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ORIGINAL ARTICLE

Association of Intrapartum CTG with Fetomaternal Outcome

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ABSTRACT

Objective: To determine the association of intrapartum CTG with fetomaternal outcome

Material and Methods:

A total number of 120 pregnant females who presented in the department of obstetrics and gynecology with labour pain were included in this cross-sectional analysis. A written informed consent was taken from all patients. The study was conducted in the department of Obstetrics & Gynaecology at Islam Teaching Hospital, Sialkot from January, 2021 to September, 2021. At presentation in the labor room, 20 minutes CTG was performed and patients were divided into two groups, those having abnormal trace including suspicious and pathological trace (Group A) and normal cardiotocography (CTG) pattern (Group B). After that the patients were followed till delivery to determine the feto-maternal outcomes e.g. APGAR score, NICU admission, perinatal mortality and caesarean section rate.

Results: The mean age was 26.9±4.12 years in group A and 27. 1 ± 3.9 years in group B (p-value 0.78). On comparison of maternal outcomes, caesarean section was done in 38 (63.3%) patients in group-A and in 17 (28.3%) patients in group-B (p-value <0.0001).Regarding neonatal outcomes, NICU admission was needed in 9 (15%) patients in group A, versus in 4 (6.7%) patients in group B (p-value 0.14). Perinatal mortality occurred in 03 (5.0%) patients in group A and in no patient in group B (p-value 0.07). APGAR score at 5 minutes was >7 in 46 (76.7%) patients in group A versus in 52 (86.7%) patients in group B (p-value 0.18).

Conclusion: The intrapartum abnormal CTG cannot be used as the only tool to identify fetal hypoxia during labor. It may lead to increased caesarean section rate because of high false positive rate of abnormal CTG.

Keywords: Cardiotocography, Fetal Distress, Cesarean section

INTRODUCTION

Fetal heart rate monitoring is one of the important components of antenatal care. Previously various methods were used for monitoring of fetal condition which included pinard stethoscope, auscultation of fetal heart rate and fetoscope etc. Most recently cardiotocography (CTG) is the method used for fetal monitoring during pregnancy and labor[1]. Intermittent auscultation of fetal heart rate was a traditional method of fetal monitoring during labor. In order to reduce fetal morbidity and mortality, electronic fetal monitoring with CTG has been used for the last 2-3 decades. CTG records the fetal heart rate pattern along with its relevance to the maternal uterine contractions[2].

A normal CTG pattern indicates a well oxygenated fetus and a pathological or abnormal trace indicates a fetus in compromised condition but there are high false positive rates[3]. Fetal blood sampling (FBS) was also introduced for fetal assessment but it is a time consuming test and not comfortable for laboring patients because it needs repetition[4]. A normal fetal heart rate pattern on CTG is having baseline heart rate of 110 to 160 beats per minute, presence of 2 or more accelerations, a normal baseline variability of 5 to 25 beats per minute and absence of decelerations[5].

CTG done at the time of admission which is also called as the admission test was first described by Ingemarsson et al. It is done in laboring patients at the time of admission for 20 minutes[6]. This admission CTG is used for detection of fetal compromise in early labor and to identify women who need continuous electronic fetal monitoring during labor[7].

The use of CTG has reduced number of neonates with seizures and the perinatal mortality which was associated with the hypoxia. Mostly, fetal hypoxia is detectable on CTG but many of the CTG signs of hypoxia have been seen, in neonates without hypoxia, leading to mismanagement in these cases[8].

The aim of this study is to determine the association of intrapartum CTG with fetomaternal outcome in terms of NICU admissions, perinatal mortality, APGAR score at 5 minutes and rate of cesarean section.

MATERIAL AND METHODS

A total number of 120 pregnant females who presented in the department of obstetrics and gynecology with labor pain were included in this cross-sectional analysis. A written informed consent was taken from all patients. The study was conducted in the department of Obstetrics & Gynaecology at Islam Teaching Hospital, Sialkot from January, 2021 to September, 2021.

The inclusion criteria was pregnant females presenting in first stage of labor, having gestational age ≥36 weeks and singleton pregnancy. The exclusion criteria were, women having history of previous caesarean section, having any other obstetrical indication for caesarean section (except for abnormal CTG) and fetus with congenital anomaly.

At presentation in the labor room, data regarding detailed obstetrics history, gestational age, comorbidities and clinical examination was collected. A 20 minutes CTG was performed and patients were divided into two groups; those having abnormal (including suspicious and pathological) CTG pattern (Group A) and normal CTG pattern (Group B).

The following criteria was used to determine abnormal CTG pattern; heart rate <100 beats/min, or >180 beats/min, Sinusoidal pattern for >10 minutes, heart rate variability <5 for >90 minutes, decelerations (atypical variable decelerations, late decelerations or single prolonged deceleration for more than 3 minutes).

After that the patients were followed till delivery to determine the feto-maternal outcomes e.g. APGAR score, NICU admission, perinatal mortality and caesarean section rate.

The data was analyzed using SPSS version 25. Frequency and percentage was calculated for qualitative data. For quantitative data, mean ± standard deviation was calculated. Chi- square test was applied for statistical analysis. P value of ≤ 0.05 was taken as significant.

RESULTS

The mean age was 26.9±4.12 years in group A and 27.1±3.9 years in group B (p-value 0.78). There were 21 (35%) Primigravida

patients in group A and 24 (40%) Primigravida patients in group B (p-value 0.57). Mean gestational age was 38.5±1.4 weeks in group A and 38.4±1.5 weeks in group B (p-value 0.70) (Table 1).

Table 1: Baseline Characteristics

	Group A Pathological (Abnormal)	Group B (Normal)	p-value
Mean Age	26.9±4.12	27.1±3.9	0.78
Gravidity			
Primigravida	21 (35%)	24 (40%)	0.57
> 2 gravida	39 (65%)	36 (60%)	
Gestational Age (weeks)	38.5±1.4	38.4±1.5	0.70

On comparison of maternal outcomes, caesarean section was done in 38 (63.3%) patients in group A and in 17(28.3%) patients in group B (p-value <0.0001). Regarding neonatal outcomes, NICU admission was needed in 9 (15%) patients in group A versus in 4 (6.7%) patients in group B (p-value 0.14). Perinatal mortality occurred in 03 (5.0%) patients in group A and in no patient in group B (p-value 0.07). APGAR score at 5 minutes was >7 in 46 (76.7%) patients in group A versus in 52 (86.7%) patients in group B (p-value 0.18) (Table 2).

Table 2: Comparison of Study Outcomes

	Group A (Abnormal)	Group B (Normal)	p-value
Mode of Delivery			
Vaginal	22 (36.7%)	43 (71.7%)	<0.0001
Caesarean section	38 (63.3%)	17 (28.3%)	
NICU Admission			
Yes	09 (15.0%)	04 (6.7%)	0.14
No	51 (85.0%)	56 (93.3%)	
Perinatal Mortality			
Yes	03 (5.0%)	00 (0.0%)	0.07
No	57 (95%)	60 (100%)	
APGAR Score at 5 minutes			
>7	46 (76.7%)	52 (86.7%)	0.15
<7	14 (23.3%)	08 (13.3%)	

DISCUSSION

Cardiotocograph (CTG) is a reliable method of monitoring of fetal condition during pregnancy and Labor and majority of the hospital in the whole world are using CTG as an effective monitoring tool. The aim of this study was to determine the effect of abnormal CTG pattern on fetal and maternal outcome.

The mean age of the patients with abnormal CTG pattern in our study was 26.9 ±4.12 years which is comparable to the study conducted by Amena et al where mean age of the patients was 26.7 ± 4.91 years[9]. Another study conducted by L Ali also had patients with mean age of 30.51± 6.11 years[10].

Regarding mode of delivery in our study, 71% patients delivered vaginally and 28% had caesarean section in case of normal CTG pattern. 36.7% person delivered by vaginal delivery and 63.3 % had cesarean section in case of abnormal CTG Pattern.

A study done by Salahuddin N. et al also showed increased rate of caesarean section (76.7%) with abnormal CTG patterns[11]. Similarly study by Gordana et al, Oladrain et al and Ikram et al also showed increased cesarean section rate with abnormal CTG which was 64%, 72% and 66.7% respectively[12-14].

In our study there were09(15.0 %) NICU admissions in group A (Abnormal CTG pattern) and 04(6.7%) NICU admissions in group B (normal CTG pattern). Similar findings were observed in the study by Rotich et al where NICU admissions were 15.2% for suspected birth asphyxia which was quite higher[15]. More NICU admissions were also seen in patients with abnormal CTG in the study by Salahuddin N et al and Ikram et al[11, 14].

In our study, perinatal mortality was 5% with abnormal CTG. This finding of our study is consistent with the study by Salahuddin et al and Ikram et al[11,14]. But our observed rate of perinatal mortality was lower than that found in the study by Sheikh et al where it was more than 10% [16].

We observed APGAR score at 5 minutes which was less than 7 in 76.7% neonates with abnormal CTG and 13.3% with normal CTG.APGAR score of more than 7 was seen in 23.3% of patients with abnormal CTG and 86.7% of those with normal CTG. While in studies by Salahuddin et al and Ikram et al APGAR score at 5 minutes was less than 7 in 28.2% and 26.6% respectively of neonates with abnormal CTG[11,14].

Different studies have found no association between abnormal CTG and APGAR score. Like our study other studies have also reported high caesarean section rate based on abnormal CTG findings. So, CTG monitoring cannot be used as the only tool for identification of fetal compromise. We can combine CTG findings with arterial blood gas analysis and fetal electrocardiograph (ECG) analysis[17].

In this way the combination of two or three tests can provide us with more reliable information regarding fetal compromise and thus it may help in reducing rate of caesarean section.

CONCLUSION

The intrapartum abnormal CTG cannot be used as the only tool to identify fetal hypoxia during labor. It may lead to increased caesarean section rate because of high false positive rate of abnormal CTG.

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