

Role of Modified Biophysical Profile and Doppler Velocimetry in Timing of Pregnancy Termination in Growth Restricted Fetuses after 32 weeks of Gestation.

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Abstract:

AIM: To optimize the timing of pregnancy in growth restricted fetuses in pregnant women after 32wks of gestation by using modified biophysical profile & Doppler velocimetry.

Objectives: To estimate the relevance of MBPP & Doppler velocimetry in deciding the mode of delivery and to measure the lag time between abnormal Doppler finding and MBPP.

Methods: Hospital based observational study done on 100 patients in the department of obstetrics & gynecology in collaboration with department of radiology, Gandhi hospital from the period of January 2015 - November 2016.

Results: In group with abnormal Doppler presentation there was increased incidence of caesarean section and adverse perinatal outcome. In analysis of perinatal outcome the sensitivity and specificity of abnormal umbilical artery Doppler was 76% & 64% respectively.

Conclusions:

1) Abnormal Doppler had sensitivity of 53.3%, specificity of 51.76% in predicting fetal distress.

2) Abnormal MBPP had sensitivity of 100% and specificity of 50.2% and negative predictive value of 100% in predicting fetal distress.

3) Combined abnormality of both Doppler & MBPP had sensitivity of 100%, specificity of 52% negative predictive value of 100% in predicting fetal distress. The fetal compromise was greater when both Doppler & MBPP were abnormal.

4) Abnormalities in Doppler preceded on abnormal MBPP by lead time of 7.12 days which is important in the management of preterm high risk pregnancies.

Keywords: Fetal Growth Restriction, Doppler Velocimetry, Modified Biophysical Profile.

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I. Introduction

Decision for termination of pregnancy and mode of delivery are frequently based on 2 antepartum tests, the modified biophysical profile & Doppler studies.

The first changes are Doppler changes which are followed by pathophysiological changes in fetus secondary to hypoxia which are picked by MBPP.

The time lag between abnormal Doppler studies & abnormal MBPP has been estimated to be around 4days⁹ to 2 weeks.

The need for study is to study the obstetrics outcome of pregnancies terminated based upon Doppler changes as compared to outcome of pregnancies terminated after MBPP changes have set in.

AIM: To optimize the timing of pregnancy termination in growth restricted fetuses in pregnant women after 32 weeks of gestation by using Modified biophysical profile and Doppler velocimetry.

OBJECTIVES:

- To measure the lag time between abnormal Doppler finding and abnormal modified biophysical profile.
- To estimate the relevance of Modified biophysical profile and Doppler velocimetry in deciding the mode of delivery.

II. Materials And Methods

In this study, pregnant women as having FGR and more than 32 weeks were included. After informed consent, a complete history, clinical & obstetric examination, routine investigations are done. Daily fetal kick count, twice weekly non stress test & amniotic fluid index were done. Fetal Doppler parameters were done at weekly intervals.

Pregnancies with normal Doppler were followed till fetal maturity was attained or if there was absent or reverse diastolic flow in umbilical artery doppler. Termination of pregnancy was done by induction of labour or caesarean section.

The mode of timing of delivery was individualized taking into account various maternal and fetal parameters. Observations were categorized into four groups.

Group A-Doppler normal & MBPP normal with FGR.

Group B-Doppler abnormal & MBPP normal with FGR.

Group C-Doppler normal & MBPP abnormal with FGR.

Group D-Doppler abnormal & MBPP abnormal with FGR.

Neonatal outcome was noted.

Gestational age at delivery, neonatal weight, Apgar score at 5 minutes

Meconium stained liquor, NICU admissions, respiratory distress were all analyzed in each group.

III. Results

A total of 100 patients with fetal growth restriction were included in the study.

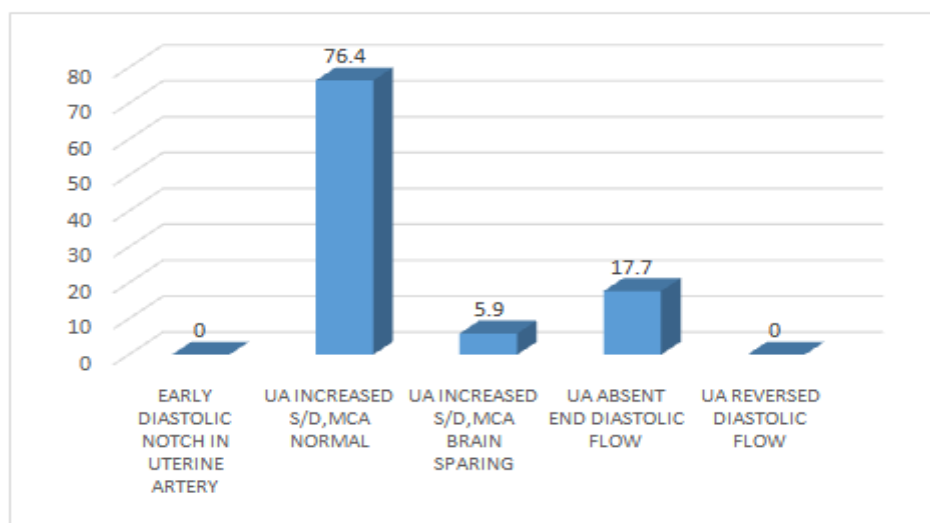
Table 1: DISTRIBUTION OF CASES INTO GROUPS BASED ON DOPPLER AND MBPP

GROUPS	NUMBER OF CASES
A-DOPPLER NORMAL AND MODIFIED BIOPHYSICAL PROFILE NORMAL	26(26%)
B-DOPPLER ABNORMAL AND MODIFIED BIOPHYSICAL PROFILE NORMAL	17(17%)
C-DOPPLER NORMAL AND MODIFIED BIOPHYSICAL PROFILE ABNORMAL	25(25%)
D-DOPPLER ABNORMAL AND MODIFIED BIOPHYSICAL PROFILE ABNORMAL	32(32%)

In group A (26 cases)-96% of cases (i.e 25 cases) delivered after 37 weeks and only one women delivered at 36weeks.

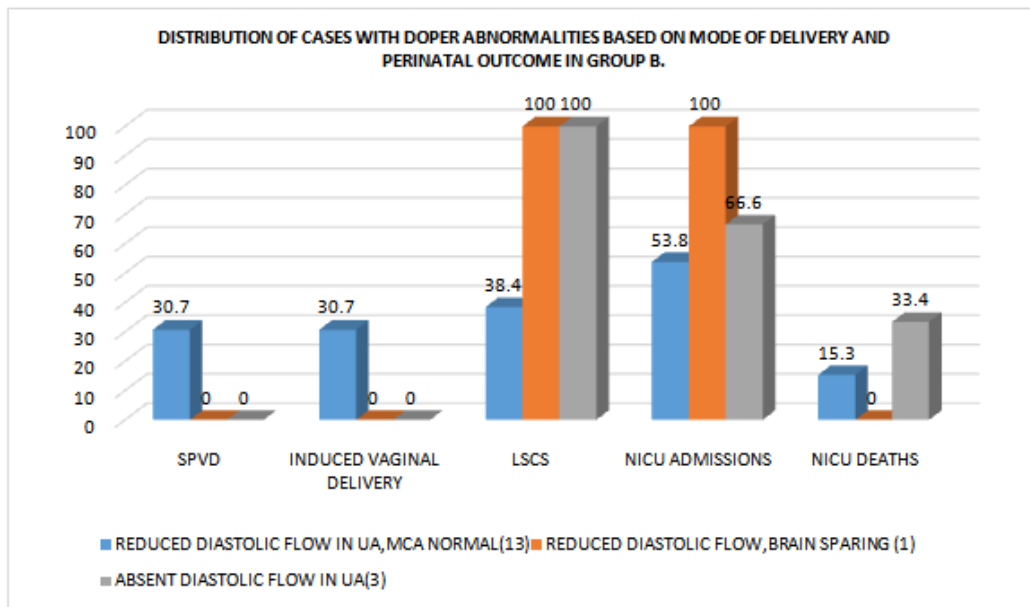
- 16 had vaginal deliveries, out of which 3 were induced.
- 10 had cesarean section.
- There were no neonatal deaths.

GRAPH 1: DISTRIBUTION OF CASE BASED ON DOPPLER ABNORMALITIES IN GROUP B



- In total 13 women who had reduced diastolic flow in umbilical artery there were 2(15.3%) neonatal deaths.
- In 3 women who had absent diastolic flow in umbilical artery there was 1(33.4%) neonatal deaths.

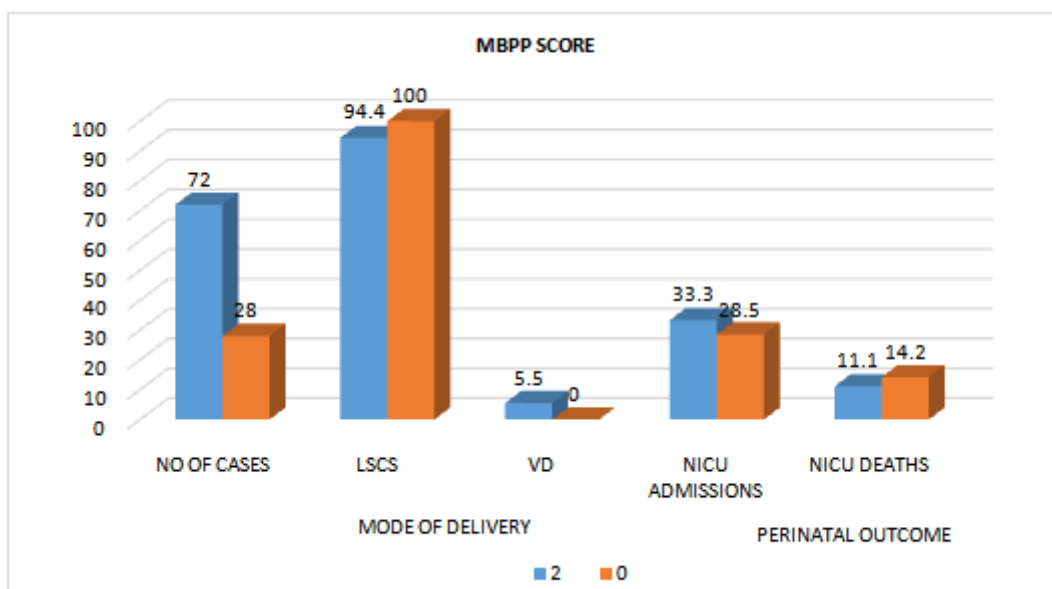
GRAPH 2: DISTRIBUTION OF CASES WITH DOPPLER ABNORMALITIES BASED ON MODE OF DELIVERY AND PERINATAL OUTCOME IN GROUP B.



GROUP C:

- Doppler normal and modified biophysical profile abnormal-25 cases.
- The Mean duration of pregnancy was 3.48 days after AFI had become abnormal.
- Interval between abnormal NST & Delivery was mean 55 minutes.

Graph 3: DISTRIBUTION OF CASES ACCORDING TO ABNORMAL MBPP AND PERINATAL OUTCOME IN GROUP C.



In Group D:

- Doppler abnormal, modified BPP Abnormal was 32 cases.
- The lag time between abnormal Doppler & abnormal MBPP was mean of 7.125 days.
- Mean duration of continuation of pregnancy in this group was mean of 9.31 days.

Graph 4: DISTRIBUTION OF CASES BASED ON APGAR SCORE IN ABNORMAL DOPPLER IN GROUP D.

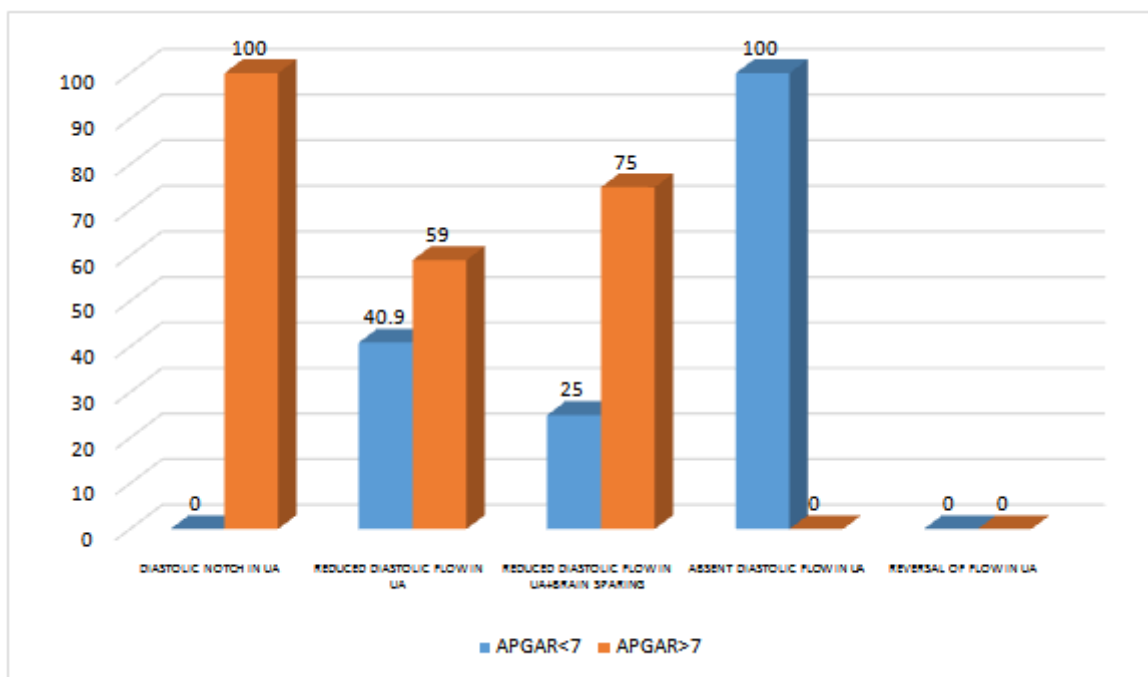


Table 2: EFFICACY OF DOPPLER IN PREDICTING FETAL DISTRESS

PARAMETER	VALUE	95% CONFIDENCE INTERVAL
Sensitivity	53.3%	26.59-78.73%
Specificity	51.76%	40.66-62.74%
Positive predictive value	16.3%	10.34-24.75%
Negative predictive value	86.2%	77.9-91.8%

Table 3: EFFICACY OF MBPP IN PREDICTING FETAL DISTRESS

PARAMETER	VALUE	95% CONFIDENCE INTERVAL
Sensitivity	100%	78.2-100%
Specificity	50.5%	39.52-61.6%
Positive predictive value	26.32%	22.3-30.6%
Negative predictive value	100%	-

Table 4: EFFICACY OF DOPPLER AND MBPP IN PREDICTING FETAL DISTRESS

PARAMETER	VALUE	95% CONFIDENCE INTERVAL
Sensitivity	100%	63.0-100%
Specificity	52%	37.4-66.3%
Positive predictive value	25%	19.9-30.79%
Negative predictive value	100%	-

IV. Discussion

FGR is a major obstetric problem and associated with high perinatal morbidity and mortality. In the sequence of deterioration the condition of the growth restricted fetus, the first abnormality is increased impedance to flow with umbilical artery, followed by arterial redistribution in fetal circulation & subsequently the development of pathological fetal heart rate pattern.

In the study there were the above 4 groups, and the analysis showed the most compromised fetuses were in women with severe preeclampsia in group D which necessitated delivery at earlier gestational age than with group A. Group C & D had majority of operative deliveries. Perinatal outcome was better with group B than in Group D.

The significant advantage of Doppler over MBPP was giving a lead time of 7.12 days. This time interval plays an important role as steroid prophylaxis could be administered.

V. Conclusions

- Abnormal Doppler had sensitivity of 53.3%, specificity of 51.76% in predicting fetal distress.
- Abnormal MBPP had sensitivity of 100% and specificity of 50.2% and NPV of 100% in predicting fetal distress.
- Combined abnormality of both Doppler and MBPP had sensitivity of 100%, specificity of 52%, negative predictive value of 100%, in predicting fetal distress. The fetal compromise was greater when both Doppler and MBPP were abnormal.
- Abnormalities in Doppler preceded an abnormal MBPP by lead time of 7.12 days. This lead time may be important in the management of preterm high risk pregnancies.
- The study concludes that both the tests are complementary to one another in fetal surveillance of high risk pregnancies.

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