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Admission CTG As a Screening Test for Fetal Distress : Not Reliable

Pankaj Desai, *Umesh* Gadhvi
Department of Obstetrics and Gynecology, Medical College and S.S.G. Hospital Baroda

OBJECTIVES – To evaluate the labor admission test by cardiotocography for screening for fetal distress. **METHODS** – In this prospective study 194 consecutive subjects with full term pregnancy and live fetuses, who came for admission to the labor room for confinement were subjected to CTG. High risk pregnancies were not differentiated from low risk pregnancies. Tests were labeled as reactive, suspicious and non-reactive as per specified criteria. Fetal outcome was assessed on the basis of apgar scores as asphyxiated and non-asphyxiated. Efficacy of this test was evaluated on the basis of statistical indices. **RESULTS** – Admission CTG proved to be a poor sensitive test in screening out an asphyxiated fetus, but its specificity was satisfactory. With a poor positive predictive value of only about 50%, the test had a high negative predictive value. Though it had an acceptable false positive rate for non-reactive and reactive tests, the false negative rate of the test was unacceptably high. **CONCLUSION** – Labor admission CTG test is not effective in screening for fetal distress.

Key words : labor admission test, fetal distress

Introduction

Screening for fetal distress is a big challenge for obstetricians. Different studies have given different and at times diametrically opposite viewpoints. The concept of Labor Admission Test (LAT) by cardiotocography (CTG) was floated to differentiate between mothers who may require continuous fetal monitoring and those who can be managed by intermittent auscultation. For this many methods have been proposed like admission doppler auscultation[1], admission colour doppler velocimetry[2], admission CTG[3] and admission single liquor pocket measurement[4]. This study evaluates the utility of admission CTG in screening for fetal distress.

Material and Methods

One hundred and ninetyfour women with full term pregnancy and live fetuses, who came for admission to the labor room for confinement were subjected to LAT by CTG. The tests lasting 20 min. were labeled as reactive, suspicious and non reactive as under –

Reactive :

- Baseline fetal heat rate : Between 110 and150 beats per minute
- Variability : Between 10 and 25 beats per minute
- Fetal movements : at least two
- Accelerations : at least two with fetal movement, with peak rise of at least 15 beats per minute, lasting for 15 seconds.
- Decelerations : Absent
- No other abnormal pattern

Suspicious :

- Baseline fetal heart rate : Between 100 and 110 beats per minute or between 150 and 170 beats per minute
- Variability : Between 5 and10 beats per minute for 20 minutes or > 25 beats per minute
- Fetal movements : < 2
- Accelerations : < 2 with fetal movements, with peak rise of at least 15 beats per minute, lasting for 15 seconds; or at least 2 fetal movements, with peak rise of < 15 beats per minute lasting for < 15 seconds
- Decelerations: Absent or variable <60 beats per minute, lasting for <60 seconds.

Non-reactive : In a 20 min. test.

- Baseline fetal heart rate : < 100 beats per minute or >170 beats per minute
- Variability : <5 beats per minute for > 20 minutes
- Fetal movements : Absent
- Accelerations : Absent
- Decelerations : Variable > 60 beats per minute, lasting for >60 seconds; or repetitive late decelerations
- Sinusoidal pattern

All women were followed up till delivery. Monitoring during labor was dependent on the results of LAT. Those women in whom LAT indicated fetal distress were subjected to usual obstetric intervention as per the stage of labor. Those in whom LAT showed no fetal distress were allowed to progress in labor with usual monitoring. Babies born were grouped as non-asphyxiated and asphyxiated. This was done on the basis of apgar scoring done at 1 and 5 minutes of birth, as is the standard procedure.

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Correspondence :
Dr. Pankaj Desai
"Guru Krupa", Opp. Alankar Apartments,
Dandia Bazaar, Baroda 390 001
Tel. (0265) 412848 / 437793 Email : meera@wilnetonline.net

Scores > 8 were labaled as non-asphyxiated.

Scores less than 8 were labeled as asphyxiated while scores < 3 were considered as severe ; 3 to 5 as moderate and 5 to 8 as mildly asphyxiated.

Standard student chi-square test was used for statistical evaluation. The sensitivity and specificity of the above mentioned parameters in predicting a non-asphyxiated baby were calculated manually and then counter checked using the SPSS software.

Results

There were 158 non-asphyxiated new born. Of these, 136 (86.07%) had a reactive test. This means about 14% had ominous tests and still the babies born were not asphyxiated. On the other hand, amongst 36 babies born asphyxiated, 61% had ominous test results whereas 38.9% had reactive admission CTG and still the babies born were asphyxiated (Table I).

Table II depicts the statistical indices of efficacy of admission CTG. Admission CTG proved a poor sensitive test in screening for an asphyxiated fetus, but its specificity was satisfactory. With a poor positive predictive value of about 50% only, the test had a high negative predictive value. Though an acceptable false positive rate for non-reactive and reactive tests, the false negative rate of the test was unacceptably high.

Table 1 : Neonatal outcome and interprepations of admission test

Neonatal outcome	Total	Reactive		Suspicious		Non-reactive	
		No	%	No	%	No	%
Nonasphyxiated	158	136	86.07	12	7.59	10	6.32
Asphyxiated	36	14	38.89	11	30.55	11	30.55
Total	194	150	77.31	23	11.85	21	10.82

Table II : Admission test interpretations and evaluation by statistical

	Non-reactive	Suspicious	Reactive
Sensitivity	30.55%	61.11%	44%
Specificity	93.67%	86.07%	93.15%
Positive Predictive value	52.38%	50%	52.28%
Negative Predictive value	85.55%	90.67%	90.66%
False +ve rate	6.33%	13.92%	6.84%
False-ve rate	69.44%	38.89%	56%

The most dreaded surprise for an obstetrician is to get a severely asphyxiated baby when every thing seems to be going smooth. To avoid this, admission test by CTG is proposed to screen out babies that may be in jeopardy. In early 1990s there were many articles that admission test is very useful, simple, convenient and a non-invasive method for screening fetal basic condition[5]. Soon this ran into rough weather and the efficacy of admission test was doubted[6]. Thorngren et al[7] studied 62 subjects by admission CTG for fetal distress and found that admission CTG was not sensitive enough for the diagnosis of fetal distress. Instead they suggested the use of astroglial protein S100 for this purpose. Yan[5] studied 71 subjects and found that admission CTG may provide some idea of the basic acid-base status of the fetuses in high-risk mothers. He is silent about low-risk mothers. Chua et al[8] studied admission CTG alone and in combination with other tests like acoustic stimulation test, AFI and umbilical artery doppler. They studied 192 subjects and found that when admission CTG was normal, AFI was >5 and there was acceleratory response to acoustic stimulation, there was no fetal distress. They

further concluded that admission CTG in combination works well for diagnosis of fetal distess. In the present study we found that admission test has a poor sensitivity to screen for fetal distress. The positive predictive value of this test was never beyond 53% and the false negative rate was unacceptably high.

About 40% babies who on birth were asphyxiated had reactive admission test on CTG. This is a very dangerous group. This is because the obstetricians may, on the basis of admission test, remain falsely reassured that all is well when 40% of these babies could well be born asphyxiated.

In this study we have not differentiated the high-risk pregnancies from the low risk. As a broad statement then, on the basis of the results of this study, we conclude that admission test is unsatisfactory for screening fetuses in distress.

References :

1. Mires G, Williams F, Howie P. Randomized controlled trial of cardiotocography versus Doppler auscultation of fetal heart at admission in labor in low risk obstetric population. *BMJ 2001; 322:1457-60; discussion 1460-2.*
2. Seyam YS, AI-Mahmeid MS, Al-Tamimi HK. Umbilical artery Doppler flow velocimetry in intrauterine growth restriction and its relation to perinatal outcome : *Int J Gynecol Obstet 2002;77: 131-7.*
3. Cito G, Nofri S: The cardiotocographic service during pregnancy. Reports on operative procedures used at different centers of the National area. *Minerva Ginecol 1999;51:379-83.*
4. Roberts D, Nwosu EC, Walkinshaw SA. The fetal outcome in pregnancies with isolated reduced amniotic fluid volume in the third trimester. *J Perinat Med 1998;26:390-5.*
5. Yan P: Cardiotocography admission monitoring and intermittent intrapartum monitoring for fetal distress in labour: *Zhonghua Fu Chan Ke Za Zhi 1993;28:217-9.*
6. Blix E, Oian P: Labor admission test: an assessment of the test's value as screening for fetal distess in labor; *Acta Obstet Gynecol Scand 2001;80:738-43.*
7. Thorngren-Jerneck K, Alling C, Herbst A et al. S 100 protein in serum as a prognostic marker for cerebral injury in term newborn infants with hypoxic ischemc encephalopathy. *Pediatr Res 2004;53:406-12.*
8. Chua S, Arulkumaran S, Kurup A et al. Search for the most predictive test of fetal well being in early labor. *J Perinat Med 1996;24:199-206.*