COMPARATIVE STUDY OF NORMAL AND ABNORMAL CTG IN TERM PREGNANT WOMEN IN LABOUR AND ITS PERINATAL OUTCOMES

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ABSTRACT

BACKGROUND

EFM was introduced into Obstetric practice during late 1960 on the premise that it would facilitate early detection of abnormal foetal heart patterns thought to be associated with hypoxia thus allowing early intervention to prevent foetal neurological damage or death.[1]

In this study, we aim to evaluate the effect of CTG on perinatal outcome in low risk and high-risk population and determine the cost-effective reliable method of foetal monitoring that is applicable to low risk and high-risk population.[2]

MATERIALS AND METHODS

A prospective randomized study conducted on 200 pregnant women in labour who were admitted to labour room in the department of OBGY, Niloufer Hospital. The Duration of study is one year. These women were divided into two groups, group-A & group-B.

RESULTS

The demographic features parity and gestational age in both the groups were comparable. The mean age group of the patient is 23 years and mean gestational age is 37.77 weeks. In this study, 125 (62.5%) belong to high risk group and 75(37.5%) belong to low risk group.

In the present study normal CTG was seen in 59.5%, suspicious CTG in 11% and pathological CTG in 29.5% in low risk group and in high risk group normal CTG was seen in 51.2%, suspicious CTG in 9.6% and pathological CTG in 39.2%.

Incidence of MSL was more in women with abnormal CTG finding in both low and high risk women.[3] NICU admissions were 55.9% in patient with abnormal CTG as compare to 1.7% in normal CTG patterns.[4] The sensitivity, specificity, PPV and NPV of CTG in Prediction of low APGAR score at 5 minutes was 93.75%, 80.13%, 50.84% and 98.31% respectively.

CONCULSION

Continuous CTG monitoring identifies conditions causing foetal compromise at an early stage of labour so that timely intervention can be taken.[5] Present study had shown that the abnormal CTG finding were associated with significantly increased incidence of LSCS, low mean APGAR scores, increased NICU admissions.

KEYWORDS

Cardiotocography (CTG), Neonatal Intensive Care Unit (NICU), Intrauterine Growth Restriction (IUGR), Labour Admission Test.

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BACKGROUND

CTG was introduced as a means of attempting to identify these foetuses of low risk mother as greatest risk of intra partum asphyxia (Arul Kumaran 2000, RCOG2001). The idea is to predict, diagnose and timely intervene the pregnancy complicated with foetal asphyxia that might lead to foetal and New Born morbidity and mortality. The purpose of our study is to evaluate the perinatal outcome following the early recognition of abnormal CTG findings and early intervention made.

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Aim of the Study

To determine the correlation of normal and abnormal CTG pattern in term low risk and high risk pregnant women in labour and perinatal outcome. The study was undertaken to determine the sensitivity, specificity and predictive value of CTG as a screening list.

Design

Prospective randomized control trail conducted at Niloufer Hospital for women and Children Tertiary care teaching hospital. (Annual statistics is 6,500 deliveries) for a period of one year. Participants-200 pregnant women.

MATERIALS AND METHODS

The women were randomly allocated in two groups 100 each. This prospective study was approved by university ethical committee. Group A include those monitored with CGT in low risk group and Group B high risk group. The inclusion criteria taken in low risk group is all pregnancy women as term gestation with established labour without risk factors. The high risk group are with previous caesarean section, other medical disorder and pregnancy related disorder like Hypertension, GDM, prolonged pregnancy, PROM, IUGR. Exclusion criteria are preterm deliveries, multiple gestation, foetal anomalies, and cases decided for caesarean section immediately. On admission women details and history including age parity antenatal care menstrual obstetric and medical history were documented. General physical examination was done. Per-abdominal and bimanual examination was performed. A tracing was taken for 20 minutes[6] and FHR traces obtained are categorised as reactive, equivocal and pathological, according to NICE guidelines 2007.[7] Following admission test patients with reactive trace was monitored intermittently by auscultation for 1 minute every 30 minutes in the first stage of labour and every 5 minutes in second stage of labour post contraction.[8] Cases with suspicious trace were kept on continuous CTG monitoring. Pregnancy outcomes were noted were the mode of delivery, indications of caesarean section, presence of meconium stained liquor.[9] Neonatal outcomes included APGAR scores, birth weight, admission into NICU, duration of stay in NICU and perinatal mortality.[10] New borns who were distressed and whose APGAR score was less than 7 at 5 minutes were attended by paediatrician and shifted to NICU.

RESULTS

A hospital based prospective study was undertaken in order to correlate the normal and abnormal cardiotocographic patterns and its perinatal outcome.

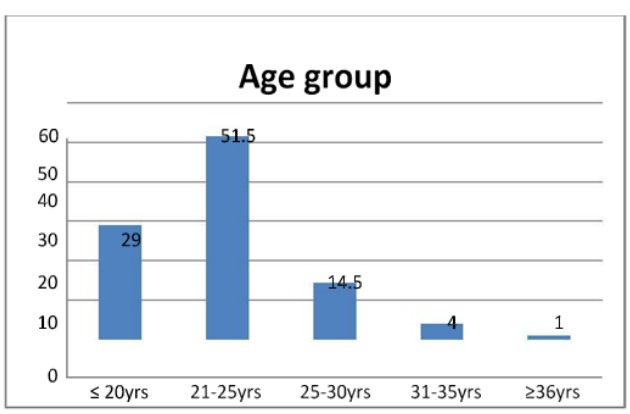

Chart 1. Distribution of Patients According to Age Group

The mean age group of the patients in the study was 23 years with a standard deviation of 3.8 years. 51.5% of the patient belonged to 21 to 25 years of age group.

Gravida	Number	Percentage
Primigravida	153	76.5
Multigravida	47	23.5
Total	200	100

Table 1. Distribution of Patients According to Gravida Status

Period of Gestation	Number	Percentage
37 weeks	66	33
38 weeks	119	59.5
39 weeks	11	5.5
40 weeks	3	1.5
> 41 weeks	1	0.5
Total	200	100

Table 2. Distribution of Patients according to Gestational Age in Weeks

Mean gestational age was 37.77 weeks.

Antepartum	Number	Percentage
High risk group	125	62.5
Low risk group	75	37.5
Total	200	100

Table 3. Distribution of Patients According to the Associated Antepartum Risk Factors

In this study 125 (62.5%) belongs to high risk group and 75(37.5%) belongs to low risk group.

Type of risk factor	Number
Preeclampsia	53
Premature rupture of membranes	26
Oligohydramnios	20
Anemla	15
IUGR	10
Hypothyroldlsm	10
GDM	6
1 previous LSCS	2
Chronic hypertension	2
Epllepsy	2
Bad obsteric history (BO^{H})	1

Table 4. Associated Antepartum Risk Factors

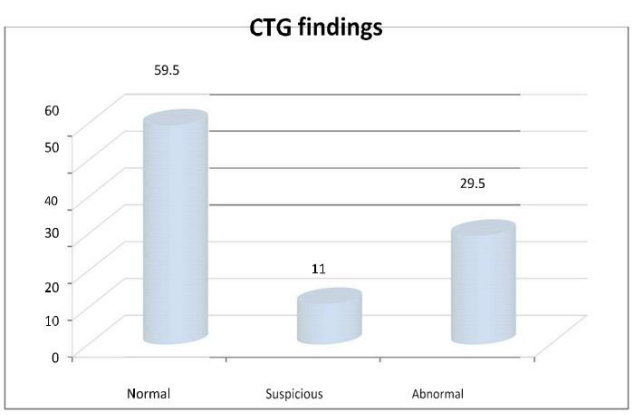

Chart 2. Distribution of Patients According to Cardiotocographic Findings

In this study 119(59.5%) patients had normal CTG patterns, 22(11%) had suspicious/equivocal patterns and 59(29.5%) had abnormal/pathological patterns.

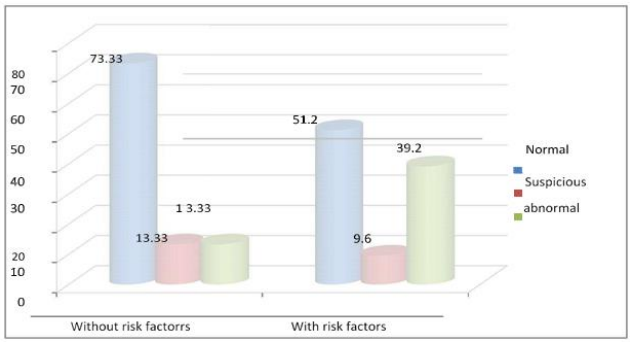

Chart 3. Distribution of Cardiotocographic Patterns according to Risk Factors

Among 75 patients without associated risk factors 73.33% patient has normal CTG pattern. 13.33% had suspicious/equivocal pattern and 13.33% had abnormal/pathological pattern. Among 125 patients with associated risk factors 51.2% patient had normal CTG pattern, 9.6% had suspicious/equivocal patterns and 39.2% had abnormal/pathological patterns.

NICU admission	Normal CTG		Suspicious CTG		Abnormal CTG	
	Number	Percentage	Number	Percentage	Number	Percentage
High risk cases (n=125)						
NICU admission	1	1,56	4	33,33	3 0	61,22
No NICU admission	63	98,43	8	66,66	1 9	38,77
Total	64	100	12	100	4 9	100
Chl	40,14					
P value	<0,001					
Low risk cases (n=75)						
NICU admission	1	1,81	1	10	3	30
No NICU admission	54	98,18	9	90	7	70
Total	55	100	10	100	1 0	100
Chl	11,45					
P value	0,003					

Table 5. Comparison of CTG Findings with NICU Admissions

DISCUSSION

There is wide intra-observer and inter-observer variations in interpretation of CTG even among experts. According to Schifrin[9] et al electronic foetal monitoring was performed to be superior method to intermittent auscultation in detecting foetal hypoxia.[11] A high percentage of admission CTG were reported as abnormal with reduced variability and variable decelerations are the most commonly reported abnormalities.[12] In our study after labour admission test for 20 minutes 200 women kept on CTG monitoring 119 had normal CTG pattern, 22 had suspicious pattern and 59 had abnormal pathological patterns. Among the women with high risk factors (125) LSCS was performed in 61 women, normal delivery in 55 women and instrumental deliveries in 9 women. Among the women no risk factors LSCS was performed in 32 women, normal delivery in 36 women and instrumental deliveries in 7 women. There was statistically significant increase in rate of LSCS in cases with abnormal CTG tracings in high risk women.[13] Incidence of MSL was more in women with abnormal CTG findings in both low risk and high risk women. Low APGAR scores of <7 at 5 minutes were seen in 32.2% of babies with abnormal CTG findings and 1.7% of babies with normal CTG findings.[14] Low APGAR scores were seen in both low risk and high risk women with abnormal CTG tracings compared to women with normal tracings. In present study NICU admissions were 55.9% with abnormal CTG as compared to 1.7% in normal CTG patterns. The results of present study were comparable to the studies by Hafizar R et al[6] and Blessy David et al. There was no perinatal deaths in women with normal CTG. The abnormal CTG patterns of the present study had 3.38% perinatal mortality which can be comparable to the study by Sandhu et al[8] where the incidence was 6.6%. The sensitivity of CTG was 87%, specificity was 66%. Positive predictive value was 54% and negative predictive value was 92% in the prediction of abnormal outcomes. High amount of false positives were identified, which led to the intervention in delivery, second stage of labour. It is established that majority of cases of cerebral palsy in non-anomalous term infants are not associated with intrapartum hypoxic-ischemia.

The duration of CTG in the labour admission list was 20 minutes. The present study had 78% incidence of meconium stained liquor during labour in women with abnormal CTG which is comparable to that of the study by Hafiz-ur-R et all where the incidence was 72%. This high incidence of MSL in abnormal traces is due to inclusion of the high-risk cases.[15] In present study in low risk women, the rate of LSCS in normal and abnormal CTG tracing was 25% and 85.7% respectively. The percentage of patient having normal vaginal delivery, instrumental delivery and LSCS in the present study was comparable to that of the studies done by Khursheed et al and Hafizur R et al.[13]

Neonatal Outcome

The mean birth weight of normal CTG group was 2.83 Kgs and that of abnormal CTG group was 2.76 Kgs. There was no statistically significant difference in CTG findings with mean weight of the body. In present study NICU admission were 55.9% in patient with abnormal CTG pattern as compared to 1.7% in normal CTG patterns. The results of present study were comparable to the studies by Hafizur R et al and Blessy Dvid et al.

Incidence of NICU admission were high in the patients with suspicious and abnormal CTG groups compared to normal CTG groups in both low risk and high risk group. There were no perinatal deaths in women with normal CTG tracing. The abnormal CTG pattern in the present study had 3.38% perinatal mortality which can be comparable to the study by Sandh et al where the incidence was 5.6%. Both the babies belonged to high risk group.

Interpretation of CTG:

In this study 11.9 patients had normal CTG pattern, 22 had suspicious/equivocal pattern and 29.5% had abnormal / pathological pattern. Among 75 patients without associated

risk factors 55 normal, suspicious 10, 10 had abnormal / pathological pattern. Among 125 patient with associated maternal risk factors, 64 had normal CTG pattern, 12 has suspicious pattern and 49 had abnormal / pathological pattern. There was a statistically significant increase in the incidence of abnormal CTG pattern in women with risk factors that in women with no risk factors. The popular study conducted at Dublin review women with a highly abnormal CTG in labour i.e., foetal tachycardia with reduced variability and late decelerations. They found that only 58% of these foetuses were acidotic at birth as judged by umbilical artery pH and only 0.2% went on to develop CP. Due to this high false positive rate continuous FHR monitoring cannot be recommended as a predictor of CP.

CONCLUSION

Abnormal CTG finding was associated with significantly increased incidence of LSCS, low mean APGAR scores, increased NICU admission and perinatal mortality compared to those with normal CTG finding.[16] The incidence was more in high risk pregnancies than low risk pregnancies. CTG can be used as good screening test of foetal surveillance but should not be used as single criteria for management. However routine electronic foetal monitoring in labour results in increased unnecessary intervention for foetal compromise. CTG should be supplemented with other tests like foetal monitoring and to avoid unnecessary surgical intervention. Research is needed to identify more specific tests of foetal well-being that will allow us to identify babies at risk during labour without having major impact on women.

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