forming the aims to provide simple and clear approach to intrapartum fetal surveillance.

### METHODS

Present study was conducted prospectively in department of Obstetrics and Gynecology, GCS Medical College and Hospital which is a tertiary referral Centre in Eastern Ahmedabad. 80 patients from December 2017 to May 2018 of labor were taken and CTG was applied to all these patients.

### Inclusion criteria

Inclusion criteria were, all term and near-term pregnancies, mild to moderate PIH/IUGR, mild to moderate anemia /oligohydramnios, previous LSCS (non-recurrent), breech/Twins

### Exclusion criteria

Exclusion criteria were preterm labour <33 weeks, antepartum hemorrhage, severe preeclampsia, fetal anomaly, medical disease of mother, severe maternal infection

In this study, the measure of pregnancy outcomes studied were mode of delivery, indications of caesarean section, percentage requiring caesarean section for fetal distress, oligohydramnios, meconium stained liquor. Early neonatal outcomes included were apgar score, birth weight, admission into neonatal intensive care unit (NICU), duration of stay in NICU and perinatal mortality. There were significant differences between the two groups regarding pregnancy outcomes and early neonatal outcomes.

In respect to endpoints, two main outcome variables were evaluated, relating to obstetric intervention (induction of labour, spontaneous vaginal delivery, operative vaginal delivery, emergency caesarean section), and perinatal outcome (subsequent perinatal death, low apgar scores, neonatal resuscitation, NICU admission) using Pearson chi square and Cramer's V test.

There are four main features that should be systematically examined to assist with the interpretation of the CTG: baseline rate, baseline variability, accelerations & decelerations. The CTG tracings interpretation was based on RCOG/NICE guidelines-2001 (adopted by FIGO). On a sample of tracings, a re-evaluation of intra observer and interobserver agreement between two different obstetricians was conducted to confirm reliability of interpretations. A follow-up of perinatal and maternal outcomes was performed.

## RESULTS

Primi and multi gravida women were observed for reassuring and non-reassuring patterns. incidence of non-reassuring pattern in primi was 13.9% as compared with multi gravida where incidence was 13.5%. both had near equal incidence of non-reassuring patterns (Table 1).

**Table 1: Parity and CTG Patterns.**

	Number	Reassuring	Non reassuring
<b>Total</b>	80	69	11
<b>Primigravida</b>	43	37	6
<b>Multigravida</b>	37	29	5

High incidence of non-reassuring pattern was noted in PIH. Out of total high-risk pregnancy incidence of non-reassuring pattern was seen in PIH group around 17% (Table 2).

**Table 2: CTG patterns observed in high risk group.**

Sr. no.	Cases	Total		Non-reassuring pattern	
		Primi	Multi	Primi	Multi
<b>1</b>	PIH	10	4	3	1
<b>2</b>	PROM	2	1	0	0
<b>3</b>	Oligohydramnios	1	1	1	1
<b>4</b>	IUGR	2	1	0	0
<b>5</b>	Diabetes	0	1	0	1
	<b>Total</b>	<b>15</b>	<b>8</b>	<b>4</b>	<b>3</b>

Comparison of CTGs of patients In Spontaneous labor and induced labour. Non reassuring pattern was 13% as compared to 18% in Induced labor. So, induction of labour pts had higher incidence of CTG abnormality (Table 3).

**Table 3: Patterns as per spontaneity of labor versus induction.**

Sr. no		Reassuring	Non-reassuring
<b>1</b>	Spontaneous	60	9
<b>2</b>	Induced	9	2
	<b>Total</b>	<b>69</b>	<b>11</b>

Non-reassuring pattern was 8.75% in high risk pregnancies as compared to 5% in low risk pregnancies (Table 4).

**Table 4: CTG patterns observed as per risk factors.**

Sr. no.	Cases	Total		Non-reassuring pattern	
		No.	%	No.	%
<b>1.</b>	No risk Factor	57	71.25	4	5
<b>2.</b>	High risk Factor	23	28.75	7	8.75
	<b>Total</b>	<b>80</b>		<b>11</b>	

**Table 5: Correlation with meconium vs clear liquor.**

Fetal rate patterns	Meconium stained		Clear liquor	
	No.	%	No.	%
<b>Reassuring</b>	7	58	62	91
<b>Non-reassuring</b>	5	42	6	9
<b>Total</b>	12		68	

Incidence of meconium staining of liquor was high in non-reassuring pattern which was around 42% as compared to reassuring pattern was around 7%. In clear liquor, reassuring pattern was high (Table 5).

Mode of delivery in reassuring pattern was vaginal route mainly (85%) whereas in non-reassuring pattern vaginal delivery was about 62% as compared to caesarean section which was 15% in reassuring pattern and 38% in non-reassuring pattern (Table 6).

**Table 6: CTG correlation with mode of delivery.**

Sr. no.	FHR Patterns	No.	Vaginal delivery		Caesarean	
			No.	%	No.	%
1.	Reassuring	69	58	85	11	15
2.	Non-reassuring	11	8	62	3	38
	Total	80	65		15	

NICU admission was quite high in non-reassuring pattern (63.6%) as compared to reassuring pattern which was quite low about 2.89% (Table 7).

**Table 7: NICU admission.**

Sr. no.	FHR patterns	No NICU admission		NICU admission		Total	
		N o.	%	N o.	%	N o.	%
1.	Reassuring	67	97.1	2	2.89	69	86.25
2.	Non-reassuring	4	36.3	7	63.6	11	13.75
	Total	71		9		80	

Mean APGAR score was higher in reassuring pattern as compared to non-reassuring pattern, in non-reassuring pattern mean was as low as 5 (Table 8).

**Table 8: Apgar score.**

Sr. no.	FHR Pattern	Total cases	Mean APGAR score at 5 min.
I.	Reassuring	69	8
II.	Non-reassuring	11	5

## DISCUSSION

Depending upon parity in primigravida incidence of non-reassuring pattern was 13.9% as compared to multi-gravidas which was 13.5%. In high risk group in primigravidas more non-reassuring pattern were seen in hypertensive patients i.e 30%. In oligohydramnios the incidence of non-reassuring pattern was equally high in multi and primigravida. In PROM and IUGR, incidence was low. Overall incidence of non-reassuring heart rate was 8.75% in high risk pregnancies as compared to 5% in

low risk pregnancies. In a comparative studies of Sandhu et al abnormal CTGs<sup>7</sup> were observed in 10% of high-risk pregnancies.<sup>13</sup> In Hafizur Rahman et al study 2012 there was 8.7% incidence of ominous CTG in high risk group.<sup>12</sup>

In meconium stained liquor non-reassuring fetal heart rate pattern was present in 42%, whereas in clear liquor 91% had reassuring pattern. This is statistically significant  $p < 0.001$ . Rehman et al showed 72% patient of MSL having non-reassuring pattern.<sup>12</sup>

Cesarean section rate was 38%, in non-reassuring pattern as compared to 15% in reassuring pattern. In a study by Daneilian et al 51.8% with abnormal CTG results had caesarean section.<sup>9</sup>

NICU admission rate was 63.6 % in non-reassuring pattern as compared to reassuring (2.89%).<sup>6,7</sup> Similar findings were shown by Sharbaf and Rahimi et al in Sandhu et-al study group neonatal admissions were 33% with abnormal CTGs.<sup>14</sup>

Mean APGAR score was 8 in reassuring pattern as compared to 5 in non-reassuring pattern.<sup>8,9</sup> In a comparable study by EH Delinger et al in apgar scores were depressed in 75% with abnormal CTGs.<sup>6</sup>

## CONCLUSION

CTG is a simple non-invasive test and can help obstetrician in timely intervention. It is an efficient device in busy labour units with limited resources. Despite limitations, continuous CTG monitoring should be considered in all situations where there is a high risk of fetal hypoxia/acidosis. It should also be considered in predisposing maternal factors (Preeclampsia, Diabetes). In cases of induced or augmented labour where there is probability of hyper-stimulation, electronic fetal monitoring should be considered. Also, in fetal growth retardation, meconium stained liquor or where any abnormality detected during intermittent fetal auscultation CTG is recommended. It provides a recordable proof of fetal well-being in case of adverse outcome which can be helpful in growing era of litigation.

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