Fetal Biophysical Profile in Intrauterine Growth Retardation

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Summary: A high biophysical profile score correlates well with perinatal well being. 215 biophysical profiles were studied in 50 pregnancies with intrauterine growth retardation using Manning criteria at gestational age of 28-36 weeks. The scoring was repeated weekly if pregnancy continued beyond one week of scoring. 91.6% of the tests had normal score and 8.4% abnormal score. The test carried sensitivity of 95% and specificity of 87% in predicting fetal distress in labour. Six perinatal deaths were seen in 14 patients with last abnormal score while 36 patients who had last score normal, 2 perinatal deaths occurred, out of which one baby had multiple congenital anomalies.

Introduction

Intrauterine growth retardation (IUGR) is an important challenging problem for the modern obstetrician. It is a cause of significant perinatal morbidity, mortality and developmental growth handicaps. Regular antepartum fetal surveillance is mandatory in a growth retarded fetus, because it leads to high perinatal mortality and morbidity, if not detected and treated in time (Marshall, 1988). Chronic asphyxia, the single most common cause of perinatal death in IUGR can be recognized in utero by evaluating various fetal biophysical activities on ultrasonography (Sabbagha, 1988).

Fetal biophysical scoring is a method of antepartum fetal surveillance, based on survey of five discrete variables. These include fetal tone, fetal movement, fetal breathing movement, amniotic fluid volume and nonstress test (Manning, 1980). It was proposed that the combined use of five biophysical variables was more accurate means of assessing fetal health than any single variable used alone (Basket et al, 1984). Assurance of fetal well being in IUGR pregnancy allows for conservative therapy and prevents early intervention and the associated risk of failed induction, iatrogenic prematurity and increased operative delivery.

The present study was undertaken with the aim of finding the correlation between evaluation of IUGR by biophysical scoring and outcome of pregnancy, irrespective of mode of delivery.

Material and Methods

The study included 50 antenatal patients clinically diagnosed as cases of IUGR, in the Department of Obstetrics and Gynaecology, Government Medical College, Jammu. The cases were subjected to weekly biophysical profile study with the help of USG after detailed history, examination and routine investigations. USG was done with Sonoline SL 2 units/RT 3000, using linear and sector transducers of 3.5 Mhz frequency. Five biophysical variables were studied, using Manning criteria as

Fetal Movement Presence of at least 3 discrete episodes of FM within 30 min period. Simultaneous limb and trunk movement were counted as single movement.

Fetal Breathing Movement Presence of at least one episode of fetal breathing movement of at least 60 secs duration within 30 min. observation period.

Fetal Tone Upper and lower extremities in position of full flexion. At least one episode of extension with return to position of flexion and/or extension of spine with return to position of flexion and/or opening and closing of hand.

Amniotic Fluid Volume Fluid evident throughout uterine cavity. Largest pocket of fluid greater than 1 cm in vertical diameter.

Non stress Test 2 or > FHR accelerations of at least 15 bpm in amplitude and of 15 secs. duration associated with fetal movement in a 20 min observation period.

Depending on the presence or absence of a particular feature, the scoring for each variable was assigned as 2 or 0. The test was discontinued, whenever these variables met the normal criteria. The 30 min. observation period usually was needed when fetal biophysical activities were diminished or absent.

Weekly follow up was done till delivery and last score within one week of delivery was compared with outcome of pregnancy. End points, used to assess outcome of

pregnancy were, incidence of fetal distress in labour, 5 minute Apgar score and perinatal mortality. The statistical evaluation was done by Chi square test for analysis of significance.

Results

Out of 50 cases, preeclamptic toxaemia (54%) formed the major group responsible for growth retardation followed by anaemia (22%), intrauterine infections, twin pregnancy, placenta previa and congenital malformations (Table I).

Table I
Aetiology of IUGR in Study Cases

Aetiology	Number of cases	Percentage
Pre-eclamptic Toxemia	27	54%
Anaemia	11	22%
Intrauterine infections	3	6%
Twin pregnancy	2	4%
Placenta previa	1	2%
Congenital malformation	1	2%
Constitutional	1	2%
Miscellaneous	4	8%
Total	50	100%

Total of 215 biophysical tests were done, 137 tests showed scoring of 10, 60 tests showed score of 8, 11 tests showed score of 6 and 7 tests showed a score of 4 (Table II). 91.6% of tests had normal score and 8.4% of tests had abnormal score.

Table II
Test-Score Distribution

Score		Number of cases	Percentage
Normal			
	10	137	63.7
	8	60	
Abnormal	6	11	5.1
	4	7	3.3
	0-2	-	-
Total		215	100%

Out of 50, 36 patients showed normal biophysical profile scoring within 7 days of delivery of baby. Among patients with a last normal score, only 2 had fetal distress in labour while in 34 no evidence of fetal distress was noted. The 14 patients with last abnormal score showed evidence of fetal distress in labour in 4 cases while 5 cases delivered normally without any sign of fetal distress and 5 patients had intrauterine deaths in antepartum period (Table III).

Table III
Correlation Between Last Biophysical Score and Fetal Distress in Labour

Biophysical Profile score	Number of cases	IUD	Fetal Distress	
			Present	Absent
Normal	36	-	2	34
Abnormal	14	5	4	5
Total	50	5	6	39

The 5 minute Apgar score was observed in 36 cases with a normal last biophysical score of 8-10. It was more than 7 in 34 cases and less than 7 in 2 cases (Table IV).

Table IV
Correlation Between Last Biophysical Score and 5 Minute Apgar Score

Biophysical profile Score	Number of cases	5 minute A/S	
		7 or >	< 7
Normal	36	34	2
Abnormal	14	7	7
Total	50	41	9

The 14 cases with abnormal last score showed more than 7 Apgar score at 5 min. less than 7 in 7 cases.

Two perinatal deaths were observed among 36 patients with last biophysical score of 8 or 10. Out of the two deaths, one baby had multiple congenital anomalies. Perinatal death was observed in 6 of 14 abnormal score fetuses.

Table V
Correlation Between Last Biophysical Score and Perinatal Mortality

Biophysical Profile Score	Number of cases	Perinatal mortality	
		Present	Absent
Normal	6	34	2
Abnormal	14	8	6
Total	50	42	8

Discussion

Accurate perinatal recognition of fetal risk remains a major challenge for obstetrician in the management of IUGR. The ability to predict continuing fetal survival for definite interval has major clinical implications for both mother and fetus. It has become possible to recognize, categorize and ultimately treat IUGR with ever increasing precision due to information accumulated by study of biophysical profile scoring.

The major etiological factors operating in our study were maternal disease like pre-eclamptic toxemia, anemia and intrauterine infections. Numerous studies have shown that about 2/3rd of IUGR fetuses are born to the patients with such risk factors and hence it is significant to analyse the fetus for evidence of IUGR, while screening such groups of population.

The distribution of total test score in our study indicated that majority (91.7%) of the tests were normal. Similar normal test score distribution was observed by Manning, 1980 (97.5%); Basket, 1984 (97.1%); Platt, 1985 (94%); Mehta and Srinivas, 1993 (93.4%).

A normal biophysical profile scoring correlates well with good perinatal outcome. In our study of 36 cases with last normal score, fetal distress was absent in 34 cases. Amongst 14 cases which had last score abnormal, 5 intrauterine deaths occurred and equal number of cases showed evidence of fetal distress in labour, that necessitated emergency delivery. The figure was statistically significant. The test had sensitivity of 66% specificity 87% and false negative value of 5.5%.

Thirty four of 36 cases with a last normal biophysical score had 5 min Apgar score of > 7. In 14 cases with abnormal score, 7 had 5 min Apgar score of more than 7 and equal number had it less than 7. This figure was found to be statistically significant. The test had sensitivity of 66% specificity 83% and false negative rate on 5.5%.

Eight perinatal deaths occurred in 50 study cases, 6 of these had score abnormal, and 2 had last score normal. Out of these 2, with last normal score, one baby had multiple congenital anomalies.

To conclude, a normal biophysical activity indicates that the intrauterine environment is not hypoxemic. Antepartum assessment by biophysical scoring is particularly attractive, since this method yields immediate results, does not require perturbation of the in utero environment and results relate specifically to the fetus being observed.

References

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