

Original Article

FETAL OUTCOME OF PREGNANCY WITH HYPERTENSION

Shazia Rasul, Aflak Rasheed and Lubna Riaz Dar

Objective: To assess relationship of neonatal morbidity and mortality with severity of hypertension. The effect of severity of hypertension on time of delivery and neonatal outcome including birth weight, APGAR score, neonatal nursery admission, intrauterine death and neonatal deaths was studied.

Methods: All pregnant patients with diastolic blood pressure of at least 90 mmHg or systolic blood pressure of 140 mmHg taken at two occasions at least 6 hours apart, with singleton pregnancy at any gestational age were included in the study. They were categorized in two groups according to diastolic blood pressure at the time of presentation. Mild to moderate hypertensive patients were those with diastolic blood pressure up till 109 mmHg. Patients with diastolic blood pressure 110 mmHg or more were labeled as severely hypertensive patients. All patients were followed throughout antenatal period till delivery. Time of delivery was decided by senior consultants according to obstetrical parameters. All babies delivered were attended by pediatricians and admission in neonatal nursery was decided by pediatricians. Babies admitted in nursery were followed till discharge or expiry.

Results: Out of 1661 screened patients, 119 hypertensive pregnant patients were detected (an incidence of 7.16%). Out of these 78.2% were mild to moderate hypertensive and 21.8% were severely hypertensive patients. The effect of severity of hypertension was significant on time of delivery. There were 74% preterm deliveries in severely hypertensive patients as compared to 13% in mild to moderate group ($p=0.0001$). The effect of severity of hypertension was significant on birth weight, APGAR score, intrauterine and neonatal deaths.

Conclusion: Fetal morbidity and mortality is directly related to severity of hypertension in terms of birth weight, pre-term deliveries, APGAR score and perinatal mortality rate.

Keywords: Hypertension, Preterm, Birth Weight, APGAR Score and, Perinatal Mortality rate.

Introduction

Hypertension in pregnancy is defined as diastolic blood pressure of at least 90 mmHg and or systolic blood pressure of at least 140 mmHg and three blood pressure readings must be recorded at least 6 hours or more apart.¹ Hypertensive disorders of pregnancy are responsible for significant maternal and perinatal morbidity and mortality.^{2,3}

Hypertensive disorders include pregnancy included hypertension (PIH), chronic hypertension and chronic hypertension with superimposed PIH.⁴

Hypertensive disorders of pregnancy complicate about 12% of all pregnancies. Pregnancy included hypertension which includes pre-eclampsia and eclampsia is responsible for 70% whereas chronic hypertension represents 30% of hypertensive disorders in pregnancy. Superimposed pregnancy induced hypertension complicates approximately 5-10% of pregnancies of chronic hypertension.¹

The etiology of PIH is still unknown despite intensive research being undertaken e.g. role of angiotensin converting enzyme gene polymorphism,⁵ T594M mutation of epithelium sodium

channel beta submit gene,⁶ role of prothrombotic factors.⁷ There is clinical correlation between maternal factors associated with impaired placental function and increased risk of stillbirth, suggesting that intrauterine fetal death (IUD) represents a point in the spectrum of intrauterine hypoxia.⁸ The predominant theory is that reduced intra-placental perfusion is unique pathogenic process in development of pre-eclampsia. Decreased utero-placental blood flow results in low birth weight babies or small for gestational age infants.^{9,10}

Hypertensive disorders were diagnosed in 75% cases of placental abruption and 39% had a previous history of hypertensive disease during pregnancy, placental abruption, IUD or preterm delivery.¹¹ Definitive treatment of pre-eclampsia mandates early termination of pregnancy that results in pre-term delivery.¹²

The purpose of study was to highlight fetal morbidity and mortality related to severity of hypertension.¹³

Material & Methods

This study was carried out in Obstetrics and

Gynaecology Department at Sheikh Zayed Federal Postgraduate Medical Institute Lahore from 16th April 2005 to 15th April 2006. All patients who attended antenatal clinic or were admitted through emergency or private clinic fulfilling inclusion criteria were included in study. Inclusion criteria was pregnant patient with diastolic blood pressure of at least 90 mmHg or systolic blood pressure of 140 mmHg taken on at least two occasions 6 hours apart at any gestational age. Patients with multiple gestations or with congenital fetal anomalies were excluded.

All patients fulfilling inclusion criteria were further divided into mild hypertensive, moderate and severely hypertensive according to diastolic blood pressure 90-99 mmHg, 100-109 mmHg and >110 mmHg respectively at the time of presentation. Mild to moderate hypertensive patients were managed in outpatient department whereas severe hypertensive were managed on indoor basis in consultation with physicians.. Maternal and fetal surveillance was done till pregnancy was terminated when fetus was reasonably mature or risk to the fetus was more than that of premature delivery itself or mother's health was at risk. This decision was made by consultants with intimation to pediatricians who attended all babies. Weight, APGAR score and decision about neonatal nursery admission were made by pediatricians. All babies admitted in NNU were followed till they were discharged or expired. All collected data was entered in specially designed proforma and analyzed using statistical program for social sciences (SPSS) version 10.

Results

Out of 1661 screened patients throughout one year,

119 were detected as hypertensive which makes incidence of hypertension as 7.16%. These patients were classified into two groups; mild to moderate (78%) and severely hypertensive patients (21.8%). Out of 119 patients, 3 patients left against medical advice, hence excluded. **Table 1** shows the effect of severity of hypertension on time of delivery. There were 74% preterm deliveries in severely hypertensive patients as compared to 13% in mild to moderate group. **Table 2** shows significant influence of hypertension on birth weight as in severely hypertensive group, small for gestational age were 65.2% whereas 34.8% were appropriate for gestational age. **Table 3** and **4** reflect the effect of severity of hypertension on APGAR score taken at 1 minute and 5 minutes; 21% were shifted with mother. **Table 6** reflects perinatal deaths again significantly affected by severity of hypertension.

Discussion

Hypertensive disorders of pregnancy are responsible for significant maternal and perinatal morbidity and mortality. Hypertensive disorders complicate 7-10% of all pregnancies.¹ Same incidence of hypertension in pregnancy is seen (7%) in our study, done in Obstetrics and Gynaecology Department at Shaikh Zayed Hospital, Lahore.

The incidence of pre-term deliveries among hypertensive patients is quite high i.e. 25% observed in our study, which closely resembled with incidence of pre-term delivery in PIH patients (35%) as observed by Ara & Jamal. When relating with severity of hypertension, 71% of pre-term deliveries were present among severely hypertensive patients as compare to 13% among mild/moderate (p = 0.0001). The increase in preterm delivery rate in hypertensive

Table-1: Effect of severity of hypertension on time of delivery (gestational).

Severity of Hypertension	Pre-Term	Term	Total
Mild/Moderate	12 (13%)	81 (87%)	93 (100%)
Severe	17 (74%)	6 (24%)	23 (100%)
Total	29 (25%)	87 (75%)	116 (100%)

p=0.0001 (Significant)

Table-2: Effect of severity of hypertension on birth weight.

Birth Weight	Mild/Moderate Hypertension	Severe Hypertension	Total
SGA (Small for gestational age)	11 (42.4%)	15 (57.6%)	26 (100%)
AGA (Appropriate for gestational age)	77 (90.5%)	08 (29.5%)	85 (100%)
LGA (Large for gestational age)	05 (100%)	0 (0%)	05 (100%)

p=0.0001 (Significant)

Table-3: Effect of severity of hypertension on mean APGAR score at 1 minute.

Severity of Hypertension	Mean (APGAR)	Standard Deviation	No. Of Obsevation
Mild / Moderate	4.7	1.68	93
Severe	3.4	1.81	23

$p=0.0015$ (significant)

Table-4: Effect of severity of hypertension on mean APGAR score at 5 minutes.

Severity of Hypertension	Mean (APGAR)	Standard Deviation	No. Of Obsevation
Mild / Moderate	7.33	1.73	93
Severe	6.1	2.3	23

$p=0.0009$ (significant)

Table-5: Effect of severity of hypertension on neonatal nursery admission.

Severity of Hypertension	Need Admission	Do not need admission	Total
Mild/Moderate	50 (53.8%)	43 (46.2%)	93
Severe	18 (78.3%)	05 (21.7%)	23
Total	68 (58.6%)	48 (41.4%)	116

$p<0.05$ (significant)

Table-6: Effect of severity of hypertension on perinatal deaths (neonatal deaths & IUD):

Severity of Hypertension	Perinatal Deaths	Healthy Neonate/Outcome	Total
Mild/Moderate	3 (3.2%)	90 (96.8%)	93
Severe	8 (34.3%)	15 (65.2%)	23
Total	11 (9.4%)	105 (80.6%)	116 (100%)

$p=0.0001$ (significant)

patients is due to elective termination of pregnancy, keeping in view the clinical condition of mother or when compromising for the fetus.

The offspring of women with hypertension during pregnancy are at increased risk of low-birth weight or small for gestational age. The incidence of small for gestational age (SGA) was 22.4% in our study which differs from incidence of SGA as 54% in study by Ara,¹⁴ because they labeled all babies below 2.5 kg as SGA whereas in our study babies were labeled as SGA with birth weight <10th centile according to growth chart in William Obstetrics.¹⁵

There is significant effect of severity of hypertension on birth weight as evident in this study, same as shown by Buchbmdr et al, that women who had severe gestational hypertension had increased rate of delivery of SGA infants (20.8% vs 6.5% $p = 0.024$) as compared to women with mild gestational hypertension/mild pre-eclampsia.¹²

This study revealed that there was significant effect of severity of hypertension on APGAR score at 1 minute and at 5 minutes as severe pre-eclampsia predisposes the fetus to acute hypoxia¹⁶ and perinatal

asphyxia is associated with pregnancy related complications such as hypertension as shown by Chandra.¹⁷

Out of 116 babies delivered, 68 needed admission in neonatal nursery. However the severity of hypertension did not significantly affect the admission because in our hospital all the babies delivered by caesarean sections were admitted in Neonatal Nursery Unit for routine care. When these babies were followed up in NNU, 6 babies expired and the rest were discharged in satisfactory condition. Perinatal death includes neonatal death and intrauterine death which is significantly affected by severity of hypertension as observed in this study. Out of 11 perinatal deaths, 6 were neonatal deaths and 5 were intrauterine deaths (IUDs). Intrauterine deaths represent the mortality end point in spectrum of intra-uterine hypoxia. Impaired placental function, reduced utero-placental perfusion, not only compromises fetal growth but results in intrauterine hypoxia and in severe cases intrauterine death. There were two IUDs in severely hypertensive patients, both

were having chronic hypertension with superimposed pre-eclampsia and this is a known fact that patients with chronic hypertension are at greater risk of adverse perinatal outcome including IUD, pre-maturity, intrauterine growth retardation.¹⁸ One of them had added risk factor of gestational diabetes. There were two IUDs in patients with moderate hypertension. Both of them were unbooked patients and presented with absent fetal hearts. One of them had placental abruption. There is definitely co-relation between placental abruption and pregnancy with hypertension.¹⁹ Placental abruption is major risk factor for fetal morbidity and mortality causing 50.63% of intrauterine deaths.²⁰ One of intra-uterine death was due to tight true knot in umbilical cord.

There were six neonatal deaths; all were in severely hypertensive patients. All babies were pre term and all were small for gestational age. Three neonatal deaths were due respiratory distress syndrome, two were due to neonatal sepsis and one

was due to intraventricular haemorrhage. Respiratory distress syndrome, one major complication contributing to neonatal morbidity and mortality in pre-term infants²¹ with 5 IUD^s and 6 neonatal deaths; peri-natal mortality rate was 9.4% i.e. 94/1000 live births. Peri-natal mortality rate was 130/1000 live birth in the study by Ara¹⁴ whereas it was 53/1000 live birth in hypertensive pregnancies by Buchbinder et al in Iran.²²

Conclusion

Fetal morbidity and mortality is directly related to severity of hypertension in terms of birth weight, pre-term deliveries APGAR score and perinatal mortality rate.

*Department of Obstetrics and Gynaecology
Shalamar Hospital, Lahore*

theesculapio@hotmail.com
www.sims.edu.pk/esculapio.html

References

- Hallak M, Wafisch A. Hypertension. In: James DK, Streer PJ, Weiner CP, Gonick B eds. High risk pregnancy 3rd ed. India: Elsevier 2006; 772-97.
- Koonin LM, Mackey AP, Berg CJ. Pregnancy related mortality surveillance: United States 1987-1990. Maternal Morbidity Rep CDC surveil Summ 1997; 46: 17-36.
- Sikandar R, Memon A, Shaikh F. Pre-eclampsia & prevention strategies. J Surg Pak 2003; 8:30-1.
- Ray JG, Burrows RF, Burrows EA, Vermeulen MJ. McMaster outcome study of hypertension in pregnancy. Early Hum Dev 2004; 64: 129-43.
- Galao AO, Souza de LH, Costa da BE, Scheibe CE, Figueiredo de. Angiotensin converting enzyme gene polymorphism in pre-eclampsia and normal pregnancy. Am J Obstet Gynaecol 2004; 191:821-4.
- Pezoraro RJ, Roberts CB, Rom L, Moodly J. T594M mutation of epithelial sodium channel beta subcent gene in pre-eclampsia and eclampsia in black south African women. Br J Obstet Gynaecol 2004; 111: 1012-3.
- Salonon O, Seligsohn U, Steinberg DM, Zalel Y, Lerner A, Rosenberg N et al. The common pro-thrombotic factors in nulliparous women do not compromise blood flow in fetomaternal circulation and are not associated with pre-eclampsia or intrauterine growth restriction. Am J Obstet Gynaecol 2004; 191: 2002-9.
- Dodd JM, Robinson JS, Crowther CA, Chan A. Stillbirth & neonatal outcome in South Australia, 1991-2000. Am J Obstet Gynecol 2003; 189: 1731-6.
- Xiong X, Dermianczwk NN, Saunders LD, Wang FL, Fraser WD. Impact of pre-eclampsia and gestational hypertension on birth weight by gestational age. Am J Epidemiol 2002; 155: 203-9.
- Khan N, Jamal N. Maternal risk factor associated with low birth weight. JCPSP 2003; 13:25-8.
- Leunen K, Hall D, Odemdaal MJ, Grove D. The profile and complications of women with placental abruption and intra-uterine death. J Trop Pediatr 2003. 49: 231-4.
- Buchbinder A, Sibai BM, Carites S, Mac Pherson C, Hauth J, Marshall D et al. Adverse perinatal outcomes are significantly higher in severe gestational hyper-tension than in mild pre-eclampsia. Am J Obstet Gynecol 2002; 186:66-71.
- Jamal M, Khan. Neonatal morbidity and mortality in high risk pregnancy. JCPSP 2002; 12:657-61.
- Ara J, Jamal M, Sultan N. Perinatal outcome in pregnancy induced hypertensive mothers. Pak Armed Forces Med J 2004; 54: 76-8.
- Jenkin SM, Hlad BB, Hauth JC. Severe pre-eclampsia at <25 weeks of gestation. Maternal and neonatal outcomes. Am J Obstet Gynecol 2002; 186: 790-5.
- Yang JM, Wang KG. Relationship between acute fetal distress and maternal placental fetal circulations in severe pre eclampsia. Acta Obstet Gynecol Scand 1995; 74: 419-24.
- Chandra S, Ranji S, Thirpuram S. Perinatal asphyxia: multivariate analysis of risk factors in hospital births. Indian Paediatr 1997; 34:2.6-12.
- Effect of pregnancy induced and chronic hypertension on pregnancy outcome. J Perinatal

- 1999;425-7.
19. Tasleem H, Tasleem S, Adil MM, Siddique M, Waheed Y. Correlation of pregnancy induced hypertension with placental abruption and effect of anti-hypertensive therapy. *Rawal Med J* 2005;30:59-61.
 20. Jabsen M, Guul F. Abruptio placenta: Risk and perinatal outcome. *J Postgrad Med Inst* 2004;18:669-76.
 21. Kurkinen RM, Koivisto M, Jouppila P. Pre-term delivery for maternal or fetal indications: maternal morbidity, neonatal outcome and late sequel in infants. *BJOG* 2000;107: 648-49.
 22. Zareian Z. Hypertensive disorders of pregnancy. *Int J Gynecol Obstet* 2004;87: 194-8.

PICTURE QUIZ

This healthy 4-year-old boy developed palpable purpuric lesions on his extremities, face, and buttocks 2 weeks after an upper respiratory infection. He subsequently experienced swelling of his ankles and wrists, colicky abdominal pain, and hematuria. His skin eruption and associated symptoms recurred for 3 weeks before resolving without complications. What is the diagnosis?



See Answer Page # 41