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Immediate Perinatal Outcome of Neonates with Maternal Hypertensive Disorders in Pregnancy

Hassan M[1], Choudhury F[2], Begum M[3], Rahman H[4], Akhter S[5]

[1]Dr. Mahmuda Hassan, MBBS, MD, Associate Professor, Department of Paediatrics, [2]Dr. Ferdousi Choudhury, MBBS, FCPS, Associate Professor and Head of Department, Obstetrics and Gynaecology, [3]Dr. Marium Begum, MBBS, DCH, MD. Assistant Professor, Department of Paediatrics, [4]Prof. Dr. Hamidur Rahman, MBBS, FCPS, Professor and Head of Department of Paediatrics, [5]Prof. Dr. Sayeba Akhter, MBBS, FCPS, FRCOG, Academic Director. All from Ad-din Women's Medical College Hospital, Dhaka. Bangladesh.

Abstract

Introduction: Hypertensive disorders of pregnancy seem to be one of the major causes of maternal morbidity and mortality leading to 10-15% of maternal deaths especially in the developing world. This study examines the perinatal outcome of neonates with mothers having hypertensive disorder of pregnancy. **Materials and Methods:** Seventy three mothers and their newborn babies were selected. Mothers with Gestational hypertension, preeclampsia, eclampsia, chronic hypertension, preeclampsia superimposed on chronic hypertension were included. Gestational diabetics (GDM), chronic maternal diseases, infant of diabetic mother (IDM), babies with major congenital malformations were excluded. **Results:** Thirty five mothers (47.9%) had regular antenatal check up (ANC) and 38 (52%) had irregular. Nineteen mothers (26%) were primipara and 54 (74%) were multipara. Forty four mothers (60%) had positive family history or had own history of hypertensive disorder during their previous pregnancy. 13 mothers (17.8%) had normal vaginal delivery (NVD), 60 mothers (82.19%) had lower uterine cesarean section (LUCS). 30 babies (41%) were admitted. 44 mothers (60%) had gestational hypertension, 21 had (28.6%) pre-eclamtic toxemia (PET), 3 had (4.1%) eclampsia, 5 had (6.8%) essential hypertension 3 of them subsequently developed PET. Mean maternal age 26.86 years, gestational age 34.15 (±1.46)weeks among admitted and 36.30 (±1.6)weeks among non-admitted group. Mean birth weight was 1.69 (±0.39) kg. among admitted and 2.71 (±0.31) kg. in non-admitted babies. Seven pregnancies (9.58%) were twin, macerated 1 twin among was among 2 pregnancies (2.7%), 5 intra uterine death (IUD) observed in single pregnancy. **Conclusion:** Significant number of babies with maternal hypertensive disorder of pregnancy needed hospitalization, mean birth weight and gestational age was less than that of the non-admitted group.

Key words: Hypertensive disorder of pregnancy, neonate, outcome.

Introduction

Every year nearly 5,29,000 women die globally due to pregnancy related causes. For each death nearly 118 women suffer from life threatening events or severe acute morbidity[1]. Hypertensive disorders of pregnancy seem to be one of the major causes of maternal morbidity and mortality leading to 10-15% of maternal deaths specially in the developing world[2]. Recent work has suggested that women with mild pregnancy-induced hypertension may have improved perinatal outcomes. There may be differences in placental nutrient and oxygen transfer between hypertensive and normotensive mothers. The reduced ability of the maternal arterial supply of the placenta to autoregulate flow at the intervillous level means that changes in maternal blood pressure will be reflected within the intervillous space. Syndromes that improve perfusion at this level may improve maternal-fetal transfer of nutrients and oxygen and should be reflected as improved neonatal and infant health. Certainly, a continuum must exist at which such an increase in perfusion to the villous spaces becomes maladaptive, or constitutes a "biological overshoot" and increases the risk to the mother and/or fetus. So, mild pregnancy induced hypertension may have some beneficial effect on fetus, but other than mild gestational hypertension is a leading cause of maternal and neonatal morbidity and mortality[3].

Address for correspondence
Dr. Mahmuda Hassa
Ad- din Medical College and Hospital
2 Boro-Moghbazar, Dhaka. 1217, Bangladesh
Cell: +8802-01711-814940
E-mail: mahmudahasn@yahoo.com

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The hypertensive mothers were divided into the following groups:

Gestational hypertension: Hypertension manifested after 20 weeks of gestation.

Pre-eclampsia/pre-ecpamptic toxemia (PET): Hypertension associated with proteinuria greater than 0.3 g in a twenty four hour urine collection or greater than 1 g/L in a random sample.

Essential hypertension: The presence of sustained blood pressure of 140/90 mm Hg or higher before pregnancy or before twenty weeks of gestation.

Pre-eclampasia superimposed on essential hypertension : Pre-eclampasia diagnosed in a previously hypertensive women[4].

Eclampsia: Pre-eclampsia when complicated with convulsion and/or coma.

The term pregnancy induced hypertension (PIH) is defined as the hypertension that develops as a direct result of the gravid state. It includes (i) *Gestational hypertension,* (ii) *Pre-eclampasia, (iii) Eclampsia*[5].

Hypertensive disorders of pregnancy (HDP) predispose women to acute or chronic utero-placental insufficiency, resulting in ante or intra-partum asphyxia that may lead to fetal death, intrauterine growth retardation and/or preterm delivery[6,7].

The offspring of women with hypertension during pregnancy experience higher rates of prematurity and low birth weight compared to healthy maternal controls. Expectant management with temporizing treatment should be performed to lengthen gestation, which may be associated with enhanced perinatal survival. Maternal and fetal surveillance is conducted at regular intervals and delivery is indicated for worsening maternal and foetal conditions[8]. Special neonatal care is required for such babies, which is associated with emotional and financial stress for both parents and third party payers and long-term infant developmental consequences[9].

Moreover the disease not only affects pregnancy outcome but also predisposes mother and child to long term health complications like cardiovascular diseases[10]. The aim of the study was to see the immediate perinatal outcome of neonates with maternal hypertensive disorders of pregnancy.

Materials and Methods

This prospective study was done at Ad-din Medical College and Hospital from 1st January 2012 to June 30th 2012 at the department of Obstetrics and Gynecology to see the perinatal outcome of neonates with maternal hypertensive disorders in pregnancy. Seventy three cases with maternal history gestational hypertension, pre-eclampasia, essential hypertension, pre-eclampasia superimposed on essential hypertension or eclampsia admitted for the delivery were taken for the study. While all those patients who gave history of raised blood pressure prior to 20 weeks of gestation or those mothers taking treatment for control of blood pressure prior to 20 weeks of pregnancy were assumed to be chronic hypertension. Patients with pre-gestational chronic hypertension who were taking treatment were also included irrespective of their blood pressure reading at the time of admission.

Data regarding the demographic parameters like antenatal check up, parity, gestational age, time of onset of raised blood pressure, associated medical disorders specially the history of hypertensive disorder during their previous pregnancy, family history of hypertension, preterm labour, mode of delivery, and fetal complications like intra uterine death (IUD) were recorded in a structured questionnaire. Neonatal parameters like gestational age, birth weight, sex, respiratory distress due to respiratory distress syndrome (RDS), congenital pneumonia, meconium aspiration syndrome (MAS), perinatal asphyxia with convulsion were also recorded. Gestational age (GA) were categorized as pre-term when GA < 37 completed weeks, term when GA between 37 to 42 completed weeks, post term when GA > 42 weeks. Birth weight were categorized as normal birth weight. (2.5 to 4 kg), low birth weight (LBW) < 2.5kg, (up to and including 2499gms), Very low birth weight (VLBW) < 1.5kg, (up to and including 1499gms), extremely low birth weight baby (ELBW) < 1000gm (up to and including 999gms). Intra uterine growth retardation (IUGR) when the birth weight was less than 10th percentile for the gestational weight.

Mothers with diabetes mellitus (DM), gestational diabetes mellitus (GDM), chronic diseases like chronic renal and chronic liver diseases, endocrine and collagen diseases were excluded from the study. Babies with major congenital malformations were also excluded from the study. Statistical analyses of clinical and demographic factors were carried out by X^2 test. Data was analyzed with SPSS version 17. *p*-value less than 0.05 was considered statistically significant.

Results

Total 73 mothers with their babies were selected for the study. Mean maternal age was 26.86 years. Total male babies were 40 and female 33.

Highly significant values for the HDP were observed among the multi-para women. Significant number of

mother had irregular ANC or no ANC at Ad-din hospital. Number of LUCS and the NICU admission were highly significant (*p*-value <0.001). Significant number of mothers had own history of HDP during their previous pregnancy or had positive family history of hypertension (*p*-value <0.01).

This pie diagram shows type of hypertensive disorder during pregnancy. 44 (60%) mother had gestational hypertension, 21 (29%) had PET, eclampsia 3 (4%) and essential hypertension were 5 (7%), 3 of them subsequently developed PET. Gestational hypertension was the major hypertensive disorder followed by pre-eclamptic toxemia.

Overall there was male preponderance. Males 40, females 33, Ratio M:F = 1.2:1. There is male preponderance in admitted group. Eighteen (60%) males and females 12 (40%) than that of the non admitted group. In non-admitted group number of male 22 (51.15%) and female 21 (48.83%), is almost equal.

Mean birth weight and gestational age was low in admitted group and which was highly significant (*p*-value <0.001). Incidence of preterm/near term was significantly high in admitted group (*p*-value 0.01). No AGA seen in admitted group. Low birth weight baby (*p* value 0.01), VLBW (*p* value 0.001), IUGR, were significantly high in the admitted group (*p* value 0.004) and the number of term delivery was low in admitted group and the *p*-value was also not significant (*p*-value 0.08). Significant number of mothers had positive family of hypertension or had own history of hypertensive disorder in previous pregnancy (*p*-value 0.01). No term appropriate for gestational age (AGA) (>2.5 kg) babies were found in the admitted group (*p*-value 0.001).

This diagram shows babies needed NICU admission had history of respiratory distress 18 (60%), perinatal asphyxia (PNA) 6 (20%), meconium aspiration syndrome (MAS) 10(33.33%), 30 (100%) to rule out (R/O) sepsis. 7 (9.58%) pregnancies were twin, macerated 1 twin among 2 (2.7%) pregnancies, 5 (6.84%) intrauterine death (IUD) in single pregnancies. Two (6.6%) babies expired during the course of treatment at NICU out of 30 babies. Total peri-natal death was 9 (12.32%).

Table 1: Maternal Demographic profile

			Total	X^2	*p*-value
ANC	With ANC 35 (47.9%)	Irregular or no ANC 38 (52%)	73	5.45	<0.001
Parity	Primi 19 (26%)	Multi 54 (74%)	73	33.56	<0.001
Family H/O/past H/O/HTN/HDP	44 (60.27%) present	29 (39.72%) absent	73	6.16	0.01
Mode of delivery	60 (82.19%) LUCS	13 (17.80%)NVD	73	60.52	<0.001
NICU admission	30 (41%) needed	43 (59%) not needed	73	4.63	0.001

Table 2: Sex distribution of the admitted and the non admitted groups of neonates in relation to gestation and birth weight (n=73).

	Admitted Group. 30		Non-admitted Group. 43		Total
	M	F	M	F	
Term (>37wks)	6 (20%)	4 (13.33%)	14 (32.55%)	13 (30.23%)	37 (50.68%)
Pre/near term (< 37wks)	12 (40%)	8 (26.66%)	8 (18.60%)	8 (18.60%)	36 (49.31%)
Term AGA (>2.5kg)	(0%)	(0%)	10 (23.25%)	12 (27.90%)	22 (30.13%)
LBW (1.5 to 2.5 kg)	12 (40%)	10 (33.32%)	12 (27.90%)	9 (20.93%)	43 (58.90%)
VLBW (<1.5kg) ELBW (<1.0kg)	6 (20%)	2 (6.66%)	0	0	08 (10.95%)
IUGR/SGA	6 (20%)	5 (16.66%)	2 (4.65%)	0	13 (17.80%)

Table 3: Neonatal Demographic profile

	Admitted Gr. 30	Non-admitted Gr. 43	Total	X^2	*p*-value
Mean Wt in kg.	1.69 (±0.39)	2.71 (±0.31)			<0.001
Mean GA in weeks	33.15 (±1.46)	36.30 (±1.6)			<0.001
Term (>37wks)	10 (33.33%)	27 (62.79%)	37 (50.68%)	17.05	0.08
Pre term/near term (< 37wks)	20 (66.66%)	16 (37.20%)	36 (49.31%)	6.13	0.01
Term AGA (>2.5kg)	0 (0%)	22 (51.16%)	22 (30.13%)	25.3	<0.001
LBW (1.5 to 2.5 kg)	22 (73.32%)	21 (48.83%)	43 (58.90%)	4.38	0.01
VLBW (<1.5kg)/ELBW (<1.0kg)	08 (26.66%)	0	08 (10.95%)	16.0	0.001
IUGR/SGA	11 (36.66%)	02 (4.65%)	13 (17.80%)	12.46	0.004
F/H/ HTN+own H/O HDP in previous pg.	23 (76.66%)	21 (48.83%)	44 (60.27%)	5.72	0.01

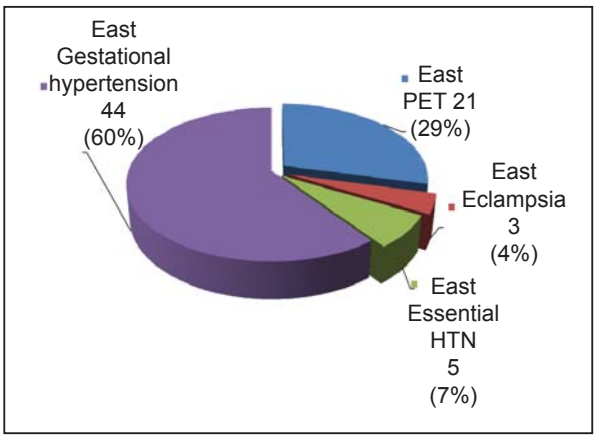

Fig 1: Types of maternal hypertensive disorder observed

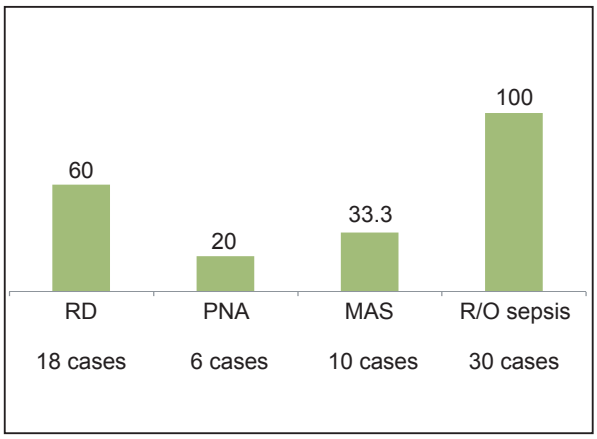

Fig 2: Shows causes for admission and the percent distribution

Discussion

Hypertensive disorder of pregnancy is one of the major health problems among the pregnant mothers. It is also considered to be a major worldwide health problem causing an increased risk of perinatal and maternal morbidity and mortality[11].

The prevalence of HDP varies according to geographic regions of world and ranges from 1.5% in Sweden to 7.5% in Brazil[12]. Some studies from Saudi Arabia reported prevalence between 2.6% and 3.7%[13] while Venture determine a prevalence of 3.8% in USA in 2000[14]. The incidence reported from Turkey was 8.49%[15].

In our study gestational hypertension 44 (60%) was the major hypertensive disorder observed, essential hypertension was the least 5 (6.8%). Other study also showed essential hypertension cases were less, probably because majority of the mothers did not receive antenatal care and were admitted as emergency cases with raised blood pressure and had history of hypertension before this pregnancy and no blood pressure record during the antenatal period was available[3], in our study 38 (52%) mothers had irregular ANC or un-booked at our hospital.

Age has an important influence on the incidence of hypertensive disorders of pregnancy. Young primi-gravidae under 20 years and patients over 30 years have an increased chance of hypertension and hence a higher perinatal mortality. This could be because the majority of conceptions take place in this age group. But in this study mean maternal age was 26.86 years and majority of the pregnancy occured between the age of 20 to 30 years. Hypertensive disorder of pregnancy is a disease of primi-para[16,17]. But our study showed a problem among the multi-para was 54 (74%).

Hypertensive disorders of pregnancy predispose women to acute or chronic utero-placental insufficiency, resulting in ante or intra-partum hypoxia or anoxia that may lead to intrauterine growth retardation and/or preterm delivery even fetal death.

In this study preterm/near term delivery was 20 (66.66%) vs. 16 (37.20%) and low birth weight babies 22 (73.32%) vs. 21 (48.83%), VLBW was 8 (26.66%) vs. 0 (0%) in admitted vs. non-admitted group respectively. In different studies prematurity and low birth weight was the major cause of NICU admission among the babies with maternal history of hypertensive disorder of pregnancy[18,19,20] Prematurity was the most important

factor responsible for increased perinatal morbidity and mortality which is in accordance with earlier reports[18]. Our study IUGR was 13 (17.80%) which is higher than other studies 9.5%[21].

Birth asphyxia was the commonest neonatal complication in another study[19], but in our study 18 (60%) admission was due to respiratory distress, meconium aspiration syndrome was among 10 (33.33%) and PNA was the least 6 (20%) were the cause of admission at NICU. Sepsis screening was done in all 30 (100%) cases in our study by doing blood culture along with other base line investigations just after admission. 30 (40%) needed admission out of 73 neonates. High need for NICU admission was also seen in another study[21, 22].

In this study 44 (69.27%) mothers had hypertensive disorder during their previous pregnancy or had positive family history of hypertension, out of them 23 (76.66%) in admitted and 21 (48.83%) in non admitted group. Same observation was reported in other literature[23]. Operative delivery is reported to be increased in hypertensive disorders of pregnancies[24]. In our study delivery route did not differ from the literature, 60 (82.19%) needed LUCS. In this study total perinatal mortality was 9 (12.32%), out of them, macerated one twin among 2 pregnancies (2.7%), 5 IUD (6.84%) in single pregnancy. 2 (6.6%) babies expired during the course of treatment at NICU out of 30 babies. In another study, where total perinatal death was 68 (15.9%) out of 427, 40 (31.1%) was early neonatal deaths and 28 (6.5%) still births[3].

Conclusion

Hypertensive disorders of pregnancy remains an important cause of fetal and neonatal morbidity and mortality which is observed in this study. Significant number of babies were delivered by caesarian section and needed hospitalization. This is a major obstetric problem has a variable degrees of neonatal involvement, we observed mean birth weight, mean gestational age was less, IUGR was high in admitted group than that of the non admitted group.

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Permission from IRB: Yes

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