

## Evaluation of Modified Biophysical Profile in 50 Cases of Preeclampsia

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### Abstract:

**Objectives:** To study the antepartum fetal surveillance with modified biophysical profile and perinatal outcome in 50 cases of pre-eclampsia. To prove the efficacy of modified biophysical profile as an effective tool for antepartum surveillance and assessment of perinatal outcome through timely diagnosis and treatment of fetal compromise.

**Methods:** 50 pregnant women admitted to the wards in the department of obstetrics and gynaecology, Government general hospital, Vijayawada diagnosed with both severe and non-severe pre-eclampsia having gestational age more than 34 weeks over a period of 6 months were recruited randomly into the study. All the cases were investigated by modified biophysical profile and the results were analyzed.

**Results:** Among 50 cases of pre-eclampsia, most of them were primi-gravidae (58%) and belonged to the age group 18-25 yrs (76%). Most of them were having gestational age more than 36 weeks (80%). Non stress test was non-reactive in 38% of cases and AFI < 5 cm in 6% of cases. Incidence of LSCS was high in the study group (62%) due to various high risk factors. Low birth weight (< 2.5 kg) was detected in 38% of cases due to prematurity/IUGR.

**Conclusion:** Modified biophysical profile is easier, less time consuming, cost effective, and patient compliant test. It gives reassurance that the fetal status is good with good perinatal outcome when the test results are normal.

**Keywords:** Modified biophysical profile (MBPP), Non stress test (NST), Amniotic fluid index (AFI), Pre eclampsia.

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### I. Introduction

Since the development of technologies for electronic fetal heart monitoring in the 1970's and with increased sophistication of ultrasound, an array of techniques for antenatal assessment of fetal well being have been introduced into clinical practice. The primary goal of antenatal testing is to identify the fetuses at risk for intra-uterine injury or death so that these adverse outcomes can be prevented.

Fetal hypoxia and acidosis represent final common pathway to fetal injury and death in many high risk pregnancies. The basis for antepartum testing relies on the premise that the fetus whose oxygenation in-utero is challenged will respond with a series of detectable, physiological, adaptive, or decompensatory signs, as hypoxia or frank metabolic acidemia develop. In an adaptive response to hypoxia, blood flow is redirected to the brain, heart, and adrenals, with subsequent decrease in renal perfusion and fetal urine production leading to oligamnios.

Fetal movement is an indirect indicator of CNS integrity and function. During acute hypoxemia, fetal movement decreases as the fetus attempts to conserve energy. Loss of fetal movements raises concern for on-going CNS hypoxia and injury. A chemoreceptor response to hypoxemia leads to vagally mediated reflex slowing of the fetal heart rate which may appear clinically as decelerations.

MBPP combines the NST with AFI, which is the sum of measurements of the deepest cord free amniotic fluid pocket in each of the four abdominal quadrants, as an indicator of long term function of the placenta. The MBPP is considered normal if NST is reactive and AFI > 5 cm. MBPP is considered abnormal if NST is non-reactive and AFI is 5 cm or less.

Manning and colleagues (1980) proposed the combined use of 5 fetal biophysical variables as a means of assuring fetal health. They are fetal breathing, body movements, reflex, tone, and flexion-extension movements which require 30-60 min time for evaluation. Because the BPP is labour intensive and requires a person trained in sonography, Clark and co-workers (1989) used an abbreviated BPP as a first time screening

test which requires approximately 10 min to perform. This was later also studied by Nagoette and colleagues in 1994.

## II. Materials and methods

50 cases of pre-eclampsia, both severe and non-severe, attending the antenatal OP or referred from outside were admitted to the wards during the study period of 6 months at Government general hospital, Vijayawada, had been subjected to MBPP evaluation. They included both booked and unbooked cases with gestational age > 34 weeks, followed over a period of time.

A detailed history was taken and thorough clinical and obstetric examination was done at booking or admission. All basic investigations including ultrasound were done along with PIH profile. The patients were evaluated with MBPP consisting of NST recording for 20 min followed by AFI measurement using 4-quadrant technique. The test was repeated weekly or bi-weekly depending on the severity of pre-eclampsia.

### Interpretation of MBPP and action:

- 1) If both tests are normal - Weekly follow-up with MBPP
- 2) If both tests are abnormal – Management depends on gestational age.
- 3) If gestational age > 36 wks – Delivery
- 4) If gestational age < 36 wks – Individual management
- 5) If NST is reactive but AFI is decreased – Evaluate for chronic fetal conditions and perform MBPP twice weekly
- 6) IF AFI is normal and NST is non-reactive – Further testing with full BPP is indicated

**End points to assess the outcome of pregnancy:** Thick meconium stained liquor, 5 min APGAR < 7, NICU admission.

## III. Observations and results

The study group consisted of 50 cases of pre-eclampsia, both severe and non-severe, on whom MBPP tests were performed and following observations were made.

### 1) Gravida status

No. of cases	Primi	2nd	3rd	4 <sup>th</sup>
50	29	13	7	1
100%	58%	26%	14%	2%

Most of the cases were primi gravidae (58%).

### 2) Age distribution

18-20 yrs	21-25 yrs	26-30 yrs	31-35 yrs
19	19	10	2
38%	38%	20%	4%

Most of them belonged to the age group 18-25 yrs (76%).

### 3) Booking status

Booked	Unbooked
20	30
40%	60%

60% were unbooked cases referred from outside hospitals or rural health centres with severe pre-eclampsia at the time of admission.

### 4) Gestational age wise results

34-36 wks	36-38 wks	38-40 wks	>40 wks
6	18	22	4
12%	36%	44%	8%

80% of them were term pregnancies with gestational age > 36 wks.

### 5) MBPP results

NST		AFI		
Reactive	Non-reactive	<5 cm	5-9 cm	>9 cm
31	19	3	46	1
62%	38%	6%	92%	2%

6) **MBPP results analysis**

NST and AFI	No. of cases	Percentage	Vaginal delivery	LSCS
Both normal	28	56%	14 (28%)	14 (28%)
Both abnormal	3	6%	-	3 (6%)
NST normal, AFI abnormal	-	-	-	-
NST abnormal, AFI normal	19	38%	5 (10%)	14 (28%)

LSCS was performed in 62% of cases due to various high risk factors as outlined below.

7) **Indications for LSCS**

Total	Failed induction	Fetal distress	Failed progress of labour	Uncontrolled Pre-eclampsia	Abnormal doppler	CPD	Breech
31	9	7	5	5	3	1	1

Most common indication for LSCS was failed induction (9 cases), followed by fetal distress (7 cases).

8) **Fetal outcome**

NST and AFI	Meconium stained liquor	APGAR < 7	NICU admission
Both normal	1	2	-
Both abnormal	3	3	3
NST normal, AFI abnormal	-	-	-
NST abnormal, AFI normal	7	9	7

9) **Birth weight**

1.5-2.5 kg		>2.5 kg
Preterm	IUGR	
9	10	31

There were no stillbirths in the present study.

**IV. Discussion**

How pregnancy incites or aggravates hypertension remains unsolved despite decades of intensive research. Indeed hypertensive disorders remain among the most significant and intriguing unsolved problems in obstetrics. Hypertensive disorders complicate 5-10% of all pregnancies and together they are one of the deadly triad along with hemorrhage and infection that contributes greatly to maternal morbidity and mortality. Of these disorders, the pre-eclampsia syndrome, either alone or superimposed on chronic hypertension is the most dangerous.

In the present study, the test group consists of 50 cases of pre-eclampsia with gestational age > 34 weeks. Most of them were primi-gravidae (58%), with age group 18-25 years (76%). Majority of the patients in our study had initiation of MBPP testing more than 36 weeks onwards. This was because of late referral of patients as unbooked cases, constituting 60% of the present study.

The distribution of MBPP test score results in our study indicates that both parameters are normal in 28 cases, both parameters abnormal in 3 cases, and only NST abnormal in 19 cases. MBPP variables are good in picking up cases of abnormal outcomes in the non-reactive NST group with normal AFI. They are associated with increased incidence of MSL (7 cases), APGAR < 7 (9 cases), and NICU admission (7 cases). The abnormal AFI (< 5 cm) was associated with abnormal outcome in 100% of cases.

**Comparison of study findings**

Test result	Manning et al.	Miller et al.	Eden et al.	Present study
Abnormal NST	60%	90.8%	96%	38%
AFI < 5 cm	42.7%	82.7%	88.4%	6%

Remarkable differences in the NST and AFI results in the present study may be attributed to the study group population which was selected for MBPP testing by various people as only high risk cases were selected for testing in the previous studies whereas cases of both mild and severe pre-eclampsia were randomly recruited in the present study.

Out of 50 cases of pre-eclampsia, 31 had LSCS and 19 had normal vaginal delivery.

Among 50 cases, 36 cases were induced for normal labor with cerviprime, and 19 had vaginal delivery. Out of them 16 had normal MBPP and 3 had non-reactive NST. These 3 cases were followed up with complete bio-physical profile and Doppler, which were normal and hence allowed vaginal delivery.

Out of 50 cases, 14 cases were not induced and taken directly for caesarian section due to indications like uncontrolled pre-eclampsia, abnormal Doppler, low bio-physical profile, breech and CPD.

Regarding the mode of delivery, when both parameters are normal (28 cases), 14 had vaginal delivery, and LSCS was done in 14 cases due to failed induction, failed progress, CPD, and fetal distress.

When MBPP was abnormal with respect to both parameters (3 cases), all cases had LSCS and none of them had vaginal delivery. Incidence of abnormal outcome was also increased – all of them had MSL, APGAR < 7, followed by NICU admission.

MSL was seen in 11 cases in present study – 7 had non-reactive NST with normal AFI. 3 cases had both parameters abnormal. Patients with 2 or more risk factors like PIH with IUGR or past dates were having APGAR < 7.

10 cases had NICU admission in the present study. Indications were MSL (6 cases), IUGR (2 cases), and RDS (2 cases).

## **V. Conclusion**

American College of Obstetrics and Gynecology (ACOG) and American Association of Pediatrics, 2012 (AAP) have concluded that MBPP test is as predictive of fetal well being as other approaches to biophysical fetal surveillance.

Despite the invention of increasingly complex testing methods, abnormal results are seldom reliable, prompting many clinicians to use antenatal testing to forecast fetal wellness rather than illness. Decision regarding timing of delivery should be made using a combination of information from tests of fetal well being along with careful monitoring of maternal status.

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