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A NEW BIOPHYSICAL PROFILE- HOW MUCH EFFECTIVE IN IDENTIFYING FETAL JEOPARDY?

Obstetrics & Gynaecology

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ABSTRACT

Objective: To determine whether the addition of ratio of the middle cerebral to umbilical artery S/D ratio to the modified biophysical profile would improve perinatal outcome in patients at high risk.

Method: A prospective study of patients for antenatal surveillance was undertaken. 112 patients were randomized to two antenatal surveillance protocols: Group-I, modified biophysical profile; and Group-II, modified biophysical profile plus ratio of middle cerebral artery to umbilical artery S/D ratio (new biophysical profile). Patients were followed up serially and neonatal outcome data including incidence of caesarean section delivery for fetal distress, admission to NICU and neonatal mortality were tabulated.

Result: The total population showed no statistical difference in outcome parameters between Group-I and Group-II. However, a subgroup of patients at risk of utero-placental insufficiency showed a significant reduction in caesarian section for fetal distress and neonatal morbidity in Group-II patients.

Conclusion: In a subgroup of patients at high risk for uteroplacental insufficiency, the addition of ratio of middle cerebral artery to umbilical artery S/D ratio to MBPP helps in early identification of foetal jeopardy and timely intervention, hence improves the perinatal outcome.

KEYWORDS

INTRODUCTION

Antenatal screening gives valuable information about status of the fetus and whether there is a need to intervention in high risk condition. The most common test used for antenatal fetal evaluation is the non-stress test, either alone or in combination with other fetal parameters in the form of a fetal biophysical profile. The modified biophysical profile (NST and AFI) is used as primary fetal surveillance test and appears to be as accurate predictor of perinatal outcome as the full BPP. The NST is the first parameter to become abnormal with developing fetal hypoxia. Some recent studies suggest that a non-reactive NST may be a very late sign of fetal compromise.

Color Doppler reveals changes of hypoxia at least a week before the MBPP or NST. Comparison of information, regarding fetal status, in S/D ratio in the MCA to the S/D ratio in the UA appears to be an accurate method for prediction of fetal outcome, especially in growth restricted fetuses.

The present study was undertaken to test the hypothesis that the addition of the ratio of MCA/UA S/D ratio to the MBPP would improve the ability to identify fetuses at risk for uteroplacental insufficiency and thereby decrease neonatal morbidity and mortality rates.

MATERIAL AND METHODS

In the present study 112 females above 30 weeks of gestation were included. These were divided into two groups-

Group-I (Control Group): Included 24 patients with normal pregnancy and 32 patients with high risk pregnancy (*high risk group included females with previous history of BOH, stillbirths, preterm deliveries or any coexistent medical disease). All these patients of Group-I underwent modified biophysical profile testing after recording history and clinical examination of patients.

Group-II (Study Group) : Included 27 patients with normal pregnancy and 29 patients with high risk pregnancy. These patients underwent new biophysical profile testing [MBPP and Ratio of MCA to UA S/D ratio] after history, clinical and Doppler examination.

All data thus calculated was charted, tabulated and analyzed statistically for both the entire patient population and for a subgroup of patients at risk of uteroplacental insufficiency. The different parameters were determined as normal or abnormal by using previous studies as reference value.

Mode of delivery was tabulated, whether vaginal or caesarian. Neonatal morbidity and mortality rate was evaluated by parameters: the need for admission to NICU and neonatal death in NICU.

RESULTS

There were no significant differences in mean AFI, percentage of non-reactive NST, percentage of patients delivered by caesarian section for fetal distress, neonatal morbidity and mortality rates between two groups in general population of patients. As with entire groups of patients, there were no significant differences in mean AFI, percentage of patients with non-reactive NST and neonatal mortality rate between the subgroups of patients believed to be at high risk for uteroplacental insufficiency (High risk patients). But there was higher incidence of caesarean section rate for fetal distress and higher incidence of neonatal morbidity rate in high risk patients of control group (Group-I) in comparison to high risk patients of study group (Group-II). In Group-I high risk patients, caesarean section was done in 22 (69%) patients and in Group-II caesarian section was done in 10 (34%) patients.

Table-I Clinical Outcome Data: All Patients (low Risk And High Risk)

	Group-I	Group-II	Statistical significance
1) Mean AFI (cm) (Before delivery)	16.78 (32.44)	17.00 (32.38)	p>0.05
2) Non-reactive NST	29%	25%	p>0.05
3) Caesarian section	71%	64%	p>0.05

Table-II Clinical Outcome Data: High Risk Patients

	Group-I	Group-II	Statistical significance
1) Mean AFI (cm) (Before delivery)	84%	69%	p>0.05
2) Non-reactive NST	31%	38%	p>0.05
3) Caesarian section	69%	34%	P<0.01

Out of 32 neonates in Group-I high risk patients 20 (63%) were admitted to NICU for significant complication while in Group-II high risk patients, out of 29 neonates only 10 (34%) were admitted to NICU.

Table-III Neonatal Morbidity And Mortality Rates In High Risk Patients

	Group-I	Group-II	Statistical significance
1) Admission to NICU	63%	34%	P<0.05
2) Neonatal death	32%	34%	p>0.05

Table-IV Neonatal Morbidity And Mortality Rates: All Patients (low Risk And High Risk)

	Group-I	Group-II	Statistical significance
1) Admission to NICU	41%	36%	p>0.05
2) Neonatal death	18%	20%	p>0.05

DISCUSSION

In the present study average maternal age of study group (Group-I) was 24.73 years while in control group (Group-II), it was 25 years. There was no significant association of outcome with maternal age. ***Natu and Panaik (1986)*** also did not find any relation to age in an Indian series.

There was no significant difference in mean AFI, percentage of non-reactive NST in both the groups (control as well as study group) in general population as well as in high risk patients (p>0.05) (Table-I and II).

Ott et al (1998) also did not find any significant difference.In high risk patients of study group (Group-II) caesarian section rate was less in comparison to control group (Group-I) (p<0.01) (Table-III).

Similarly, in high risk patients of study group (Group-II) neonatal admission to NICU (i.e. neonatal morbidity rate) was less (34%) (p<0.05), while in control group (Group-I), 63% neonates were admitted to NICU (Table-III and IV) indicating that MCA/UA S/D ratio will identify fetal compromise earlier than the NST and AFI. There was also no difference in caesarean section rate, neonatal morbidity and mortality rates in both the group in general population (Table-I and II).

Weiner et al (1994) found in their study that fetal heart rate patterns remain normal despite significant increase in diastolic velocity flow in the MCA.

Devine et al (1994) compared the ability of the MCA/UA S/D ratio, NST or BPP to predict adverse perinatal outcome in 49 postdated pregnancies and found that MCA/UA S/D ratio was a better predictor of adverse outcome than the other two tests.

CONCLUSION:

There was decreased incidence of caesarian section due to fetal distress and neonatal admission to NICU in study group of high risk patients. Therefore, we conclude by this study that addition of ratio of middle cerebral artery to umbilical artery S/D ratio to modified biophysical profile (NST + AFI) doesn't improve the perinatal outcome in general population, whereas in patients at high risk for uteroplacental insufficiency, it helps in early identification of foetal jeopardy and timely intervention, hence improves the perinatal outcome.

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