


Research Article

Study on Abnormal Cardiotocography (CTG) and Correlation with Fetal Outcomes in BSMMU

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Abstract

Background: Elaborate Cardiotocography (CTG) is the most commonly used test for antepartum and intrapartum fetal surveillance because it gives information via the cerebro-cardiac response of fetal cerebral activity, which is modified by the hypoxia.

Aim of the study: Determine the fetal outcomes of abnormal cardiotocography (CTG).

Methods: This cross-sectional study was conducted at the Department of Obstetrics and Gynaecology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. The study duration was one year, from January 2013 to August 2013. The study population was patients having abnormal CTG admitted for delivery in the Department of Obstetrics and Gynecology in Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka.

Result: Majority 19(38.0%) of the patient's age belonged to 21-25 years and primigravida was predominant. Antepartum CTG was found in 31(62.0%) patients and intrapartum CTG was 19(38.0%) patients. About the indications of CTG, most 9(18.0%) of the patients had pre-eclampsia/chronic hypertension followed by 14.0% had PROM, 12.0% had postdated pregnancy, 10.0% had each IUGR and oligohydramnios respectively. According to types of abnormal CTG more than one third (34.0%) patients had decelerations abnormal CTG, 10(20.0%) had non-reactive (absent of accelerations), 11(22.0%) had tachycardia. According to abnormal fetal heart rate pattern and early neonatal outcome it was observed in this present study that tachycardia was found 11 cases out of which 90.0% in normal outcome and 9.1% abnormal outcome. Nonreactive (absent of accelerations) was found 10 cases out of which 50.0% normal and 50.0% abnormal. Decelerations were found in 17 cases out of which 29.4% in normal and 70.6% in abnormal. Regarding the influence of risk factors on outcomes with abnormal CTG pre-eclampsia /chronic hypertension was found in 9 cases out of which 33.3% and 66.7% had normal and abnormal pregnancy outcome respectively. PROM was found in 7 cases out of which 28.6% normal and 71.4% had abnormal pregnancy outcome. Postdated pregnancy was found in 6 cases out of which 50.0% normal and 50.0% had abnormal pregnancy outcome. Majority (82.0%) of the patients underwent LUCS and 18.0% had vaginal delivery. At 1 min APGAR score <7 was found 30.0% and at 5 minutes APGAR score <7 was 18.0%, small for gestational age was in 34.0% and perinatal mortality was found 6.0%.

Conclusion: CTG can be continued as a good screening test of fetal surveillance but it is not the sole criteria to influence the management of high-risk pregnancies. Abnormal CTG should be supplemented with other test before intervention.

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Introduction

Cardiotocography (CTG) is a procedure of graphically recording fetal heart activity (cardio) and uterine contraction(toco), both recorded in the same time scale simultaneously and continuously [1]. Cardiotocography, a revolutionary method of fetal monitoring, was first introduced in the late 1950s. The main credit goes to the following two obstetricians-Professor G.S. Dawes and Professor R. Caldeyro Barcia of Uruguay. CTG became commercially available in the 1960s [1]. While electronic monitoring was in progress for intrapartum and contraction stress tests, investigators observed that the fetal outcome was invariably good when fetal heart rate increased with fetal movement or uterine contraction. This reactivity of fetal heart rate to its movement was later recognized as a good sign of fetal well-being, just as the absence of decelerations in oxytocin in the oxytocin stress test, and this laid the foundation of the Nonstress Test (NST) for antepartum fetal surveillance [2]. In 1969, Kubli, Daesar Kinselman, and Hammacher in Europe studied fetal heart rate fluctuations and oscillation in pregnancy without stress [3]. They observed that lack of fetal heart rate acceleration was associated with poor fetal outcomes. NST is used only in selected cases. Clinicians originally anticipated that FHR monitoring would solve two problems. First, it would serve as a screening test for severe asphyxia (i.e., asphyxia severe enough to cause neurological damage or fetal death). Second, FHR monitoring would allow recognition of early asphyxia so that timely obstetric intervention could avoid asphyxia-induced brain damage or death in the newborn [4]. The concept of a prenatal or intrapartum technique that could predict the newborn's condition encapsulated the goal of obstetric practice, and widespread use of electronic FHR monitoring quickly followed. Antepartum cardiotocography (NST) has achieved general acceptance throughout the world as a screening test for fetal surveillance. Pooled results of four studies 5-7 of NST involving 10,169 patients revealed a satisfactory outcome with a false negative rate of seven per 10,000 cases. The false positive rate is high, 50% for morbidity and 80% for mortality, indicating that the probability of fetal problems when the test is positive (non-reactive) is low.8 The most serious pattern of heart rate changes, namely fetal bradycardia with loss of baseline variability and late decelerations, is associated with significant fetal hypoxia in about 65% of cases, even among there will therefore be about 35% of cases in which fetal blood sampling will show that immediate intervention is not necessary. So, any suggestion that a hypoxic fetus should be checked by other methods, especially by determining the PH of fetal blood before the caesarian section is undertaken [5]. Justification of my study: Cardiotocography is a method of fetal surveillance about which there is much controversy worldwide. It is available

in most developed countries and some developing countries like ours. So, this study aims to find out the predictability of this method regarding fetal distress in the context of a tertiary hospital in our country.

Methodology and Materials

This cross-sectional study was conducted at the Department of Obstetrics and Gynaecology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. The study duration was one year, from January 2013 to August 2013. The study population was patients having abnormal CTG admitted for delivery in the Department of Obstetrics and Gynecology in Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka. Women with abnormal cardiotocography (CTG) were recruited for the study purposively. The research protocol is approved by the committee (Local Ethical Committee).

Inclusion criteria:

- Singleton gestation is between 32-40 weeks of gestation. One of the following indications for FHR tracing is present.
- History of prior stillbirth
- Maternal medical conditions: Diabetes mellitus, Hypertension, Renal disease, Collagen disease, Cardiac disease.
- Complications during pregnancy: Premature rupture of membrane, Preeclampsia, Abruptio-placentae, Undiagnosed third trimester bleeding, IUGR, Macrosomia, Oligohydramnios, Polyhydramnios Postdated pregnancy, less fetal movement and Rh isoimmunization
- Complications during labour: Prolong labour, Meconium staining of amniotic fluid, Abnormal FHR by auscultation

Exclusion criteria:

- Multifetal pregnancy
- Gestational age <32 weeks.
- Inability to obtain a satisfactory FHR tracing
- Those with premature rupture of membranes, multiple pregnancies, and severe pregnancy-induced hypertension.
- Cases decided for cesarean section immediately after admission

Statistical analyses were carried out by using the Statistical Package for Social Sciences version 16.0 for Windows. The mean values were calculated for continuous variables. Frequencies and percentages indicated the observation. At every step of data collection, processing, and analysis, a suggestion from a statistician was sought, and the data collected was rechecked to avoid the entry of wrong data and ensure analysis using appropriate statistics.

Result

In this study, a total of 50 patients were enrolled and analyzed, where the majority of 19(38.0%) patients were aged 21-25 years, and their mean age was 26.60±6.9 years with range from 18-42 years (Table 1). Regarding parity, majority 21(42.0%) patients had para 1 and lowest 7(14.0%) patients had para ≥4 (Table 2). Regarding the gestational age of the study patients, it was observed that the majority, 20(40.0%) patients, had a gestational age of 35-37 weeks, followed by 17(34.0%) had 38-40 weeks, 7(14.0%) had 41-43 weeks and 6(12.0%) had 32-34 weeks (Table 3). Antepartum CTG was found in 31(62.0%) patients, and intrapartum CTG was found in 19(38.0%) patients (Table 4). Majority 9(18.0%) patients had pre-eclampsia/chronic hypertension followed by 7(14.0%) had PROM, 6(12.0%) had postdated pregnancy, 5(10.0%) had each IUGR and oligohydramnios respectively. Other results are depicted in the table (Table 5). More than one-third (34.0%) patients had decelerations abnormal CTG, 10(20.0%) had nonreactive (absent of accelerations), and 11(22.0%) had tachycardia. Other results are depicted in table 6. According to abnormal fetal heart rate patterns and early neonatal outcomes, it was observed in this present study that tachycardia was found in 11 cases, out of which 10(90.0%) in normal outcomes and 1(9.1%) were abnormal outcomes. Bradycardia was found in 4 cases, out of which 1(25.0%) and 3(75.0%) in normal and abnormal fetal outcomes, respectively. Absent beat-to-beat variability was found in 3 cases, out of which all were in abnormal fetal outcomes. Nonreactive (absent of accelerations) was found in 10 cases, out of which 5(50.0%) were normal and 5(50.0%) abnormal. Decelerations were found in 17 cases, out of which 5(29.4%) in normal and 12(70.6%) in abnormal. Decelerations with low baseline variability were found in 3 cases out of which 2(66.7%) in normal and 1(33.3%) in abnormal. Bradycardia with decelerations was found in 2 cases, out of which all were abnormal fetal outcomes (Table 7). Regarding the influence of risk factors on outcomes with abnormal CTG, it was observed in this current study that diabetes mellitus was found in 2 cases, out of which all cases had normal pregnancy outcomes, Pre-eclampsia /chronic hypertension was found in 9 cases, out of which 3(33.3%) and 6(66.7%) had normal and abnormal pregnancy outcome respectively. IUGR was found in 5 cases, out of which 2(40.0%) were normal and 3(60.0%) had abnormal pregnancy outcomes. Postdated pregnancy was found in 6 cases, out of which 3(50.0%) were normal and 3(50.0%) had abnormal pregnancy outcomes. PROM was found in 7 cases, out of which 2(28.6%) were normal and 5(71.4%) had abnormal pregnancy outcomes. Less fetal movement was found in 4 cases, out of which 2(50.0%) were normal and 2(50.0%) had abnormal pregnancy outcomes. Oligohydramnios was found in 5 cases, out of which 3(60.0%) were normal and 2(40.0%) had abnormal pregnancy outcomes. Bad obstetric history was found in 3 cases, and all had normal pregnancy outcomes. Abruptio placenta was

found in 4 cases, out of which 1(25.0%) was normal, and 3(75.0%) had abnormal pregnancy outcomes. Maternal Heart disease Grade II was found in 2 cases, and all had normal pregnancy outcomes. Maternal Heart disease Grade III was found in 1 case, which had an abnormal pregnancy outcome. Rh isoimmunization was found in 2 cases, and all had abnormal pregnancy outcomes (Table 8). Forty-one (82.0%) patients had delivery by LUCS, and 9(18.0%) patients had a vaginal delivery (Table 9). At 1 min APGAR score <7 was found 15(30.0%) and at 5 minutes APGAR score <7 was 9(18.0%), small for gestational age was 17(34.0%). Majority 11(22.0%) patients had duration of hospital stay ≤7 days and perinatal mortality was found 3(6.0%) (Table 10). Table 11 shows the evaluation of three pregnancy outcomes in terms of maternal risk factors, CTG findings, mode of delivery, and cause of death.

Table 1: Distribution of the study patients by maternal age (n=50).

Age (years)	Frequency (n)	Percentage (%)
≤20	5	10
21-25	19	38
26-30	16	32
>30	10	20
Mean±SD	26.6	±6.9
Range (min-max)	18	-42

Table 2: Distribution of the study patients by parity (n=50).

Parity	Frequency (n)	Percentage (%)
Para 1	21	42
Para 2	12	24
Para 3	10	20
Para ≥4	7	14

Table 3: Distribution of the study patients by gestational age (n=50).

Gestational age (wks)	Frequency (n)	Percentage (%)
32-34	6	12
35-37	20	40
38-40	17	34
41-43	7	14

Table 4: Distribution of the study patients by cardiotocography (n=50).

Cardiotocography (CTG)	Frequency (n)	Percentage (%)
Antepartum	31	62
Intrapartum	19	38

Table 5: Distribution of the study patients by indication of cardiotocography (CTG) (n=50).

Indications of CTG	Frequency (n)	Percentage (%)
Diabetes mellitus	2	4
Pre-eclampsia/chronic hypertension	9	18
IUGR	5	10
Postdated pregnancy	6	12
PROM	7	14
Less fetal movement	4	8
Oligohydramnios	5	10
Bad obstetric history	3	6
Abruption placenta	4	8
Maternal Heart disease Grade II	2	4
Maternal Heart disease Grade III	1	2
Rh isoimmunization	2	4

Table 6: Distribution of the study patients by frequency of major abnormalities in cardiotocography (CTG) (n=50).

Types of abnormal CTG	Frequency (n)	Percentage (%)
Tachycardia	11	22
Bradycardia	4	8
Absent beat-to-beat variability	3	6
Non-reactive (absent of accelerations)	10	20
Decelerations	17	34
Decelerations+ low baseline variability	3	6
Bradycardia+ decelerations	2	4

Table 7: Distribution of the study patients by abnormal fetal heart rate pattern and early neonatal outcome (n=50).

Types of abnormal CTG	Total (n=50)	Normal (n=23)		Abnormal (n=27)	
		n	%	n	%
Tachycardia	11	10	90.9	1	9.1
Bradycardia	4	1	25	3	75
Absent beat to beat variability	3	0	0	3	100
Nonreactive (absent of accelerations)	10	5	50	5	50
Decelerations	17	5	29.4	12	70.6
Decelerations+ low baseline variability	3	2	66.7	1	33.3
Bradycardia+ decelerations	2	0	0	2	100

Table 8: Distribution of the study patients by influence of risk factors on outcomes with abnormal CTG (n=50).

Risk factors	Total N	Pregnancy outcome			
		Normal (n=23)		Abnormal (n=27)	
		n	%	n	%
Diabetes mellitus	2	2	100	0	0
Pre-eclampsia /chronic hypertension	9	3	33.3	6	66.7
IUGR	5	2	40	3	60
Postdated pregnancy	6	3	50	3	50
PROM	7	2	28.6	5	71.4
Less fetal movement	4	2	50	2	50
Oligohydramnios	5	3	60	2	40
Bad obstetric history	3	3	100	0	0
Abruption placenta	4	1	25	3	75
Maternal Heart disease Grade II	2	2	100	0	0
Maternal Heart disease Grade III	1	0	0	1	100
Rh isoimmunisation	2	0	0	2	100

Table 9: Distribution of the study patients by mode of delivery (n=50).

Mode of delivery	Frequency (n)	Percentage (%)
Delivery by LUCS	41	82
Vaginal delivery	9	18

Table 10: Distribution of the study patients by early neonatal outcome of abnormal CTG (n=50).

Neonatal outcome	Frequency (n)	Percentage (%)
APGAR score		
At 1 min		
<7	15	30
≥7	35	70
At 5 min		
<7	9	18
≥7	41	82
Small for gestational age	17	34
Duration of Hospital stay		
≤ 7 days	11	22
> 7 days	4	8
Perinatal mortality	3	6

Table 11: Distribution of the study patients by evaluation of death in different cases (n=50).

Outcome	Maternal risk factors	CTG	Mode of delivery	Cause of death
Stillborn	Pregnancy-induced hypertension with severe jaundice.	Non-reactive declaration present	NVD	Asphyxia birth weight 2.5 kg
Neonatal death	Pre-eclampsia with GDM with IUGR	Non-reactive deceleration present	LUCS	Asphyxia SGA prematurity birth weight 1.4 kg
Neonatal death	Oligohydramnios, IUGR	Non-reactive deceleration present	LUCS	Asphyxia SGA prematurity birth weight 1.2 kg

Discussion

This cross-sectional study was carried out with the aim of assessing the socio-demographic characteristics of the patients having abnormal CTG, assessing CTG types, and determining the fetal outcome. A total of 50 patients having abnormal CTG admitted for delivery in the Department of Obstetrics and Gynecology in Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, from January 2013 to August 2013, were included in this study. Singleton gestation between 32-40 weeks of gestation, and the indications for FHR tracing included the history of prior stillbirth, Maternal medical conditions: Diabetes mellitus, Hypertension, Renal disease, Collagen disease, Cardiac disease, Complications during pregnancy: Premature rupture of membrane, Pre-eclampsia, Abruptio-placentae, Undiagnosed third trimester bleeding, IUGR, Macrosomia, Oligohydramnios, Polyhydramnios, Postdated pregnancy, Less fetal movement, and Rh isoimmunization, complications during labour: Prolong labour, Meconium staining of amniotic fluid, Abnormal FHR by auscultation were included in this study. Multifetal pregnancy, gestational age <32 weeks, inability to obtain a satisfactory FHR tracing, premature rupture of membranes, multiple pregnancies, severe pregnancy induced hypertension, and cases decided for cesarean section immediately after admission were excluded from the study. The present study findings were discussed and compared with previously published relevant studies. In this present study, it was observed that the majority of 19(38.0%) of the patients belonged to 21-25 years, and their mean age was 26.60±6.9 years with a range from 18-42 years. Similarly, Khatun et al. and Kaban et al. found that the mean age of the patients was 26.7±4.9 years and 27.82 ± 5.29 years, respectively, which closely resembled the current study [7,8]. In another study, Westerhuis et al. observed a higher mean age of their study patients having abnormal cardiotocography (CTG), which was 32±5 years [10]. Regarding parity, it was observed that the majority (42.0%) of patients had para 1, followed by 24.0% para 2, 20.0% para 3, and 14.0% patients had para ≥4. Rahman also made similar observations regarding parity; Westerhuis et al. and Kaban et al. found that the majority of abnormal cardiotocography (CTG) was found in primigravida [9-11]. The frequently observed gestational age was lower than the normal CTG group because early intervention was taken by observing the abnormal fetal heart rate pattern

obtained by Khatun et al. [7]. In this series study, it was observed that the majority (40.0%) of patients had gestational age belonged to 35-37 weeks, followed by 34.0% had 38-40 wks, 14.0% had 41-43 wks, and 12.0% had 32-34 wks. In this present study, it was observed that antepartum CTG was found in 62.0% of patients, and intrapartum CTG was in 38.0% of patients. In this current study, it was observed that the majority (18.0%) of patients had pre-eclampsia/chronic hypertension, followed by 14.0% had PROM, 12.0% had postdated pregnancy, and 10.0% had each IUGR and Oligohydramnios respectively. Abruption placenta 8.0%, bad obstetric history 6.0%, maternal Heart disease Grade II 4.0%, Rh iso immunization 4.0%, and maternal Heart disease Grade III 2.0%. Rahman²⁷ mentioned in their study that about 42% of patients were postdated pregnancies followed by pregnancy-induced hypertension (PIH) (15.6%) and premature rupture of membranes (PROM) 11.3% as the major risk factors. A few patients had multiple risk factors, IUGR 6.3%, Oligohydramnios 5.0%, diabetes 3.1%. In this series study, it was observed that more than one-third (34.0%) of patients had decelerations abnormal CTG, 20.0% had nonreactive (absent of accelerations), 22.0% had tachycardia, 8.0% bradycardia, 6.0% absent beat to beat variability, 6.0% decelerations with low baseline variability and 4.0% had Bradycardia with decelerations. The CTG abnormalities of the studied women done by Khatun et al. observed 100 abnormal CTG, out of which 30% had fetal tachycardia, 38% had deceleration, 38% was nonreactive CTG, 4% had fetal Bradycardia, and 4% had absence beat to beat variability [7]. Eighteen patients had more than one abnormal finding. Almost similar findings were also obtained by Khatun in our country [12]. According to abnormal fetal heart rate patterns and early neonatal outcomes, it was observed in this present study that tachycardia was found in 11 cases, out of which 90.0% in normal outcomes and 9.1% had abnormal outcomes. Bradycardia was found in 4 cases, out of which 25.0% and 75.0% in normal and abnormal fetal outcomes, respectively. Absent beat-to-beat variability was found in 3 cases, out of which all were in abnormal fetal outcomes. Nonreactive (absent of accelerations) was found in 10 cases, out of which 50.0% were normal and 50.0% were abnormal. Decelerations were found in 17 cases, out of which 29.4% in normal and 70.6% in abnormal. Decelerations with low baseline variability were found in 3 cases, out of which 66.7% in normal and 33.3% in abnormal. Bradycardia with

decelerations were found in 2 cases, out of which all were in abnormal fetal outcomes observed that only tachycardia had 13.3% abnormal outcomes Khatun et al. [7]. It is the early sign of fetal distress obtained by Keagen and Paul [13]. As interventions were taken early, outcomes were good. Bradycardia was seen in 4% of case outcomes was normal in their study and observed Bradycardia in 1-2% of all CTG Druzin et al.; Dashow and Read [14,15]. defined as Bradycardia, a fetal heart rate of 90 beats per minute, or a fall in the fetal heart rate of 40 beats per minute below the baseline for one minute or longer. Druzin et al. in his study found that Bradycardia was associated with increased morbidity and mortality; the causes were cord compression, IUGR, and fetal malformation. Druzin et al. [14]. reported that abnormal CTG was observed with continuous Bradycardia, frequently mild and severe variable deceleration (VD), late deceleration (LD), prolonged deceleration (PD), and diminished baseline variability (DBV) in the study group, with occasionally Bradycardia and early deceleration (ED) or VD and LD or PD and no DBV in the control group Shou-Zhen et al [14,16]. Regarding the influence of risk factors on outcomes with abnormal CTG, it was observed in this current study that diabetes mellitus was found in 2 cases, out of which all cases had normal pregnancy outcomes, Pre-eclampsia /chronic hypertension was found in 9 cases, out of which 33.3% and 66.7% had normal and abnormal pregnancy outcome respectively. IUGR was found in 5 cases, out of which 40.0% were normal, and 60.0% had abnormal pregnancy outcomes. Postdated pregnancy was found in 6 cases, out of which 50.0% were normal and 50.0% had abnormal pregnancy outcomes. PROM was found in 7 cases, out of which 28.6% were normal, and 71.4% had abnormal pregnancy outcomes. The less fetal movement was found in 4 cases, out of which 50.0% were normal and 50.0% had abnormal pregnancy outcomes. Oligohydramnios was found in 5 cases, out of which 60.0% were normal, and 40.0% had abnormal pregnancy outcomes. Bad obstetric history was found in 3 cases, and all had normal pregnancy outcomes. Abruption placenta was found in 4 cases, out of which 25.0% were normal and 75.0% had abnormal pregnancy outcomes. Maternal Heart disease Grade II was found in 2 cases, and all had normal pregnancy outcomes. Maternal Heart disease Grade III was found in 1 case, which had an abnormal pregnancy outcome. Rh iso immunization was found in 2 cases and all had abnormal pregnancy outcome. found the different indications of CTG. the highest number was less fetal movement (23.0%), followed by pre-eclampsia (18.0%), oligohydramnios (18.0%), prolonged 1st stage of labor (12.0%), postdated pregnancy (10.0%), IUGR (9.0%), GDM (8.0%), PROM (7%), chronic hypertension (7.0%) and others were Rhve, HbsAg +ve, placenta provide, thalassemia, fibroid uterus, meconium stained liquor, polyhydramnios, CPD, bad obstetric history, rubella infection, and congenital heart disease Khatun et al. [7]. Another study in our country

found the highest percentage had fetal distress (63.0%) followed by pre-eclampsia (18.0%), Oligohydramnios (18.0%), less fetal movement (23.0%), prolonged 1st stage of labor (12.0%), postdated pregnancy (10.0%), intrauterine growth retardation (9.0%), gestational diabetes mellitus (8.0%), chronic hypertension (7.0%), leaking membrane (4.0%), Rh-ve (4.0%), HbsAg+ve (4.0%), premature rupture of membrane (3.0%), placenta provides (3.0%), thalassemia (2.0%), fibroid uterus (2.0%), and other are meconium stained liquor, polyhydramnios, CPD, bad obstetric history, rubella infection, UTI and congenital heart disease Khatun [12]. The findings regarding the influence of risk factors on outcomes with abnormal CTG in the studies mentioned above are comparable with the current study. In this series study, it was observed that most (82.0%) of the patients underwent LUCS and 18.0% had vaginal delivery showed, 58.4% had spontaneous vaginal deliveries, and 41.6% underwent cesarean section. Kaban et al. [11]. Another study found that the incidence of vaginal deliveries was 26.1%, and 73.9% underwent cesarean section Shou-Zhen et al. [16]. In this current study it was observed at 1 min APGAR score <7 was found 30.0% and at 5 minutes APGAR score <7 was 18.0%, small for gestational age was in 34.0%. The majority (22.0%) of patients had a hospital stay ≤7 days, and perinatal mortality was found at 6.0% in this study. Khatun et al.10 studied APGAR scores were <7 at 1 min among the babies of the abnormal CTG group than normal CTG that was similar to the current study. Almost similar findings were also found by Dellinger et al. [17]. The difference in the number of babies with APGAR scores <7 at 5 min was very insignificant in the normal CTG group than abnormal CTG group, which was similar to many other studies obtained by Khatun et al [7]. In this series study, it was observed that one fetus was stillbirth, which was associated with pregnancy-induced hypertension with severe jaundice, and delivered NVD having asphyxia birth weight 2.5 kg. Two neonatal deaths: one patient had Pre-eclampsia with GDM with IUGR, and the other patient had Oligohydramnios and IUGR, and both cases underwent LUCS. One case had an asphyxia SGA prematurity birth weight of 1.4 kg, and another case had an asphyxia SGA prematurity birth weight of 1.2 kg. All three cases had nonreactive deceleration in CTG findings. found that out of 100 pregnant women, two fetuses were stillbirths, two died on the 2nd, and two died on the third day of birth (perinatal death); all these six had deceleration in CT Khatun et al. [7]. This study does not attempt to demonstrate an ability to decrease cesarean delivery rates, nor does it attempt to link electronic fetal monitoring with long-term neurologic function and cerebral palsy. It only attempts to show the pregnancy outcome and early neonatal outcomes in the case of normal CTG and abnormal CTG cases.

Limitations of the study:

Every hospital-based study has some limitations, and the present study undertaken is no exception to this fact. The

limitations of the present study are mentioned. Therefore, the results of the present study may be different from the whole of the country or the world at large. The number of patients included in the present study was less in comparison to other studies. Because the trial was short, it was difficult to remark on complications and mortality. The study population was selected from one selected hospital in Dhaka city, so the results of the study may be different from the exact picture of the country. The present study was conducted in a very short period. As the present study included small sample size and early neonatal outcomes were evaluated on the clinical babies, further randomized studies with larger sample size and early neonatal outcomes also on a biochemical basis like umbilical cord blood gas analysis, fetal scalp pH may further confirm the result of the present study and will be more informative.

Conclusion and Recommendations

Although the clinical impact of cardiotocography on neonatal outcomes remains controversial, CTG is the most commonly used test for antepartum and intrapartum fetal surveillance in the major hospitals of developed countries. This study was undertaken to determine the fetal outcomes of abnormal cardiotocography (CTG). CTG provides direct information on the fetal condition in contrast to other techniques. So, CTG can be continued as a good screening test of fetal surveillance but is not the sole criterion to influence the management of high-risk pregnancies. When CTG shows abnormal patterns, the antepartum CTG should be supplemented with amniotic fluid volume studies, oxytocin stress test, and biophysical profile before intervention.

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Ethical approval: The study was approved by the Institutional Ethics Committee.

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