Original Research Article

Modified biophysical profile in high-risk pregnancy and its correlation with perinatal outcome

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ABSTRACT

Background: Aim of the present study was to evaluate the perinatal outcome in high-risk pregnancy with modified biophysical profile (MBPP).
Methods: The study is observational study,65 high risk pregnant women fulfilling the inclusion criteria participated in the study. The study subjects were subjected to MBPP. Then perinatal outcomes were assessed in view of mode of delivery, maternal and neonatal morbidity and mortality.
Results: Out of 65 cases, 78.5% had normal NST, 80% had normal AFI.3 neonates got admitted in NICU. 13 women underwent LSCS, 9 had instrumental delivery and rest delivered vaginally normal.
Conclusions: The study showed that HRPs with MBPP abnormal or any of MBPP parameter abnormal have higher chances of perinatal morbidity and mortality.

Keywords: Modified biophysical profile, Non stress test, Amniotic fluid index, Lower segment caesarean section

INTRODUCTION

Pregnancy and childbirth are normal physiological process with great pathological potential. Most of the pregnancies progress normally but some pregnancies are more complex. Modern obstetric practice demands extra care of the mother and her fetus. The antenatal and intra-partum conditions place the mother, or the developing fetus or both at a higher risk for complications.[1] Intrapartum asphyxia is a major risk for neonatal morbidity and mortality. Approximately 20-25 infant deaths per 1000 live births are known to occur with significant metabolic acidosis during delivery.

The term "high risk pregnancy (HRP)" refers to any pregnancy associated with an increased risk for adverse outcomes. This can be maternal or fetal. High-risk pregnancies includes complications including pre-eclampsia, eclampsia, anemia, oligohydromnios etc are the major causes of perinatal loss.[2] Intermittent auscultation, continuous electronic fetal heart rate (FHR) monitoring and invasive techniques like fetal blood gas analysis is the available methods for such a surveillance.[3] The obstetricians have long searched methods of antepartum fetal evaluation which would be non-invasive, accurate and yield is immediately available.[4]

The history of the development of electronic fetal heart rate monitoring or cardiotocography is a complexity of technologic development and empirical observations of heart rate patterns found to be associated with various causes of fetal distress.[5,6]

The modified BPP was first suggested by the Nageotte et al which combines the NST as a short term marker of foetal status and the amniotic fluid index as a marker of long term placental function which is easier to perform and less time

consuming than the contraction stress test or the complete BPP.[7]

The main advantage of application of this rapid test is in a busy high risk pregnancy unit with inadequate personnel; but the efficacy of collecting two variables and ignoring the other variables of complete biophysical profile is still open to challenge.[8] Modified biophysical profile is often considered to be an effective complete biophysical profile.[9] It is cost effective, non-invasive and best screening test to evaluate fetal health and to predict the fetal outcome. Perinatal mortality and morbidity can thus be largely reduced in India by this test. This test helps to wait for the spontaneous onset of labour and decrease the operative intervention associated with induction of labour.

METHODS

This prospective observational study was undertaken in the department of obstetrics and gynaecology of Pannadhay Rajkiya Mahila Chikitsalaya, R.N.T Medical College Udaipur over a period of 1 year (July 2021 to August 2022). Clearance from institutional ethics committee was obtained before the study was started. An informed bilingual, written consent was obtained before the subjects were included into the study. Subjects fulfilling inclusion criteria were recruited from patients presenting in OPD, IPD and zanana emergency.

A total 65 patients were included in the study by conventional sampling method.

Inclusion criteria

Singleton pregnant women with consent who met one or more of the criteria's as primigravida/ multigravida above 32 weeks of gestation, intrauterine growth restriction (IUGR), post-dated pregnancies (more than 40 weeks), maternal conditions including HDPs (hypertensive disorders of pregnancy), liver and chronic renal disease, antiphospholipid disorders, decreased fetal movements, bad obstetrical history related to third trimester, previous lower segment caesarean section, short stature woman, malpresentation, moderate to severe anaemia, heart disease.

Exclusion criteria

Pregnant women with congenital anomaly, placental anomalies, gestational diabetes, multiple gestation, premature rupture of membranes and Rh incompatibility.

Study protocol

Women were selected after thorough general physical examination with temperature, pulse rate, blood pressure, cardiovascular system, respiratory system, per abdomen, prevaginal and relevant blood investigations like ABO RH typing, complete hemogram, urine routine microscopic examination, blood sugar fasting and post prandial, thyroid profile, HIV, HBsAg, VDRL etc. The selected antenatal women also underwent aneuploidy and anomaly scan. NST was performed with cardiotocogram and noted as reactive/nonreactive as per FHR monitoring, beat to beat variability, presence/absence of acceleration /deceleration. Then ultrasound obstetrics was performed to know AFI. Then with MBPP perinatal outcome evaluated.

Statistical analysis

The data thus obtained was entered in a pre-designed proforma. The data was compiled and analyzed using Statistical Package for Social Services (SPSS version 18). Frequencies and proportions were used for presenting the categorical variables. Chi Square test was used as significance test for categorical variables. Means and other measures of central tendency were used for quantitative variables.

RESULTS

More than half of the study subjects were aged less than 20 years. About 78.5% of the study subjects were booked cases and 21.5% of the cases were unbooked cases.84.6% cases were primigravida, 66% subjects had gestational age of 38 weeks.

Table 1: Distribution of HRP according to high risk factors.

Comorbidities	Frequency (%)
HDPs	40%
Anaemia	20%
IUGR	30%
Decreased fetal movements	20%
Postdatism	10.5%

Most common high-risk factor among this study was HDPs (40%) then anemia. There were one than one comorbidity in one patient.

Table 2: Distribution of study group according to MBPP results.

MBPP	Frequency (number)
Both normal	46
NST normal and AFI abnormal	5
NST abnormal and AFI normal	6
Both abnormal	8

Both MBPP parameters were abnormal in 8 subjects.

Three new-borns were shifted to NICU.

A total 3 new-borns admitted to NICU had both abnormal parameters of MBPP with APGAR score 6 in one of them and 2 had APGAR of 7. There was statistically significant difference in birth weight between the MBPP results.

About 95.4% of the study subjects were normal and 4.6% improved at the time of discharge. No neonatal mortality was seen in our study.

Table 3: Distribution of the study group according to NICU admission.

NICU admission	Frequency	Percent
Not admitted	62	95.4
Admitted	3	4.6
Total	65	100

DISCUSSION

Pregnancy and childbirth is normal physiological process with great pathological potential. High-risk pregnancies include complications including pre-eclampsia, eclampsia, anemia, oligohydramnios etc., are the major causes of perinatal loss.[2] Modified biophysical profile is often considered to be as effective complete biophysical profile.[10]

More than half of the study subjects in this study were aged less than 20 years. In study by Yogitha et al had shown that most of women were aged between 21-25 years.[11] In a study by Raparthy et al, the age group was between 21-25 years.[12]

Most of the cases in this study were booked cases. In a study by Raparthy et al, 25% cases were unbooked cases.[12] About 66.2% of the study subjects had gestational age of 38 weeks. In a study by Yogitha et al, the mean age of gestation was 39.38±1.54 weeks.[11]

About 84.6% were primigravidae in this study. A study by Yogitha et al had shown that about 48.5% of pregnant were multigravidas and 1.5% were grand- multipara.[4] This study had shown that, about 87.7% were primipara. About 7.7% of the study subjects had meconium stained liquor in this study.

The mean birth weight was 2.83 kgs in this study. In a study by Yogitha et al around 80% babies were born with weight more than 2.5kg, 2% had weight less than 1.5kg and 3.5% of >3.5kg.[11] In a study by Sowmya et al, majority of the cases had birth weight between 2.5-3.5kgs, followed by 30% of the babies whose birth weight was between 1.5-2.4kgs.[13] Only 4.6% of the new-borns had APGAR score of 7 or less than 7 in this study. Three new-borns in this study were admitted to the NICU.

The NST results had shown that about 78.5% of the study subjects. In a study by Maurya et al, about 72.7% of the cases had reactive NST pattern and 27.2% of the patients had non-reactive test results.[14] The amniotic fluid index was less than 5 in 20% of the cases. In a study by Maurya et al, about 21.8% of cases had abnormal AFI.[14] NST was normal but AFI was abnormal in 7.7% of the cases, NST was abnormal and AFI normal in 9.2% of the cases and both were abnormal in 12.3% of the cases. In a study by

Sowmya et al, both parameters were normal in 62.8% of cases, abnormal in 7.14% cases, NST normal and AFI abnormal in 5.71% cases and NST abnormal and AFI normal in 24.29% cases.[13]

This study had shown that, 20% of the normal NST and abnormal AFI cases had instrumental delivery and 80% had vaginal delivery. About 16.7% of the abnormal NST cases and normal AFI cases instrumental delivery, 50% had LSCS and 33.3% had vaginal delivery. About 12.5% of the both abnormal cases had instrumental delivery, 25% had LSCS and 62.5% had vaginal delivery. New-borns of about 37.5% of cases with abnormal MBPP were admitted to the NICU. This difference in admission to NICU and MBPP results was statistically significant. Maurya et al had shown that the NICU admission was present in 80% of the abnormal MBPP cases.[14]

This study had shown that, about 12.5% of the cases with abnormal MBPP results had APGAR score of 6 and 25.0% had APGAR score of 7. This difference in MBPP results and APGAR scores was statistically significant. In a study by Jamal et al, the APGAR score was ≤7 in 9.4% cases.[12]

Limitations

The sampling methods are not followed and hence the results cannot be generalized. But the study was able to bring out many facts about the usefulness and efficacy of modified biophysical profile in prevention of perinatal morbidity and mortality. Further studies are needed especially at the local level with sound methodology to study the effectiveness of MBPP in prevention of Perinatal morbidity and mortality.

CONCLUSION

This study was mainly undertaken to study the usefulness of modified biophysical profile in antepartum surveillance to ensure the welfare of the mother and baby especially in high-risk pregnancies. The study was able to find that the Modified Biophysical profile can effectively predict the perinatal outcome and thus helps in reduction of the morbidity and mortality.

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