A CO-RELATION BETWEEN INCIDENCE OF PERINATAL ASPHYXIA WITH MATERNAL ABNORMAL BIOPHYSICAL PROFILE (BPP) IN IUGR PRETERM NEONATE

Sudhanshu Kumar Das¹, L. Jaganmohan Rao², Monalisa Subudhi³, Krishnamma B⁴

¹Assistant Professor, Department of Paediatrics, NRI Medical College and Hospital, Sangivalasa, Visakhapatnam, Andhra Pradesh.

²Professor, Department of Paediatrics, NRI Medical College and Hospital, Sangivalasa, Visakhapatnam, Andhra Pradesh.

³Assistant Professor, Department of Microbiology, NRI Medical College and Hospital, Sangivalasa, Visakhapatnam, Andhra Pradesh.

⁴Professor, Department of Obstetrics and Gynaecology, NRI Medical College and Hospital, Sangivalasa, Visakhapatnam, Andhra Pradesh.

ABSTRACT

BACKGROUND

IUGR may be due to condition in the foetal environment (e.g. chronic deficiency in oxygen or nutrition or both) or problem intrinsic to the foetus. So, we can prevent only further asphyxia by giving a good environment in already compromised foetus; that can be possible only by early assessing the foetus using the Biophysical profile score or Doppler velocity ratio of the umbilical artery or middle cerebral artery. So, this study will be helpful for those physicians where other investigations as Doppler velocimetry is not available and make plan to progress the pregnancy or deliver the baby.

The aim of this study is to know the incidence of perinatal asphyxia as compared to other neonatal complications in preterm at or above 34 weeks Intrauterine Growth Restricted (IUGR) neonates in relation to abnormal BPP in mother.

MATERIALS AND METHODS

A prospective study of the pattern of perinatal outcome as well as incidence of perinatal asphyxia of 80 preterm at or above 34 weeks Intrauterine Growth Restricted (IUGR) neonates in relation to maternal abnormal BPP was studied at the Neonatal Unit of NRI Medical College, Visakhapatnam.

RESULTS

The most frequent early neonatal complication in preterm IUGR was asphyxia. There is a strong correlation between BPP < 6 with foetal distress before delivery and Apgar score < 6 at 5 mins. after delivery.

CONCLUSION

In severe IUGR neonates, low values of BPP is a predictor of asphyxia.

KEYWORDS

IUGR (Intrauterine Growth Retardation), BPP (Biophysical Profile).

HOW TO CITE THIS ARTICLE: Das SK, Rao LJ, Subudhi M, et al. A co-relation between incidence of perinatal asphyxia with maternal abnormal biophysical profile (BPP) in IUGR preterm neonate. J. Evolution Med. Dent. Sci. 2016;5(101):7397-7399, DOI: 10.14260/jemds/2016/1674

BACKGROUND

IUGR may be due to the condition in the foetal environment (e.g. chronic deficiency in oxygen or nutrition or both) or to problem intrinsic to foetus. Also, foetus suffering from utero-placental insufficiency typically has intermittent hypoxic episode induced during episode of uterine contraction. It is important to identify constitutionally normal foetus; whose growth is impaired so that appropriate care can be given to prevent the risk of mortality before and during labour. They need preterm intervention for better survival rate. The biophysical sign of acute asphyxia may be loss of breathing movement, heart rate reactivity. So we can prevent only further asphyxia by giving a good environment in already compromised foetus. Identification of such an asphyxiated

foetus can be possible only by early assessing the foetus using the Biophysical profile score or Doppler velocity ratio of the umbilical artery or middle cerebral artery, because emergency delivery may improve outcome. But our limitation is Doppler not available everywhere, so BPP is our only mode of detection of antenatal asphyxia after the clinical diagnosis.

So, by this study physician can alert about the outcomes, especially perinatal asphyxia where other investigations as Doppler velocimetry is not available, and make plan to progress the pregnancy or deliver the baby.

MATERIALS AND METHODS

The study was conducted in a tertiary level neonatal unit teaching hospitals, NRI Medical College over one-year period from Nov 2015 to Oct 2016, with patient's consent and Ethical Committee approval. Total eighty babies at or above 34 weeks' gestation IUGR born to high risk pregnancy mother at the Obstetric Unit of this hospital and admitted to NICU were enrolled in this study. In all the neonates enrolled into the study the information as sex, gestational age, weight, length and head circumference were recorded at birth. The details of delivery, viz. induced or spontaneous, vaginal or operative, colour of liquor and the APGAR score at birth, need for resuscitation, presentation and vitals at the time of admission were collected and recorded.

Financial or Other, Competing Interest: None.

Submission 11-11-2016, Peer Review 08-12-2016,

Acceptance 12-12-2016, Published 19-12-2016.

Corresponding Author:

Dr. Sudhanshu Kumar Das,

Assistant Professor,

Department of Paediatrics,

NRI Medical College and Hospital,

Visakhapatnam, Andhra Pradesh.

E-mail: swayam.dr007@gmail.com

DOI: 10.14260/jemds/2016/1674

Relevant antenatal history of maternal age, parity, infection including TORCH, drug intake, Pregnancy-Induced Hypertension (PIH), gestational diabetes, abruptio placenta, chorioamnionitis and foetal distress were recorded. The details of Biophysical Profile as Non-Stress Test (NST), amniotic fluid volume (AFI), foetal breathing movement, foetal movement, foetal tone and ultrasound scanning were collected. The Biophysical Profile score < 6 was taken as abnormal and 0 - 2 with certain foetal asphyxia, 4 with probable foetal asphyxia. Essential investigations done in all the neonate as blood glucose, total serum calcium, serum sodium and arterial PH. USG of cranium was done at earliest.

Inclusion Criteria

1. All neonates at or over 34 weeks of gestational age admitted to NICU.
2. Neonate with complication at birth.
3. Neonate with maternal abnormal BPP score.

Exclusion Criteria

1. Neonate below 34 weeks gestational age.
2. Neonate with congenital anomalies.
3. Neonate with h/o maternal normal BPP.

Statistical

The statistical analysis of the study was performed using chi-square method. P value of < 0.05 was accepted as significant.

RESULTS

During the study period, total 80 babies at or above 34 weeks gestation were admitted with complication at birth, with maternal history of abnormal Biophysical Profile. The incidence of preterm babies at 34 weeks gestation were 38 (47%) in contrast to 42 (53%) above it. Out of eighty preterm babies, 50 (62.5%) SGA and 30 (37.5%) were AGA babies (Table 1).

Gestational Age	No. of Pts.	Percentage (%)
34 wks.	38	47%
> 34 wks.	42	53%
SGA	50	62.5%
AGA	30	37.5%

Table 1. Distribution of New Born According to Gestational Age

Most of the women were primigravidas (62%) and were in the age group 20 - 25 years (46%). Most of the newborn (51%) were delivered by vaginal route (Table 2).

Mother	No. of Patient	Percentage (%)
Gravida	Primi	49
	Multi	31
Age	< 20 yrs.	33
	20 - 30 yrs.	37
	> 30 yrs.	10
Type of Delivery	SVD	41
	LSCS	39

Table 2. Distribution of Mother According to Age, Gravida and Type of delivery

Antenatal risk factors in neonates were associated with neonatal maternal pre-eclamptic toxemia (45%) followed by IUGR (20%), BOH (10%), Rh Negative pregnancy (10%),

abruption placenta (10%) and diabetes complicating pregnancies (10%) (Table 3).

Risk Factor	No. of Patient	Percentage (%)
GDM	08	10
PIH	36	45
BOH	16	20
Rh Negative Pregnancy	04	05
Abruptio Placenta	08	10
IUGR (Preterm SGA)	08	10

Table 3. Distribution of Risk Factor

The total incidence of perinatal asphyxia with APGAR score <6 at 5 mins. isolated cases were 52 (65%). In isolated cases it was 30 with delayed cry for more than 5 mins. (10) with respiratory distress (04) and MSAF (08). Out of 17 (21.25%) newborn with respiratory distress, isolated cases were 10 and in association with MSAF (07), whereas newborn babies delivered with isolated meconium stained amniotic fluid were 03 (3.75%) and 08 (10%) were preterm SGA baby with abnormal BPP. BPP score was abnormal 0 - 2 in 37 cases, < 4 in 22 cases and < 6 in 11 cases (Table 4).

Perinatal Outcome (n = %)	No. of Cases	BPP Score
Perinatal Asphyxia (52 = 65%)	Isolated Cases (Apgar < 6 at 5 mins.)	30
	Delayed Cry for > 5 mins.	10
	With Resp Distress	04
	With MSAF	08
Respiratory Distress (17 = 21.25%)	Isolated Cases	10
	With MSAF	07
MSAF (03 = 3.75%)	Isolated Cases	03
Preterm SGA (8 = 10%)	Isolated Cases	08

Table 4. Relation between Perinatal Outcome and BPP Score

DISCUSSION

Here, we utilised Biophysical profile as antenatal assessment in high risk pregnancies to identify the compromised foetuses. BPP parameters increased its predictive ability for foetal academia. In contrast to the antepartum state, the BPP is not a reliable predictive test for acid-base status during the intrapartum state, nor during cervical ripening with prostaglandin E2 immediately before oxytocin induction of labour.⁽¹⁾ So by this study, physician can alert about the outcome, where other investigations as Doppler velocimetry is not available, and make plan to progress the pregnancy or deliver the baby.

In our study, BPP score < 6 was taken as abnormal. In 30/52 cases of birth asphyxia and 17 respiratory distress cases with MSAF, the BPP score was < 2. In one study by Manning et al, 75% patients had foetal distress with BPP < 6 but only 21.2% cases had meconium stained liquor.⁽²⁾ This shows significant foetal hypoxia with low BPP score. In this present study, birth asphyxia was 22/52 with the BPP < 4 is

nearer to that of the above study. In this setting if pregnancy crossed 36 wks. of gestation and favourable deliver the baby and if not crossed then test should be repeated again after 4 - 6 hrs. Manning et al found an inverse, exponential, highly significant correlation between the last BPP score and the incidence of Cerebral Palsy (CP).⁽³⁾ A score of 6 or less had a sensitivity of 49% and the more abnormal BPP score higher the risk of CP. A normal BPP score was associated with CP in 0.7 per 1000 live births. Sassoon and co-workers found no correlation between the last BPP and the umbilical cord pH in labouring patients.⁽⁴⁾

Platt and Colleagues studied 136 pregnancies for the presence or absence of breathing before delivery.⁽⁵⁾ Neonate with MSAF had antenatal BPP score was < 6, where repeat testing should be done in next 4 - 6 hrs. and deliver if oligohydramnios present. The neonatal health can be assessed antenatally with BPP which is easy to perform, so that timely intervention and immediate postpartum treatment can be administered.

CONCLUSION

The present study aims at identifying the high risk babies with fatal complication at birth at an earlier, so that extra vigilance can be provided to give a good environment and while treating them in order to have a fruitful outcome. So this study will be helpful for those physician where other investigations as Doppler velocimetry not available, and make plan to progress the pregnancy or deliver the baby.

REFERENCES

1. Amon E, Fossick K, Sibai BM. The biophysical profile in patients undergoing cervical ripening by PGE₂ prior to induction of labor. *Am J Obstet Gynecol* 1991;164(1 Pt 2):243.
2. Manning FA, Platt LD, Sipos L. Antepartum fetal evaluation: development of a fetal biophysical Profile. *Am J Obstet Gynaecol* 1980;136(6):787-95.
3. Manning FA. Fetal biophysical profile. *Obstet Gynecol Clin North Am* 1999;26(4):557-77.
4. Sassoon DA, Castro LC, Davis JL, et al. The biophysical profile in labor. *Obstet Gynecol* 1990;76(3 Pt 1):360-5.
5. Platt LD, Manning FA, Lemay M, et al. Human fetal breathing: relationship to fetal condition. *Am J Obstet Gynecol* 1978;132(5):514-8.