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Research Article

Modified Biophysical Profile and Fetal Outcome in High Risk Pregnancy

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Abstract: The aims and objectives of this study was to evaluate foetal health in high risk pregnancy with modified B.P.P., to record the perinatal outcome, to evaluate efficacy of modified B.P.P. in predicting perinatal outcome in high risk pregnancy. In this study 110 admitted cases having one or more high risk factors were studied. Modified B.P.P., N.S.T. and C.T.G. was done. Only the last antenatal test within 7 days of delivery was considered for analysis. Sensitivity of the test (diagnostic accuracy) is improved in modified B.P.P. (79.5 as compared to 53.5 for N.S.T. and 60.5 for A.F.I.), P.P.V. (diagnostic power) is also improved in 85.83% as compared to 17.6% for N.S.T. and 26.16% for A.F.I. In conclusion, modified B.P.P. is cost effective, non-invasive and best screening test to evaluate fetal health and to predict fetal outcome thus perinatal mortality and morbidity can be reduced in our country. With this test we can wait for spontaneous onset of labour and decrease operative intervention associated with induction of labour. Thus maternal morbidity and mortality is also reduced.
Keywords: Modified biophysical profile, High risk pregnancy, N.S.T., C.T.G., Fetal outcome in high risk pregnancy

INTRODUCTION

As technology has advanced, the field of antepartum fetal evaluation has grown [1, 8]. A variety of options are available for use in high risk pregnancy. Modified B.P.P. is the best available test for primary fetal surveillance [2]. It combines the observation of an index of acute fetal hypoxia - the N.S.T. and an indicator of chronic fetal problem amniotic fluid volume [3-7].

Aims and Objectives

- To evaluate foetal health in high risk pregnancy with modified B.P.P.
- To record the perinatal outcome.
- To evaluate efficacy of modified B.P.P. in predicting perinatal outcome in high risk pregnancy.

MATERIAL AND METHODS

This study was carried out in the Department of Obstetric and Gynaecology at Kamla Raja Hospital, G.R. Medical College, Gwalior (M.P.) from June 2005 to October 2006.

Total 110 admitted patients having one or more high risk factors were studied. Modified B.P.P. was done in every patient. N.S.T. was done and C.T.G. was done. Only the last antenatal test within 7 days of delivery was considered for analysis.

RESULTS

Table-1 shows that most common high risk factor in patients included in our study was hypertensive disorder i.e. 24(21.8%) followed by IUGR 13(11.8%), Post dated pregnancy11(10%), Previous LSCS 11(10%), BOH 10(9.09%), Anemia 6 (5.45%), PROM 6 (5.45%), Rh incompatibility 6 (5.45%), Decreased fetal movement 5 (4.54%), Short Stature 5 (4.54%), Malpresentation 5 (4.54%), APH 3 (2.72%), Heart disease 3 (2.72%), Liver disease 1(0.9%), Gestational diabetes 1(0.9%).

Table-2 shows that out of 110 high risk cases 80 cases (72.7%) had reactive NST pattern and 30 (27.2%) cases had non reactive NST pattern.

Table-3 shows that out of 110 high risk cases included in the study 24 cases (21.8%) had AFI value $\leq$ 5 (Oligohydramnios), 14 cases (12.7%) had AFI value between 6-<8 (Borderline), 72 cases (65.4%) had AFI value between 8-24 (Normal) according to Phelan classification.

Table-4 shows that out of 80 reactive NST cases 43 cases (53.75%) had normal vaginal delivery and when NST pattern was non-reactive 14 cases (46.6%) had normal vaginal delivery out of 30 non-reactive NST. Forceps application was done in 4 cases out of which 2 cases had fetal distress 1 (1.25%) was in reactive pattern and 1 (3.33) was in non-reactive pattern. LSCS was done in 45 cases out of which 31

cases (38.75%) had reactive pattern and 14 cases (46.6%) had non reactive pattern.

6 cases (7.5%) had LSCS for fetal distress when NST was reactive and 7 cases (23.3%) had LSCS for fetal distress when NST was non-reactive.

Table-5 shows that 7 cases (8.75%) had fetal distress when NST pattern was reactive and 8 cases (26.6%) had fetal distress when NST pattern was non-reactive. 9 cases (11.25%) had apgar score < 7 after 5 min when NST pattern was reactive and 7 cases (23.3%) had apgar score < 7 after 5 min when NST pattern was non reactive. 4 cases (5%) had to be admitted in NICU when NST was reactive and 5 cases (16.6%) had to be admitted in NICU when NST was non-reactive. 12 cases (15%) had meconium staining of liquor when NST was reactive and 4 cases (13.3%) had meconium staining of liquor when NST was non-reactive. 9 cases (1.3%) had birth weight < 2 kg when NST was reactive and 7 cases (23.3%) had birth weight < 2 kg when NST was non-reactive. There was 1 perinatal death (3.33%) when NST was non-reactive and no perinatal death occurred when NST was reactive.

Table-6 shows that when AFI was > 5 cm 51 cases (59.3%) had normal vaginal delivery and when AFI was $\leq$ 5, 6 cases (25%) had normal vaginal delivery. Forceps application was done in 4 cases out of which 2 cases had fetal distress and both cases had AFI $\leq$ 5 (8.33%). Forceps were not applied for fetal distress for fetal distress when AFI was > 5 cm. LSCS was done in 45 cases out of which 29 cases (33.7%) had AFI > 5 and 16 cases (66.66%) had AFI $\leq$ 5.

5 cases (5.81%) had LSCS for fetal distress when AFI value was > 5 and 8 cases (33.3%) had LSCS for fetal distress when AFI value was $\leq$ 5.

Table-7 shows that 8 cases (9.3%) had fetal distress when AFI value was > 5 and 7 cases (29.1%) had fetal distress when AFI value was $\leq$ 5. 6 cases (6.97%) had apgar score < 7 after 5 min when AFI value was > 5 and 10 cases (41.6%) had apgar score < 7 after 5 min when AFI value was $\leq$ 5. 3 cases (3.48%) had to be admitted in NICU when AFI value was > 5 and 6 cases (25%) had to be admitted in NICU when AFI value was $\leq$ 5. 7 cases (8.1%) had meconium staining of liquor when AFI value was > 5 and 9 cases (37.5%) had meconium staining of liquor when AFI value was $\leq$ 5. 11 cases (12.7%) had birth weight < 2 kg when AFI value was > 5 and 5 cases (20.8%) had birth weight < 2 kg when AFI value was $\leq$ 5. There was 1 perinatal death (4.1%) when AFI value was $\leq$ 5 and no perinatal death occurred when AFI value was > 5.

Table 1: Distribution of High Risk cases according to their high risk factor

Sl. No.	High Risk Factor	No. of cases	Percentage (%)
1.	Hypertensive disorder	24	21.8%
2.	IUGR	13	11.8%
3.	Post dated pregnancy	11	10%
4.	Previous LSCS	11	10%
5.	BOH	10	9.09%
6.	Anemia	6	5.45%
7.	PROM	6	5.45%
8.	Rh Incompatibility	6	5.45%
9.	Decreased fetal movement	5	4.54%
10.	Malpresentation	5	4.54%
11.	Short Stature	5	4.54%
12.	APH	3	2.72%
13.	Heart disease	3	2.72%
14	Liver disease	1	0.90%
15.	Gestational diabetes	1	0.90%
	Total	110	100%

Table 2: Distribution of High risk cases according to their last NST Pattern

Sl. No.	NST Pattern	No. of cases	Percentage (%)
1.	Reactive	80	72.7%
2.	Non Reactive	30	27.2%
	Total	110	100%

Table 3: Distribution of cases according to their last AFI value with in 1 week of delivery

Sl. No.	AFI Value (cm.)	No. of cases	Percentage (%)
1.	$\leq$ 5	24	21.8%
2.	6 - < 8	14	12.7%
3.	8 - 24	72	65.4%
4.	25 - 30	0	0%
	Total	110	100%

Table 4: Correlation of Last NST pattern with mode of delivery

Sl. No.	Mode of delivery	Reactive NST (N=80)		Non Reactive NST (N=30)	
		No.	%	No.	%
1.	Normal Vaginal	43	53.75	14	46.6
2.	Vaginal Breech	4	5	0	0
3.	Forceps application				
	(a) Fetal distress	1	1.25	1	3.33
	(b) Others	1	1.25	1	3.33
	(c) Total	2	2.5	2	6.66
4.	LSCS				
	(a) Fetal distress	6	7.5	7	23.3
	(b) Others	25	31.25	7	23.3
	(c) Total	31	38.75	14	46.6

Table 5: Correlation of Last NST pattern with perinatal outcome

Sl. No.	Measurement of Perinatal outcome	Reactive NST (N=80)		Non Reactive NST (N=30)	
		No.	%	No.	%
1.	Fetal Distress in labour	7	8.75	8	26.6
2.	Apgar score < 7 after 5 min.	9	11.25	7	23.3
3.	Admission to NICU	4	5	5	16.6
4.	Meconium staining of liquor	12	15	4	13.3
5.	Low birth weight < 2 kg.	9	11.3	7	23.3
6.	Perinatal death	0	0	1	3.33

Table 6: Correlation of Last AFI with mode of delivery

Sl. No.	Mode of Delivery	AFI (> 5) (N=86)		AFI (≤ 5) (N=24)	
		No.	%	No.	%
1.	Normal Vaginal	51	59.3	6	25
2.	Vaginal Breech	4	4.65	0	0
3.	Forceps application				
	(a) Fetal distress	0	0	2	8.33
	(b) Others	2	2.32	0	0
	(c) Total	2	2.32	2	8.33
4.	LSCS				
	(a) Fetal distress	5	5.81	8	33.33
	(b) Others	24	27.9	8	33.33
	(c) Total	29	33.7	16	66.66

Table 7: Correlation of Last AFI value (cm) with perinatal outcome

Sl. No.	Measurement of Perinatal outcome	AFI (> 5) (N=86)		AFI (≤ 5) (N=30)	
		No.	%	No.	%
1.	Fetal Distress in labour	8	9.3	7	29.1
2.	Apgar score < 7 after 5 min.	6	6.97	10	41.6
3.	Admission to NICU	3	3.48	6	25
4.	Meconium staining of liquor	7	8.1	9	37.5
5.	Low birth weight < 2 kg.	11	12.7	5	20.8
6.	Perinatal death	0	0	1	4.1

Table 8: Relationship of modified biophysical profile with various aspects of perinatal outcome in total patients (n=110)

Sl. No.	Measurements Perinatal outcome	NST	AFI in cm					
			≤ 5		6-< 8		8-24	
			No.	%	No.	%	No.	%
1.	Fetal distress in labour n=15 (13.6)	Reactive n=7 (46.6) Non-reactive n=8 (53.33)	1 6	14.2 75	3 1	42.8 25	3 0	42.8 0
2.	No Fetal distress n=95 (86.36)	Reactive n=73 (76.8) Non-reactive n=22 (23.1)	9 8	12.32 36.3	13 5	17.8 22.7	51 9	69.8 40.9
3.	Apgar score < 7 after 5 min n=16 (14.5)	Reactive n=7 (43.7) Non-reactive n=9 (56.25)	2 8	28.57 88.88	2 1	28.5 11.11	3 0	42.85 0
4.	Apgar score > 7 after 5 min n=94 (85.4)	Reactive n=71 (75.5) Non-reactive n=23 (24.4)	8 6	11.26 26.08	13 7	18.3 30.4	50 10	70.4 43.47
5.	Meconium staining of liquor n=16(14.5)	Reactive n=12 (75) Non-reactive n=4 (25)	5 4	48.1 100	6 0	50 0	1 0	8.3 0
6.	Meconium absent n=94 (85.4)	Reactive n=78 (82.9) Non-reactive n=26 (27.6)	12 3	15.3 11.5	4 8	5.1 30.7	62 15	79.5 67.6
7.	Admission to NICU n=9 (8.2)	Reactive n=4 (44.4) Non-reactive n=5 (55.5)	2 4	50 80	2 1	50 20	0 0	0 0
8.	Not admitted to NICU n=101(91.8)	Reactive n=76 (75.2) Non-reactive n=25(24.8)	4 14	5.26 56	11 5	14.5 20	61 6	80.3 24
9.	Birth weight < 2 kg n=16 (14.5)	Reactive n=9 (56.25) Non-reactive n=7 (43.75)	0 5	0 71.42	4 2	44.4 28.57	5 0	55.5 0
10.	Birth weight > 2 kg n=94 (85.45)	Reactive n=71 (75.53) Non-reactive n=23 (24.5)	5 6	7.04 26.08	8 3	11.26 13.04	57 14	80 60.86
11.	Perinatal death n=1 (0.90)	Reactive n=0 (0) Non-reactive n=1 (100)	0 1	0 100	0 0	0 0	0 0	0 0

Above table-8 shows correlation of NST and AFI i.e., Modified BPP with the perinatal outcome. Out of 110 cases 15 cases (13.6%) had fetal distress in labour and among them 7 cases (46.6%) had reactive NST pattern and 8 cases (53.33%) had non reactive NST pattern. Out of 7 cases (46.6%) with reactive pattern, 3 cases (42.8%) had AFI $\leq$ 5 cm and out of 8 cases (53.3%) with non reactive pattern, 5 cases (50%) had AFI $\leq$ 5 cm.

Out of 110 cases 16 cases (14.5%) had apgar score < 7 after 5 min and out of 16 cases 7 cases (43.7%) had reactive NST pattern and 9 cases (56.25%) had non-reactive NST pattern. Out of 7 cases with reactive pattern 3 cases (42.8%) had AFI $\leq$ 5 cm and out of 9 cases (56.25%) with non reactive pattern 7 cases (87.5%) had AFI $\leq$ 5 cm.

16 cases (14.5%) had meconium stained liquor at labour and out of 16, 12 cases (75%) had reactive NST pattern and 4 cases (25%) had non-reactive NST pattern. Out of 12 cases with reactive NST pattern 7 cases (58.3%) had AFI $\leq$ 5 cm and out of 4 cases (25%) with non reactive pattern 2 cases (50%) had AFI $\leq$ 5 cm.

9 neonates (8.2%) were admitted in NICU and out of them 4 cases (44.4%) had reactive NST pattern and 5 cases (55.5%) had non-reactive pattern. Out of 4 cases (44.4%) with reactive pattern 2 cases (50%) had AFI $\leq$ 5 cm and out of 5 cases with non-reactive pattern 4 cases (80%) had AFI $\leq$ 5 cm.

16 neonates (14.5%) had birth weight < 2 kg, out of them 9 cases (56.25%) had reactive pattern and 7 cases (43.75%) had non reactive pattern. Out of the reactive cases 1 case (11.1%) had AFI $\leq$ 5 cm and out of non reactive pattern 4 cases (57.14%) had AFI $\leq$ 5 cm.

Among the total cases there was only 1 (0.9%) perinatal death in which NST pattern was non-reactive as well as AFI value was $\leq$ 5 cm.

DISCUSSION

The present study comprising of 110 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. Modes of delivery were also observed in every patient.

Table 1 in the observation shows the distribution of high risk cases according to their high risk factors. Hypertensive disorder formed the most common indication in the study comprising 24 cases (21.8%), followed by IUGR 13(11.8), postdated pregnancy 11(10%), Prev. LSCS 11(10%), BOH 10(9.09%), Anemia 6(5.45), PROM 6(5.45), Rh incompatibility 6(5.14), decreased fetal movement 5(4.54), Short statured 5 (4.54), malpresentation 5(4.54%), APH 3(2.72%), Heart disease 3(2.72), Liver disease 1(0.9%), gestational diabetes 1(0.9%).

Nonstress test was done in all 110 high risk patients weekly or biweekly. Amniotic fluid index was measured in every patient weekly. Last NST pattern and last AFI value of every patient was considered for study.

Correlation of last NST pattern with the mode of delivery

In our study 80 cases had reactive NST pattern and out of them 43 cases (53.75%) had normal vaginal delivery and 4 cases (5%) had vaginal breech delivery. Out of 30 non-reactive NST pattern 14 cases (46.6%) had normal vaginal delivery. Forceps application was done in 4 cases out of which 2 cases had fetal distress, 1(1.25%) was in reactive pattern and 1(3.33%) was in non-reactive pattern LSCS was done in 45 cases out of which 31 cases (38.75%) had reactive pattern and 14 cases (46.6%) had non reactive pattern (Table 4).

6 cases (7.55) had LSCS for fetal distress when NST was reactive and 7 cases (23.3%) had LSCS for fetal distress when NST was non reactive.

From the above discussion we can say that the number of LSCS for fetal distress were more i.e. 7(23.3%) when NST pattern was non-reactive as compared to reactive NST pattern i.e. 6 cases (7.5%).

Correlation of last AFI value with the mode of delivery

In our study 24 cases (21.8%) had AFI $\leq$ 5 cms and out of them 6 cases (25%) had normal vaginal delivery. 86 patients (78.18%) had AFI > 5 cm and out of them 51 cases (59.3%) had normal vaginal delivery and 4 cases had vaginal breech delivery (Table 6).

Forceps were applied in 4 cases and out of them 2 cases had fetal distress and both cases (8.33%) had AFI value $\leq$ 5 cms.

LSCS was done in 45 cases and out of them 29 cases had AFI > 5 cms and 16 cases had AFI$\leq$ 5 cms. Out of 16 cases with AFI $\leq$ 5 cms LSCS was done for fetal distress in 8 cases (33.33%) and out of 29 cases with AFI > 5 cms LSCS was done for fetal distress in 5 cases (5.81%).

From the above discussion we can summarize that the no. of normal vaginal delivery were more when AFI was > 5 cm [(51(59.3%) versus 6(25%)] LSCS for the fetal distress were more when AFI was $\leq$ 5 cms [8(33.33%) versus 5(5.81%)].

Table 9: Predictability of perintal outcome with last NST pattern

Variables	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Fetal distress in labour	53.3	76.8	26.6	91
Apgar < 7 after 5 minutes	43.75	75.53	23.3	88.75
Admission to NICU	55.55	75.24	16.6	95
Low birth weight (<2 kg)	43.75	75.53	23.3	88.75
Meconium staining of liquor	25	72.34	13.3	85
Perinatal death	100	73.3	3.33	100
Combined	53.5	74.8	17.6	91.3

Table 5 in observation shows the correlation of last NST pattern with the perinatal outcome. 7(8.75%) cases had fetal distress when NST pattern was reactive and 8(26.6%) cases had fetal distress when NST pattern was non-reactive. So predictability of abnormal NST for fetal distress in labour is as sensitivity - 53.3%, specificity - 76.8%, positive predictive value (PPV) 26.6%, negative predictive value (NPV) 91%. PPV and NPV were comparable to the study of T.F. Basket and coworker [1] (PPV=24.9%, NPV=88.2%). Sensitivity and specificity were comparable to the study of F.A. Manning and coworker [2] (Sensitivity=57.5%, Specificity=84.7%).

7 cases (23.3%) had apgar score < 7 after 5 minutes when NST pattern was non reactive and 9 cases (11.25%) had apgar score < 7 after 5 min when NST pattern was reactive Predictability of abnormal NST for apgar score < 7 after 5 minutes is as - Sensitivity - 43.75%, specificity - 75.53%, PPV-23.3%, NPV-88.75%) results were comparable to the study of Atul K. Sood, 2002[3].

5 neonates (16.6) were admitted to NICU when NST pattern was non reactive and 4 neonates (5%) were admitted to NICU when NST pattern was reactive. So predictability of abnormal NST comes out to be as: Sensitivity-55.55%, specificity - 75.24%, PPV-16.6%, NPV-95%.

In 4 cases (13.3%) meconium was present when NST was non reactive and 12 cases (15%) had meconium when NST was reactive. So predictability of abnormal NST comes out to be Sensitivity 25% specificity 72.34%, PPV 13.3% and NPV 85%.

7 newborns (23.3%) had birth weight < 2 kg. when NST was non reactive and 9 newborns (11.3%) had birth weight < 2 kg when NST was reactive.

Predictability of abnormal NST is as Sensitivity 43.75%, Specificity 75.53%, PPV 23.3%, NPV 88.75%.

Out of 110 high risk cases only 1 perinatal death occurred when NST was non reactive. So Predictability of abnormal NST is as Sensitivity 100%, Specificity 73.3%, PPV 3.33%, NPV 100%.

By combining all the above factors over all Predictability of abnormal NST pattern is as Sensitivity 53.5%, Specificity 74.8%, PPV 17.6%, NPV 91.3%.

Predictability of perinatal outcome with last AFI value

Table 10: Predictability of perinatal outcome with last AFI value

Variable	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Fetal distress in labour	46.66	82.1	29.1	90.69
Apgar < 7 after 5 minutes	62.5	85.1	41.6	93.02
Admission to NICU	66.6	82.17	25	96.5
Low birth weight (<2 kg)	31.25	79.78	20.83	87.2
Meconium staining of liquor	56.25	84.04	37.5	91.86
Perinatal death	100	78.89	4.1	100
Combined	60.5	82	26.16	93.16

Table 7 in observation shows the correlation of last AFI value with perinatal outcome. 7 cases (29.1%) had fetal distress in labour when AFI was $\leq$ 5 cm and 8 cases (9.3%) had fetal distress during labour when AFI was > 5 cm. So predictability of AFI $\leq$ 5 cm is as Sensitivity 42.66%, Specificity 82.1%, PPV 29.1%, NPV 90.69% comparable to the study of Alchalabi HA 2005 [4].

10 cases (41.6%) had apgar score < 7 after 5 min. when AFI was $\leq$ 5 cm. and 6 cases (6.97%) had apgar score < 7 after 5 min. When AFI was > 5 cm. So predictability of low AFI comes out to be as Sensitivity 62.5%, Specificity 85.1%, PPV 41.6%, NPV 93.02%.

6 neonates (25%) were admitted to NICU when AFI was $\leq$ 5 cm. and 3 neonates (3.48%) were admitted to NICU when AFI was > 5 cm. Predictability is as Sensitivity 66.6%, Specificity 82.17%, PPV 25%, NPV 96.5%.

9 cases (37.5%) had meconium during labour when AFI $\leq$ 5 cm. and 7 cases (8.1%) had meconium when AFI > 5 cm. So predictability is as Sensitivity 56.25%, Specificity 84.04%, PPV 37.5%, NPV 91.86% comparable to the study of Robson *et al*. [5] Sarno AP *et al*. [6].

5 newborns (20.8%) had birth weight < 2 kg. when AFI was $\leq$ 5 cm. and 11 neonates (12.7%) were low birth weight when AFI was > 5 cm. Predictability of tests is as Sensitivity 31.25%, Specificity 79.79%, PPV 20.83%, NPV 87.2% comparable to the work of Perni SE and co worker [7]. Out of 110 high risk cases only 1 perinatal death (4.1%) occurred when AFI was $\leq$ 5 cm comparable to the study of Rutherford [8], predictability is as Sensitivity 100%, Specificity 78.89%, PPV 4.1%, NPV 100%.

By combining all the above factors over all predictability of AFI $\leq$ 5 cm is as Sensitivity 60.5%, Specificity 82%, PPV 26.16%, NPV 93.16%.

Predictability of perintal outcome with Modified BPP (Non reactive NST+AFI $\leq$ 5 cm)

Table 11: Predictability of perintal outcome with Modified BPP

Variable	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Fetal distress in labour	85.7	75	75	85.7
Apgar < 7 after 5 minutes	80	83.33	88.88	71.4
Admission to NICU	66.66	66.66	80	50
Low birth weight (<2 kg)	100	81.8	71.4	100
Meconium staining of liquor	44.44	100	100	58.33
Perinatal death	100	0	100	0
Combined	79.5	67.83	85.83	60.83

Table No. 8 in observation shows the correlation of modified BPP with various aspects of perinatal outcome. Out of 110 cases fetal distress was present in 15 cases (13.6%) and out of these 7 (46.6%) had reactive NST and 8 (53.33) had non reactive NST. Out of 7 cases with reactive NST 1 case had AFI $\leq$ 5cm. and out of 8 cases with non reactive NST 6 cases (75%) had AFI $\leq$ 5 cm. so predictability mBPP is as

Sensitivity 85.7%, Specificity 75%, PPV 75%, NPV 85.7%.

Apgar score was < 7 after 5 min. in 16 newborns (14.5%) and out of these 7 cases (43.7%) had reactive NST and out of these 7 cases 2 cases (28.5%) had AFI ≤ 5 cm. 9 cases (56.25) had non reactive NST and out of these 8 cases (88.88%) had AFI ≤ 5cm. predictability comes out to be as Sensitivity 80%, Specificity 83.33%, PPV 88.88%, NPV 71.4%.

9 neonates (8.25%) were admitted to NICU. Out of the 9 cases 4 had (44.4%) reactive NST and 5 (55.5%) had non reactive NST. Out of the 4 cases with reactive pattern, 2 cases (50%) had AFI ≤ 5 cm. and out of 5 cases with non reactive pattern 4 cases (80%) had AFI ≤ 5 cm. Predictability is as Sensitivity 66.6%, Specificity 66.66%, PPV 80%, NPV 50%.

16 cases (14.5%) have meconium staining of liquor during labour. 12 subjects (75%) had reactive NST and 4 (25%) had non reactive NST. 5 cases (58.3%) with reactive NST had AFI ≤ 5 cm. and all the cases with non reactive pattern (100) had AFI ≤ 5 cm. Predictability is as Sensitivity 44.44%, Specificity 100%, PPV 100%, NPV 58.3%.

16 newborns (14.5%) were low birth weight out of these 9 cases (56.25%) non reactive NST and 7 cases (43.75%) had reactive NST. No patients with reactive NST had AFI ≤ 5 cm and 5 cases (71.42%) with Non reactive NST had AFI ≤ 5 cm Predictability is as Sensitivity 100%, Specificity 81.8%, PPV 71.4%, NPV 100%.

There was only 1 perinatal death (0.9%) in our study in which NST pattern was non reactive and AFI was < 5 cm predictability is as Sensitivity 100%, Specificity 0%, PPV 100%, NPV 0%.

By combining all the above factors the predictability of modified BPP for perinatal outcome is as Sensitivity 79.5%, Specificity 67.83%, PPV 85.83%, NPV 60.83%.

Comparison of abnormal NST, abnormal AFI (≤ 5 cm) and modified BPP in predicting perinatal out come

Table 12: Comparison of abnormal NST, AFI (≤ 5 cm) and modified BPP in prediction of perinatal out come

Test	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Abnormal NST	53.5	74.8	17.6	91.3
AFI ≤ 5 cm	60.5	82	26.16	93.1
Abnormal modified BPP	79.5	67.83	85.83	60.83

Above table shows that when non reactive NST and AFI ≤ 5 cm were combined in modified BPP then sensitivity of the test is increased i.e. 79.5% as compare to 53.5% for NST and 60.5% for AFI.

sIn modified BPP positive predictive value of test is increased i.e. 85.83% as compare to (17.6%) for NST and (26.16%) for AFI.

Sensitivity of the test (Diagnostic accuracy) is improved in modified B.P.P. (79.5 as compared to 53.5 for NST and 60.5 for AFI) P.P.V. (Diagnostic power) is also improved in 85.83% as compared to 17.6% for NST and 26.16% for AFI as we have selected only hi high risk pregnancies.

CONCLUSION

Modified B.P.P. is cheap, non invasive and best screening test to evaluate the fetal health and to predict fetal outcome thus perinatal mortality and morbidity can be reduced in our country. With this test we can wait for the spontaneous onset of labour and can decrease morbidity and operative intervention associated with induction of labour. Thus maternal mortality and morbidity is also reduced.

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