Section: Gynaecology & Obstetrics

Research

MODIFIED BIOPHYSICAL PROFILE AS ANTEPARTUM FETAL SURVIELLANCE IN PREDICTING PERINATAL OUTCOME IN HIGH RISK

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Abstract

Background: Fetal biophysical profile is a well-established method of antepartum surveillance in high-risk pregnancies. Classical biophysical profile with all parameters (fetal breathing movement, fetal tone, fetal gross body movements, amniotic fluid volume and nonstress test) neds two phase testing by ultrasound and external Doppler monitor to record fetal heart rate, is more cumbersome, time consuming and expensive. To study the effectiveness of using modified biophysical profile as a primary antepartum fetal surveillance test in predicting perinatal outcome. **Materials and Methods:** This study was a prospective clinical study which consisted of 120 patients having pregnancy with high risk factors. The patients were evaluated with the modified biophysical profile consisting of NST recording for 20minutes, followed by ultrasound assessment of amniotic fluid volume, using four quadrant technique. **Result:** When the modified biophysical profile is normal, it gives reassurance that the fetal status is good with good perinatal outcome. When the modified biophysical profile is, abnormal there is increased incidence of perinatal morbidity as well as mortality. When considered individually, abnormal AFI was associated with increased incidence of perinatal morbidity and abnormal NST is associated with increased incidence of perinatal morbidity as well as perinatal mortality. **Conclusion:** Modified biophysical profile is an effective primary antepartum fetal surveillance test in high risk pregnancies in predicting perinatal outcome.

INTRODUCTION

It has been a known fact that no health problem can be of greater consequence to a nation than maternal health and perinatal mortality. From hospital records it is observed that the average perinatal mortality in a year is about 45 per 1000 live births. Various maternal complications such as pre-eclampsia, eclampsia, anaemia, oligohydramnios etc. are the major causes for perinatal loss. Such high-risk pregnancies need to be identified so the appropriate surveillance and timely interventions can be employed and thus bring down the rate of perinatal morbidity and mortality.

Antenatal fetal surveillance is directed at identifying foetuses of the high- risk pregnancy group which are at risk of suffering intrauterine hypoxia with resultant damage including death. Since the 19th century, fetal assessment consisted of auscultation of fetal heart sounds and subjective recording of fetal movements. In the 20th century, these techniques have been augmented by electronic fetal heart rate monitoring and sonographic evaluation of fetal activity and amniotic fluid volume.

The fetal biophysical profile is one of the most widely accepted test for the evaluation of fetal wellbeing in such high-risk cases. The original biophysical profile was described by Manning, which includes study of five variables i.e., fetal breathing movements, fetal tone, fetal body movements, amniotic fluid index and non-stress test. It needs two phase testing by ultrasound and external Doppler monitor to record fetal heart rate. The complete biophysical is more cumbersome, time consuming and is more expensive. The modified biophysical profile suggested by Nageotte, combines non-stress test as a short-term marker of fetal status and the amniotic fluid index as marker of long term placental function is easier to perform and less time consuming than complete biophysical profile or contraction stress test. 1Also,

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MBPP is as effective as complete biophysical profile. Hence in this study, Modified Biophysical Profile is used as primary surveillance test in high-risk pregnancy to study its effectiveness in predicting perinatal outcome.

MATERIALS AND METHODS

In this prospective observational study, 120 pregnant women with high risk factors attending the antenatal outpatient clinic or admitted to the wards in the obstetrics and gynecology department of Shri Chanda Kanthaiah memorial Govt maternity hospital, Warangal from March 2015 to June 2016, for their high-risk factors, who met below criteria were included.

Inclusion Criteria

Pregnant women at or above 30 weeks of gestation, with any one of the following risk factors are Hypertensive disorders in pregnancy, anaemia, pregnancy beyond 40weeks of gestational age, oligohydramnios and Polyhydramnios, history of previous still births (Bad obstetric history), decreased fetal movements, gestational Diabetes Mellitus, IUGR and heart disease complicated pregnancy

Exclusion Criteria

Multifetal pregnancies and fetuses with congenital anomalies

All pregnant women attending outpatient clinic or admitted in the antenatal ward during the study period, fulfilling the above criteria and who gave written consent to participate in the study were, included in the study. The study group included 120 patients.

After taking written and informed consent and fulfilling the inclusion criteria, patients were included into the study.

A detailed history of pregnant women included in the study was taken by personal interview and thorough clinical examination including recording of vital parameters, systemic and obstetric examination was carried out at booking or admission. Booked case is when the pregnant women had a minimum of three visits of antenatal check-ups after she was registered or confirmed pregnancy, should have taken minimum of 100 tablets of iron & folic acid and calcium tablets during second trimester, should have taken two doses of tetanus toxoid if it was her first pregnancy and now should be in third trimester and should have come for safe confinement. Patients were registered as booked and unbooked cases during admission. All preliminary investigations including ultrasound were done. The risk factors for which the patient was included was noted.

The patients were evaluated with the modified biophysical profile consisting of NST recording for 20mins, followed by amniotic fluid index measurement using four quadrant technique. The test was initiated at 30 weeks of gestation or above at which risk factor was identified.

The test was repeated weekly or bi-weekly depending on the findings of previous test and the risk factors.

Test results were documented as follows:

The NST was performed with cardiotocogram (FM model –viridia 50a, Hewlett packard) in semi-fowlers position. Recordings of FHR, fetal movements, uterine contractions were done. The trace was considered as reactive, if more than 2 fetal movements with accelerations of more than or equal to 15beats\min lasting for more than or equal to 15 seconds, with good beat to beat variability and no decelerations.

If the reactive pattern was not recorded within 20 minutes' period, the fetus was stimulated with VAST (vibroacoustic stimulator), or administration of a glucose containing beverage and the test continued for another 20 minutes' period. If there is no reactivity in this extended period, the trace was deemed non-reactive.

Real time ultrasound scanning was performed using a 3.5 MHz sector probe and general survey of fetus was done and presentation noted. The volume of amniotic fluid was measured according to the four-quadrant technique, with the patient in supine position, uterus was divided into four quadrants by two imaginary lines. The vertical line corresponding to linea alba and transverse line equidistant from pubic symphysis to the top of the fundus. The transducer was held vertically along the maternal longitudinal axis. An AFI was obtained by summing up the depths of largest vertical pockets, which is cord free in all four quadrants.

An AFI of >5 was considered normal and less than or equal to five or above 18 was considered as abnormal. Patients management was decided on gestational age, risk factors and MBPP results. The last observation of MBPP before the delivery was compared with outcome of pregnancy.

End Points to Assess Outcome of Pregnancy

- Thick meconium-stained liquor
- 5-minute APGAR score <7 was considered as abnormal.
- Admission to NICU.
- Perinatal morbidity
- Perinatal mortality.

Interpretation of MBPP and Action

If both tests were normal – weekly fetal surveillance with MBPP

If both test were abnormal – management depends on gestational age

If gestational age >36weeks – delivery

If gestational age <36wks - management is individualized.

If NST is reactive, but AFI is decreased – evaluate for chronic fetal conditions particularly congenital abnormalities and perform MBPP twice weekly. If AFI is normal and NST is non-reactive, further testing with complete BPP is indicated.

Statistical Analysis

Descriptive statistics i.e. percentages and frequencies were calculated. Chi square test was used to test the

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association between the variables. Z test (proportion) was applied to find the significant difference.

RESULTS

The study group consist of 120 patients having pregnancy with high risk factors attending antenatal outpatient clinic or admitted to the wards in the obstetrics and gynecology department of Shri Chanda Kanthaiah memorial government maternity hospital, Warangal from March 2015 to June 2016.

A detailed history was taken and thorough systemic examination was done. The patients were evaluated with the modified biophysical profile consisting of NST recording for 20mins, followed by amniotic fluid index measurement using four quadrant technique. The test was initiated at 30wks of gestation or above at the gestational age at which the risk factors were identified. The test was repeated weekly or bi-weekly depending on the severity of the risk factor. The results and observations recorded in the study are evaluated under the following parameters.

Table 1: Demographic distribution

Age in years	**Frequency**
16-20	21(17.5%)
21-25	61(50.8%)
26-30	25(20.8%)
31-35	11(9.2%)
>35	2(1.7%)
Total	120
Booked	88(73.3%)
Unbooked	32(26.7%)
Gestational age	
primi	53(44.2%)
2nd gravida	32(26.7%)
3rd gravida	22(18.3%)
4th gravida	7(5.8%)
5th gravida	3(2.5%)
6th gravida	3(2.5%)
Gestational age in weeks	
30-31wks	4(3.3%)
32-33wks	7(5.8%)
34-35wks	21(17.5%)
36-37wks	54(45%)
38-39wks	23(19.2%)
40-42wks	11(9.2%)

In the above table, it was observed that, out of 120 patients 21 of them (17.5%) belonged to the age group between 16-20years. Majority of the cases (50.8%) belonged to an age group of 21-25years. 25 (20.8%) of them belonged to age group 26-30years. 11(9.2%) of patients were grouped between 31-35years and only 2(1.7%) of the patients were among the age >35years.

In the present study, majority of the cases (73.3%) were booked and 26.7% were unbooked. Majority of the cases were primigravida (44.2%), followed by 2nd gravida constituted 26.7% of total cases. 18.3% of the cases were 3rd gravida. 4th gravida patients were 5.8% of the cases. 5th gravida and above 6th gravida patients were 2.5% each. When the patients were categorized as per the gestational age in weeks, it was found that majority of the patients belonged to the gestational age between 36- 37weeks gestation age (45%). 3.3% were belonging to 30-31wks, 5.8% were 32- 33wks,17.5% patients were among gestational group 34-35wks, 19.2% were 38- 39wks and 40-42wks were 9.2%.

Table 2: Distribution of risk factors

Risk factors	**Frequency (n%)**
Hypertensive disorders in pregnancy	42(35%)
Anaemia	12(10%)
Postdatism	6(5%)
Oligohydramnios	16(13.3%)
Polyhydramnios	2(1.7%)
GDM	5(4.2%)
Decreased fetal movements	13(10.8%)
BOH	10(8.3%)
IUGR	12(10%)
RHD	2(1.7%)

The risk factors with which the patients presented were; hypertensive disorders of pregnancy which included mild preeclampsia, severe preeclampsia and gestational hypertension (35%), which formed the majority group of cases, patients with anaemia formed 10% of the cases, patients with postdatism formed 5% of the cases, patients with oligohydramnios formed 13.3% of the cases, patients with polyhydramnios formed 1.7% of cases, patients with gestational diabetis mellitus formed were 4.2% of cases , patients with decreased fetal movements were 10.8% of

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cases, those with bad obstetric history were 8.3% of cases, those with IUGR were 10% 0f cases and those with rheumatic heart disease constituted 1.7% of total cases.

Table 3: Number of MBPP's performed

MBPP's performed	Number of cases (percentages)
1 time	65 (54.1%)
2times	31(25.8%)
3times	11 (9.1%)
4times	7 (5.8%)
5times	4(3.3%)
6times	2(1.6%)
Non-stress test	
Reactive	94(78.4%)
Non-reactive	26(21.6%)
Last AFI result	
5 – 18	80(66.6%)
3-5	32(26.6%)
<3	3(2.5%)
>18	5(4.1%)
Last MBPP	
Both parameters normal	65(54.2%)
Both parameters abnormal	11(9.2%)
NST normal AFI abnormal	29(24.2%)
NST abnormal AFI normal	15(12.5%)
Last MBPP test and delivery	
<12hrs	69(57.5%)
13-24hrs	32(26.7%)
25-36hrs	10(8.3%)
37-48hrs	6(5%)
>48hrs	3(2.5%)

Majority of the patients had one MBPP test performed (54.1%), two times test was performed in 25.8% of the cases, three times test was performed in 9.1% of cases, four times test was performed in 5.8% of cases, five times test was performed in 3.3% of cases and six times test was performed in 1.6% of cases. The last NST test results were reactive in 78.4% of cases and nonreactive in 21.6% of cases. Among 120 patients, last AFI 5-18 is seen in 80(66.6%), AFI 3-5 is seen in 32(26.6%) and AFI<3 is among 3(2.5%) patients and >18 is seen in 4.1% of cases. Among 120 patients in whom MBPP test was done, both parameters (NST & AFI) were normal in 65(54.2%) of cases, both parameters were abnormal in 11(9.2%) of the total cases, NST normal and AFI abnormal in 29(24.2%) cases and NST abnormal AFI normal in 15(12.5%) cases Majority of the patients i.e., 69(57.5%) delivered in <12hrs from the last test. 26.7% had delivery between 13-24hrs from the last test. Last test and delivery interval among 8.3% was between 25-36hrs, among 5% of cases was between 37- 48hrs and 2.5% of cases was more than 48hrs.

Table 4: Mode of delivery, indications for LSCS and birth weight in present study

Mode of delivery	Number of cases (percentages)
FTVD	71(59.2%)
PTVD	10(8.3%)
EM LSCS	28(23.3%)
EL LSCS	11(9.2%)
Indication for LSCS Frequency	
Fetal distress	21(53.8%)
CPD	7(17.9%)
Breech	6(15%)
Scar tenderness	5(12.8%)
Birth wt. in kg Frequency (n %)	
<1.5	3(2.5%)
1.5-2.4	62(51.6%)
2.5-3.5	49(40.8%)
>3.5	6(5%)

Among 120 cases, 71(59.2%) of cases had full term vaginal delivery (FTVD), 10(8.3%) cases had preterm vaginal delivery (PTVD), 28(23.3%) of cases had undergone emergency LSCS (EM LSCS) and 11(9.2%) of cases had undergone elective LSCS (EL LSCS).

Out of 39 cases who underwent LSCS, majority of them had fetal distress (53.8%) as indication. Other indications were cephalopelvic disproportion (17.9%), breech (15%), and scar tenderness (12.8%). In majority of the babies, the birth weight was between 1.5-2.4kg (51.6%). Babies with birth weight between 2.5-3.5kg were 40.8%, >3.5kg were 5% of cases and <1.5kg babies were 2.5% of total cases.

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Table 5: Last test results Vs mode of delivery

Last MBPP Test results	LSCS	Vaginal delivery	P value
Both parameters normal (65)	9(3.8%)	56(86.1%)	<0.002 S
Both parameters abnormal (11)	8(72.7%)	3(27.3%)	<0.012 S
NST normal AFI abnormal (29)	11(37.9%)	18(62.1%)	>0.28 NS
NST abnormal AFI normal (15)	11(73.3%)	4(26.7%)	<0.001 S
Last NST			
Reactive (94)	20 (21.3%)	74 (78.7%)	<0.001 S
Nonreactive (26)	19 (73%)	7 (26.9%)	<0.001 S
Last AFI			
Normal AFI >5& <18)	20 (25%)	60 (75%)	<0.025
Abnormal AFI (<5 & >18)	19 (47.5%)	21(52.5%)	<0.001 S

Chi square 30.21 p value<0.001

Among 120 patients in whom MBPP was done, in 65 patients both parameters were normal (NST was reactive and AFI>5). Out of these 65 cases, 86.1% had vaginal delivery and 13.8% had undergone LSCS. Among 11 cases in whom both parameters were abnormal (NST non-reactive and AFI<5) 72.7% had LSCS and 27.3% had vaginal delivery. Those cases (29) with NST normal and AFI abnormal, 37.9% underwent LSCS AND 62.1% had vaginal delivery. Out of 15 cases with NST abnormal and AFI normal 73.3% had LSCS and 26.7% had vaginal delivery. Out of 120 patients when NST was considered individually with the mode of delivery, the observations were as follows, when NST was reactive, majority of them i.e., 74 (78.7%) cases had vaginal delivery and 20 (21.3%) cases had undergone LSCS. In cases with NST non-reactive 19 cases (73.1%) underwent LSCS and 7 cases (26.9%) had vaginal delivery.

Out of 120 cases, 80cases had normal AFI, in whom 60 cases (75%) had vaginal delivery and 20 cases (25%) underwent LSCS. Out of 40 cases in whom AFI was abnormal, 19cases (47.5%) underwent LSCS and 21 cases (52.5%) had vaginal delivery.

Table 6: last MBPP test results vs Meconium staining of liquor

Last MBPP	Thick MSL	p value
Both parameters normal (65)	3(4.6%)	>0.05
Both parameters abnormal (11)	11(100%)	<0.05
NST normal AFI abnormal (29)	5(17.2%)	>0.37
NST abnormal AFI normal (15)	9(60%)	<0.003

Out of 120 cases, thick MSL was observed among 28 cases (23.3%). When both parameters were normal, out of 65 cases, 3cases (4.6%) had thick meconium-stained liquor. When both parameters were abnormal total 11cases (100%) had thick MSL. In 29cases with NST normal and AFI abnormal 5 cases (17.2%) had thick MSL. Out of 15 cases with NST abnormal and AFI normal 9 cases (60%) had thick MSL.

Table 7: Last MBPP test results Vs APGAR score five minutes

Last MBPP Test results	APGAR<7	APGAR>7	P value
Both parameters normal	2(3%)	63(97%)	<0.001 S
Both parameters abnormal	11(100%)	0	<0.0001 S
NST normal AFI abnormal	5(17.2%)	24(82.8%)	>0.86 NS
NST abnormal AFI normal	7(46.6%)	8(53.4%)	<0.002 S

Among the 120cases include in the study, APGAR score of <7 was observed among 25 cases (20.8%). When both parameters were normal out of 65cases, 3% had APGAR score <7 and 97% had APGAR >7. In 11 cases when both parameters were abnormal, all cases i.e. 100% had APGAR <7. In 29 cases with NST normal and AFI abnormal 17.2% had APGAR score <7 and out 15 cases were NST abnormal and AFI normal 46.6% had APGAR score <7.

Table 8: perinatal morbidity associated with Last MBPP test results

Last MBPP	No of patients	p-value
Both parameters normal (65)	17(26.1%)	0.25NS
Both parameters abnormal (11)	8(72.7%)	0.02S
NST normal AFI abnormal (29)	10(34.4%)	0.75S
NST abnormal AFI normal (15)	9(60%)	0.02S

When both parameters were normal perinatal morbidity was present in 17 (26.1%) of total cases. When both parameter were abnormal 8(72.7%) cases had perinatal morbidity. When NST was normal and AFI abnormal perinatal morbidity is seen in 10 cases (34.4%). When NST was abnormal AFI was normal 9(60%) cases had perinatal morbidity. This suggest that whenever both parameters were abnormal or even one of the parameters were abnormal there was increased incidence of perinatal morbidity.

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Perinatal Mortality Associated with Last MBPP Test Results

Table 9: Perinatal mortality associated with Last MBPP test result

Last MBPP Test results	No of patients(percentages)
Both parameters normal (65)	0
Both parameters abnormal (11)	3(27.2%)
NST normal AFI abnormal (29)	0
NST abnormal AFI normal (15)	4(26.6%)

Table 10: comparison of risk factor with other study groups

Study Incidence of PIH (%)	
Archana M et al,[4]	21.8%
Himabindhu P et al,[5]	43%
Sarita A et al,[3]	30%
Yogitha et al,[2]	23.5%
Present study	35%
Study Incidence of LSCS in cases with abnormal MBPP	
Rathod S et al,[1]	73%
Present study	72.7%
Study Incidence of fetal distress	
Archana M et al,[4]	11.8%
Rathod S et al,[1]	19.2%
Miller et al,[7]	6.8%
Yogitha V et al,[3]	30.1%
Present study	17.5%
Study Thick MSL	
S. K. Patil et al,[6]	11.4%
Present study	23.3%
study APGAR score<7	
Yogitha V et al,[2]	14.5%
Rathod S et al,[1]	10%
Present study	20.8%
Study Incidence of perinatal mortality	
S. K. Patil et al,[6]	1.2%
Rathod S et al,[1]	2%
Present study	5.8%

When both parameters (NST and AFI) were normal perinatal mortality was not present in any of the cases. When both parameters were abnormal 3(27.2%) cases had perinatal mortality. When NST was normal and AFI was abnormal perinatal mortality was not present in any of these cases. When NST was abnormal and AFI normal perinatal mortality was present in 4(26.6%) cases. This suggest that abnormal MBPP and abnormal NST had increased incidence of perinatal mortality.

DISCUSSION

One of the major goals of antepartum fetal surveillance is early detection of the compromised fetus and timely intervention. There are various methods of antepartum fetal surveillance. The best method is the one, which aims at identifying the fetus which is at risk, but still in an uncompromised state and requires immediate intervention. In the present study, the modified biophysical profile (MBPP), which is a combination of two parameters, is used as primary fetal surveillance test for high-risk patients. The two parameters are non-stress test (NST), short term marker and Amniotic fluid index (AFI), a long-term marker of placental function.

The study group consists of 120 pregnant patients with high risk factors. Majority of the cases belonged to age group 21-25years (50.8%). Similar incidence was seen in studies conducted by Yogita V et al,[2] and Sarita A et al.[3] In study conducted by Yogita et al2 majority of patients belonged to 21-25years (48%) and in study conducted by Sarita et al,[3] age distribution of 50% of patients were between 21-25years.

Majority of the cases in the present study were booked cases (73.3%). In present study majority of patients were primi gravida (44.1%).

The major risk factor encountered in this study was hypertensive disorders in pregnancy (35%). Similarly, in study conducted by Archana M et al,[4] 21.8% of cases, in study by Himabindhu P et al,[5] 43% of cases, in study by Yogitha et al,[2] 23.5% and in study by Sarita A et al,[3] 30% of cases were having the same risk factor.

The surveillance of patients in study group was initiated at 30 wks of gestation, as fetus beyond this gestational age can be salvaged with good NICU facilities. But majority of the patients in our study had initiation of MBPP testing from 36 wks onwards. This was because of the late referral of the patients or patients attending antenatal clinic, only after the development of complications. In the present study, there were 4 cases were testing was initiated at 30weeks and 11 cases were testing initiated after 40weeks of gestation.

There were 220 MBPP test performed on 120 patients with an average test per patient being 1.8. The

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number of patients undergoing one test constituted 54.1%. The highest number of tests performed was 6 in 2 patients.

The last test done showed that 54.2% of the MBPP test results were normal, 9.2% of the tests were abnormal, NST was abnormal and AFI normal in 12.5% of cases and AFI abnormal (AFI<5 and >20) and NST normal in 24.2% cases. Similar result seen in study by Yogitha V et al,[3] i.e. majority of the test were normal in 85%, both parameters abnormal in 4.5% and either any of the parameter was abnormal in 10.5% of cases.

Out of 120 NST's in the last MBPP, 78.4% were reactive and 21.6% were non-reactive. Similar results were seen in study by Archana M et al,[4] i.e., reactive NST were 72.7% and nonreactive were 27.2%. In study by Rathod S et al,[1] 68% of cases were having reactive NST and 32% of cases were having nonreactive NST.

In present study, last AFI value 5 to 18 were 66.6%, 3 to 5 were 26.6% and <3 were 2.5% and > 18 were 4.1% out total patients. The studies done by Rathod et al,[1] Archana M et al,[4] Miller et al,[7] and Sowmya, K.P, et al,[8] showed similar incidence. In study by Rathod S et al,[1] 62% of cases were having last AFI >5 and in study by Archana M et al,[4] also 78.1% of cases had last AFI >5. In study by Miller et al1=7, the last AFI >5 were 88.45% and 86.1% respectively.

Out of 120 cases, 81(67.5%) cases had vaginal delivery and 39(32.5%) cases underwent LSCS. The mode of delivery in the study group with respect to last MBPP result showed that among 65 cases when both parameters of MBPP were normal, the incidence of LSCS and vaginal delivery were 13.8% and 86.2% respectively, when both parameters of MBPP were abnormal (11cases), the incidence of LSCS was 72.7% (8cases) and that of vaginal delivery was 27.3%(3cases) and these differences was found to be statistically significant. This shows that majority of cases with normal MBPP had vaginal delivery. There is increase in incidence of LSCS in cases with abnormal MBPP.

In the study by Rathod S et al,[1] the mode of delivery in the MBPP test group with respect to last MBPP result showed that, When the MBPP was abnormal with respect to both parameters, 73% of them had LSCS. In the present study, also when both parameters were abnormal the incidence of LSCS was 72.7%

In the study by Miller et al,[7] caesarean section rate when test results were abnormal was high compared to those when MBPP was normal (36% v/s 13.2%). This shows that when MBPP was normal, the mode delivery was not affected, whereas when it is abnormal, the operative intervention was increased showing the ability of the MBPP to predict fetal compromise.

In present study 28 cases underwent emergency LSCS. The major indication for emergency LSCS was fetal distress. The overall incidence of fetal distress was 17.5% (21 cases). Similar incidence was seen in study by Archana et al,[4] 11.8% (13cases), in study by Rathod S et al,[1] 19.2% (9cases), and in study by Miller et al,[7] 8.8% (15 cases). In study by Yogitha V et al,[2] the incidence of LSCS done for fetal distress is 30.1% which was the commonest indication in study group.

The parameters used to assess the perinatal outcome were thick meconium-stained liquor, APGAR score<7, NICU admission, perinatal morbidity and perinatal mortality. In our study those babies requiring NICU admission were taken as having perinatal morbidity.

When studied with respect to the last MBPP, showed that when the test results were abnormal, we had 100% (all of 11 out of 11 cases) showing thick meconium-stained liquor. When the test results were abnormal with respect to NST 60% (9 out 15 cases) had thick meconium. These results were statistically significant. In study by Yogitha V et al,[2] showed that whenever MBPP test results were abnormal, 88.8% i.e. 8 out of 9 cases had thick meconium.

Overall incidence of thick MSL in present study is 23.3%. Similar results were seen in study as 15.4% and in study by S. K. Patil et al,[6] 11.4% of cases. In study conducted by Rathod S et al,[1] showed similar results. When the last MBPP was abnormal, perinatal outcome was also abnormal. Rathod S et al,[1] had 88% (7 out of 8 cases) showing thick meconium, when the test results were abnormal with respect to both parameters and 12% (1 out 8 cases) when one of the parameter were abnormal. In study by Rathod S et al,[1] none had meconium when the test results were normal with respect to both parameters where as in present study when both parameters were normal out of 65 cases, only 3 cases (4.6%) had thick meconium. Hence from above results it is seen that the incidence of perinatal morbidity with respect to meconium is increased when both parameters were abnormal and more so when NST is abnormal compared to abnormal AFI when individual parameters were considered.

An APGAR score of <7 was seen in 25 cases (20.8%) in our study group, when MBPP was normal only 2 cases had APGAR score <7, when both parameters were abnormal all cases i.e. 100%had APGAR <7(p value<0.0001 significant) and these differences were statistically significant. When NST was normal and AFI abnormal 5cases (17.2%) had APGAR <7. When NST was abnormal AFI normal 7cases (46.6%) had APGAR score<7 (p value<0.02 significant). This indicates that compared to normal MBPP, when MBPP is abnormal or when any one of the parameters (NST & AFI) is abnormal there is increased incidence of low APGAR score. This signifies the value of MBPP as an antepartum surveillance tool to predict perinatal morbidity.

Similar results were seen in study conducted by Yogitha V et al.[2] APGAR score less than 7 was seen in 14.5% in MBPP group. When both parameters were abnormal 100% i.e. 9 cases had APGAR score less than 7. In study by Rathod et al1 10% of cases had APGAR score <7 in the test group.

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In present study 44 (36.6%) babies were admitted in NICU. Those babies requiring NICU admission were taken as having perinatal morbidity. This is comparable to earlier study by Compitak K et al,[9] on 185 patients with high-risk pregnancies, were 33.3% of the babies admitted to NICU in his study.

When MBPP was abnormal (both parameters abnormal) out of 11 cases, 8 cases (72.7%) had perinatal morbidity and 3 cases (27.2%) had perinatal mortality. In 29 cases when only AFI was abnormal and NST normal there were 9 cases (31%) with perinatal morbidity and there was no perinatal mortality. Among 15 cases with abnormal NST and normal AFI, 10 cases (66.6%) had perinatal morbidity and 4 cases (26.6%) with perinatal mortality. When both parameters were, abnormal there is increased incidence of both perinatal morbidity and mortality. When only AFI is, abnormal there is increase in incidence of perinatal morbidity and there no perinatal mortality and when only NST is, abnormal there is increase in both perinatal morbidity and mortality.

In our study, there were 7(5.8%) perinatal mortalities. 5 cases had severe preeclampsia, one case had come with decreased fetal movements and one case with bad obstetric history. MBPP was abnormal (both parameters abnormal) in 3 cases. The NST was non-reactive in all the 7 cases and AFI was abnormal in 3 cases.

Among 5cases of severe preeclampsia 4 cases were unbooked cases and one case was booked cases and the gestational age was between 34wks to 36wks. Two cases with severe preeclampsia of 34 week's gestation had vaginal delivery. These cases were induced for vaginal delivery in view of severe preeclampsia. Remaining 3 cases with severe preeclampsia had emergency LSCS. Fetal distress was the indication for emergency LSCS in these cases.

The case with decreased fetal movements was unbooked case with 37weeks gestation with both parameters abnormal, had underwent emergency LSCS for fetal distress. The case with bad obstetric history is an unbooked case, which also had underwent emergency LSCS. In these cases also indication for LSCS was fetal distress.

In all cases the modified biophysical profile was abnormal i.e. both parameters NST and AFI were abnormal. In all cases, thick meconium-stained liquor was seen. This shows that modified biophysical profile recognises a compromised fetus. MBPP helps in predicting perinatal outcome.

The birth weight of the babies was <1.5kg in one case and 1.5 to 2kg in 4cases. More than 2 kg were seen in two cases. There is increased incidence of low birthweight in these cases.

A study by S. K. Patil et al,[6] showed perinatal mortality of 8 cases (1.2%) out of 650 patients and Eden et al,[10] showed 5.94% of perinatal mortalities in their study. In study by Rathod S et al,[1] had 2% perinatal death in the MBPP group, which had showed abnormal test results. Thus, the present study suggests that when MBPP abnormal there is increased incidence of both perinatal morbidity and mortality. When considered individually, abnormal AFI was associated with increased incidence of perinatal morbidity and abnormal NST was associated with increased incidence of perinatal morbidity as well as mortality. From above discussion, we can conclude that MBPP can be used as a primary antepartum fetal surveillance test to predict the perinatal outcome in high-risk pregnancies.

CONCLUSION

Modified biophysical profile (MBPP) is easier, less time consuming, cost effective and patient compliant test. When the modified biophysical profile is normal, it gives reassurance that the fetal status is good with good perinatal outcome. At the same time, when MBPP is abnormal, it indicates that the fetus may be compromised. When the MBPP is, abnormal there is increased incidence of perinatal morbidity as well as mortality. Confirmation with complete biophysical profile can be done when MBPP results are abnormal. When considered individually, abnormal AFI was associated with increased incidence of perinatal morbidity and abnormal NST was associated with increased incidence of perinatal morbidity as well as perinatal mortality. MBPP can be used as a primary antepartum fetal surveillance test to predict perinatal outcome and provide timely intervention in high-risk pregnancies. The number of patients included in this study was 120. To formulate a definitive protocol, further multicentric studies with larger samples should be conducted.

REFERENCES

1. Rathod S et al. Clinical study of modified biophysical profile (MBPP) as an antepartum surveillance test in high risk pregnancies. SAS J. Surg 2015;1(2):36-39.
2. Yogitha V, S. C. Sanjay, Anil Kumar Shukla, Gomathy Narayanan et al. modified biophysical profile as an antepartum fetal surveillance test in high risk pregnancy: a prospective comparative study with conventional biophysical profile. Journal of Research in Radiodiagnosis, Teleradiology and Imaging 2016; 2(1):18-25.
3. Sarita A Deshpande et al. The efficacy of nonstress test in high-risk pregnancy in Indian Population. International J. of Healthcare and Biomedical Research 2015; 4(1):120-125.
4. Archana M et al. Modified Biophysical Profile and Fetal Outcome in High Risk Pregnancy. Sch. J. App. Med. Sci 2014; 2(1C):283-290.
5. Himabindu P et al. Evaluation of Nonstress Test in Monitoring High Risk Pregnancies. IOSR Journal of Dental and Medical Sciences 2015;14(4) Ver. VII: 40-42.
6. Patil SK, Ghregrat RH, Khadilkar SS et al. Correlation of NST and AFV in antenatal fetal monitoring. J Obstet Gynecol India. 1998;32(106):177-81.
7. Miller et al. The modified biophysical profile antepartum testing in 1990's. Am J Obstet gynaecol 1996;174(3):812-7.
8. Sowmya, K.P., et al. "Modified biophysical profile in antepartum fetal surveillance of high risk pregnancies." International Journal of Reproduction, Contraception, Obstetrics and Gynecology, vol. 6, no. 5, May 2017, pp. 1854+
9. Compitak K et al. Diagnostic performance of NST, AFI, and modified biophysical profile for screening fetal acidemia in high risk pregnancies. J med Assoc Thai 2004;87(13):512-7.
10. Eden RD, Scifert LS, Kodack LD et al. A MBPP for antenatal fetal surveillance. Obstet Gynecol. 1988;71(3):365-9.

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