Foetal Biophysical Profile scoring in High Risk Pregnancy

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Summary

Foetal Biophysical Profile (FBPP) was studied in 96 high risk pregnancies. Foetal outcome was correlated with FBPP, Non Stress Test (NST) alone and various combinations of biophysical variables. Composite FBPP was a better predictor of normal and abnormal perinatal outcome than NST. Similarly, quantitative amniotic fluid (QAF) predicted the perinatal outcome better than NST. Reactive NST was a better predictor of perinatal outcome than normal fetal breathing movement (FBM), but abnormal FBM predicted abnormal outcome more consistently than non-reactive NST.

Among the combinations fetal movements (FM) + QAF and FBM + QAF were better predictors than FM + FBM. Further, the combination of FBM + FM + QAF showed high degree of correlation with perinatal outcome. In fact, this combination was a better predictor than the composite FBPP. Hence, these 3 variables may be used in antepartum foetal monitoring in preference to NST and composite FBPP.

Introduction

Ante-partum deaths account for 75% of all foetal deaths in infants born after 37 weeks and weighing more than 2500 gms. (Goodlin 1979). Hence, there is a need for a reliable test for ante-partum foetal surveillance.

The non-stress test (NST) has been widely used for this purpose, but is associated with high false positive and false negatives rates (Habeebullah et al, 1992). Manning et al (1980) introduced the concept of foetal biophysical profile (FBPP) with a scoring system involving a combination of factors reflecting both foetal oxygenation and hence acute hypoxia (FT, FM, FBM & NST) and placental function and hence chronic hypoxia (AFI).

The present study was conducted to evaluate FBPP in predicting foetal outcome in high risk pregnancies.

Patients and Methods

Ninety-six high risk patients attending the antenatal clinic at JIPMER Hospital, Pondicherry (India) between September 1994 and August 1995 were included in the study. The main indication for antenatal foetal surveillance included recurrent pregnancy loss (33), IUGR (27), PIH (25) and Post-term pregnancy (18). Many patients had more than one indication.

The peri-natal outcome was correlated with the composite biophysical profile score and the individual components of the same. The peri-natal outcome was considered abnormal if any of the following was present

1. Ante-partum/intra-partum foetal distress
2. APGAR score at 5 min. <7
3. Admission of NICU for > 24 hrs.
4. Peri-natal death

Statistical analysis was carried out using the Chi

Table I: Composite FBPS and perinatal outcome

Score	No.	Outcome		Comments
		Normal	Abnormal	
8-10	87	85 (97.7%)	2 (2.3%)	Both pts. with abn. outcome had QAF ≤ 2 cm
6	4	2 (50.0%)	2 (50.0%)	Both cases with normal outcome had abnormal QAF and NST
0-4	5	0	5 (100.0%)	

Square Test, Fischer exact test, the sensitivity, specificity and predictive value of positive and negative test.

Results

About 60% of patients were under 25 years of age and one-third were nulliparous. Forty one patients (42.7%) each had SVD and LSCS, while 14 patients (14.6%) had operative vaginal delivery. However, only 4 of the 41 caesarean sections and only one of the 14 operative vaginal deliveries were performed for foetal distress.

The sensitivity of the composite FBPS was 97.7% and the specificity was 77.8%. When each component was correlated to the perinatal outcome, NST had a sensitivity of 87.4% and a specificity of 67.7%. The corresponding figure for FBM were 100% and 55.6% and for QAF were 91.9% and 88.9% (Table II).

An analysis of the predictive values of the various possible combinations of the individual factors of FBPP showed that FBM + QAF and FM + QAF to be better than FBM + FM (Table III). When the combination of FM + FBM + QAF were normal, the abnormal outcome was 2.3%. An abnormal FM + FBM + QAF correlated perfectly with an adverse outcome of 100%. This combination of three

variables had a sensitivity of 100% and specificity of 77.8%.

Discussion

The objective of antenatal foetal surveillance is to identify the foetus at risk of death due to placental insufficiency so that it could be delivered at an appropriate time.

Composite FBPP was good in picking up cases of abnormal outcome. Manning et al (1981 & 1990) showed similar results. Score of 6 warrants repeat testing. While reactive NST was a good predictor of good outcome, the nonreactive NST was associated with abnormal outcome in 35%. Vintzileos et al (1983) reported 38%. Composite FBPP was a better predictor than NST in the prediction of normal outcome as well as abnormal outcome in our study (P<0.001).

QAF was a better predictor of foetal outcome than NST (P<0.001). Severe oligohydramnios is not only indicative of chronic placental insufficiency but also the cause for intra-partum distress due to cord compression.

The combinations of QAF with either FBM or

Table II: Predictive Outcome of Biophysical tests

	Result		Perinatal Outcome		Sensitivity	Specificity
			Normal	Abnormal		
NST	N	89	76	3		
					87.3	66.6
	Abn.	7	11	6		
QAF	N	81	80	1		
					91.9	88.9
	Abn.	15	7	8		
FBM	N	91	87	4		
					100	55.6
	Abn.	5	0	5		
FMOV	N	93	87	6		
					100	33.3
	Abn.	3	0	3		
FT	N	96	87	9		
					100	0
	Abn.	0	0	0		

FMOV were better predictors than combination of FBM and FMOV. Further, we evaluated the combination of three variables e.g. FBM + FMOV + QAF. This combination was considered abnormal if FBM was abnormal or when QAF and FMOV were abnormal. Out of 89 patients with normal score, 2 foetuses had abnormal outcome whereas all the 7 with abnormal score had abnormal outcome. So, the sensitivity (100%), specificity (77.8%), predictive value of positive test (97.8%) and negative test (100%) were very high. The normal score of this combination was better predictor of normal outcome than composite FBPP (P<0.001). Similarly, abnormal score of this combination was also a better predictor of abnormal outcome than composite FBPP (P=0.022).

It may be concluded that a combination of three biophysical variables (FBM + FMOV + QAF) may be used in antepartum foetal monitoring in preference to NST and composite FBPP.

References

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