ORIGINAL RESEARCH PAPER

Gynaecology

Volume : 6 | Issue : 12 | December : 2016 | ISSN - 2249-555X | IF : 3.919 | IC Value : 79.96

MODIFIED BIOPHYSICAL PROFILE AND FETAL OUTCOME

KEYWORDS

Fetal outcome, High risk pregnancy, Modified biophysical profile.

Dr.K.Vijayalakshmi

Professor, Department of Obstetrics and Gynaecology ,ASRAM Medical college, Eluru, Andhra Pradesh, India.

Dr.M.Sivakumari

Final year Post Graduate, Department of Obstetrics and Gynaecology, ASRAM Medical college, Eluru, Andhra Pradesh, India. Corresponding Author

ABSTRACT *The goal of antepartum fetal surveillance is to decrease the perinatal morbidity and mortality. Modified bio physical pofile is an antepartum surveillance test combining NST and AFI. We tested the high risk antepartum cases admitted in ASRAM hospital Eluru, from March 2015 to October 2016 with MBPP, and compared the foetal outcome(colour of liquor, APGAR,NICU admission). MBPP has a 95.6% sensitivity and 39.3% specificity in diagnosing foetal distress. MBPP gives reassurance that the foetal status is good when the test results are normal. The same do not hold true when we have abnormal results, it could be a false alarm and requires reconfirmation of poor foetal status with conventional biophysical profile.*

Introduction:

It is estimated that perinatal mortality rate 19.2 in the world,28 in India. (1) Both antepartum and intrapartum foetal surveillance involves serial systematic fetal assessment aimed at identifying foetus in jeopardy so that appropriate steps can be undertaken to prevent damage or death.

Clark and colleagues (2), Vintzilleous et al(3), and Nageotte and colleagues (4) used the modification of bio-physical profile by combining NST (short term marker of foetal status) and AFI (a long term marker of placental function), for primary foetal surveillance. The test has excellent negative and positive predictive values of 0.8/1000 and 1.5 % respectively. In this study, MBPP is used as the primary surveillance test in high risk pregnancy to study the effectiveness and outcome of pregnancy.

AIMS & OBJECTIVES:

1) To study the effectiveness of using Modified Biophysical Profile as a primary antepartum surveillance test in predicting perinatal outcome.
2) To compare the perinatal mortality and morbidity with respect to each of the parameters of Modified Biophysical Profile.

METHODOLOGY:

Design : A prospective clinical study

This study was conducted at Alluri Seetharamaraju Academy of Medical Sciences, Eluru, which is a teaching hospital.200 pregnant patients of >32 weeks with high risk-factors for fetal hypoxia admitted to the antenatal ward, during a period of one and half year from March 2015 to October 2016 were considered as the "study group". The patients were evaluated with the Modified Biophysical Profile (MBPP).

The Non Stress Test was performed. Recording of fetal heart rate, fetal movements and uterine contractions was done. The trace was designated reactive if more than 2 fetal movements with two accelerations of more than or equal to 15 beats/minute lasting for more than or equal to 15 seconds, with good beat to beat variability and no decelerations. If there was no reactivity in this period, the trace was deemed non-reactive.

Real-time ultrasound scanning was performed, the volume of amniotic fluid was measured according to the four quadrant technique described. An amniotic fluid index was considered normal if more than five and abnormal if less than or equal to five.

Risk factors included are Pre-eclampsia, Anemia, Pregnancy beyond 40 weeks, Bad obstetric history, Intrauterine growth restriction(suspected clinically), Gestational diabetes mellitus, Heart disease, Pregnancies with uncertain dates, Patients with decreased fetal movements, Oligohydramnios. Exclusion criteria is fetuses with congenital anomalies, low risk pregnancy, high risk pregnancy less than 32 weeks gestation, Multiple pregnancy, Seriously ill patients.

Results:

Table-1 Risk factors

Risk factor	Number (n= 200)	%
HTN disorders	51	25.5
Decreased FM	32	16
Oligo	25	12.5
Rh-ve	20	10
GDM	16	8
Bad Obstetric History	18	9
Anemia	16	8
Hypo Thyroid	14	7
IUGR	11	5.5
Heart Disease	9	4.5
Epilepsy	6	3
Others	6	3

From the above table, the most common high risk factors are Pre-eclampsia (25.5%), Postdated pregnancies (22%) and decreased fetal movement (12.5%).

Table 2 MBPP

MBPP parameter	Number (n = 200)	%
NST-Normal : AFI - Normal	170	85
NST-Abnormal : AFI - Abnormal	9	4.5
NST-Normal : AFI - Abnormal	17	8.5
NST-Abnormal : AFI - Normal	4	2

Table 2 shows the result of MBPP in our study.85% of the cases having both MBPP parameters normal, both parameters were abnormal in 4.5% of the cases and either one of the parameters were abnormal in 10.5% of the cases

Table - 3 Association of Non-Stress Test with study outcomes

Study outcomes	NST reactive (n=187)	NST Non-reactive (n=13)	P Value
Mode of delivery			
Vaginal	86(45.9)	2 (15.4)	0.032*

Volume : 6 | Issue : 12 | December : 2016 | ISSN - 2249-555X | IF : 3.919 | IC Value : 79.96

Instrumental	9(4.8)	-	-
LSCS-elective	12 (6.4)	2(15.4)	0.228-
LSCS- emergency	80(42.8)	9(69.2)	0.064a
Color of liquor			
Clear liquor	148(79.1)	3 (23.1)	0.000**
Thin meconium	31(16.6)	1 (7.7)	0.697
Thick meconium	8(4.3)	9 (69.2)	0.000**
Birth weight in Kgs			
<1.5	-	4(30.8)	0.000**
1.5 – 2.5	38 (20.3)	-	-
2.5 – 3.5	142 (75.9)	9(69.2)	0.525
>3.5	7(3.7)	-	-
Apgar at 5 minute			
Normal (>7)	166 (89.3)	4(30.8)	0.000**
Abnormal (<7)	20(10.7)	9(69.2)	0.000**
Morbidity			
Absent	168(86.6)	4(30.8)	0.000**
present	19(13.4)	9(69.2)	0.000**

a-near significant *significant at 5% **significant at 1%

Table 3 shows the clinical outcome with reactive and non reactive NST.When NST was reactive, 45.9% had vaginal delivery, when NST was non-reactive, 69.2% had LSCS. When NST was non-reactive, the incidence of thick meconium stained liquor, Apgar score at 5th minute < 7 and NICU admissions were high (69.2%) in the study group. LSCS, thick meconium, abnormal APGAR (<7) and perinatal morbidity is positively related with non-reactive NST patterns.

Table 4 Association of AFI with study outcomes

Study outcomes	AFI (>5) Normal (n=174)	AFI (<5) Abnormal (n=26)	P value
Mode of delivery			
Vaginal	83 (47.7)	5(19.2)	0.006**
Instrumental	8(4.6)	1(3.8)	p>0.05
LSCS-elective	12(6.9)	2(7.7)	p>0.05
LSCS- emergency	71(40.8)	18(69.2)	0.077a
Color of liquor			
Clear liquor	142(81.6)	9(34.6)	0.000**
Thin meconium	26(14.9)	6(23.1)	0.291
Thick meconium	6(3.4)	11(42.3)	0.000**
Birth weight in Kgs			
<1.5	-	4(15.4)	0.000**
1.5 – 2.5	33(18.9)	5(19.2)	p>0.05
2.5 – 3.5	135(77.6)	16(61.5)	0.076a
>3.5	6(3.4)	1(3.8)	p>0.05
Apgar at 5 minute			
Normal (>7)	163(93.7)	8(30.8)	0.000**
Abnormal (<7)	11(6.3)	18(69.2)	0.000**
Morbidity			
Absent	157(90.22)	9(34.6)	0.000**
present	17(9.8)	17(65.4)	0.000**

a-Near significant * significant at 5% ** significant at 1%

Table 4 shows the clinical outcome in relation to AFI. When AFI was <5, the incidence of caesarean section was seen in 69.2% of the cases, thick meconium stained liquor in 42.3%, Apgar score at 5th minute < 7 in 69.2%, and perinatal morbidity is positively in 65.4% when compared to normal AFI parameters.

This suggests that LSCS, thin and thick meconium, abnormal Apgar and perinatal morbidity is positively related with abnormal AFI(<5).

Table 5 MBPP with mode of delivery

MBPP	Mode of delivery				
	Vaginal	Instrumental	LSCS-Elective	LSCS-Emergency	Total (n =200)
Both normal	82(48.2)	8(4.7)	11 (6.5)	69(40.6)	170(100.0)
Both abnormal	1(11.1)	-	1(11.1)	7(77.8)	9(100.0)
NST–Normal: AFI - Abnormal	4(23.5)	1 (5.9)	1(5.9)	11(64.7)	17(100.0)
NST – Abnormal AFI - Normal	1(25.0)	-	1(25)	2 (50.0)	4(100.0)
Inference	Cases with both MBPP parameters abnormal are more likely to have emergency LSCS with p = 0.040.				

Table 5 : Majority of cases were delivered by LSCS when both parameters were abnormal. The incidence of operative delivery is increased when both the parameters of the MBPP test were abnormal (77.8%).When individual parameters of MBPP test that is either NST and AFI were abnormal ,the situation was same.

Table 6 MBPP with color of liquor

MBPP	Clear	Thin	Thick	Total (n=200)
Both Normal	139 (81.8)	26(15.3)	5 (2.9)	170(100.0)
Both abnormal	-	1(11.1)	8 (88.9)	9(100.0)
NST – Normal AFI-Abnormal	9(52.9)	5(29.4)	3 (17.6)	17(100.0)
NST–Abnormal AFI- Normal	3 (75)	-	1 (25)	4 (100.0)
Inference	Significantly higher proportion of thick meconium in cases When both MBPP parameters were abnormal (p<0.001).			

Table 6: The incidence of thick meconium stained liquor, which is an indicator of intrauterine fetal hypoxia with respect to last MBPP result is as shown in Table 13. It is observed that the presence of thick meconium, which is of significance, is increased whenever both the test parameters were abnormal (88.9%).

Table 7 MBPP with APGAR score and Morbidity

MBPP	APGAR score at 5 minute		Morbidity		Total (n =200)
	Normal (>7)	Abnormal (<7)	Absent	Present	
Both Normal	159 (93.5)	11 (6.5)	153 (90)	17 (10)	170 (100.0)
Both abnormal	-	9 (100)	0	9(100)	9(100.0)
NST – Normal AFI- Abnormal	8 (47.1)	9 (52.9)	9(52.9)	8(47.1)	17 (100.0)
NST – Abnormal AFI- Normal	4(100.0)	-	4(100.0)	-	4(100.0)
Inference	Significantly higher proportion of low APGAR score and perinatal morbidity in cases when both MBPP parameters were abnormal(p<0.001)				

Table 7: The APGAR score of > 7, which is considered normal is seen in 93.5% of cases when both parameters are normal. Values of < 7, which is considered abnormal were mostly seen when test parameters were showing abnormality (100%).

The perinatal morbidity is increased whenever both parameters of the test were abnormal (100%).

Volume : 6 | Issue : 12 | December : 2016 | ISSN - 2249-555X | IF : 3.919 | IC Value : 79.96

Table 8 Comparison of NST, AFI and MBPP with overall outcome.

Overall outcome	Non-stress test	Amniotic Fluid Index	MBPP
Sensitivity	98.57	95.86	95.68
Specificity	18.33	36.36	39.34
PPV	73.80	79.88	78.23
NPV	84.61	76.92	80.00
%Flase Negatives	1.43	4.13	4.31
%False positives	81.67	63.63	60.65

Overall outcome is defined as abnormal outcomes if at-least one of the factors namely meconium, Apgar score, birth weight and perinatal morbidity is abnormal.

From table 8, MBPP had sensitivity of 95.68%, specificity of 39.34%, PPV of 78.23, NPV of 80, % false negatives 4.37 and % false positives 60.65 with respect to Overall outcome in this study. MBPP had low false positivity compared to NST and AFI.

DISCUSSION

The present study comprising of 200 patients aims to evaluate the efficacy of modified BPP in predicting perinatal outcome in high risk pregnancies by observing various measures of perinatal outcome in terms of sensitivity, specificity, positive predictive value and negative predictive value.

In our study ,majority of the MBPPs were performed with hypertensive disorders in pregnancy. This was comparable with Eden et al study. (5)

The distribution of MBPP test score results in this study indicates that the vast majority of the tests were normal in 85%, both parameters abnormal in 4.5% and either any one parameter was abnormal in 10.5%(NST normal AFI abnormal in 8.5%,NST abnormal AFI normal in 2%). This compares well with the results obtained by S.K. Patil who had both MBPP parameters normal in 81.8% of cases in his study.(6)

Cesarean section rate was 47% when both parameters were normal, 57 % when either one of these abnormal, when both parameters are abnormal 88.8%.Cases with both MBPP parameters abnormal are more likely to have emergency LSCS with p = 0.040.it is comparable with the study of Eden et al.(5)

Thick meconium stained liquor was seen in 2.9% cases when both parameters are normal, 19% cases when either parameters were abnormal and 88.9% (p<0.001 which is highly significant) when both abnormal. This is comparable with Eden et al & S K Patil et al studies.(5,6)

5mins APGAR <7 was seen in 6.4% cases when both parameters were normal, 42% when either parameters were abnormal and 100% when both parameters were abnormal (p<0.001 which is highly significant). This is comparable to the study of Eden et al(5).

NICU admission >7days in 10% cases of normal MBBP, 38% when either one parameter is abnormal and 100% when both parameters were abnormal(P <0.001 highly significant)

Sensitivity of diagnosing fetal distress of MBPP 95.6%, specificity 39.3%,PPV 78.2%,NPV 80%, false positive 4.3%, false negatives 60.6%.

CONCLUSION

- Modified biophysical profile is easier, less time consuming, cost effective and patient compliant test.
- Modified biophysical profile gives reassurance that the fetal status is good with good perinatal outcome, when the test results are normal.
  - NST = Acute marker of foetal status.
  - AFI = Chronic marker of placental function.
- The same do not hold true when we have abnormal results, it could be a false alarm and requires reconfirmation of poor foetal status with conventional biophysical profile.
- Modified biophysical profile can be used as a primary foetal surveillance.
- To bring down caesarean section rate, we require more accurate diagnostic tools like fetal scalp blood pH estimation during intrapartum periods.
- The number of patients studied in this comparative analysis is 200. To formulate the definitive protocol the study should continue with large number patients.

REFERENCES:

1. Parks text book of social and preventive medicine, 23 edition p.563.
2. Clark SL, Sabey P, Jolley K; Non Stress Testing with acoustic stimulation of amniotic fluid volume assessment - 5973 tests without unexpected fetal deaths; Am J Obstet Gynaecol, 1989 160(3): 694697.
3. Vintzileos AM Campbell WA, Ingardia CJ, Nochimson DJ; The fetal biophysical profile and its predictive value. Obstetrics & Gynecology, 1983; 62(3): 271-278.
4. Nageotte MP, Towers CV, Asrat T, Freeman RK; Prenatal outcome with the modified biophysical profile. American journal of obstetrics and gynecology, 1994; 170(6): 1672-1676. 4
5. Eden RD, Scifert LS,Kodak LD et al. A MBPP for antenatal fetal surveillance Obstet Gynaecol 1988:71(3).
6. Patil Sk, Ghregrat RH, Khadilkar SS et al. Correlation of NST and AFV in antenatal fetal monitoring. J Obstet and Gynaecol India 1988:32(106):177-181.