

EFFECT OF HYPERTENSION IN PREGNANCY ON BIRTH WEIGHT

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Summary

Objective : To evaluate the effect of hypertension in pregnancy on fetal growth.

Design : It was a prospective case control study.

Materials & methods: Study carried out in the department of Obstetrics and Gynaecology Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka From May 2005 to December 2005. Total 100 case among them 50 cases of pregnancy with hypertension and 50 cases of normal pregnancy.

Results : Incidence of LBW babies in control group was 10% and that of the case group was 48%. Birth weight of babies of hypertensive mother were 2.49kg and that of normal pregnancy were 2.93kg.

Conclusion : Hypertension in pregnancy increases the incidence of low birth weight baby.

Key words : Hypertension; birth weight; low birth weight; pregnancy

Introduction

Birth weight is regarded as one of the simple measures of outcome of pregnancy. Among the various biological variables, which characterize the newborn birth weight is found to occupy a unique position. Birth weight is a reliable index of intrauterine growth and a major factor determining child survival, susceptibility of disease, physical and mental development¹.

The ability to reach an optimal birth weight results from the interaction between the fetal growth potential & the environment. The growth potential varies from race to race & from individual to individual. This is one reason for significant differences in birth weight among fetuses of same gestational age.

The fetus requires several substrates for normal growth. The most important are oxygen, glucose and amino acids. Oxygen crosses the placenta by simple diffusion and is necessary for the formation of chemical energy in the form of adenosine triphosphate (ATP).

Glucose crosses the placenta by facilitated diffusion, is used in the formation of energy & provides the carbon building blocks for the synthesis of protein. Any persistent decrease in the availability of any of these substrates will limit the ability of the fetus to reach his or her growth potential. Persistent & severe substrate deficiency may threaten the ability of the fetus to survive.

The availability of substrates necessary for fetal growth may be limited by pathologic conditions affecting the mothers, the placenta, and the fetus. The maternal conditions most frequently associated with poor fetal growth are chronic hypertension, pre-eclampsia, and chronic renal disease. The most common placental problem causing impaired fetal growth is abnormal placentation characterized by small size and inadequate changes in the spiral arteries. Suboptimal growth as a consequence of fetal disease occurs is chromosomal abnormalities, infections and multi-factorial malformations².

In both developed & developing countries low birth weight is the single most important factor that affects neonatal morbidity & mortality. Thus birth weight has largely been a subject of clinical and epidemiological importance and target for public health intervention.

Babies with a birth weight of 2500 gm or less irrespective of their gestation are classified as low birth weight. Some sub classified the category into very low birth weight as <1500 gm and extreme low birth weight as <1000 gm the epidemiology of low birth is yet not well understood. In 30-50% of cases the cause is unknown³.

In developing countries low birth weight is mainly due to intrauterine growth retardation and in developed country it is due to prematurity. Intrauterine growth retardation is defined as birth weight <10th percentile for gestational age. Prematurity usually defined as gestational age less than 37 weeks⁴.

Hypertensive disorders of pregnancy (HDP) constitute the commonest medical disorders diagnosed by obstetricians in clinical practice⁵. Hypertensive disorder of pregnancy categorized as chronic hypertension, chronic hypertension with superimposed PE, gestational hypertension without proteinuria, preeclampsia (hypertension with proteinuria)⁶.

Compared with normotensive gravidas, patients with elevated blood pressure have significantly greater maternal & fetal mortality and morbidity.

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Xiong X, *et al* studied impact of pregnancy-induced hypertension on fetal growth at a large referral centre in Canada and concluded pre-eclampsia and severe pre-eclampsia increased the risk of intrauterine growth restriction and low birth weight. However the risk of low birth weight was not increased significantly for gestational hypertension⁷. Hypertension is the most common medical disorder during pregnancy. Chronic hypertension is a serious medical complication in pregnancy with increased maternal & perinatal morbidity & mortality. Those who develop uncontrolled severe hypertension, those with target organ damage and those who are poorly compliant with prenatal visits are at high risk for poor perinatal outcome including prematurity, low birth weight & perinatal death⁸. Another study on effect of pregnancy induced and chronic hypertension on pregnancy outcome by 'Jain L' 1997 in USA showed women with chronic hypertension are of greater risk for adverse outcome than those with pregnancy induced hypertension⁹.

Bangladesh is one of the developing countries of the world, where disease, poverty & illiteracy are common phenomenon. In our country there is scanty information about incidence of the hypertensive disorders of pregnancy and birth weight.

The purpose of this study was to evaluate the birth weight of hypertensive pregnancy and the birth weight of normal pregnancy after 37 completed weeks.

Methodology

It was a prospective case control study carried out department of obstetrics and Gynaecology, BSMMU Dhaka From May 2005 to December 2005. Total 50 cases of pregnancy with hypertension and 50 cases of normal pregnancy included in this study. Inclusion Criteria are: Both primigravida and multigravida, after 37 weeks completed weeks of pregnancy, pregnancy with hypertension – both pre-eclampsia, pregnancy induced hypertension and chronic hypertension. Exclusion criteria are: pregnancy before 37 completed weeks, Multiple pregnancy, any associated medical disorders like Diabetes mellities, cardiovascular diseases, hepatic dysfunction, and any others chronic diseases. The data for the study was collected through direct interview from the patients admitted in labour ward in BSMMU by structured questionnaire. Collected data were compiled and analyzed using computer base software statistical package for social science (SPSS) for windows version 12.

Results and observation

Table I: Incidence of different types of hypertension in pregnancy

Types of hypertension	Frequency	Percentage
Pre eclampsia	20	40%
PIH	21	42%
Chronic hypertension	9	18%
Total	50	100

Table II: Sociodemographic data of study subjects

Age group years	Study Group		Control group		P value
	No	%	No	%	
18-22	18	36	16	32	>0.05
23-27	21	42	24	48	
28-32	10	20	10	18	
33-37	1	2	0	2	
Mean ±SD	27.36 ± 5.28		25.64 ± 3.83		
Socio-economics					
Low	11	22	11	22	> 0.05
Middle	26	52	29	58	
High	13	26	10	20	
Parity					
Primi	21	42	17	34	>0.05
Multipara	29	58	33	66	

Table III: Birth weight of neonates in study and control group

Group	Birth weight	No	Mean	Std Deviation
Case	<2.5 kg	24	2.02	.36
	>2.5 kg	26	2.93	.36
Control	<2.5 kg	5	2.72	.29
	>2.5 kg	45	3.72	.35

Table IV: Difference of birth weight of babies of the mothers of different types of hypertension

Types of hypertension	Mean birth weight kg±SD	F Value	P Value
Pre-eclampsia	2.17±0.39	6.47	<0.05
PIH	2.74±0.69		
Chronic hypertension			

Table V : Comparison of birth weight of the neonates between case and control group

Group	No	Mean birth weight (kg)	Std deviation	P value
Case	50	2.49	.58	< 0.001
Control	50	2.93	.65	

Discussion

Birth weight is one of the important factors of infant survival. In Bangladesh 30 to 50% of new born babies are low birth weight. Out come of LBW babies is associated with high perinatal mortality and morbidity. Hypertension in pregnancy is one of the significant causes of maternal and fetal morbidity even mortality in our country.

Regarding different types of hypertension in pregnancy we found that 40% of hypertensive mothers were pre-eclampsia. 42% were with PIH and 18% were chronic hypertensive patients. On study carried out by Jain L in which 74.5% was with PIH. 25.5% patients were with chronic hypertension. Incidence of PIH was found more than chronic hypertension in pregnancy in that study⁹. So, my findings are consistent with that study.

In this study we have found that statistically there was no difference between the mean (\pm SD) age of control and case group ($P > 0.05$). On study carried out by Duckitt and Harrington, in which they have found young maternal age did not seem to affect the risk of developing pre-eclampsia¹⁰. So, my findings are consistent with that study.

Socioeconomic status of the present study showed that in control group 58% patient belonged to middle class. 22% belonged to low socio-economic group. 20% from high socio-economic group. Where as in case group it was about 52%, 22% & 26% accordingly. Another study carried out by Nesa in BSMMU, which showed in hypertensive group 63.3% belonged to middle class. 36.7% belonged to low socio-economic group¹¹. Findings is consistent with this study

About parity we have found that there was no significant difference of parity between case & control group ($P > 0.05$). It is not consistent with the study carried out by Ahsan which showed 41% of hypertensive patient was primigravida¹².

Our main study was to find out the effect of hypertension in pregnancy on birth weight. We found that there was significant difference in birth weight between hypertension with pregnancy and that of normal pregnancy. In this study mean (\pm SD) birth weight of control group was 2.93kg in case group was 2.49 kg. It is consistent with the study by Xing X, which showed difference of mean birth weight between women with severe pre-eclampsia and women with normal blood pressure ranged between -467.7 gm and 189.1 gm⁷.

In our study the incidence of LBW in case group was 48% and that of control group was 10%. Another study carried out by Nesa which showed 33.3% babies of the preclampsic mothers weighed <2.5 kg. This showed significantly LBW in hypertensive pregnancy¹¹.

We also studied the relationship of birth weight of the babies of mothers with different types of hypertension in pregnancy. The mean birth weight of the babies of pre-eclamptic mother was 2.17 kg (\pm SD), for PIH was 2.74 kg (\pm SD) and for chronic hypertension was 2.64 kg (\pm SD). So there was significant difference between birth weight of different types of hypertension in pregnancy.

We compared the birth weight between pre-eclampsia and PIH and found there was significant difference between birth weight of pre-eclampsia and that of PIH. In case of pre-eclampsia it was 2.17kg and in case of PIH it was 2.74kg. P value was <0.05. No such study had been identified so far.

We also studied the birth weight of pre-eclampsia and chronic hypertensive mother and found significant difference between them. In case of pre-eclampsia birth weight was 2.17kg and in case of chronic hypertension it was 2.64kg. Pre-eclampsia has more adverse effect on birth weight than chronic hypertension.

Conclusion

Birth weight is a reliable index of intrauterine growth and also one of the major factors that determine the child survival, future growth and mental development. Prediction of LBW prior to delivery can improve delivery care and neonatal care, including referral in well equipped center leading to improved perinatal outcome.

This study shows that there was significant difference of birth weight of the babies of the mothers between pre-eclampsia, PIH and chronic hypertension. But there was no significant difference between that of PIH and chronic hypertension. But risk of low birth weight is greater in pre-eclampsia than chronic hypertension. So risk of LBW in pre-eclampsia is more than other types of hypertensive disorder in pregnancy.

LBW is the most common fetal outcome of hypertensive pregnancy. Careful examinations and investigations should be done to exclude a definitive cause of hypertension. We have to manage our patients with appropriate medications in order to reduce the morbidity and mortality of the fetus and mothers.

Disclosure

All the authors declared no competing interests.

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