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Electronic Fetal Monitoring of Low Risk Patients

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Introduction- Minimizing fetal morbidity during labor is one of the principal aims of intrapartum care. Electronic fetal heart rate monitoring (EFM) and intermittent auscultation are the known modalities of intrapartum fetal surveillance. Electronic fetal heart rate monitoring is routinely used at admission- the so-called Fetal Admission Test. If no fetal heart rate abnormalities are detected, continuous electronic monitoring is replaced by intermittent assessment for the remaining labor. The Admission test may help to identify those cases at risk in labor at the same time doing away with continuous monitoring. EFM at high risk is understandable, but at low-risk, does its advantages balance out the cost and increased incidence of operative delivery? This study is aimed at studying electronic fetal monitoring of low-risk patients in labor and its relation to perinatal outcome.

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Electronic Fetal Monitoring of Low Risk Patients

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I. Introduction

Minimizing fetal morbidity during labor is one of the principal aims of intrapartum care. Electronic fetal heart rate monitoring (EFM) and intermittent auscultation are the known modalities of intrapartum fetal surveillance. Electronic fetal heart rate monitoring is routinely used at admission- the so-called Fetal Admission Test. If no fetal heart rate abnormalities are detected, continuous electronic monitoring is replaced by intermittent assessment for the remaining labor. The Admission test may help to identify those cases at risk in labor at the same time doing away with continuous monitoring. EFM at high risk is understandable, but at low-risk, does its advantages balance out the cost and increased incidence of operative delivery? This study is aimed at studying electronic fetal monitoring of low-risk patients in labor and its relation to perinatal outcome.

II. Aim

To assess the role of routine admission electronic fetal monitoring as a screening method in all low-risk pregnancies.

III. Objectives

- To find out the implication of EFM on the mode of delivery and perinatal outcome.
- To study the correlation of EFM with fetal outcomes.
- To assess perinatal outcomes in all these cases.

IV. Materials and Methods

A cross-sectional study was conducted over a period of one year from November 2018 to October 2019 in all low-risk pregnant woman with the period of gestation 37-42 weeks attending labor room in early labor or pre labor phase in the Department of Obstetrics and Gynaecology of Rohilkhand Medical College and Hospital, Bareilly, U.P.

Inclusion criteria- Pregnant woman with period of gestation between 37-42 weeks.

Exclusion criteria- Pregnant women with high-risk pregnancy and obstetric complications like multiple pregnancies, malpresentation, placenta previa, pre-eclampsia, PIH (pregnancy-induced hypertension), antepartum eclampsia, oligohydramnios, IUGR (intra uterine growth restriction), decreased fetal movements, PROM (pre mature rupture of membranes),third trimester bleeding, gestational DM (Diabetes Mellitus), Rh incompatibility, anemia, pregnant mothers whose dates were not confirmed and those who have irregular cycles.

V. Results

The majority were in Category I (73.57%); Fetal distress was in 18.57%, while 14/140 required NICU admission. In Category II, III there was more fetal distress and operative intervention.

Out of 140 patients, 59 patients belonged to the age group of 20-24 years. Fifty-five patients belonged to 25 – 29 years of age group, and only rest belonged to 30 – 34 years of age group. The mean age was 25.35 ± 3.56 years. The maximum number of patients was multigravida (80 out of 140).

Out of 140 patients, 78 patients belonged to the gestational age of 39 – 40 weeks. Forty patients were of gestational age 37 – 38 weeks, and only 22 patients were of gestational age 41 – 42 weeks. One hundred eighteen patients were of gestational age 37-40 weeks. A maximum number of patients, i.e, 109 patients belonged to low socioeconomic class. 74 patients were residing in the urban areas and rest in the rural area.

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Table 1: Correlation of EFM category with the mode of delivery along with the presence or absence of fetal distress

EFM Category	No.	Percentage (%)	Normal Delivery	Instrumental Delivery	LSCS	Normal Vaginal Delivery		Assissted Vaginal Instumental Delivery		LSCS	
						With FD	Without FD	With FD	Without FD	With FD	Without FD
Category I	103	73.57	94 (91.26%)	1(0.97%)	8 (7.7%)	4(4.25%)	90(95.75%)	1(100%)	0(0%)	3(37.5%)	5(62.5.0%)
Category II	26	18.57	7 (26.9%)	2(7.7%)	17(65.4%)	1(14.3%)	6(85.7%)	1(50%)	1(50%)	8(47.06.5%)	9(52.94%)
Category III	11	7.86	2 (18.2%)	0 (0%)	9(81.82%)	1(50.0%)	1(50.0%)	0(0%)	0(0%)	7(77.78%)	2(22.22%)
Total	140	100.0	103	3	34	6	97	2	1	18	16

Table 2: Correlation of EFM Category with the color of the liquor

EFM Category	Clear Liquor	Thin MSL	Thick MSL
Category I	92(89.32%)	6(5.82%)	5(4.85%)
Category II	13(50.0%)	7(26.92%)	6(23.08%)
Category III	4(36.36%)	2(18.18%)	5(45.45%)
Total	**109**	**15**	**16**

Table 3: Correlation of EFM with Fetal Outcome

EFM cate.on:	Apgar score _>7 at 5 minute	Apgar score<7at 5 minute	Need for intubation/ NICU admission	Abnormal behaviour	Neonatal death
Category I	99(96.12%)	4(188%)	4(3.88%)	0(0%)	0(0%)
Category II	21(80.77%)	5(19.23%)	5(19.23%)	0(0%)	0(0%)
Category III	6(54.5%)	5(45.45%)	5(45.45%)	0(0%)	0(0%)
Total	126	14	14	0	0

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Table 4: Correlation of EFM with Fetal distress

EFM Category	Total	Fetal distress	Percentage(%)
Category I	103	8	7.77%
Category II	26	10	38.46%
Category III	11	8	72.72%
Total	**140**	**26**	**18.57%**

VI. Discussion

One of the main concerns of Obstetricians is the early recognition of fetal distress during labor to avoid any adverse outcome. Fetal monitoring during labor identifies the fetuses at risk of hypoxic damage, so that appropriate intervention could be instituted to optimize perinatal outcome. EFM can detect hypoxia early, and unnecessary delay in intervention can be avoided. The EFM did at the time of admission to labor room in pre labor or early labor phase has two potential roles. It can be used as a screening test in early labor to detect compromised fetuses on admission and to select women in the need for continuous electronic fetal monitoring during labor. The present study was conducted in Obstetrics and Gynaecology Department, Rohilkhand Medical College and Hospital, Bareilly, U.P. from November 2018 to October 2019 over one year period on 140 low-risk patients admitted in early or prelabor phase. The different factors observed during the study are discussed and compared with other studies in the literature as below.

Most of the pregnant women (81.43%) in the present study were in the age group of 20 – 29 years. The mean age group in our study was 25.35 +/- 3.56 years. The present study correlates well with the study of Lohana RU, Khatri M, Hariharan C (2013)[2], Nikita V, Bhavna K (2014)[3] and Gurung G, Rana A, Giri K (2006)[4]. Most of the patients (77.86 %) belonged to low socioeconomic class. Most of the patients in our study group belonged to urban area (52.86 %). The distribution of the patients in the present study is similar to the study done by Patel Nirav R, Kadikar Gunvant K, Kalathiya Bhumika G, Bajaj Preeti (2015)[5], M Shah Jitesh, N Mehta Meghna, A Kongnathi Satyanarayan (2015)[6].

Most of the patients (73.57 %) belonged to category I, and the least number of patients (7.86 %) belonged to category III. 18.57 % were in category II. The present study is similar to the study done by Gaikwad V, Puri M S, Pandey P (2015)[7] .

Out of 103 patients in Category I, 92 patients (89.32 %) had clear liquor, and only 10.67 % of the patients had meconium-stained liquor, out of which 4.85% of patients had thick meconium stained liquor. In category II, out of 26 patients, 13 patients (50 %) had clear liquor, and rest of 13(50%) patients had meconium-stained liquor, out of which 23.08 % of patients had thick meconium-stained liquor. However, in category III, 4 patients (36.36 %) patients had clear liquor and 7 patients (63.64%) had meconium-stained liquor, out of which 45.45% of patients had thick meconium-stained liquor. This was highly significant. The present study is in accordance with the study done by Shrestha P, Misha M, Shrestha S (2015)8, Gaikwad V, Puri M S, Pandey P (2015)[7].

In category I, 99 neonates, i.e 96.12 % had Apgar score more than or equal to 7 at 5 minute and only 3.88 % of neonates had Apgar score less than 7 at 5 minute, and all of these neonates needed intubation and admission to NICU. In category II, 5 neonates (19.23%) had Apgar score less than 7 at 5 minute and all of these neonates needed intubation and were admitted to NICU. However, in category III, 5 neonates (45.45%) had Apgar score less than 7 at 5 minute and all of these neonates needed intubation and admission to NICU. None of the neonates in any of the three categories had abnormal behavior, and there were no

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neonatal death. So, there were more neonates with poor Apgar score and who required intubation and admission in NICU in category II and category III. This was also highly significant. The present study is almost similar to the other study. [5,8,9]

In category I, only 7.77% of neonates had fetal distress but in category II and category III, 38.46% and 72.72% of neonates had fetal distress, respectively. There was a highly significant difference in EFM categories with Fetal distress (p=0.000). The present study is similar to the study done by E Rama Devi, B Madhvi G, L P Reddy, P Anusha Rao (2015)[10] which showed fetal distress in 7.73% of neonates in a normal group of Admission Test, 42.8 % in suspicious and 88.88% in the pathological group had fetal distress. The present study is also by the study done by Gaikwad V, Puri M S, Pandey P (2015)[7] which showed fetal distress in 8.4 %, 48 % and 75 % of reactive, suspicious and pathological group of labor Admission Test. In category I, in our study, 91.26 % of patients underwent normal vaginal deliveries, and 7.77 % underwent cesarean section, and 0.97 % had instrumental deliveries.

Amongst these, 4.25 % of the vaginal normal delivery group had fetal distress, however 100% of the instrumental delivery group and 37.5 % of LSCS group had fetal distress. In category II, 14.3% of the normal vaginal delivery group had fetal distress; however, 50% of the instrumental delivery group and 47.06 % of LSCS group had fetal distress. In category III, the maximum number of patients underwent LSCS and of which 77.78 % of neonates had fetal distress. So, in category II and category III, there was more number of operative interventions for fetal distress. In the present study, findings of the type of delivery and fetal distress in category I, category II and also in category III of EFM correlated well with the study done by Nikita V, Bhavna K (2014)[4] which reported that 1.4%, 50% and 33.3% of neonates had fetal distress in normal vaginal delivery group, instrumental delivery group, and LSCS group respectively in reactive group of labor Admission Test. In the equivocal group, 11.1%, 66.7%, and 62.5 % of neonates had fetal distress in normal vaginal delivery group, instrumental delivery group and LSCS group, respectively. In the ominous group, 66.7% of patients underwent LSCS and neonates of all those patients who underwent LSCS in ominous group had fetal distress.

In category I, 3.88% of patients underwent LSCS for fetal distress; another 3.88% underwent LSCS for other indications like nonprogress of labor (NPOL). The only one patient (0.97%) had instrumental delivery, and it was for fetal distress. In category II, 34.61% of patients underwent LSCS for fetal distress another 30.76% underwent LSCS for other indications like NPOL. 3.84% of patients had instrumental delivery for fetal distress and another 3.84% had instrumental delivery for NPOL. In category III, all the nine patients (81.82%) who underwent LSCS, was for fetal distress only. So, the rate of LSCS for fetal distress was much higher for category II and category III patients. The present study is by the study done by E Rama Devi, B Madhvi G, L P Reddy, P Anusha Rao (2015)8 which showed that in normal group of Admission Test,4.16% of patients had fetal distress as indication and 3.57% had other an indication for LSCS.

Performance of EFM with fetal outcome in the percentage-Our study showed high specificity and high Negative predictive value for the perinatal outcome. The present study is also by other studies done by Patel S et al. (2014)[7], Lohana R U, Khatri M, Hariharan C (2013)[2].

VII. Conclusion

Electronic Fetal Monitoring is a simple, convenient, noninvasive and economical screening test in even low-risk patients and it can be used for the detection of intrapartum fetal distress during early hours of labor where pregnant women present in labor for the first time or where facilities of fetal scalp pH are not available in labor wards. The high specificity and high negative predictive value of the test shows its good reliability in prediction of perinatal outcome. But, in category II and III, there was also more number of instrumental vaginal delivery and cesarean section in which many neonates had Apgar score of more than 7. So, Electronic Fetal Monitoring could be backed with other tests such as fetal scalp pH sampling to detect fetal acidemia, and it may also decrease unnecessary operative deliveries.

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