Research Article

Labour admission test (cardiotocography) as intrapartum risk screening test and its efficacy to predict fetal outcome

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Abstract

Introduction: The perinatal mortality is high in our country since majority of fetal death occur during the labour. There is need for active assessment of intrapartum period to guide proper interventions which modifies the outcome. LAT is the screening test where short 20 minutes of continuous electronic fetal heart rate recording is made on the patient in active labour as soon as admitted to labour ward **Objectives:** To evaluate the LAT in predicting fetal outcome and plan for mode of delivery based on the results. **Methods:** Two hundred low risk pregnant women >= 37 weeks of gestation in the active phase of labour were included in the study. **Results:** The LAT can detect fetal distress already present on admission. LSCS and instrumental delivery rate ominous. Percentage of fetal distress increases in the suspicious and the ominous group. NCU admissions are more in ominous group. **Conclusion:** It is a simple, visual, easily performed, non invasive, cheaper, non time consuming, acceptable, effective and without any contraindications for testing.
Keywords: LAT (Labour Admission Test).

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INTRODUCTION

intrauterine fetal health and wellbeing assessment have been prime concern for obstetricians over centuries and has become an integral part of management of "all" pregnancies. It aims to identify fetuses at risk of developing fetal distress during labour. Normal labour is a process of stress with repeated physiological hypoxic events for the fetus.[1] A previously uncompromised fetus can withstand this strain. But a previously compromised fetus and/or in a pathological state of labour develops fetal hypoxia and acidosis that is fetal distress. The perinatal mortality and morbidity is high in our country. Since majority of fetal deaths occur during the process of labour, there is need for active assessment of intrapartum period to guide proper interventions which modifies the outcome of labour in an effort to prevent fetal deaths and also morbidities resulting from birth asphyxia. The aim of fetal surveillance and other forms of labour management is to ensure the delivery of a healthy baby in good condition with minimum intervention.[2] In developing countries like INDIA numbers of patients get admitted to the labour wards leading to heavy workload, where fewer resources are available in most of the centers, with less medical personals and comparatively few CTG monitors available. As such it is not possible and feasible to apply continuous EFHR monitoring to every low risk patient. even in low risk mothers fetal acidosis can occur just as in high risk pregnancies during the process of labour. Therefore there is a need of a suitable method to screen large numbers of fetuses in low risk mothers upon admission. CTG is commonly used as screening test[3,4] called as" Labour Admission test". Here a "short" continuous 20 minutes CTG is made immediately in a patient in labour on admission in the labour ward.

AIMS AND OBJECTIVES

1. To detect fetal distress already present at the time of admission and intervene appropriately thereby avoiding unnecessary delay in management.

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2. To select the patients who need continuous monitoring.
3. To assess the efficacy of Admission test in predicting adverse fetal outcome.
4. To co-relate test results with mode of delivery and different fetal outcomes.

Methodology

The present study is a prospective study. It was conducted in the LABOUR WARD of a Tertiary Care Hospital over a period of two years. Total 200 low risk (based on antenatal factors) patients.

Inclusion Criteria

We included patients with Singleton pregnancy and Cephalic presentation, having Gestational Age >/= 37 wks, Patients in true labour and in the FIRST stage of labour. Those who delivered within 24 hours of LAT

Exclusion Criteria

Patients admitted in second stage of labour**,** Patients for elective Caesarean section, patients with Malpresentations, Antepartum Haemorrhage and High risk cases (pre-eclampsia, eclampsia, severe anaemia, IUGR, severe oligohydramnios, polyhydramnios, sepsis, DIC, maternal heart disease and maternal diabetes and Congenital fetal anomalies

Sampling Technique

The women visiting labour ward with labour pains were subjected to a detailed history-taking followed by thorough clinical examination after assessment of all factors. The suitable low risk cases were further subjected to LAT, after taking written consent. A short Electronic FHR tracing simultaneously with uterine activity was recorded for 20 minutes duration called as LAT.

Instrument

" Maestros coddle Graph " machine, coddle graph CTG paper, Toco and Ultrasound Doppler(FHR) transducers/ probes, event marker probe, two elastic belts and ultrasound coupling gel.

Recording and tracing:

1. On the upper region, FHR is plotted continuously and the green zone signifies normal range of FHR (unit= bpm)
2. In the lower region of the paper, uterine activity measuring intra-uterine pressure is plotted simultaneously (unit= mmHg)

Variables which were read in a Labour Admission test graph[5,6]:

1. Baseline FHR, 2) Variability of FHR,
2. Accelerations,4) Decelerations

The CTG (LAT) traces were then categorized into three groups based on the "Three-Tier" Fetal Heart Rate Interpretation System (NICDH Workshop 2008) as follows:

1. Normal/ Reactive
2. Indeterminate/ Equivocal/ Suspicious
3. Abnormal/ Ominous

"Three-Tier" Fetal Heart Rate Interpretation System (NICDH Workshop 2008)[5,6]

Category I –Normal / Reactive

Category I FHR tracings include all of the following:

- Baseline rate: 110–160 beats per minute
- Baseline FHR variability: moderate
- Late or variable decelerations: absent
- Early decelerations: present or absent
- Accelerations: present or absent

Category II –Indeterminate / Equivocal / Suspicious

Category II FHR tracings includes all FHR tracings not categorized as Category I or Category III. Category II tracings may represent an appreciable fraction of those encountered in clinical care. Examples include any of the following:

Baseline rate:

- Bradycardia not accompanied by absent baseline variability
- Tachycardia

Baseline FHR variability

- Minimal baseline variability
- Absent baseline variability with no recurrent decelerations
- Marked baseline variability

Accelerations:

- Absence of induced accelerations after fetal stimulation

Periodic or episodic decelerations:

- Recurrent variable decelerations accompanied by minimal or moderate baseline variability
- Prolonged deceleration more than 2 minutes but less than10 minutes
- Recurrent late decelerations with moderate baseline variability
- Variable decelerations with other characteristics such as slow return to baseline, overshoots, or "shoulders"

Category III –Abnormal / Ominous

Category III FHR tracings include either

- Absent baseline FHR variability and any of the following:
    1. Recurrent late decelerations
    2. Recurrent variable decelerations
    3. Bradycardia
- Sinusoidal pattern

Following this

a. If the test was **reactive**, intermittent auscultation was advised for monitoring of the fetus. As a routine, the FHR was monitored intermittently by auscultation for 1 minute, repeated every 30

minutes in the first stage of labour and every 15 minutes in the second stage of labour.

b. If the test was **suspicious** patient was put on continuous electronic monitoring and after the intra-uterine resuscitation measures, a repeat 20 minutes strip was taken and re-classified.
c. If the test was **ominous** immediate delivery by the favourable route was planned.

RESULT

In the present study out of 200 cases, majority (61 %) were from the age group of 21 to 25 years. The average age of patients was 23.3 yrs, minimum age being 19 yrs and maximum 32 yrs. Majority 116 (58%) cases were multigravida, while 84 (42%) were primigravida. The average gestational age was 39 weeks and 1 day with minimum 37 wks and maximum 41weeks and 5 days. Mean baseline FHR was 135 bpm (i.e., in the range 130-140 bpm) with minimum 100 bpm and maximum 190 bpm. The average birth weight was 2.79 Kg, with minimum 2 Kg and maximum 4 Kg. Normal variability (of moderate range, i.e., 6 – 25 bpm) was found in 155 (77.5%) Admission test tracings. Variability was less than 5 bpm in 29 (14.5%), marked in 7 (3.5%) and absent in 9 (4.5%) traces. Decelerations were present in 56 traces (28%). In these tracings, late decelerations were found in 21 (10.5%), variable decelerations in 16 (8%), early decelerations in 14 (7%), episodic decelerations in 3 (1.5%) and prolonged deceleration in 2 (1%) cases. After interpretation of 200 tracings of LAT, 126 (63%) cases had “category 1- Reactive” tracing, 65 (32.5%) had “category 2- Equivocal” tracings and only 9 (4.5%) had “Category 3-Ominous” tracings. Out of 200 patients, 115 (57.5%) were delivered normally, in 31 (15.5%) cases, ventouse was applied, while LSCS was done in 54 (27%) cases. During the intrapartum period, FHR abnormalities were seen in 52 (26%) cases. While in the reactive group, 13 (10.30%) had IPFHR abnormalities, they were present in 32 (49.20%) cases in the equivocal and 7 (77.80%) of the ominous group. In the reactive group, 89 (70.60 %) cases had normal vaginal delivery, 14 (11.10 %) had ventouse application and 23 (18.30 %) underwent LSCS. In the Equivocal group, 25 (38.50 %) delivered normally, 16 (24.60 %) had ventouse application and 24 (36.90 %) underwent LSCS. In the Ominous group, 1 (11.10%) case delivered normally, in 1 (11.10 %) case ventouse was applied and rest 7 (77.80 %) cases underwent LSCS. The above co-relation was found to be significant statistically. In the present study, after birth, at 1 min, the Apgar score was <7 in 57 (28.5%) cases which improved at 5 min and at 5 min the resulting Apgar score of <7 was found only in 15 (7 Apgar score at 1 minute was less than 7 in 22 (17.50%), 27 (41.50%) and 8 (88.90%) neonates respectively, in R,E and O groups. While it was more than 7 in 104(82.50%) neonates in R, 38(58.50%) in E and 1(11.10%) neonate in O group. There was co-relation between LAT and Apgar score of <7 at 1 min, which was statistically significant. Amongst the reactive group, out of 126 neonates delivered, 12 (9.5%) required resuscitation. In the Equivocal group, out of 65 neonates delivered, 17 (26.2%) required resuscitation. In the Ominous group, out of 9 neonates delivered, 7 (77.8%) required resuscitation. The above co-relation was found to be significant statistically. Apgar score at 5 minutes, was less than 7 in 15 (7.50%) neonates, thus, 8 (6.30%), 4 (6.20 %) and 3 (33.30%) in the R, E and O groups respectively. There was co-relation between LAT group and Apgar score of <7 at 5 min, which was moderately significant, statistically. In the above study out of 200 deliveries, overall 30 (15 %) neonates were admitted to NICU, out of which, 26 (13% of 200) were for FD (respiratory distress, neonatal depression, meconium aspiration, observation) and 4 (2 % of 200) were for other cause (i.e. PROM). In the reactive group, out of 14 (11.1%) NICU admissions, 11 were done for FD and 3 for other cause. In Equivocal group, out of 11 (16.9 %) NICU admissions, 10 were done for FD and 1 for other cause. In the Ominous group, out of 5 (55.6%), all were done for FD. In the entire study, here was no stillbirth. The above co-relation was found to be significant statistically. Amongst the reactive admission test group, FD developed in 17 (13.50 %) out of 126 cases. In the equivocal group, FD developed in 32 (49.20 %) out of 65 cases, while in the ominous group, FD developed in 8 (88.90 %) out of 9 patients. The co-relation on LAT and fetal distress was found to be statistically significant. In the reactive group, out of 23 LSCS performed, 2 (8.7%) were done for FD and 21 (91.3%) were done for other causes, whereas, out of 14 ventouse deliveries, 8 (57.1%) were done for FD and 6 (42.9%) were done for other causes. In the equivocal group, out of 24 LSCS performed, 13 (54.2%) were done for FD and 11 (45.8%) were done for other causes, whereas, out of 16 ventouse deliveries, 13 (81.3%) were done for FD and 3 (18.7%) were done for other causes. In the ominous group, all 7 (100%) LSCS were done for FD and 1 ventouse delivery (100%) was done that too for FD only. The calculated sensitivity of LAT was 70 %, specificity was 76%, PPV was 54 % and NPV was 86%. The accuracy was found to be 0.75, thus, seeing its diagnostic value, LAT was found to be a “Fair test” for predicting fetal outcome.

DISCUSSION

Considering that majority of fetal deaths occur during labour, the high perinatal mortality and morbidity in our country can be decreased to some extent by intrapartum

fetal surveillance. Fetal distress can occur even is low risk pregnancies which are categorized so based on the antenatal factors, even leading to NICU admission and perinatal morbidity. Hence an intrapartum risk screening is essential. The present study was mainly compared with the two studies the study conducted by Ingemarsson *et al*.[7] and another study conducted by Hegde Aparna 2001 published in journal of Obstet Gynecol India[8]. In present study fetal distress was seen in 17(13.50%), 32(49.20%) and 8(88.90%) in reactive, suspicious and ominous group respectively. In our study, we have considered requirement of neonatal resuscitation at birth as one of the criteria to clinically decide for the presence of fetal distress. Neonates requiring initial steps of resuscitation like naso-oral suctioning, tactile stimulation etc followed by observational care being kept with mother were not included in the "resuscitation done" category. Only those requiring advanced steps like endotracheal intubation or bag and mask ventilation alone or with chest compressions were taken into account. In this study, amongst the reactive group, out of 126 neonates delivered, 12 (9.5%) required resuscitation. In the Equivocal group, out of 65 neonetes delivered, 17 (26.2%) required resuscitation. In the Ominous group, out of 9 neonates delivered, 7 (77.8%) required resuscitation. Thus, we can see that the need for resuscitation increases as the test becomes abnormal and is statistically significant (with the p-value <0.001 as per chi-square test). The incidence foetal distress, meconium stained liquor, need of resuscitation and neonatal intensive care unit (NICU) admission was significantly more frequent among patients with ominous test results compared with equivocal or reactive test results on admission, and the incidence increases as the test becomes reactive to equivocal to ominous.

CONCLUSION

Amongst the 200 cases studied, 9 patients (4.5%) had ominous tests suggestive of fetal distress already present at the time of admission and overall 37% had abnormal tests (32.5% equivocal and 4.5% ominous). 65 (32.5 %) patients with equivocal traces were put on continuous monitoring and 9 (4.5%) patients who had ominous tests were directly delivered by the appropriate route. The calculated sensitivity of LAT was 70 %, specificity was 76%, PPV was 54 % and NPV was 86%. The accuracy was found to be 0.75, thus, seeing its diagnostic value, LAT was found to be a "Fair test" for predicting fetal outcome. The adverse fetal outcomes like occurance of fetal distress, meconium stained liquor, operative delivery (caesarean section and ventouse application) for fetal distress, need for resuscitation, low Apgar score at 5 minutes and NICU admission are more associated with the abnormal Labour Admission tests and their incidence increases as the LAT becomes equivocal to ominous.

REFERENCES

1. Cunningham FG. Williams obstetrics. 23 rd Ed. USA: McGraw-Hill Companies Inc: pg 410-443.
2. Whittle MJ, Martin WL. Fetal monitoring in labour. In. Chamberlain G, Steer P,editors. Turnbull's obstetrics. London: Churchill Livingstone, 2001.
3. Berglund S, Nordstrom L. National survey (Sweden) of routines for for intrapartum fetal surveillance. Acta Obstet Gynecol Scand 2001; 80:552-553.
4. Devane D, Lalor JG, McGuire W. Cardiotocography versus intermittent auscultation of fetal heart on admission for assessment of fetal wellbeing. The Cochrane Database of Systematic Reviews 2005; Issue 1, Art No.:CD005122.
5. Macones GA, Hankins GD, Spong CY, et al. The 2008 National Institute of Child Health and Human Development workshop report on electronic fetal monitoring: update on definitions, interpretation, and research guidelines. Obstet Gynecol 2008; 112:661-666 .Journal of Obstetric, Gynecologic and Neonatal Nursing, 37(5), 510-515.
6. Electronic fetal heart rate monitoring: research guidelines for interpretation. National Institute of Child Health and Human Development Research Planning Workshop. Am J Obstet Gynecol 1997; 177:1385.
7. Ingemarsson I Electronic fetal monitoring as a screening test. In: Intrapartum Fetal SurveillenceEds: Spencer JAD and Ward RHT RCOG Press London 1993 45-52.
8. Hedge Aparna, Kore Shailesha, Srikrishna Sushma, et al. Admission test: screening test for prediction of fetal outcome in labour. J Obstest Gynaec India 2001; 51(2) 40-43.

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