ORIGINAL RESEARCH PAPER

Gynaecology

KEY WORDS: Non reassuring fetal heart rate , Cardiotocography , meconium stained liquor , caesarean section.

ROLE OF CARDIOTOCOGRAPHY IN EARLY DETECTION OF ABNORMAL FETAL HEART RATE PATTERNS AND THEIR EFFECT ON PERINATAL OUTCOME.

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ABSTRACT

Background : Delivery of healthy baby to healthy mother is the aim of the management of every pregnancy which is only possible if proper heart rate monitoring is done. All know that the uterine contractions may be a source of stress along with other indicators like meconium stained liquor (MSL), placental infarction, cord compression and oligohydramnios. Objective: To detect fetal distress through CTG early so that timely management can be done and to find out perinatal outcome in cases of non reassuring Cardiotocography (CTG) tracings and correlating it with intraoperative findings for cause of fetal distress.

Methods: It is a case control interventional study conducted in Mahatma Gandhi Medical College and Hospital in department of Obstetrics and Gynaecology from January 2018 to June 2019 time period in which 180 patients with abnormal CTG findings were studied which were compared with control group of other 180 patients having absolutely normal CTG for perinatal outcome and Neonatal intensive critical unit (NICU) admission , intraoperative findings were correlated . For all patients CTG tracings were correlated with intraoperative findings and perinatal outcome were analyzed and statistical evaluation done.

Results: Among 180 subjects of case group,4 cases had bradycardia and late deceleration only, 83 cases had bradycardia , late deceleration & decreased variability , 9 cases had bradycardia only,38 cases had bradycardia with decreased or absent variability and 46 cases had Tachycardia with decreased or absent variability. There was a positive correlation between non reassuring and abnormal CTG with intraoperative findings with MSL was 46.6% with P value <0.001, oligohydramnios was 32.2% with P value <0.001 , Cord around neck was 41.1% with P value <0.001, NICU admission were only 13.3 % and was less significant . Perinatal outcome was good because timely decision was taken based on CTG tracings.

Conclusion: CTG patterns are highly predictive of fetal hypoxia, they correlate well with causes of fetal distress, low Apgar score and NICU admissions therefore every labour should be monitored by CTG for the best perinatal outcome .However proper interpretation of fetal heart tracing is necessary so that rate of unnecessary cesarean doesn't rise simultaneously , the cases of fetal distress are not missed to improve the fetal outcome.

INTRODUCTION

Electronic fetal heart rate monitoring (EFM) by CTG was introduced in 1960 to detect fetal status during antepartum and intrapartum period(1).

CTG is a record of fetal heart rate and uterine contractions obtained externally (abdominally) and having a simultaneous graphic representation on paper, also referred as electronic fetal monitoring .

Labour is itself a state of stress to fetus, uterine contractions sometimes may adversely affect fetus, especially in already compromised state of poor placental reserves , Oligohydramnios, MSL , Cord around neck and iatrogenic uterine hyperstimulation with injudicious use of prostaglandins and oxytocin.

Fetal hypoxia is a concern for both obstetrician and pediatrician and therefore intensive fetal monitoring by CTG should be done .

The number of fetal deaths because of hypoxia may be reduced by 60%, which means that EFM can prevent one perinatal mortality in 1000 live births.(7)

Chances of poor neonatal outcome is significantly increased with poor CTG score and chances of good neonatal outcome is high with good CTG score.(3)

Abnormalities of CTG such as decelerations and decreased variability are significantly associated with presence of MSL and poor APGAR score at birth.(4)

The main purpose of intrapartum monitoring is to find out any impending fetal hypoxia to prevent acidemia and irreversible brain damage.(2)

Fetal heart rate is controlled or maintained by the pacemaker cells, these pacemaker are under the influence of sympathetic system which accelerates and parasympathetic system which decelerates mediated by vagus nerve, heart rate is also controlled by the chemoreceptors present in the arteries which are influenced by hypercapnia and hypoxia. If there is acidemia (metabolic) which is severe also if associated with an increasing blood level of lactate, it is seen that there is persistently decrease in heart rate.(1)

The most important concern of every Obstetrician is to recognize fetal jeopardize as early as possible in order to prevent fatal outcomes .

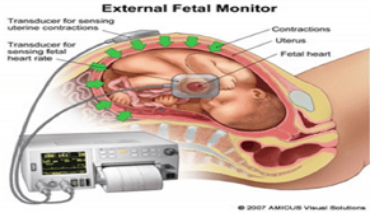
CTG is a non invasive, prenatal diagnostic technique to monitor fetal heart rate during labour.

CTG Application

It involves placement of 2 transducers placed on abdomen of pregnant women using the ultrasound beam one records heart rate of fetus , while other records uterine contractions.

Categorisation of CTG traces was done on basis of 4 features – baseline FHR , Variability , Deceleration , Acceleration as Normal , Suspicious and Pathological.(8)

Resuscitative measures to be taken in cases of non reassuring and abnormal tracing. Left lateral position , give oxygen to mother , start intravenous fluid therapy and stop oxytocin to decrease uterine contractions .



AIM: To evaluate the fetal outcome in Cesarean sections for Abnormal Fetal heart rate patterns on Cardiotocography in terms of causes of fetal distress(intraoperative findings) and Apgar score.

MATERIAL AND METHODS

It was a case control interventional study conducted in Mahatma Gandhi Medical College in Department of Obstetrics and Gynaecology at Sitapura Jaipur in time period of January 2018 to June 2019.

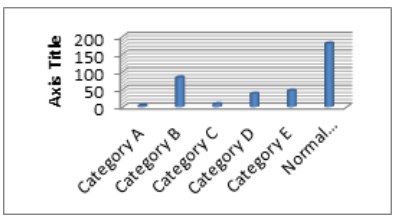
180 cases with abnormal CTG findings were studied and compared with 180 cases of normal CTG . In all these cases cesarean section was done intraoperative findings for cause of fetal distress and correlated with Low Apgar and NICU admission.

CTG tracings taken , tracing showing bradycardia , late deceleration , decreased or absent variability, tachycardia were considered non reassuring fetal heart rate. On the basis of CTG patterns case group was divided into 5 categories as follows group A –CTG showing bradycardia with late deceleration, Group B – CTG showing bradycardia , late deceleration with decreased or absent variability, Group C – CTG showing bradycardia only, Group D- CTG showing bradycardia with decreased or absent variability , group E – CTG showing tachycardia with decreased or absent variability .

Fetal heart rate was correlated with the intraperative cause of fetal distress and low apgar score and NICU admissions , statistical test were applied such as CHI square test using SPSS data.

RESULTS

Out of 180 cases , 2.2% had Group A CTG , 46.1% had Group B CTG , 5% had group C CTG , 21.1% had group D CTG and 25.5% had group E CTG . In Control Group of 180 cases CTG findings were normal



CTG Trace And Colour Of Amniotic Fluid

	Case					Control	Total
	A	B	C	D	E		
No. of Cases With Meconium stained liquor	3	42	3	18	18	16	100
No. of Cases without Meconium stained liquor	1	41	6	20	28	164	260
Total	4	83	9	38	46	180	360

Chi-square = 68.375 with 5 degrees of freedom; P < 0.001

46.6% cases with abnormal CTG had

	Case					Control	Total
	A	B	C	D	E		
No. of cases with Oligohydramnios	0	28	4	10	16	12	70
No. of cases with Normal Amniotic Fluid	4	55	5	28	30	168	290
Total	4	83	9	38	46	180	360

meconium stained liquor , whereas 53.4% cases with abnormal CTG had clear liquor.chi square test and p value was applied came to be significant <0.001 . In control group with reassuring CTG pattern only 8.8% MSL was found .

CTG Trace & Amount of Amniotic fluid.

Chi-square = 51.268 with 5 degrees of freedom; P <0.001

32.2% Cases with abnormal CTG had oligohydramnios and women with adequate amniotic fluid were 67.8% .It was found to be statistically significant with p value <0.001. In control group only 6.6% cases had oligohydramnios with normal CTG .

Chi square test was applied using SPSS method.

CTG trace & Cord around neck

	Case					Control	Total
	A	B	C	D	E		
No. of cases with Cord around neck	0	28	5	20	21	11	88
No. of cases without Cord around neck	4	55	4	18	25	169	272
Total	4	83	9	38	46	180	360

Chi-square = 79.676 with 5 degrees of freedom; P < 0.001

41.1% Cases with abnormal CTG had cord around neck and women without cord around neck were 58.9% .It was found to be statistically significant with p value <0.001. In control group only 6.1% cases had cord around neck with normal CTG .Chi square test was applied using SPSS method.

Apgar score at birth and CTG trace in labour

	Case					Control	Total
	A	B	C	D	E		
Low Apgar Score	1	11	1	5	6	6	30
Normal Apgar Score	3	71	8	33	40	174	330
Total	4	83	9	38	46	180	360

Chi-square = 0.511 with 4 degrees of freedom; P = 0.972

13.3% babies had poor Apgar score and 86.7 % babies had normal Apgar score. No. of cases with normal Apgar score and abnormal CTG tracing were more in number , could be due to early intervention by caesarean section.

Table

Perinatal Outcome	Cases	Control	P value
Shifted to mother's side	156	174	0.76
Shifted to NICU	24	6	0.01 (S)
Total	180	180	

Discussion

Fetal heart rate monitoring by CTG is a noninvasive method in detecting non reassuring and abnormal fetal heart rate patterns in order to reduce perinatal mortality and morbidity .The present study was done to know the perinatal outcome in patients whom cesarean section was done for abnormal fetal heart rate pattern , this study was also compared with the perinatal outcome in cases where cesarean section was done for other indication and CTG was reassuring .In our study, The Sensitivity of electronic fetal heart rate monitoring by CTG was 85.29%, specificity was 96.15%, positive predictive value was 96.6% & negative predictive value was 83.3%.

Nisha Bhatia et'al April 2018,showed that in cases of abnormal CTG patterns 63.4 % had Deceleration and 28 % persistently decreased variability whereas in our study we divided CTG parameters into 5 groups ,Group A bradycardia with late decelerations found to be 2.2%. Group B bradycardia , late deceleration with absent or decreased variability found to be 46 %. Group C with bradycardia was found to be 5%. Group D with bradycardia and decreased or absent

variability found to be 21%. Group E with tachycardia with decreased or absent variability found to be 25.5 %.In Nisha bhatia et'al study , the most common CTG finding was deceleration only found to be 63.4%cases whereas In our study ,the most common CTG finding was Prolonged Bradycardia ,Late deceleration , decreased and absent variability categorized under group B which was found to be 46%. In their study cases with meconium stained liquor as intraoperative findings were 47.1 % whereas in our study it was 46.6 %. In Nisha Bhatia et'al study 33.3% cases had cord around neck, whereas in our study it was found to be 41.1% , which was statistically significant with p value <.001. In the study of N Bhatia et'al , in 41.3% cases of poor apgar score fetal heart rate found to be abnormal on the other hand in our study abnormal CTG findings association with low apgar score seen in 13.3% only it was found to be less, may be because Cesarean sections were timely done .Electronic fetal monitoring by cardiotocography is necessary for good neonatal outcome.

Bindu kumar et'al 2015, correlated abnormal CTG findings with Meconium stained liquor in 86.3% statistically significant and in our study it was found to be 46.6% which was also statistically significant with p value <0.001. They also correlated abnormal tracings with neonatal morbidity and mortality and concluded that electronic fetal monitoring reduces hypoxia related death of neonate by 60 %. They also compared their study with the control group with normal CTG tracings.

The mean age of cases were 25.6 +/- 4 years , ranging from 18 years to 35 years whereas in our study the mean age +/- SD were 25.52 years +/- 3.86 years. The age group in which most number of patients were of 20-30 years.

In their study, 38% cases had decelerations, 30 % had tachycardia whereas in our study 48.3% had deceleration , 25.5% had tachycardia .

Their correlation with oligohydramnios and abnormal CTG findings were 67.9% and in our study it was found to be 32.2%was statically significant with p value <.001.

In this study, correlation of abnormal tracings with cord around neck found to be 14.13%, whereas in our study it was 41.1% which was statistically significant with p value <0.001.

CONCLUSION

Labour is a state of physiological stress leading to acidemia, It might become pathological if not monitored during the intrapartum period and timely decision for delivery is not taken.

Intrapartum fetal surveillance can best be done by Electronic fetal monitoring(EFM) by Cardiotocography.

Cardiotocography is an useful monitoring tool for fetal heart rate monitoring during both antepartum and intrapartum period for the best perinatal outcome .

CTG abnormalities of category B with prolonged bradycardia , decelerations and decreased variability are significantly associated with the presence of Meconium stained liquor , cord around neck , oligohydraminios, placental infarction and Low APGAR score at birth .

Hence I conclude that CTG patterns are highly predictive of fetal hypoxia. However CTG tracings should be properly Interpreted, Proper Resuscitation measures taken ,then revaluation done as a whole. This will minimize unnecessary Cesarean sections, all the same, cases of fetal distress should be picked up in time so that fetal outcome is improved many times.

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