Research Article

Perinatal Outcome in Growth Retarted Babies Born to Normotensive and Hypertensive Mothers: A Prospective Study

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Abstract:

Pregnancy induced hypertension is one of the common condition of unknown etiology which increases the maternal and perinatal morbidity and mortality. The present study was carried out to find the perinatal outcome in intra-uterine growth retarted (IUGR) babies born to 110 mothers with pregnancy induced hypertension (PIH) and 100 normotensive mothers. The incidence of small for gestational age (SGA) was four times more in the hypertensive group; outcome in terms of morbidity and mortality was also statistically significant. The study further revealed that 57.1% babies were preterm and intra-uterine growth retarded (IUGR) in the study group, 71% of them being asymmetrical. The study was aimed to know the problems likely to be encountered in early neonatal period.

Key Words: PIH, IUGR, Asymmetrical, Perinatal.

Introduction:

Hypertensive disorder of pregnancy leads to higher perinatal and neonatal mortality as compared to the outcome in normotensive mothers. Chief complications which may arise are intra-uterine growth retardation (IUGR) and intra-uterine death due to chronic placental insufficiency, prematurity and birth asphyxia. The clinician's challenge is to identify IUGR fetuses whose health is endangered in utero because of a hostile intra-uterine environment and to monitor and intervene appropriately. There is little improvement in perinatal and neonatal outcome in hypertensive disorders of pregnancies in developing countries. In India alone, 6-8 million low birth weight (LBW) infants are born annually (Singh, 2010).

Intra-uterine growth retardation contributes to almost two-thirds of LBW infants born in India (UNICEF, 2004).

Pre-eclampsia should probably be regarded as a syndrome of heterogeneous origin. Shallow trophoblast invasion of decidual arteries can precipitate pre-eclampsia, reduced placental perfusion and causes insufficient transport of nutrients (Arnholdt et al, 1991). It has been hypothesized that fetal growth retardation might depend on abnormal placental development (Ness & Roberts, 1996). Very few studies have been carried out to know the specific and common neonatal complications in growth retarded babies born to mothers with PIH, and they too are conflicting (Basso et al, 2006).

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Materials & Methods:

The study was conducted in the departments of Pediatrics and Obstetrics & Gynanecology of Sultania Zanana hospital and Kamla Nehru Hospital attached to Gandhi Medical College, Bhopal. The registered pregnant women with hypertension after the 20th week of gestation with associated proteinuria of more than 0.3 gm/l in 24 hour urine collection or more than 1gm/l in a random sample, pitting oedema after 12 hour of rest in bed or weight gain of 5 lbs or more in 1 week or both and with or without convulsions, attending out patients department (OPD) of Sultania Zanana hospital from 1st October, 2010 to 31st January, 2011 were selected for the present study. Unbooked women, women with diabetes, chronic hypertension, chronic renal problem, thyrotoxicosis, TORCH positive mothers or body weight <40 kg and with history of smoking were excluded from the study as they are confounding variables known to be associated with both PIH and IUGR babies. Healthy normotensive pregnant women were included in the control group. After the selection of each case of the study group, the next registered healthy normotensive pregnant women was included in the control group, thus hundred registered normotensive healthy pregnant women were taken as control.

Detailed information related to maternal history was obtained. Details of labour, mode of delivery, any

complications during labour were recorded. Apgar score was reocrded at 1 and 5 minutes (Apgar, 1953). Resuscitation measures, if employed were recorded. Sex & birth weight of new born were noted; gestational age was assessed by modified Ballard scoring system (Ballard et al, 1991). Any indication for admission to neonatal intensive care unit (NICU), duration of stay and final diagnosis at the time of discharge was recorded. For categorizing IUGR babies, intra-uterine weight chart prepared by Department of Paediatrics, All India Institute of Medical Sciences, New Delhi was used (Singhal, 1991). Ponderal index (PI) was considered for assessment of symmetry of growth retardation (Grande et al, 1999).

Those discharged from hospital earlier than 7 days, were followed at their home. All other data to know perinatal mortality for cases and controls was recorded on a proforma especially designed for the study. Data was analyzed by the using SPSS version 12 and students t-tests for statistical significance.

Results:

A total of 3010 women delivered at Sultania Zanana Hospital from 1st September, 2010 to 31st December, 2011, of which 320 (10.63%) had hypertension. Out of these 320 cases 110 (34.36%) were registered and were included in the present study. One hundred registered normotensive healthy pregnant women were taken as control. Majority of them had pre-eclampsia (66.36%) and the rest of them had eclampsia (33.64%). In the present study, 36.7% mothers were between 21-25 years of age. As the maternal age increased (>35 years), only 4% of them presented with PIH. Primigravida (47%) was the commonest risk factor associated with PIH, followed by teenage pregnancy (6%) and twin pregnancy (6%). In spite of PIH, 79.6% babies were born of normal vaginal deliveries, 4% were assisted delivery and 18.36% were lower segment caesarean section (LSCS) delivery. Perinatal mortality was highest in multiparous followed by nulliparous women. It was observed, that as the parity increases, the number of cases of PIH decreases.

In the study group, perinatal mortality was 26.53% against 9.09% in the control group. Perinatal mortality was higher in cases having hypertension of more than 4 weeks, and was significantly higher in mothers having severe proteinuria (> 5 gm/24 hours; Table I; $p<0.001$). Perinatal mortality was high when mothers had more than 10 episodes of convulsion.

Out of 110 deliveries in the study group, there were 104 live births and 6 still births; 66 (60%) babies were of low birth weight as compared to 31(31%) in the control group. Out of these 110 newborn; 49 (44.5%) were small for gestational age (SGA) against 11(11%) in the control group (Fig. I). Mean birth weight of babies born to PIH mothers was 1.7 kg as compared to 2 kg in the control group (Table II). Amongst 49 IUGR babies, 3 were stillbirth and 10 died within 7 days as compared to 1 stillbirth in the control group. Perinatal mortality was higher in PIH group as compared to SGA in the control group. Preterm IUGR in the study group were 57.1 % with 71% being asymmetrical IUGR (Fig. II; Table III). In the study group, 75.5% babies required hospitalization as compared to 36.36% of the control group (Table I). Duration of stay in NICU was more than 7 days in 32.65% cases of the study group as compared to 9% of the control group. Birth asphyxia (40%) was the major cause of neonatal death, followed by respiratory distress syndrome (20%) and sepsis (20%; Fig. III; Table IV).

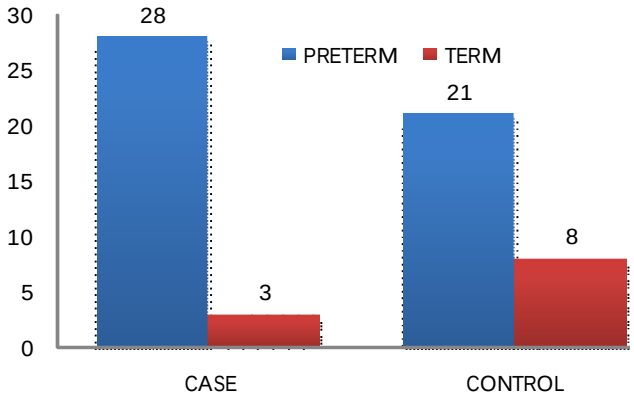

Fig. I: Distribution of cases in study and control group according to gestational maturity

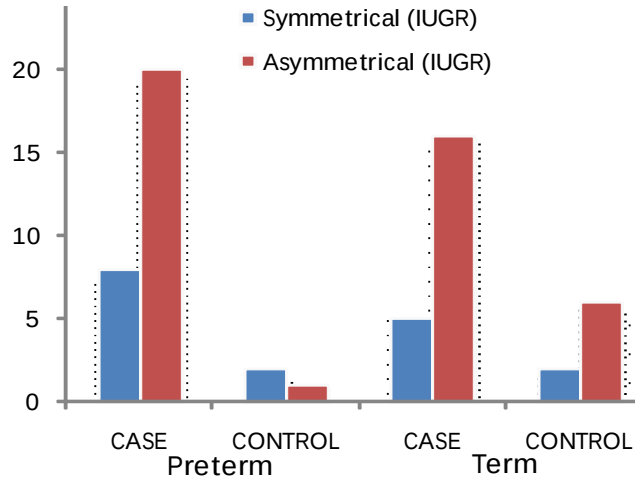

Fig. II: Distribution of case according to ponderal index in study and control group.

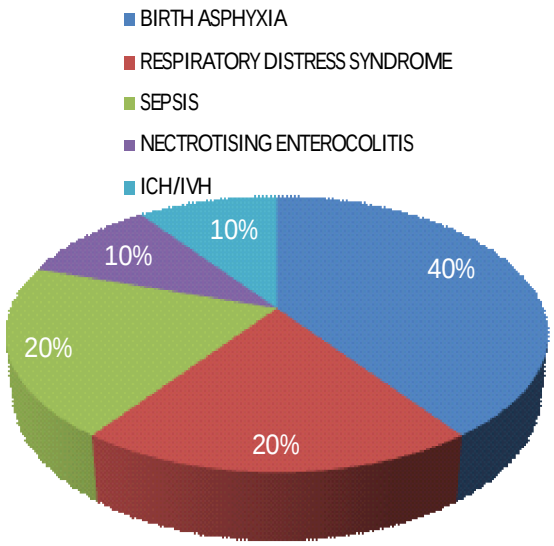

Fig. III: Causes of neonatal mortality with HDP

Table I: Morbidity and mortality of babies according to severity in PIH.

Total no. of mothers	Morbidity of babies	Mortality of babies
Mild proteinuria <5 gm/24 hours	29	4
Severe proteinuria ≥ 5 gm/24 hours	6	10
z-value	3.5764	3.6613
p-value	=0.0003 HS	=0.0003 HS

Table II: Weight wise distribution of newborn in study and control group

Weight	Study	Control
<1 kg	2	0
1-1.5 kg	14	1
1.5-2 kg	13	2
2-2.5 kg	20	8

Table III: Distribution of newborns according to gestational age and ponderal index.

	Study group n = 49	Control group n = 11	z-value	p-value
Preterm (asymmetrical)	20	1	13.405	<0.001* HS
Preterm (symmetrical)	8	2	3.182	=0.0015* HS
Term (asymmetrical)	16	6	3.310	=0.009** S
Term (symmetrical)	5	2	1.645	=0.099 NS

Table I: Neonatal complication in admitted IUGR newborn in PIH & control.

Complications	Study(37)	Control(4)
Preterm	5	2
Neonatal hyperbilirubinemia	4	1
Birth asphyxia	8	0
Respiratory aspiration syndrome	7	0
Sepsis	6	1
Necrotising entrocolitis	3	
Meconium aspiration syndrome	2	
ICH/IVH	2	

Discussion:

Pregnancy induced hypertension is a global problem and complicates approximately 10-17% of pregnancies (Gilstrap & Ramin, 2002). The incidence of PIH in India ranges from 5-15% (Raddi et al, 2009). During the study period, a total of 3010 women delivered in hospital, of which 320 mothers were hypertensive (10.63%). In the present study, majority of the hypertensive mothers were between the age group of 21-25 years which is at par with the study of Nadkarni et al (2001). The results of the present study are at par with the study carried out in Saudi Arabia on 705 consecutive maternities, which showed that women at extremes of maternal age, the nulliparous women, and high-parity women are at an increased risk of developing pre-eclampsia (Lawoyin & Ani, 1996). The risk of SGA increased with the severity of PIH (Rasmussen et al, 2006). Early diagnosis of pre-eclampsia, which indicate severe disease, tripled the recurrence risk (Hijartarobottir et al, 2006). In the present study, perinatal mortality was higher in severe cases of PIH and where duration of PIH was more than 4 weeks. Sibai & Barton (2007) also reported that severe pre-eclampsia that develops before 34 weeks of gestation, is associated with high perinatal mortality and morbidity. The association of low birth weight and SGA was particularly evident with severe and early onset pre-eclampsia as compared with milder PIH (Rasmussen et al, 2006).

Fetal growth retardation and PIH are thought to be initiated with improper remodeling of the uterine spiral arteries caused by inadequate trophoblast invasion in early pregnancy, leading to reduced placental and fetal perfusion and subsequent dysfunction of the maternal vascular endothelium (Roberts & Gammill et al, 2005). In the present study, low birth weight babies with IUGR were statically significant in the study group ($p<0.05$). This is in accordance with the result of Fatemeh et al (2010), who studied 100 hypertensive

& 100 normotensive mothers and revealed a difference in the birth weight. Preterm asymmetrical IUGR were higher in the study group as compared to term asymmetrical IUGR in the control group (Fig. I & II). Neonatal intensive care unit admission and duration of stay was higher in the study group. This observation is similar to that of Fatemah et al (2010). The reason for the prolonged stay in NICU was prematurity and its associated complications. Shefeer-mimouni et al (2002) also observed that SGA, LBW and preterm delivery was significantly higher in woman with PIH. The neonatal mortality was higher in the study group than control in the present study. Vandenbosche & Kirchner (1998) also stated that the infants of hypertensive mothers have three fold increase in perinatal mortality as compared to infants with IUGR who are born to normotensive mothers. However, the study carried out in Maryland, USA amongst 150 IUGR newborns due to isolated placental insufficiency and 98 maternal preeclampsia, found no difference in perinatal outcome suggesting that birth weight is predictor for adverse outcome (Cosmil et al, 2009).

Conclusion:

Intra uterine growth retardation remains a challenging problem for clinicians; IUGR secondary to PIH is associated with significant perinatal mortality and morbidity. The primary medical intervention in an IUGR affected pregnancy is to ensure delivery of the baby at the optimal time, balancing the risks of fetal compromise from uteroplacental dysfunction against those of prematurity. Early detection of high risk individual by well trained personnel and timely referral to advanced tertiary centres, early and timely treatment of pre-eclampsia may lead to improved perinatal outcome.

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