Original Article

Impact of Pregnancy Induced Hypertension on Babies

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Abstract

Background: *Pregnancy-induced hypertension (PIH) is a relatively common pregnancy disorder that causes variable maternal and fetal problems. This may increase the number of perinatal asphyxia, sepsis, still birth etc. It also has a significant affect on birth weight which is also related to gestational age.*

Objectives: *To observe the impact of pregnancy induced hypertension on their newborn babies and compare the findings with the babies of normotensive mother.*

Materias and Methods: *This case control study was conducted from July 2016 to December 2016. The study group was selected from the babies of pregnancy induced hypertension (PIH) mothers and control group selected from babies of a normotensive mother attending in Obstetrics department of Dhaka Medical College Hospital, Dhaka having the inclusion and exclusion criteria. The total number of 100 neonates were included consecutively in this study. 50 neonates born to mothers with pregnancy-induced hypertension were grouped as cases and 50 neonates born to normotensive mothers were grouped as control.*

Results: *The study revealed that, the highest frequency of neonatal morbidities were perinatal asphyxia (22%) among the babies of PIH mother. Stillbirth it was found 12 % . The duration of pregnancy were also affected by PIH where most of the babies were preterm (88%) and complete-term pregnancy found only (12%). It should be mentioned that those mother having history of preeclampsia delivered more premature babies ($p < 0.001$). Another important outcome birth weight related to gestational age was also very important which were measured as the highest for SGA 92% and AGA 8%. The weight of the baby were significantly ($p<0.001$) reduced in those who had a history of PIH and the mean weight was 1592.78 ± 470.06.*

Conclusion: *Prematurity, Small for gestational-age babies and perinatal asphyxia are more common in Pregnancy induced hypertension group than in the normotensive group.*

Key words: *Neonates, Pregnancy Induced Hypertension (PIH) Impact.*

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Introduction

Pregnancy induced hypertension, specially pre-eclampsia is a major cause of maternal and perinatal morbidity and mortality.[1,2] It is a multifactorial condition involving some sort of immune response to pregnancy. It is characterized by hypertention, proteinuria and also oedema and hyperreflexia occuring primarily in nulliparas after the twentieth week of gestational age and most frequently near term.[3,4] It has been estimated that 5-8% of pregnancies worldwide are complicated by this disorder.[5,6] There is no concrete data found on incidence of pre-eclampsia in our country, but calculated from the US Census Bureu, International Data base,2004, the extrapolated annual case report of pre-eclampsia in Bangladesh is 76,032.[7] Bangladesh is the most densly populated country in South East Asia and has high MMR that is 420/100,000 live birth as well as high NMR 27/1000 live birth,[8] there are number of causes are responsible for these death, pre-eclampsia being one of them, is well known to complicate pregnancy and thus contribute to maternal and fetal death.[9] Proteinurea and increased blood pressure in pre-eclampsia are associated with a lower fetal birth weight and a lower APGAR score and an increased risk of adverse perinatal outcome.[10] The low birth weight infants have a higher risk of mortality as they are likely to die especially their neonatal period. In severe cases there may be intrapartum fetal distress or still birth. IUGR is a well known fetal complication of pre-eclampsia. If these cases are untreated may causes dangerous seizures or even death of the fetus.[11] Sandhay Sivkumar et al found higher number of preterm, IUGR and small for gestational age(SGA) babies among the infants of hypertensive mothers. There was also a significantly higher incidence of thrombocyto

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penia and nucleated RBCs in these babies but no significant A large population based study conducted in New South wales, Australia shwed that the infant of mothers with hypertension were likely to be born preterm and small for gestational age. They were more likely to suffer adverse outcomes than those of women without hypertension 42% of morbidity was contributed by neonates born at less than 33 weeks gestation.[12] Sharmin Rahman et al. found 51% PIH mothers had normal foetal outcome, while 18% had LBW, 12% had birth asphyxia, 2% had congenital malformation and IUD was found in 2% cases among 100 PIH mothers in a cross sectional study conducted at a tertiary level hospital in Dhaka.[1] As pregnancy induced hypertension itself is not preventable and the fetal out come is poor in complicated pre-eclampsia, early measures may be taken to prevent it's complications that will greatly help to improve fetal outcome. This study was conducted in DMCH to document neonatal outcome of the PIH mother regarding birthweight, maturity, APGAR score, gestational age and as well as other complications maternal conditions associated with child birth related maternal deaths. The effects of this condition on the foetus are also very unsatisfactory and disappointing in some cases. Outcome of foetuses in hypertensive mothers is directly related to the reduced effective blood flow to the utero-placental circuit. Fetal death is usually due to hypoxia, often acute and secondary to abruptio placentae or vasospasm, and is generally preceded by intrauterine growth retardation (IUGR). If untreated, severe pregnancy induced hypertension may cause dangerous seizures and even death of the mother and fetus. Because of these risks, it may be necessary for the baby to be delivered early before 37 weeks of gestation i.e. before the baby being matured. This prematurity also adversely affects the foetal outcome. Now-a-days, the diagnosis and management of PIH (pre-eclampsia) are improving and will eventually improve the maternal and fetal outcome.[1]

Materials and Methods

This is a Case control study, was carried out in the department of Neonatology and Gynaecology and Obstetrics, of Dhaka Medical College and Hospital (DMCH), Dhaka. The study was carried out during July 2016 - December 2016. Sampling technique was purposive sampling. Babies having the inclusion criteria had been included in the study. Therefore 100 babies who meet the criteria had been included. Among them 50 were cases & 50 were controls chosen by every alternate healthy baby. Inclusion criteria were, babies born to mothers with PIH, babies of mother having eclampsia, other disease, normotensive, congenital anomalies were excluded. Each newborn was immediately examined thoroughly after fulfilling the inclusion and exclusion criteria, patient was enrolled with unique ID and Informed consent was obtained accordingly. The pre-structured Case Record Form (CRF) was filled up. Detailed history, complete physical examination and relevant individualised investigations was done for obtaining diagnosis. Maternal parity, weight, height, duration of labor, mode of delivery, neonatal variables such as sex, maturity, birth weight, and resuscitation requirements was analyzed. Data was processed and analyzed with the help of computer program SPSS (Statistical Package for Social Sciences) win version 20. Quantitative data was expressed as mean and standard deviation and qualitative; data was expressed as frequency and percentage. Comparison was done by Chi-Square ($\chi 2$) test and unpaired t-test where necessary. A probability (p) value of < 0.05 ($p<0.05$) was considered statistically significant.

Results

Table I: Demographic characteristics of neonates in both group.

		Case (50)		Control (50)	
		Number (N)	Frequency (%)	Number (N)	Frequency (%)
Mode of delivery	NVD	8	16.0	16	32.0
	LUCS	42	84.0	34	68.0
Sex	Male	20	40.0	31	15.5
	Female	30	60.0	19	9.5
Birth weight(gm)	>2500	11	22.0	37	74.0
	2500 -1500	17	34.0	13	26.0
	1500 - 1000	20	40.0	0	0
	<1000	2	4.0	0	0

Table I shows most of the studied neonate were delivered by LUCS. In PIH group female babies and in normotensive group male babies were predominant. SGA were more in PIH mother group and AGA were more in normotensive mother group. These findings were showed according to frequency.

Table II: Mean birth weight and gestational age of neonates in both group.

	Case	Control	P-value
Mean birth weight± SD(gm)	1592.78± 470.6	2441.30±802.50	0.000
Mean gestational age ± SD(weeks)	35.22±1.37	37.65±3.97	0.001

The mean birth weight of neonates were 1592.78 ± 470.6 gm and 2441.30±802.50 gm, in case and control group respectively. Mean difference in two groups were statisticallysignificant P<0.000. Mean gestational age difference between two groups were also statiscally significant P< 0.001. (Table II)

Table III: Effect of PIH on maturity and birth weight on newborn babies.

Variables		Case		Control		P value
		N	%	N	%	
Maturity	Term	6	12.0	28	56.0	<0.001
	Pre-term	44	88.0	13	26.0	
	Post-term	0	0	9	18.0	
Birth weight	SGA	39	92.0	13	38	<0.001
	AGA	11	8.0	37	62	

Among the babies of mother with PIH (88%) babies were preterm while (26%) babies were preterm in normotensive mother. The difference between two group were statistically significant. PIH also significantly affects on gestational age and as well as birth weight where SGA were mostly found in PIH group (P value < 0.001). (Table II)

Table IV: Morbidities of neonates of both group.

Variables		Case		Control		P value
		N	%	N	%	
Morbidities of neonates	No morbidities	10	20.0	35	70.0	0.01
	Perinatal asphyxia	22	20.0	4	8.0	0.01

Neonatal morbidities are significantly higher in PIH group than normotensive group. PNA (20%) is significantly more (P value< 0.05) in PIH group in relation to normotensive group. (Table IV)

Table V: Comparison of still birth between two groups.

	Case		Control		P - Value
Still Birth	N	%	n	%	
	6	12	2	4	0.37

Still birth number are more in PIH group. However it is not statiscally significant in our study. (Table V)

Discussion

The aim of our study was to see the impact of pregnancy induced hypertention on their newborn babies and their immediate hospital outcome and the outcome were measured in terms of birth weight, maturity, PNA, still birth. The present study showed that neonatal birth weight has been reduced in pregnancies complicated by PIH. Among the babies 92% babies were SGA in PIH mothers group whereas in normotensive group that is only 38% (P<0.001). That is statistically significant. Mayhew et al. (2003)[13] who studied placental morphology in pregnancies complicated by preeclampsia with or without intrauterine growth restriction and observed that fetal weights were reduced in all complicated pregnancies but only intrauterine growth restriction was accompanied by a significantly smaller placenta. Odegard et al. (2000)[14] found that preeclampsia was associated with a 5% reduction in birth weight. In severe preeclampsia, the reduction was 12% and in early onset disease, birth weight was 23% lower than expected. The risk of small for gestational age (SGA) was four times higher in infants born after preeclampsia than in control pregnancies. Among nulliparous, preeclampsia was associated with a nearly threefold higher risk of SGA than that of normal pregnancy. However, in multiparous women, the risk of SGA was particularly high after recurrent preeclampsia. Teasdale studied with 10 placentae of which 5 from primigravid women with severe preeclampsia and 5 from normal healthy women. He found that the infants of the preeclampsia group were significantly smaller than the control infants in terms of the mean birth weights i.e. 2466 gm and 3315 gm respectively (p<0.001).[15] Later , he again examined 10 placentae of which 5 from women of second gravida with severe preeclampsia and 5 from healthy women. He found that severe preeclampsia group gave birth to infants who were severely growth retarded with birth weights that ranged between 1330 and 1960 gm. The mean infant birth weight was 2662 gm and 1724 gm in control and preeclampsia group respectively, as studied within 35 ± 2 weeks of gestational age. The underlying cause was described by Soma et al. (1982)[16], who suggested that low birth weight of the neonate in hypertensive pregnancy was due to placental insufficiency resulting in fetal growth retardation. Cibils (1974)[17] found that the infants born to normal patients weighed an average of 3321 grams. They lost an average of only 4.14 per cent of their weight in the first few days of life, and this was regained within the fifth to seventh days. Those born to mothers with transient or moderate hypertension weighed an average of 2770 grams. The infants born to mothers with severe or chronic hypertension weighed an average of 2353 grams. The last two figures are much lower than the normal average and are indirect evidence of the deficient somatic growth of these infants who presented the so-called "intrauterine growth retardation syndrome".

The study showed that prematurity occurs more frequently in PIH mother than the babies of normotensive mother that is mean gestational age in case group 35.22 weeks and 37.65 weeks in control group. 88% babies were premature in PIH mothers group on the other hand 26% in control group. These differences are also statistically significant P<0.001 . Barua (2002)[18] found mean gestational age of eclampsia group was 35.21 weeks and that of control group was 37.82 weeks. Boyd and Scott (1985)[19] found that preeclampsia group was significantly more likely to be primiparous than control group. They also found that the mean gestational age of preeclampsia group was 35.2 weeks and that of normal group was 37.8 weeks. In the evaluation of condition of the babies at birth as assesed by APGAR score, most of the babies born to PIH mother had low APGAR score defined as perinatal asphyxiais significantly higher p<0.01 than control group S. Kishwara et al.[6] Cibils (1974)[17] Masodkaret al. (1985)[20] also observed a low APGAR score in toxaemia of pregnancy. Still birth is another finding in our study but it was not statistically significant P<0.37%, although the incidence of perinatal mortalityis very high in pregnency induced hypertension. Study by imrat jahan[21] and kobra[22] perinatal death was 9% and 10.97% respectively. Prematurity, restricted intrauterine growth, and low birth weight were the outcomes found in a retrospective cohort study among 1308 hypertensive pregnent women.[23] Our study result was non significant, it might be due to small study sample size and single centred study. Multicentered study was needed.In this study 62% babies of PIH mother had different complications. These complications were mainly resulting from prematurity followed by early delivery which may have to be done in many casesto save mother. Prematurity, SGA, LBW, PNA, were the common complications that this study found. This study didnt find any corelation of neutrophil count among PIH group although previous study done by Koenig JM et al. reported that the neonatal neutropenia are more common in PIH

mothers group and later associated with an increased risk of nosocomial infection.[24]

Conclusion

Prematurity, small for gestational age and perinatal asphyxia are more common among the babies of pregnancy induced hypertension mother.

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References

1. Rahman S, Sultana N, Rahman AKMM, Akhtar S, Begum N, Rahman MM. Study on foetal outcome in pre-eclamptic mother. J Bangladesh Col Phys Surg 2007; 25:57-61.

2. Arshad A, Pasha W, Kattak TA, R Kiyan RB. Impact of pregnancy induced hypertention on birth weight on newborn at term.JRMC 2011; 15(2):113-115.

3. Gerad MD. Hypertension in pregnancy. Chronic Hypertension and gestational hypertension. 2004. Retrived from: www.gynob.com/htiup.htm

4. Van Wijk MJ, Boer K, van der Meulen ET, Bleker OP, Spaan JA, VanBave lE. Resistence artery smooth muscle function in pregnancy and preeclampsia.Am J Obstet Gynaecol.2002; 186(1):148-154.

5. Nzli R, Jan MR, Shah J .Changes in lipoprotein concentration in primiparous women with pregnancy induced hypertension.Pak J Med Res. 2009; 48:83-87.

6. Peters RM, Flack JM Hypertensive disorder of pregnancy. J ObstetGynecol Neonatal Nurs.2004; 33:209-220.

7. Statistics by country for preeclampsia: extraploration of incidence rate for preclampsia to countriesandregions.Availablefrom:http://www.wrongdiagnosis.com/p/preeclampsia/stats-country.htm[accesed on 15th April, 2010].

8. Bangladesh demographic and health survey: summary indicators. National Institute of Population Research and Training (NIPORT), Dhaka, Bangladesh.2010

9. Xiong Xu, Buekens P, Pridjian G, Fraser WD. Pregnancy induced Hypertension and perinatal mortality. J Reprod-Med (USA) 2007-May; 52(5):402-406.

10. Dhananjay BS, Dyananda G, Sendilkumaran D. Murthy N.A study of factors affecting perinatal mortality in eclampsia. JPhysiol Biomed Sci. 2009; 22(2): 2-5.

11. Ferhoeff FH, Brabin BJ, VanBuuren V. An analysis of intrauterine growth retardation in rural Malwi. Eur J ClinNutr 2001; 44: 682-689

12. Roberts CL, Algert CS, Morris, Ford JB, Hederson-smart DJ. Hypertensive disorder of pregnancy a population based study.MJA 2005; 187(7):332-335.

13. Mayhew TM, Ohadike C, Baker PN, Crocker IP, Mitchell C, Ong SS. Stereological investigation of placental morphology in pregnancies complicated by preeclampsia with and without intrauterine growth restriction. Placenta.2003; 24: 219-226.

14. Odegård RA, Vatten LJ, Nilsen ST, Salvesen KA, Austgulen R. Preeclampsia and fetal growth. Obstet Gynecol. 2000; 96(6): 950-955.

15. Teasdale F. Histomorphometry of the human placenta in maternal preeclampsia. Am J Obstet Gynecol. 1985; 152: 25-31.

16. Soma H Yoshida K, Mukaida T, Tabuchi Y. Morphological changes in the hypertensive placenta. Contrib Gynecol Obstet. 1982; 9: 58-75.

17. Ciblis LA. The placenta and newborn infant in hypertensive conditions. Am J Obstet Gynecol. 1974; 118(2): 256-270.

18. Barua R. Macroscopic and microscopic changes in human placenta in gestational diabetes and eclampsia [thesis]. Dhaka: BSMMU; 2002.

19. Boyd PA, Scott A. Quantitative structural studies on human placentas associated with preeclampsia, essential hypertension and intrauterine growth retardation. Br J ObstetGynaecol.1985; 92: 714-721.

20. Masodkar AR, Kalamkar LR, Patki PS. Histopathology of placenta and its correlation with foetal outcome. J Obstet-Gynecol India.1985; 35: 294-300.

21. Jahan I. Maternal and fetal outcomein pregnency induced hypertension according to clinical features and laboratory investigations. (dissertation) Dhaka . Bangladesh college of Physians and Surgeons, 2007.

22. Kobra KT . Outcome of hypertensive disorder in pregnancy in Dhaka , National Medical Institute Hospital (dissertation) Dhaka. Bangladesh college of Physians and Surgeons, 2005

23. Xiong X Mayes D, Deminczuk N Olson DM, Davidge ST, Newburn – Cook C, et al. Impact of pregnancy induced hypertension on foetal growth.Am J Obstet Gynecol. 1999 ; 180(1 Pt 1): 207 – 213.

24. Koenig JM, Christensen RD. Incidence and natural history of neonatal neutropenia associated with maternal hypertension. NEng J Med 1983 Aug 31; 32(9): 557-562