FETAL MONITORING IN HIGH RISK PREGNANCY BY MATERNAL DAILY FETAL MOVEMENT RATE (DFMR) AND NON STRESS TEST (NST)

By

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SUMMARY

With emphasis on "Small Family Norms" it is all the more necessary that every wanted conception should successfully end in a birth of a viable healthy baby. For this, close monitoring for assessment of fetal well being is required, specially for High-risk pregnancies (Hingorani, 1983).

Introduction

Fetal cardiotocography as Non-Stress Test (NST), and oxytocin challenge test to determine placental reserve and to indicate optimal time for intervention, is proving extremely useful for assessment of fetal well being. However these machines are costly and not even available in all medical colleges in India. If we critically look at our problems, majority of our pregnancies would be labelled high risk on general high risk factors like low socio-economic status, undernourishment, short stature, grand multiparity and bad obstetric history etc. (Debdas and Kaur, 1983). If biophysical monitoring (ultrasound and fetal cardiotocography) which is more accurate, can not be made available to all high-risk mothers, clinical methods like maternal Daily fetal movement Rate (DFMR) are necessary and occupy a very important place in Obstetric armamentarium for antenatal fetal monitoring in developing countries. How useful are DFMR and NST in de ecting fetal compromise? This question lead to this prospective study on 500 HRP cases.

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Material and Methods

This prospective study was done on 500 cases of High-Risk pregnancy (HRD) admitted in antenatal wards of Lady Hardinge Medical College, New Delhi to evaluate the importance of DFMR and NST. All cases were followed up to delivery and babies in postnatal wards and neonatal nursery for perinatal outcome.

DFMR

Each mother was asked to record her DFMR for 12 hours per day or 10 movements whichever occurred first. The decision of what constitutes a fetal movement was left entirely to the mother. Three counings, each of one hour dura-

tion (morning, afternoon and evening, was not recommended as our patients are illiterate or less educated and do not have excess to wrist watch. Each mother was given a paper and pencil and was asked to record a line for a fetal movement. DFMR was reviewed the same evening. However, the findings of DFMR was not used for any obstetrical decisions. If there was diminution of DFMR to less than 10 in 12 hours, it indicated failing placental function and urgent fetal cardiotocography was indicated to evaluate fetal health. NST: A baseline record of 20 minutes was taken. If during this time two accelerations of greater than 15 BPM lasting for longer than 15 seconds associated with fetal movement were obtained. the test was interpreted as 'Reactive'. If the test was Non Reactive, stimulation was applied to the fetus using abdominal wall manipulation for one minute. The presence of two accelerations, excluding the stimulation period and subsequent four minutes during the next 20 mins was taken as Reactive. If there was no acceleration for another 20 minutes, the test was considered Non reactive. If the NST was non-reactive, the test was repeated the next day. Having repeat Non-reactive NST, OCT was done. The test was considered unsatisfactury when FHR tracings were not adequate for interpretation. Unsatisfactory test was repeated after 24 hours. Reactive NST was usually done on weekly basis, except in selected cases where it was done bi-weekly (Diabetes, Severe IUGR).

Results

Table I shows the distribution of High-Risk cases. 61.8% had previous had obstetrical history. Hypertensive disorders of pregnancy (mainly pregnancy induced hypertension) was associated complication in 18.8% cases.

TABLE I
Distribution of High-Risk Cases (N-500)

	%
. Bad Obstetric History	61.8
. Hypertensive Disorders of Pregnancy	18.8
. Post Dated Pregnancy	9.2
. Diabetes — A	1.8
B	1.0
. I.U.G.R.	4.2
. Miscellaneous Group	3.2

It was observed that every fetus had its own individual rate of movements; however gradual fall in DFMR was noted around 38 weeks in about 80% cases. On an average most women took 4-5 hours to complete 10 movements, though we took 10 movements in 12 hours as the lowest limit of normal.

Table II shows the correlation of DFMR with various indices. 33 cases reported low DFMR resulting in 4 stillbirth, 1 NND and presence of meconium in 16 cases. 2 still-births occurred rather suddenly, while another 2 stillbirths occurred in cases of intrauterine growth retardation where NST was also non-reactive and active intervention was intentionally deferred in view of extreme intrauterine growth retardation. Contrary to expectation normal DFMR group (N-467) also had one stillbirth due to accidental haemorrhage and 2 NNDs (1 died of septicemia, 1—sudden infant death syndrome). Meconium stained amniotic fluid (MSAF) and birth asphyxia were significantly higher in low DFMR group as compared to normal DFMR.

NST details are shown in Table III. Only 8.2% test were reported as persistently

TABLE II
Correlation of D.F.M.R. with Various Indices

	Total %	Meconium %	Fetal Heart abnormality in labour %	Sudden loss of fetal movement %	S.B. %	N.N.D. %	C.S. %	Birth Asphyxia %
Low D.F.M.R.	33 (6.6)	16 (48.48)	9 (27.27)	1 (3.03)	4 (12.12)	1 (3.03)	21 (63.63)	17 (51.5)
Normal D.F.M.R.	467 (93.4)	36 (7.70)	13 (2.78)	1 (0.21)	1 (0.21)	2 (0.42)	117 (25 05)	14 (2.99)

non-reactive. Table IV shows the correlation of NST with various parameters of fetal outcome. In Non-reactive NST group there were 6 perinatal deaths. However, 2 perinatal deaths occurred in Reactive NST group too (1 stillbirth due to accidental haemorrhage and 1 NND due to sudden infant death syndrome). Incidence of MSAF and birth asphyxia, were significantly higher with Non reactive NST as compared to Reactive NST group.

Correlation of DFMR with NST is shown in Table V. It was observed that normal DFMR had false negative rate of 3.04% (non-reactive NST), while low DMR showed false positive rate of 27.27% (Reactive NST), with specificity of 98.03%. However sensitivity of DFMR in relation to NST was 58.53%.

Regarding the sensitivity and specificity of DFMR and NST in predicting perinatal deaths (Table VI), DFMR and NST gave sensitivity rate of 62.5% and 75% respectively, while specificity rate was observed as 94.29% for DFMR and 92.88% for NST. Sensitivity is more important than specificity for such antenatal fetal surveillance tests. Delay in detecting fetus in jeopardy is much worse than referring a fetus in jeopardy.

Comments

Both DFMR and NST are used primarily as screening procedure to differentiate between a healthy but 'at risk' baby and baby suffering from anoxia. NST requires less time and less inconvenient to the patient and can be repeated and continued indefinitely, while DFMR is quite leliable, inexpensive method of screening 'at risk' fetus where sophisticated gadgets

TABLE III
N.S.T. Details

	No. of patients No.	%	Total tests
Non Reactive			
Persistent	41	(8.2)	121
Reactive	459	(91.8)	
Reactive throughout	426		779
Reactive after unsatisfactory results	6		17
Reactive after non-reactive tests	27		61
	500		978

TABLE IV
Correlation of NST with various Indices

	Fetal Heart Abnormality in labour %	Meconium %	Apgar score of 6 or less %	S.B. %	N.N.D. %	C.S. %
Non reactive 41	11 (26.82)	19 (46.34)	23 (56.09)	4 (9.75)	2 (4.87)	24 (58.53)
Reactive 459	11 (2.39)	33 (7.18)	8 (1.74)	1 (0.21)	1 (0.21)	114 (24.83)

TABLE V
Correlation of D.F.M.R. with N.S.T.

	Reactive	Non Reactive
Normal DFMR 467	450 (96.35%)	17 (3.64%) (False negative rate)
Low DFMR 33	9 (27.27%) (False +ve Rate)	24 (72.72%)

TABLE VI
Specificity and sensitivity of DFMR and NST in Relation to perinatal deaths

	DFMR %	NST %
Sensitivity	62.5	75.0
Specificity	94.29	92.88

Sensitivity: Measure of false negative rate in relation to Perinatal death.
Specificity: Measure of false positive rate in relation to perinatal death.

are not available. One movement per hour has been described as the acceptable lower limit for good fetal outcome (Pearson *et al* 1970, Cardiff 'Count to ten' 1978).

Normal DFMR and Reactive NST are of value and more reliable. However, this study points out the limitation of normal DFMR and Reactive NST in predicting sudden intrauterine death due to ac-

cidental haemorrhage. There is high chance of false positive results too, with these two tests and such false positive test cases are subjected to sometimes unnecessary intervention.

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