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Role of Admission CTG as a Screening Test to Predict Fetal Outcome and Mode of Delivery.

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ABSTRACT

Intrapartum fetal surveillance is important to ensure the delivery of a healthy baby with minimum intervention. In busy labour wards with few monitors, selection of patients for continuous monitoring is necessary. The objective of this study was to evaluate the predictive value of admission CTG of pregnant women in early labour in detecting fetal hypoxia at the time of admission and to correlate the results of the admission CTG with the perinatal outcome and mode of delivery. This study is a prospective study which included women with singleton pregnancies and gestational age more than 37 weeks with fetus in cephalic presentation admitted to the labour room in first stage of labour (spontaneous onset) with no maternal complications. They were subjected to an admission CTG, which included a 20 minute recording of FHR and uterine contractions. 400 patients were recruited. More than half (51%) were multi gravida. Out of 400 women, 267 (66.75%) had reactive trace, 114 (28.5%) had equivocal trace and 19 (4.75%) had ominous trace. The admission CTG can serve as a screening tool to detect foetal distress already present or likely to develop and to predict the mode of delivery and fetal outcome.

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INTRODUCTION

The process of labour poses a physiological stress to the fetus. Therefore intrapartum fetal surveillance is important to ensure the delivery of a healthy baby with minimum intervention [1]. The baseline fetal heart rate (FHR) can be determined by intermittent auscultation but other features of the fetal heart such as baseline variability, accelerations and decelerations cannot be measured. Hence over the last 15 years [2] the use of antepartum and intrapartum cardiotocography (CTG) has increased. This detects hypoxic damage in the fetuses so that appropriate intervention can be done to prevent neurological injury including cerebral palsy [3]. In industrialized countries routine electronic monitoring of fetal heart rate during labour has become an established practice which is limited in developing countries like India due to economic constraints. In a busy labour ward with only few monitors, selection of patients for continuous monitoring is necessary. Antepartum factor alone is insufficient because intrapartum fetal morbidity and mortality are often encountered even in low risk patients [4].

The Admission Test was described by Ingemarsson et al [5]. It is a method of monitoring fetal heart rate at the onset of labour to pick up fetuses which are already compromised or are likely to become compromised during labour. It is a natural contraction stress test which records the fetal heart rate for usually 20 minutes immediately after admission to the labour ward. An abnormal tracing indicates a deficiency in the placental circulation and thus identifies fetal compromise at an early stage to allow intervention [6]. The Admission Test in low risk women was not recommended by the British guidelines [7] published in 2001 when in the same year the Swedish guidelines [8] recommended the test in all women. The objective of this study was to determine the predictive value of admission CTG to detect fetal hypoxia at the time of admission and correlation of the results of admission CTG with perinatal outcome and mode of delivery.

METHODOLOGY

This study was conducted from January 2013. It included 400 women admitted to the labour room of the Department of Obstetrics and Gynaecology, Sree Balaji Medical College and Hospital, Chennai. This prospective study was approved by the University Ethical Committee. All women with singleton pregnancies more than 37 weeks of gestational age in cephalic presentation who were admitted to the labour room in the first stage of labour with no maternal complications were included in the study. Informed written consent was obtained. Multiple pregnancies, maternal complications like GDM, PIH, GA less than 36 weeks, anomalous fetus and all conditions which required immediate Caesarean Section (abruption, cord prolapse, uterine scar rupture, abnormal lie or presentation) were excluded from the study. Detailed history was documented on admission. General physical examination was done. To determine the stage of labour per abdominal and bimanual pelvic examinations were performed. Then the patients were subjected to an admission CTG. A tracing was taken for 20 minutes with the patient in the left lateral position. The tracings taken were categorized as Reactive, Equivocal or Ominous according to NICE guidelines September 2007 [9]. Patients with reactive trace were monitored intermittently by auscultation for one minute every 30 minutes during the first stage of labour and every 5 minutes post contraction in the second stage. Cases with equivocal trace were put on continuous CTG monitoring. In those with ominous tracings, appearance of late, significant variable or prolonged decelerations, delivery was hastened depending upon the stage of labour. Pregnancy outcomes noted were the mode of delivery, indications of Caesarean sections, presence of meconium stained liquor and cord round the neck. Early neonatal outcomes included APGAR score, birth weight, admission into Neonatal intensive care unit (NICU), duration of stay in NICU and perinatal mortality.

RESULTS

Four hundred women were included in this study. More than half (51%) were multi gravida. Out of 400 women, 267 (66.75%) had reactive trace, 114 (28.5%) had equivocal trace and 19 (4.75%) had ominous trace. (Figure 1) On comparing admission test tracings with the mode of delivery, 80 out of 267 women of the reactive group had caesarean delivery (29.96%), but 105 out of 114 women (92.11%) of the equivocal group and all 19 women of the ominous group (100%) had caesarean delivery. This showed a significant association of abnormal tracings with increased incidence of caesarean delivery than reactive tracings ($p < 0.05$). (Table 1)

In this study, 13 out of 19 babies (68.42%) in the ominous group and 12 out of 114 (10.53%) babies in the equivocal group had apgar score < 7 compared to only 13 out of 267 (4.87%) babies in the reactive group.

So abnormal tracings had a statistically significant increase in risk of having low apgar score than reactive tracings. (Figure 2)

Figure 3 Admission CTG pattern

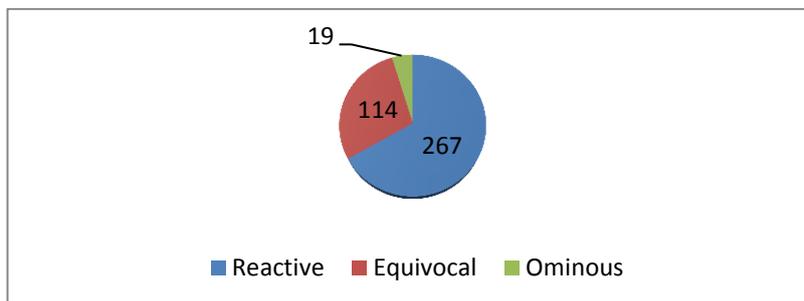
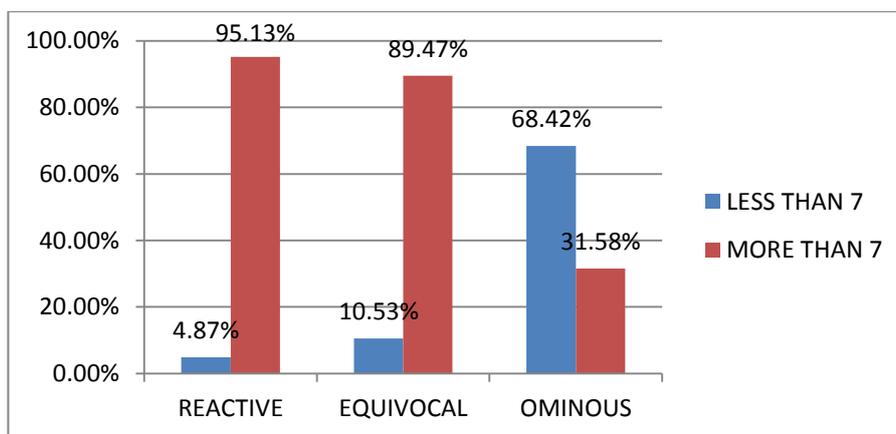


Table 2: Admission CTG and Mode of Delivery

CTG	MODE OF DELIVERY			TOTAL
	VAGINAL	FORCEPS	LSCS	
REACTIVE	179 (67.04%)	8 (3%)	80 (29.96%)	267
EQUIVOCAL	2 (1.75%)	7 (6.14%)	105 (92.11%)	114
OMINOUS	0	0	19 (100%)	19
TOTAL	181	15	204	400

As per Chi- square test P vaule <0.0001 - significant

Figure 4: CTG AND APGAR



P value < 0.0001 – significant

Out of the 80 LSCS in reactive CTG groups 3 were because of fetal distress (3.75%) and 13 out of 105 (12.38%) LSCS in equivocal group and 9 out of 19 LSCS (47.37%) were due to fetal distress. This indicates that the incidence of foetal distress significantly increased with worsening of admission CTG (p<0.001).

About 72% patients with an ominous test had moderate-thick MSL, compared to 39% and 9% in the equivocal and reactive AT group respectively (p<0.001). Among 267 patients with reactive CTG only 3 babies (1.12%) were admitted in the NICU. 14 out of 114 babies (12.28%) in the equivocal group and 9 out of 19 (47.37%) babies in the ominous group required NICU admission. P value = 0.036 and hence there is a significant increase in NICU admissions in equivocal and ominous groups.(Table 2) This study showed that admission CTG has 92.85% sensitivity and 94.16% specificity. The positive predictive value was 87.96% and negative predictive value was 96.62% with a diagnostic accuracy of 93.75% indicating that reactive admission CTG correlates well with the fetal wellbeing.

Table 2: CTG AND NICU STAY

CTG	< 5 DAYS	5 TO 10 DAYS	TOTAL
REACTIVE (n=267)	2	1	3 (1.12%)
EQUIVOCAL (n=114)	12	2	14 (12.28%)
OMINOUS (n= 19)	3	6	9 (47.37%)
TOTAL	17	9	26

P value = 0.03. since P value is <0.05, statistical significance exists

DISCUSSION

Risk assessment based on antepartum factor is quite often insufficient for patient selection because intrapartum fetal morbidity and mortality are not uncommon in low risk patients [4]. The labour itself causes a physiological stress to the fetus. The admission CTG has two potential roles. It can be used as a screening test in early labour to detect compromised fetuses on admission and to select the women who need continuous EFM during labour. Use of admission CTG is controversial. For example Impey et al [10] believes that there is no significant improvement in the neonatal outcome by the use of admission CTG as compared to intermittent FHR auscultation during labour. Thacker et al [11] also feels that the use of EFM is of limited effectiveness and carries an increased risk of interventions. Increased information at admission, according to them will not necessarily lead to better clinical outcomes. In developed countries it may be true because the majority are provided with comprehensive antenatal care and receive personal attention during labour. In developing countries with inadequate antenatal care and with large number of high risk pregnancies being delivered in crowded settings and inadequate health care provider to patient ratios, this may not be possible. In this study, 181 delivered vaginally, 15 by forceps and 204 had LSCS. On comparing admission test tracings with the mode of delivery, only 29.96% of the reactive group had caesarean delivery but 92.11% of the equivocal group and 100% of the ominous group had caesarean delivery. This showed a significant association of abnormal tracings with increased incidence of caesarean delivery than reactive tracings ($p < 0.05$). In a study conducted by Vinitha Das and G.K.Malik [12] in 170 women on efficacy of Admission test in predicting foetal jeopardy in labour, 60.97% of the abnormal tracings group had Caesarean delivery. In reactive tracings group only 45.7% of patients had Caesarean delivery. Like in our study, they observed a significant relation between admission test tracings and mode of delivery.

In reactive CTG group 3 out of 80 LSCS (3.75%), in equivocal group 13 out of 105 LSCS (12.38%) and 9 out of 19 (47.37%) LSCS Ominous group were because of fetal distress. The incidence of fetal distress significantly increases with worsening of admission CTG ($p < 0.001$). Sandhu et al [13] reported similar results of fetal distress in high risk obstetrics patients (15% in reactive, 55% in equivocal and 73% in ominous test group). Ingemarsson et al [5] reported fetal distress in 1.3% of reactive group, 10% of equivocal group and 40% of ominous group babies. In this study, 13 out of 19 babies (68.42%) in the ominous group and 12 out of 114 (10.53%) babies in the equivocal group had APGAR score <7 compared to only 13 out of 267 (4.87%) babies in the reactive group. So abnormal tracings had a statistically significant increase in risk of having low APGAR score than reactive tracings. Fawole AO et al [14] did a study on antenatal CTG in 300 women in Nigeria. They analysed that low APGAR <7 occurred most commonly in non reactive tracings ($p = 0.04$). Reactive test was associated with 3 fold reduction in the incidence of low APGAR compared with non reactive test.

Among 267 patients with reactive CTG only 3 babies (1.12%) were admitted in the NICU. 14 out of 114 babies (12.28%) in the equivocal group and 9 out of 19 (47.37%) babies in the ominous group required NICU admission. P value = 0.036 and hence there is a significant increase in NICU admissions in equivocal and ominous groups. Atul K. Sood [15] did a study in 500 women and found that 5 min APGAR score < 7 and neonatal admissions were more commonly associated with Non Reactive tracings than reactive tracings ($p < 0.005$).

The diagnostic accuracy of this study was 93.75%. The values obtained in the present study shows it has a very high diagnostic accuracy, indicating that reactive admission CTG correlates well with fetal well – being.



CONCLUSION

This study shows that there is a significant correlation between the Reactive admission CTG and the good fetal outcome even with less frequent monitoring. Therefore the admission CTG serves as a useful screening tool to detect fetal distress already present or likely to develop and to predict the mode of delivery and fetal outcome.

REFERENCES

- [1] Whittle MJ, Martin WL. *Turnbull's obstetrics*. London: Churchill Livingstone, 2001.
- [2] Lekis S, Loghis C, Parayoto N. *Clin Exp Obstet Gynaecol* 1997;24:79–81
- [3] Chandraharan E, Sabaratnam A. *J Obstet Gynecol India* 2008;58(2):121–130
- [4] Schifrin BS, Foye G, Amato J, Kates R, MacKenna J. *Obstet Gynecol* 1979;54(1):21–5
- [5] Ingemarsson I, Arulkumaran S, Ingemarsson E, Tambyraja RL, Ratnam SS. *Obstet Gynecol* 1986;68(6):800–6
- [6] Prentice A, Lind T. *Lancet* 1997;ii:1375–7
- [7] Royal College of Obstetricians and Gynaecologists. *The use of electronic foetal monitoring*. London: RCOG Press; 2001
- [8] Nordström L, Waldenström U. Stockholm: Socialstyrelsen; 2001. *Handläggning av normal födsel (Management of normal labour)*
- [9] National Institute for Health and Clinical Excellence, NICE Clinical Guideline 55 Intrapartum Care. Sep, 2007. pp. 44–45
- [10] Impey L, Reynolds M, MacQuillan K, Gates S, Murphy S, Shell O. *Lancet* 2003;361:465–70.
- [11] Thacker SB, Stroup DF. *Lancet* 2003;361:445–6.
- [12] Vinita Das, Nidhi Katiyar, G.K. Malik *J Obstet Gynecol India* 2001;51(1):48-50.
- [13] Sandhu GS, Raju R et al. *Medical J Armed Forces India* 2008;64(1):43–5.
- [14] Fawole AO, Sotiloye OS: *Niger Postgrad Med J* 2008; 15(1): 19-23.
- [15] Atul K Sood . *J Obstet Gynecol India* 2002;52:71-75.