

ULTRASOUND IN ANTENATAL FOETAL SURVILLANCE

ARUNA KEKRE • KORULA GEORGE • LAKSHMI SESHADRI

SUMMARY

A total of 100 high risk cases were screened at 36 weeks of gestational age onwards by Manning (1982) Biophysical scoring system in the Department of Obstetrics and Gynaecology, Unit.I, in Christian Medical College & Hospital, Vellore. Each of the variables were classified as normal or abnormal. The data recorded in these five variables and predictive accuracy of each test alone or in combination had been correlated with clinical outcome as judged by 5 min. apgar score, birth weight small for gestational age, foetal distress in labour and perinatal mortality.

Our study revealed that with a biophysical score of 10 & 8, the foetal outcome was good in all cases. But with biophysical profile score of 6 & 4 - 94.4% of foetuses had IUGR with low apgar at 5 min. interval.

We have also studied the predictive values of each of the individual biophysical profile parameters the details of which here is discussed below.

Introduction

Antepartum detection of foetus at risk of death or damage remains a challenge to modern obstetricians. As maternal risk in pregnancy has diminished, obstetrical care has focused on the foetus and neonate. Correspondingly, as parents feel more secure about maternal safety, they increasingly expect a perfect outcome for their infant. Approximately half

of all still births are due to asphyxia often complicating intra-uterine growth retardation. In addition perinatal asphyxia jeopardises intact neonatal survival. In an effort to reduce the perinatal mortality and morbidity due to acute or chronic asphyxia various biochemical assays have been proposed. But the wide range of normal values and poor sensitivity and specificity limit their usefulness in individual cases, they have been largely replaced by biophysical assessment. The development of real time ultrasound stimulated a more comprehensive study of foetal

*Department of Obstetrics and Gynaecology,
Christian Medical College & Hospital, Vellore.*

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behaviour, allowing the observation of several biophysical events.

Material and Methods

Hundred high risk singleton pregnancies of longer than 36 weeks gestational were screened using biophysical score at Christian Medical College and Hospital, Vellore, Tamil Nadu. A total of 600 biophysical score have been done with a minimum of 2 in each case, the last being done 1-2 days prior to delivery. The data analysed represents only the last test. NST was done using the doppler ultrasound transducer to derive foetal heart rate and tocodynameter to record foetal movement and uterine contractions (corometrics Model 112). It was done during post prandial period with patient in left lateral position. If reactive pattern was not found within 20 minutes the foetus was stimulated with either abdominal palpation or the test was repeated after glucose beverage. If acceleration pattern was not seen within 40 minutes of the onset of testing the pattern was deemed Non-Reactive. Spontaneous foetal heart rate deceleration during NST were defined as those lasting at least 30 secs with a decrease of at least 15 beats/min from baseline. Real time ultrasound scanning using Hitachi UB 300 C with transducer 3.5 MHz was performed after completion of NST and consisted of general survey of intra-uterine contents. The 4 parameters studied were fetal breathing moments, general body moments, foetal tone and amniotic fluid volume.

The amniotic fluid was classified according to the method of Manning et al, except that we required 2 cm pocket of amniotic fluid volume in two vertical directions to be considered as normal. Pa-

tients were tested weekly unless the pregnancy was complicated by Diabetes Mellitus, postdates, IUGR. Patients with any of these diagnosis were tested twice weekly. If NST was reactive without FHR decelerations and amniotic fluid volume was normal, the patient was scheduled for repeat testing at appropriate intervals. However, if foetal heart rate deceleration or oligohydramnios was observed the patient was hospitalized for delivery. If NST was non-reactive, any of the following was considered as indication for delivery.

1. decreased amniotic fluid volume
2. spontaneous foetal heart rate deceleration
3. absent or decreased foetal body movement or foetal breathing moments.

The NST and ultrasound were done by 2 different observers in order to prevent bias. The consultant managing the patient in labour room was aware of NST and amniotic fluid volume only and his decision on management was based on these 2 criteria.

TABLE - I
DETAILS OF HIGH RISK FACTORS
ENCOUNTERED IN OUR STUDY

High Risk Factors	No. of cases
1. Pregnancy induced hypertension	12
2. Diabetes Mellitus	6
3. Intra-uterine growth retardation	13
4. Post dates	64
5. Diminished foetal moments	5

Of these 100 cases 50 were primigravidas, 25 were 2nd gravidas and remaining 25 were 3rd gravidas and above. The scoring was done according to criteria laid down by Manning.

TABLE - II
THE BIOPHYSICAL PROFILE SCORE IN
THE SCREENED CASES

Score	No. of cases
4	3
6	22
8	17
10	58

Measures of outcome were 5 minutes apgar scores, birth weight small for gestational age (below the tenth percentile according to Denver intrauterine growth chart): intrapartum foetal distress. Foetal distress in labour was defined by the clinicians and included one or more of the following

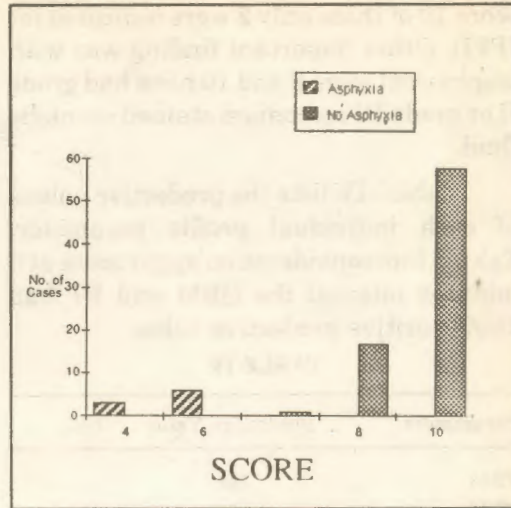
- (a) persistent foetal bradycardia
- (b) repetitive late decelerations
- (c) persistant foetal tachycardia.

Within the constraints of these considerations and the limits of the current study design and sample size the most honest appraisal of the data permits only 2 catagories of comparison i.e. the positive predecive value versus negative predecive value of each of the variables.

Results

The biophysical profile score was correlated with apgar score 5 minutes interval. With biophysical score 4 all 3 foetuses had asphyxia. With biophysical score 6 out of 22 foetuses 21 were asphyxiated. On the other hand with biophysical score 8 and 10 none of the foetuses had asphyxia.

Table III lists a correlation of biophysical score with IPFD and IUGR. All foetuses with biophysical score 4 were growth retarded and had intrapartum



foetal distress. With biophysical score 8 and 10 only 2 had IPFD and there was no IUGR.

TABLE III
BPS CORRELATED WITH IUGR AND IPFD

Score	IUGR	IPFD	Total
4	3	3	3
6	22	17	22
8	Nil	1	17
10	Nil	1	58

Regarding perinatal mortality we had no intrapartum foetal death but there was one early neonatal death. This baby had severe IUGR with biophysical score of 4 with microcephally, died within few hours of birth. The incidence of caesarean section was inversely proportional to the biophysical score. With biophysical score 4 & 6 the incidence of caesarean section was 33.3% and 72.7% respectively. All were indicated for foetal distress in early labour. On the other hand the percentage of caesarean section was 29.4 with biophysical score 8 and 15.6 will biophysical

score 10 of these only 2 were indicated for IPFD. Other important finding was with biophysical score 8 and 10 none had grade II or grade III meconium stained amniotic fluid.

Table - IV lists the predictive values of each individual profile parameter. Taking into consideration apgar score at 5 minutes interval the GBM and FT had 100% positive predictive value.

TABLE IV

Parameters	Predictive Value	(%)
FBM	76	—
GBM	86.3	100
FT	78.3	100
AFV	99.6	82.1
NST	97.3	62.1

The positive predictive value of FBM cannot be commented upon as none of our cases had FBM.

Discussion

The biophysical score a combination of NST and ultrasound evaluation of other 4 parameters seems to be effective in evaluating foetal well being in high risk pregnancy. The study confirms the reliability of reactive NST to predict foetal well being in antepartum period provided amniotic fluid volume is normal and that no spontaneous FHR deceleration occur during testing. We also confirmed the relationship of oligohydramnios and non-reactive NST and FHR deceleration during antepartum foetal monitoring. The development of oligohydramnios is associated with FHR deceleration, foetal meconium passage, foetal asphyxia and mortality, which can be forestalled by timely intervention. We had 17 cases with biophysical score 8. Of them 12 had non-

reactive NST and 5 had oligohydramnios. In presence of a non-reactive NST (with no deceleration) pregnancy can be continued as long as other parameters are normal. With oligohydromnios labour was induced after cervical ripening. With biophysical score 6 we had 22 cases of them 21 had decreased amniotic fluid volume and non-reactive NST and 1 had non-reactive NST and decreased general body movements. Labour was induced immediately in all these cases, of them 95.4% of foetuses had asphyxia. Similarly with biophysical score 4 all 3 had oligohydramnios decreased foetal tone and a non reactive NST. Labour was induced immediately. The perinatal outcome was not satisfactory in any of these cases.

Conclusion

The conclusion which we drew from our study was Biophysical score 10 indicates a normal infant with low or no risk of chronic asphyxia. Hence testing can be repeated at weekly interval or bi-weekly in patients with diabetes mellitus and patients more than 41 weeks gestation.

Biophysical score 8 indicates normal infant with low risk asphyxia. If only NST was non-reactive (no deceleration) with other parameters being normal patient needs to be followed up by weekly biophysical score and labour induced at 38 weeks by cervical ripening. With oligohydramnios labour was induced the next day after cervical ripening.

Biophysical score 6 & 4 indicates chronic asphyxia and immediate intervention is needed irrespective of gestational age. Thus biophysical score helps us to underline the important principle of treating the foetus as a patient within the patient.