

## Comparative study between intermittent auscultation and cardiotocogram in low risk group during labour in Libya

Karima T. Hawisa and Nehad Gabassa

Maternity Ward, Zawia Teaching Hospital, Zawia, Libya

**Abstract:** The goal of fetal heart rate monitoring has been early identification of the fetus at risk for hypoxic insult. The aim of this study is to establish the relation between FHR monitoring (CTG, intermittent auscultation) and fetal outcome and mode of delivery. It is prospective observational comparative study carried out in Zawia hospital maternity ward. Study population consists of 200 women in labor having the criteria of low risk group included singleton pregnancies between 37 - 40 weeks gestation, half of them monitored by intermittent auscultation and the other half by CTG. In this study, 200 women, 100 of them fetal monitoring was done by continuous electronic monitoring by CTG, the other monitored by intermittent auscultation by pinard stethoscope. Caesarean sections were performed for 31% and 6% of both groups (electronic monitoring and pinard stethoscope) respectively, statistically significant. There are three cases delivered by instrumental delivery (ventouse) one in CTG and two in fetoscope group. Abnormality in fetal heart rate was detected in (12%) of electronic monitoring group (3.5%) of the pinard stethoscope group. The apgar score of babies in both group nearly the same ( $p = 0.411$ ). The babies whose transferred in intensive care unit is higher in CTG group (26 - 20%, 9 - 6%,  $p = 0.374$ ). One in CTG group has neonatal seizure. It is concluded that abnormalities in fetal heart rate were more reliably detected by electronic monitoring than with pinard stethoscope. Uses of continuous electronic monitoring carry high rate of cesarean section with no significant difference in neonatal outcome.

### Introduction

In many developing countries large number of infant die in labour without structural abnormality and some proportion of them suffer from sustained handicap due to birth hypoxia, 10% of stillbirths and early neonatal deaths and probably for about a similar number of cases of cerebral palsy and severe mental retardation (1). Such event therefore continues to be an important source of potentially preventable death and damage. The goal of fetal heart rate monitoring has been early identification of the fetus at risk for hypoxic insult and takes the appropriate action to save fetus at risk (2). Many technique of fetal heart monitoring including clinical and electronic monitoring has been carried out, it is applied antenatal and during labour. The clinical method of monitoring especially by fetoscope remained in the past the state of art until recently when electronic fetal monitoring

has been developed. To reach the goal of test of fetal monitoring it must be effective, the test must be performed correctly, its result must be interpreted satisfactorily and the interpretation must provoke an appropriate and timely response (3).

Evaluation of the ability of intermittent auscultation to predict poor fetal outcome is still lacking with methodological problems as it is impossible to exclude the confusing effects of clinical intervention on outcome. Also the diagnosis of fetal distress is often not solely based on abnormal fetal heart rate. On the other site the continuous electronic monitoring is effective in detecting hypoxic infant but it result in increasing rate of cesarean section (4), the use of fetal blood sampling tended to limit the increased use of caesarean delivery and to promote operative

vaginal delivery. Many trial of low risk women showed that intra partum deaths were equally preventable by all of the methods of fetal heart rate monitoring currently employed provided that the importance of prompt recognition of abnormal fetal heart rate was recognized (5).

This study evaluate the validity of intrapartum CTG in predicting fetal outcome in comparison with intermittent auscultation and compared the abilities of intermittent electronic monitoring and the pinard stethoscope to detect abnormalities in fetal heart rate and their contribution to mode of delivery and fetal outcome. This study aims to establish the relation between FHR monitoring (CTG, intermittent auscultation) and fetal outcome and mode of delivery. To evaluate the validity of intrapartum CTG in predicting, fetal outcome in comparison with intermittent auscultation was used. The design of the study is prospective observational comparative study and the setting: Zawia Teaching Hospital, Obstetrics and Gynecology department (labor ward), Zawia, Libya.

## Materials and methods

Study population consists of 200 women in labor having the criteria of low risk group included singleton pregnancies between 37-40 weeks gestation and have no other obstetric complications, half of them monitored by intermittent auscultation and the other half by CTG. Fetal blood sampling facilities not always available. The patients were selected randomly over a period of three months from 1\4\2005 to 1\7\2005.

## Results

In this comparative study, 200 women came in labor to Zawia Central Hospital and fit criteria of low risk group were included singleton pregnancies between 37 - 40 weeks gestation, of them 100 patients monitored by CTG, and other 100 patients monitored by

intermittent auscultation: the results of the data will be presented under the following headlines: maternal characteristics, characteristic of labor and comparison between intermittent auscultation and CTG.

### Maternal characteristics

**Age distribution:** the age of the mothers under study ranged between 17 and 42 years, with mean age =  $29.5 \pm 5.2$  years, 67% of them aged between 25 - 35 years, younger (< 25 years) mother made 19%, the least percentage was 15% for the age > 35 years.

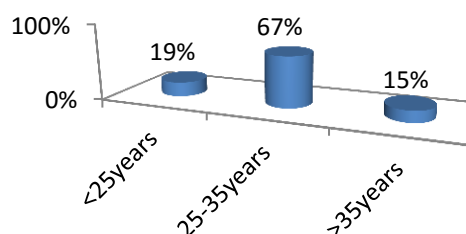


Figure 1: Age distribution of mothers

**Parity:** the parity of women under study ranged between pG to 10 children with mean number of children =  $1.63 \pm 1.77$ , PG made 34%, 51% of the mothers had 1 - 3 children, 4 - 5 children was the parity of 12% of the mothers under study, and least percentage was 4% for mothers with five children and more.

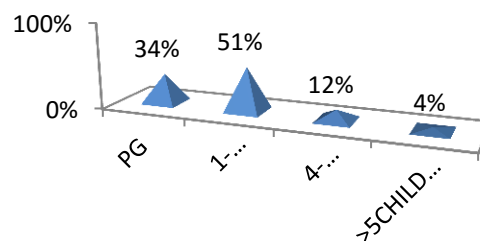
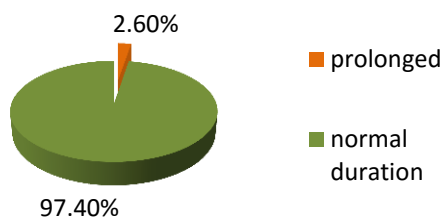


Figure 2: Parity distribution of mothers

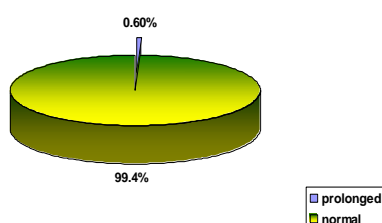
### Characteristics of labor

**Duration of first stage:** after exclusion of six cases who delivered by CS immediately after admission; the duration of first stage ranged between one hour to twelve hours with mean duration  $3.3 \pm 2.5$  hr, 97.4% had normal duration, 2.6% had prolonged first stage.



**Figure 3:** Distribution of duration of first stage of labor

**Duration of second stage:** after exclusion of the cases delivered by C/S during first stage of labor the duration of second stage of labor ranged from 1 - 60 min with mean  $11.3 \pm 9.7$  min, 81% of the mothers delivered within normal duration and 0.5% had prolonged secondary.



**Figure 4:** Distribution of second stage of labor

**Comparison between intermittent auscultation and CTG:** in this section of the result, it will be compared between intermittent auscultation and CTG monitoring regarding of mode of delivery, Apgar score and neonatal outcome.

**Mode of delivery:** by studying the relation between type of fetal heart monitoring and mode of delivery; it was found that 68% of fetuses monitored by CTG delivered normally, comparing with 92% monitored by fetoscope, 31% of fetuses monitored by CTG delivered

by c/s comparing with 6% monitored by fetoscope, vacuum extraction needed in only one cases (1%) from the group monitored by CTG but it needed in two cases (2%) from the group monitored by fetoscope and by using of chi-square test; the difference between expected and observed count was found to be statistically significant ( $p = 0.0001$ ).

	monitoring		Total
	CTG monitoring	fetoscope monitoring	
FTNVD	68 68.0%	92 92.0%	160 80.0%
CS	31 31.0%	6 6.0%	37 18.5%
FTVE	1 1.0%	2 2.0%	3 1.5%
Total	100 100.0%	100 100.0%	200 100.0%

**Table 1:** Relation between mode of delivery and type of FHR monitoring

**Apgar score:** the mean apgar score at zero time of the babies monitored by CTG was 8.47 and the apgar score at zero time for the other group was 8.6 and by using of T student test of independent samples; the difference between these means was statistically not significant ( $p = 0.411$ ).

monitoring	N	Mean	Std. Deviation	Std. Error Mean
apgar score of CTG monitoring	100	8.47	1.16	.12
baby at first minte fetoscope monitoring	100	8.60	1.07	.11

**Table 2:** Relations between apgar score and type of FHR monitoring

**Neonatal outcome:** 65% of babies monitored by CTG in good general condition and stay with mother compared with 74% monitored by fetoscope, 9% monitored by CTG need admission in ICU compared with 6% monitored by fetoscope and 26% need observation monitored CTG compared with 20% monitored by fetoscope and by using of chi-square test, the difference between expected and observation was statistically significant.

	monitoring		Total
	CTG monitoring	fetoscope monitoring	
mother	65 65.0%	74 74.0%	139 69.5%
ICU	9 9.0%	6 6.0%	15 7.5%
observation	26 26.0%	20 20.0%	46 23.0%
Total	100 100.0%	100 100.0%	200 100.0%

**Table 3:** Relations between neonatal out come and type of HR monitoring

In this study, 200 women came in Zawia Hospital fit the criteria of low risk group in labour. 100 of them fetal monitoring was done by continuous electronic monitoring by CTG, the other monitored by intermittent auscultation by pinard stethoscop. The mean age of the patient under study is  $29.5 \pm 5.2$  years, 97% of them aged between 25 - 35 years. The mean number of children is  $1.63 \pm 1.77$ , 51% of them have 1-3 children. Most of the deliveries passed without complication 80% of them delivered by normal vaginal rout, the mean duration of the first stage are  $3.3 \pm 2.5$  hr and the second stage is  $11.3 \pm 9.7$  min. 51.5% of both study groups are female and 46.5 male. The mean Apgar score at first minute is 8.5 and 95% of babies stay with mother in good condition. Caesarean sections were performed for 31%, 6% of the both group (electronic monitoring and pinard stethoscope), respectively ( $p = 0.0001$ ) which is statistically significant. There are three cases delivered by instrumental delivery (ventose) one in CTG and two in fetoscope group. Abnormality in fetal heart rate was detected in 12% of electronic monitoring group (3.5%) of the pinard stethoscope group. The apgar score of babies in both group nearly the same and statistically not significant ( $p = 0.411$ ). The babies whose transferred in observation room and in intensive care unit is higher in CTG group (26-20% / 9-6%,  $p = 0.374$ ). However, one in CTG group has neonatal seizure.

## Discussion

In Obstetric Department of Zawia Teaching Hospital, the management protocol of labour include use of partogram and augmentation of labour by oxytocin if no obvious cephalopelvic disproportion (6, 7), fetal monitoring is either by intermittent pinard stethoscope or by continuous electronic monitoring (CTG), in our hospital not always have facility for fetal blood sampling, and use of epidural analgesia rarely done during labour. Rate of c/s in Zawia hospital is 25% and the number of delivery per year around 7000. Cardiotocography (sometimes known as electronic fetal monitoring), has widely been adopted in labour (8, 9). There is debate about its overall effectiveness as well as the relative merits of routine application versus use for high-risk pregnancies only (10). It records changes in the fetal heart rate and their temporal relationship to uterine contractions. Abnormal pattern of fetal heart detected more in CTG group. Our study show increase in C/S rate in CTG group, this may because CTG more sensitive in picking up any fetal heart rate abnormality and also due to weakness in our study in relying up on CTG without fetal sampling, this result going with study of (11). Although there is an increase in number of instrumental delivery in CTG group in the previous study (12), in this study, there is no significant difference between both groups. Although there was no significant difference between the groups in neonatal Agar scores, there were more babies with low Apgar score in continuous electronic monitoring group. Fewer babies in the fetoscope monitoring group needed admission to the neonatal unit compared with the other group. This finding concurs with result of Dublin trial (13). Continuous cardiotocography during labour is associated with a reduction in neonatal seizures, but no significant differences in cerebral palsy, infant mortality or other standard measures of neonatal wellbeing. In our study neonatal seizures occurred in one case also hypoxic encephalopathy, this may be due to the small sample size of our study, but it does indicate that the two methods were

similar in their capacity to detect important abnormalities in fetal heart rate and the same neonatal out come. Although electronic monitoring was more sensitive in picking up any fetal heart rate abnormality, there were still more infants born with hypoxic ischemic encephalopathy (14), these were due to delays in performing operative deliveries and emphasize the need for appropriate and timely action irrespective of what method is used for monitoring fetal heart rate. Because not always have facility for fetal blood sampling we miss the advantage of CTG in detection of reduced variability of fetal heart rate.

In conclusion, in low risk women, the intrapartum deaths were equally preventable by all of the methods of fetal heart rate monitoring currently employed provided that the importance of prompt recognition of abnormal fetal heart rate was recognized. Abnormalities in fetal heart rate were more reliably detected by electronic monitoring than with pinard stethoscope. Uses of continuous electronic monitoring carry high rate of cesarean section with no significant difference in neonatal outcome.

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