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Labour admission test: An assessment of the test's value as screening for foetal distress in labour

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Abstract

The aim of the study was to evaluate the role of admission cardiotocography in early labour in detecting fetal hypoxia and to correlate the results of admission cardiotocography with perinatal outcome in terms of fetal distress, APGAR scoring at birth, neonatal admissions, color of liquor. The value of the test was assessed in terms of sensitivity, specificity, Positive Predictive Value and Negative Predictive Value.

Keywords: Admission test (AT), cardiotocograph (CTG), MSL, Apgar, NICU

1. Introduction

Labour admission test is a test of fetal well-being that is performed when a woman with a low risk pregnancy is admitted in labour. It is a natural contraction stress test to identify potential compromise at a stage early enough in labour to allow timely intervention; furthermore a normal AT offers reassurance. [1] Ingemarsson *et al.* described an alternative method of monitoring FHR during labour to pick the women apparently at risk whose foetuses were compromised on admission or were likely to become compromised in labour – Admission test (AT). [2] The admission CTG being a visual test can make parents as well as clinicians feel reassured that the fetus is not at risk of hypoxia at the time of admission and is unlikely to develop hypoxia in the next few hours [3]. The purpose of this study was to extend the benefit of AT to low risk women admitted to labour ward and predict fetal distress.

2. Material and Methods

The study consisted of total 150 low risk patients in labour admitted to the labour room with period of gestation ≥ 37 weeks, in the first stage of labour with fetus in cephalic presentation at Padmashree Dr. D.Y. Patil Medical College and Hospital Research Centre, Pimpri- Pune - 18. All of them were subjected to an admission test, a 20 minutes recording of fetal heart rate and uterine contractions on cardiotocograph machine at the time of admission. The trace thus obtained was classified as: Reassuring, Suspicious, Pathological according to NICE (National Institute of Clinical Excellence) guidelines. [4] The following fetal parameters were noted: APGAR score, NICU (Neonatal Intensive Care Unit) admissions, fetal distress and Meconium stained liquor. Other measures such as Sensitivity, Specificity, Positive Predictive Value and Negative Predictive Value of the test were calculated.

3. Results

Out of 150 patients, 119 (79.33%) patients showed reactive admission test (AT), 27 (18%) patients showed suspicious AT and 4 (2.67%) patients showed pathological AT.

Reactive AT group (n=119)

Out of 119 (79.33%) who had reactive AT, 10 (9.09%) patients developed foetal distress in the reactive group.

Suspicious AT group (n=27)

Out of 27 cases in this group, 13(48%) cases developed foetal distress while 14(51.85%) cases had good perinatal outcome.

In this group an extended trace was obtained for 80 minutes, amongst which 12(44%) became reactive, 8 (29.6%) remained persistently suspicious and 7(25.9%) became pathological. In the group that became reactive (n=12), 9(75%) cases delivered normally,

while 3(25%) underwent LSCS (Lower segment Caesarean Section) for foetal distress. Therefore 75% had good perinatal outcome. In the group that was persistently suspicious (n =8), continuous intrapartum monitoring was done. Foetal distress was present in all 8 cases (100%) and were shifted for LSCS. In the group that became pathological (n=7) foetal distress was present in all cases (100%), with variable/late decelerations for which LSCS was done.

Pathological AT group

In the pathological group AT (n = 4) Out of 150 cases 4(2.66%) patients showed pathological AT, 3(75%) of them had thick MSL and were taken immediately for LSCS.

Table 1: Perinatal Outcome

Labour Admission Test			
Result	Reactive	Suspicious	Pathological
No. of cases	119(79.33%)	27(18%)	4(2.67%)
Fetal distress	10(8.4%)	13(48%)	3(75%)
Mode of delivery			
Normal	90(75.6%)	12(44.44%)	1(25%)
LSCS	29(24.3%)	15(55.55%)	3(75%)
MSL			
Thick	7(5.8%)	6(22.22%)	2(50%)
Thin	6(5.04%)	8(29.6%)	1(25%)
NICU admission	9(7.5%)	12(44.44%)	2(50%)
APGAR score <7	15(12.6%)	15(55.5%)	3(75%)

Table 2: Association between labour admission test and fetal distress in study group

Fetal distress	Labour admission test			Total n=150
	Reactive n=119	Suspicious n=27	Pathological n=4	
Yes	10(8.4%)	13(48%)	3(75%)	26(17.3%)
No	109(91.5)	14(51.8%)	1(25%)	124(82.6%)
Total	119(79.3%)	27(18%)	4(2.6%)	150

Chi-square = 33.79, P<0.0001

It was observed that fetal distress was present in 10(8.4%) cases in the reactive group out of 119 cases. 13(48%) out of 27 had fetal distress in the suspicious group while 3(75%)

out of 4 babies had fetal distress in the pathological group with p value <0.0001 which is statistically significant.

Table 3: Comparison of incidence of fetal distress with previous studies

Study group	No. of patients	Reactive AT	Suspicious AT	Pathological AT
Ingemarsson (1986)	130	86.9%	8.5%	4.6%
Kamal Buckshee (1999)	100	85.0%	11.0%	4.0%
Aparna Hegde (2001)	200	84.5%	9.5%	6.0%
Present Study	150	79.33%	18%	2.67%

Table 4: Association between labour admission test and colour of liquor in study group

Colour of liquor	Labour admission test			Total n=150
	Reactive n=119	Suspicious n=27	Pathological n=4	
Clear	104(87.3%)	12(44.44%)	1(25%)	117(78%)
Intact	2(1.6%)	1(3.7%)	0(0)	3(2%)
Thick	7(5.8%)	6(22.22%)	2(50%)	15(10%)
Thin	6(5.04%)	8(29.6%)	1(25%)	15(10%)
Total	119(79.3%)	27(18%)	4(2.6%)	150

In our study the incidence of fetal distress in the pathological group was 2.67 % as compared to studies by Aparna Hegde (6.0%), Kamal Buckshee (4.0%), Ingemarsson (4.6%).

The table shows distribution of cases according to the colour of liquor amongst the three groups. The incidence of meconium stained liquor is higher in the pathological and suspicious group as compared to the reactive group.

Table 5: Association between labour admission test and mode of delivery in study group

Mode of delivery	Labour admission test			Total n=150
	Reactive n=119	Suspicious n=27	Pathological n=4	
Normal	90(75.6%)	12(44.4%)	1(25%)	103(68.66%)
LSCS	29(24.3%)	15(55.5%)	3(75%)	47(31.33%)
Total	119	27	4	150

The table implies that there was a higher incidence of LSCS for fetal distress associated with the pathological and suspicious group as compared to that of the reactive group.

4. Discussion

Intrapartum fetal surveillance is important to ensure the delivery of a healthy baby with minimum intervention. [5] In busy labour wards with few monitors, selection of patients

for continuous monitoring is necessary. [6] The labour admission test is a CTG of 20-30 minutes' duration, carried out when the woman is admitted to the labour ward. [7] (British guidelines published in 2001 do not recommend the labour admission test in low risk women, while Swedish guidelines published the same year recommend the test in all women. The British recommendations were based upon three studies and the Swedish upon seven studies).

It was observed that the incidence of fetal distress was higher in the pathological group (75%) followed by suspicious group (48%) while it was low in the reactive group (8.4%). The incidence of low Apgar Score (Apgar <7 at 1 minute) was higher in patients with pathological admission test (75%) and suspicious AT group (55.55%) while in the reactive AT group it was lower (12.6%). There was higher incidence of NICU admission for babies of patients with pathological AT (50%) and suspicious AT (44.44%) as compared to the reactive AT (7.5%).

It has been found in the study conducted by Ingemarsson and Arulkumaran *et al.* (1986) that babies may develop fetal distress after reactive AT, if the time interval between recording of admission test and delivery is more than 5 hours.

Babies may also develop fetal distress in less than 5 hours after a reactive AT, if there is associated acute catastrophe like cord prolapse, abruption placentae etc.

A statistical analysis including reactive admission test groups shows a high specificity (87.90%), but rather low sensitivity (61.54%) The sensitivity, specificity, positive predictive value and the negative predictive value of the reactive group in our study for detecting fetal distress and perinatal outcome are almost similar with that of the previous studies.

5. Conclusion

The main purpose of our study was to see the reliability of admission test in predicting foetal distress during labour. We observed that the incidence of fetal distress, LSCS, meconium stained liquor, low Apgar score and NICU admissions was higher in pathological group and suspicious group as compared to the reactive group where the incidence of fetal distress was low.

Thus, LAT is a simple test that can be used with great reliability to detect fetuses that need immediate intervention and continuous monitoring. [1] It can be used as an important non-invasive method to diagnose fetal compromise present at the time of admission in low risk patients in early labour. [8] Obstetricians can be more vigilant by either doing intermittent electronic fetal heart monitoring or if required continuous monitoring. [5] Most of the maternity units in India are not equipped with faculties for scalp pH. Hence a simple noninvasive test like AT can be used to pick up cases which need immediate intervention and those that need close surveillance by continuous electronic fetal heart rate monitoring. [9]

Furthermore, the duration between the labour admission test and delivery is also important and should be stressed upon. Barring acute events admission test may be a good predictor of fetal condition at admission and during next 4-5 hours of labor in term fetuses.

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