

Analysis of Cardiotocography Findings in Pregnancy with Less Fetal Movement and Its Association with Perinatal Outcome

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Abstract

Less fetal movement affects perinatal outcome. To examine association between antenatal CTG findings and perinatal outcome in women with less fetal movement. This prospective observational study was conducted in the department of Obstetrics and Gynecology, Kumudini Women's Medical College and Hospital, Mirzapur, Tangail over a period of six months from January 2015 to June 2015. It included 100 pregnant women after 34 weeks of gestation. They underwent a cardiotocogram (CTG) test. Data were collected by face-to-face interview, observation and document review. The mean age of the women was 24.37±4.62 (SD) years and mean gestational age was 38.48±2.15 weeks. In this study, 82.0% of the cases presented at term pregnancy, 42.0% of the women were primi gravida and rest falls between 2nd to 4th gravida. Normal vaginal delivery was in 59.0% cases and rest were undergone caesarean sections (41.0%). Late deceleration with decreased variability was (23.5%) most common. Incidence of low birth weight was 16.0% & macrosomia was 5.0%. Birth asphyxia was found in 52.0% cases, 49.0% needed immediate resuscitation, 35.0% were admitted into neonatal unit and early neonatal death was 8.0%. Birth asphyxia was significantly higher in non-reassuring [37(72.5%)] than reassuring [15(30.6%)] on CTG. Incidence of low birth weight was higher in non-reassuring [11(21.6%)] than in reassuring [5(10.2%)] on CTG (p>0.05). Early neonatal death was more in respondents with non-reassuring [5(9.8%)]

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on CTG than reassuring [3(6.1%)] on CTG (p>0.05). Twenty six (51.0%) neonatal of the non-reassuring were admitted into neonatal unit whereas only 9 (18.4%) neonatal of the reassuring were admitted into neonatal unit. It can be concluded that CTG may be the first line investigation for ante and intrapartum fetal assessment.

Keywords: CTG, Less Fetal Movement, Perinatal Outcome.

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Introduction

A reduction of fetal movements causes concern and anxiety, both for the mother and obstetrician. Reduced fetal movement is difficult to interpret because it is a subjective complaint by the mother¹. Decreased fetal movement affects 5 - 15% of pregnancies².

Currently there is no universally agreed definition of DFM. In a study of women with normal uncomplicated pregnancies, 99% of women were able to feel 10 movements within 60 minutes³. Studies have been conducted on the correlation between maternal perception of fetal movements and fetal movements detected on ultrasound scans, showing large variations, with correlation rates ranging from 16-90%^{4,5}. This variation in maternal perception may be related to gestational age, amount of amniotic fluid volume, medications, fetal sleep state, obesity, anterior placenta, smoking and nulliparity^{6,7}.

Maternal perception of DFM is a common cause of unplanned antenatal presentation in the third trimester⁸. Maternal perception of DFM is associated with increased incidence of a number of adverse pregnancy outcomes including stillbirth, preterm delivery and intrauterine growth restriction⁹. Recent evidence suggests that the improved management of DFM and uniform information to women may be associated with fewer stillbirths¹⁰.

Cardiotocography (CTG) is the graphical presentation of fetal heart activity and the uterine contraction to detect the fetal hypoxia¹. It is the most commonly used test for antepartum and intrapartum fetal surveillance in the majority hospitals of developed countries¹¹. This technology was first developed in 1950 and became commercially available in 1960¹¹. The goal of antepartum

fetal surveillance is to predict, diagnose and timely intervene the pregnancies those are complicated with fetal asphyxia and might lead to fetal and newborn morbidity and death¹². Cardiotocography (CTG) is also termed as electronic fetal monitoring. A predictive fetal heart rate record is the principle indication that led to intervention and delivery. A prediction of fetal asphyxia that leads to intervention and delivery may prevent or modify moderate or severe newborn morbidity as the result of fetal asphyxia¹³.

The fetus' health is evaluated by assessment of the fetal heart rate (FHR). This assessment involves identification of two general types of FHR patterns: those that may be associated with adverse fetal or neonatal outcomes (ie, non-reassuring patterns) and those that are indicative of fetal well-being. But there is no evidence from randomized trials that proves antepartum FHR monitoring results in a decreased risk of fetal death¹⁴.

Materials and Methods

This hospital based prospective observational study was conducted in the Department of Obst. & Gynae, Kumudini Women's Medical College and Hospital, Mirzapur, Tangail from January 2015 to June 2015 for a period of six months. A total of 100 pregnant women with less fetal movement were included as study population. Purposive sampling technique was adopted. Pregnant women with multiple pregnancy, eclampsia or severe preeclamptic, lethal congenital abnormality, severe oligohydramnios and GA<34 weeks were excluded from the study. Written consent was taken from each study population before interview. All of the study subjects underwent a cardiotocogram (CTG) test. Data were collected by face-to-face interview, observation and document review.

Results

Sixty six percent of the study population was in the age group 20 - 29 years and 20% had an age above 30 years. The mean age was 24.37±4.62 (SD) years (Table I).

Table-I: Age distribution of the study population (n=100).

Age (years)	Frequency (n)	Percentage (%)
<20	14	14.0
20 to 30	66	66.0
30 and above	20	20.0
Mean±SD (min-max)	24.37±4.62 (18-35)	

n: Number of subject

Mean gestational age of the study population was 38.48±2.15 weeks. Present study found 82.0% of the cases term pregnancy, 42.0% were primi gravida and 58.0% falls between 2nd to 4th gravida. Regarding mode of delivery, 59.0% delivered by normal vaginal delivery and rest were undergone caesarean sections (41.0%) (Table II).

Table-II: Obstetric characteristics of study population (n=100).

Characteristics	Frequency (n)	Percentage (%)
Gestational age (weeks)		
Term (≥37 to 42 weeks)	82	82.0
Preterm (28 to < 37 weeks)	15	15.0
Post-Term (> 42 weeks)	3	3.0
Mean±SD (min-max)	38.48±2.15 (34 - 44)	42.0
Gravida Status		33.0
Primi	42	17.0
2 nd	33	8.0
3 rd	17	
4 th	8	59.0
Mode of delivery		41.0
Normal vaginal delivery	59	
Caesarean Section	41	20.0
Premature rupture of membrane		
≥ 24 hours	8	10.00
< 24 hours	12	4.00
Preeclampsia	10	
Diabetes Mellitus	4	

n: Number of subject

According to CTG findings 49.0% cases were reassuring and 51.0% were non-reassuring. Absent or decreased variability was 8 (8.0%), fetal bradycardia was 7 (7.0%), fetal tachycardia was 6 (6.0%), variable deceleration with fetal bradycardia was 5 (5.0%), variable deceleration was 7 (7.0%), late deceleration with decreased variability was 12 (12.0%), and late deceleration was 6 (6.0%) (Table III).

Table-III: Distribution of study population by CTG findings (n=100).

Cardiotocography findings	Frequency (n)	Percentage (%)
Reassuring	49	49.0
Non-reassuring	51	51.0
Late deceleration	6	6.0
Late deceleration with decreased variability	12	12.0
Variable deceleration	7	7.0
Variable deceleration with fetal bradycardia	5	5.0
Fetal tachycardia	6	6.0
Fetal bradycardia	7	7.0
Absent of decreased variability	8	8.0

n: Number of subject

In this study incidence of low birth weight was 16.0 % & macrosomia was 5.0%. Birth asphyxia was found in 52.0% cases, 49.0% needed immediate resuscitation, thirty 35.0% were admitted into neonatal unit and early neonatal death was 8.0%(Table IV).

Table-IV: Perinatal outcome in study population (n=100).

Perinatal outcome	Frequency (n)	Percentage (%)
Birth Weight		
Normal (≥2.5 to <4 kg)	79	79.0
Low birth weight (<2.5 kg)	16	16.0
Macrosomia (≥ 4 kg)	5	5.0
Birth asphyxia	52	52.0
Needed resuscitation	49	49.0
Needed admission to neonatal unit	35	35.0
Early Neonatal Death	8	8.0

n: Number of subject

Birth asphyxia was significantly higher in non-reassuring [37(72.5%)] than that of reassuring [15(30.6%)] on CTG.

Incidence of low birth weight was higher in non-reassuring [11(21.6%)] than in reassuring [5(10.2%)] on CTG but the difference was not statistically significant ($p>0.05$). Early neonatal death was more in respondents with non-reassuring [5(9.8%)] on CTG than reassuring [3(6.1%)] on CTG but the difference was not statistically significant ($p>0.05$). Twenty six (51.0%) neonatal of the non-reassuring were admitted into neonatal unit whereas only 9 (18.4%) neonatal of the reassuring were admitted into neonatal unit (Table V).

Table-V: Association of abnormal CTG findings with birth asphyxia, low birth weight, early neonatal death and admission to neonatal unit (n=100).

	CTG finding		P value
	Non reassuring (n=51)	Reassuring (n=49)	
Birth asphyxia	37 (72.5%)	15 (30.6%)	<0.001
Low birth weight	11 (21.6%)	5 (10.2%)	>0.050
Early neonatal death	5 (9.8%)	3 (6.1%)	>0.050
Admission to neonatal unit	26(51.0%)	9(18.4%)	0.001

n: Number of subject

Discussion

In this study, 66 percent of the study population was in the age group 20 - 29 years and 20% had an age above 30 years. The mean age was 24.37 ± 4.62 years. Similar age was seen in the study of Kumari et al¹⁵ and Khatun et al¹⁶.

Eighty two percent of the cases presented at term pregnancy, 42% of the cases were primi gravida and 58.0% falls between 2nd to 4th gravida. Nahar et al¹⁷ had all the study populations of multigravida having various types of previous obstetrical history. On the other hand, Kumari et al.¹⁵ found 32 (42.7%) nullipara (parity 0) followed by 28(37.3%) with parity 2-5, and 15(20.0%) grand multiparous (parity >5).

As regard mode of delivery, 59% delivered by normal vaginal delivery while rest were undergone caesarean sections (41.00%). In the study of Kumari et al¹⁵, vaginal deliveries were successful in 45(60%) women, while CS was done in 30(40%) cases. Out of 45 vaginal deliveries, 33(73.3%) were spontaneous vaginal and 12(26.7%) were IVDs.

In this study, non-reassuring were 51.0% cases and reassuring were 49.0% cases. Chakrobarty et al¹⁸ found two-third of their study population with reactive CTG and one-third with nonreactive type. In their study, Kumari et al¹⁵ found 25 (33.3%) patients had non-reactive CTG, and 50(66.7%) had reactive CTG.

In present study, absent or decreased variability was 8 (8.0%), fetal bradycardia was 7 (7.0%), fetal tachycardia was 6 (6.0%), variable deceleration with fetal bradycardia was 5 (5.0%), variable deceleration was 7 (7.0%), late deceleration with decreased variability was 12 (12.0%), and late deceleration was 6 (6.0%). Late deceleration with decreased variability was most common. In the study of Khatun et al¹⁶, out of 100 abnormal CTG 30.0% had fetal tachycardia, 38.0% had deceleration, 19.0% was non reactive CTG, 4.0% had fetal bradycardia and 4.0% had

absent beat-to-beat variability. Present study showed that early neonatal death was more in nonreassuring CTG than reassuring CTG. Five early neonatal death was noted in nonreassuring CTG. Birth Asphyxia was found in 52.0% of the cases. Immediate resuscitation was needed 49.0% cases. Thirty five percent babies need admission in neonatal unit and early neonatal death was 8.0%. Only 16.0% babies were found LBW. In their study, Kumari et al¹⁵ found low birth weight in 40.0% and birth asphyxia in 1.3% cases. Chakrobarty et al¹⁸ found low birth weight in 17.1% cases.

In this study, the proportion of birth asphyxia was significantly more in non-reassuring (72.5%) than reassuring (30.6%) on CTG. The proportion of the low birth weight was higher in non-reassuring (21.6%) than in reassuring (10.2%) on CTG but not statistically significant. Early neonatal death was more in respondents with non-reassuring (9.8%) on CTG than reassuring (6.1%) on CTG but not statistically significant. This study also showed more than fifty percent of the non-reassuring 26 (51.0%) required admission to neonatal unit. On the other hand, less than twenty percent of the reassuring 9 (18.4%) required admission to neonatal unit. Statistically this difference was found significant. Birth weight was significantly lower and admission into neonatal care unit was significantly higher in non-reassuring group than that of reassuring group¹⁹.

Conclusion

Though abnormal CTG findings showed significant relationship only with birth asphyxia and admission to neonatal unit, CTG monitoring along with timely obstetrical intervention and can reduce associated complications and improve fetal outcome. So it can be concluded that CTG can be the first line investigation for ante and intrapartum fetal assessment.

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References

1. Jassawalla MJ. Reduced fetal movements: interpretation and action. *The Journal of Obstetrics and Gynecology of India.* 2011; 61(2): 141-3.
2. Sergent F, Lefevre A, Verspyck E, Marpeau L. Decreased fetal movements in the third trimester: what to do? *Gynecologie, Obstetrique & Fertilité.* 2005; 33(11): 861-9.

3. Tveit JV, Saastad E, Bordahl PE, Stray-Pedersen B, Froen JF. The epidemiology of decreased fetal movements. In: Annual conference of the Norwegian Perinatal Society; Oslo, Norway; 2006.
4. Froen JF, Saastad E, Tveit JV, Bordahl PE, Stray-Pedersen B. [Clinical practice variation in reduced fetal movements]. *Tidsskrift for den Norske laegeforening: tidsskrift for praktisk medicin, ny raekke*. 2005; 125(19): 2631-4.
5. Flenady V, Froen F, Mac Phail J, Gilshenan K, Mahomed K, Gardener G. Maternal perception of decreased fetal movements for the detection of the fetus at risk: the Australian experience of the international FEMINA collaboration. In: International Stillbirth Alliance (ISA) conference; 2008.
6. Graca LM, Cardoso CG, Clode N, Calhaz-Jorge C. Acute effects of maternal cigarette smoking on fetal heart rate and fetal body movements felt by the mother. *J Perinat Med*. 1991; 19(5): 385-90.
7. Tuffnell DJ, Cartmill RS, Lilford RJ. Fetal movements; factors affecting their perception. *Eur J Obstet Gynecol Reprod Biol*. 1991; 39(3): 165-7.
8. Tveit JV, Saastad E, Stray-Pedersen B, Bordahl PE, Froen JF. Maternal characteristics and pregnancy outcomes in women presenting with decreased fetal movements in late pregnancy. *Acta obstetrica et gynecologica Scandinavica*. 2009; 88(12): 1345-51.
9. O'sullivan O, Stephen G, Martindale E, Heazell AE. Predicting poor perinatal outcome in women who present with decreased fetal movements. *Journal of Obstetrics and Gynaecology*. 2009; 29(8): 705-10.
10. Tveit JV, Saastad E, Stray-Pedersen B, Bordahl PE, Flenady V, Fretts R, et al. Reduction of late stillbirth with the introduction of fetal movement information and guidelines-a clinical quality improvement. *BMC pregnancy and childbirth*. 2009; 9(1): 32.
11. Parer JT, King T. Foetal heart rate monitoring: Is it salvageable? *Am J Obs Gynecol*. 2000; 182(4): 982-7.
12. Low JA, Killen H, Derrick EJ. The prediction and prevention of intrapartum fetal asphyxia in pre term pregnancies. *Am J Obs Gynecol*. 2002; 186(2): 279-82.
13. Krupa N, Ali M, Zahedi E, Ahmed S, Hassan FM. Antepartum fetal heart rate feature extraction and classification using empirical mode decomposition and support vector machine. *Biomedical engineering online*. 2011; 10(1): 6.
14. Rouse DJ, Owen J, Goldenberg RL, Cliver SP. Determinants of the optimal time in gestation to initiate antenatal fetal testing: a decision-analytic approach. *American journal of obstetrics and gynecology*. 1995; 173(5): 1357-63.
15. Kumari R, Srichand P, Devrajani BR, Shah SZ, Devrajani T, Bibi I, et al. Foetal outcome in patients with Meconium Stained Liquor. *JPMA*. 2012; 62(474): 474-6.
16. Khatun A, Khanam NN, Nazir F. Role of Elaborate Cardiotocography (CTG) in Pregnancy Management. *Bangabandhu Sheikh Mujib Medical University Journal*. 2009; 2(1): 18-24.
17. Nahar K, Akhter L, Chowdhury SB. Outcome of pregnancy with history of previous cesarean section. *ORION*. 2008; 31: 588-590.
18. Chakraborty B, Mondal TK, Barman SC, Rudra BP, Sahana R, Mondal PC. Evaluation of Perinatal Outcome by Antenatal CTG and Umbilical Artery Doppler in Pre-eclamptic Mothers. *Indian Journal of Clinical Practice*. 2013; 24(6): 559-565.
19. Lekis S, Loghis C, Parayoto N. Use of antepartum and intrapartum cardiography. *Clin Exp Obstet Gynaecol*. 1997; 24: 79-81.