

Maternal & Neonatal Outcomes in Pregnant Hypertensive Females in a Tertiary Care Hospital in Rajasthan – A Prospective Case Control Study

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Abstract

Background: Around 5-10% of the pregnancies are complicated by hypertension & its associated disorders which could result in significant maternal & fetal mortality & morbidity.

Aims & Objectives: This case control prospective study evaluated the maternal and perinatal mortality rates, assess the association between adverse maternal and perinatal outcomes with the type of hypertensive disorder, degree of hypertension, gestational age, mode of delivery, and demographic characteristics and neonatal outcomes.

Material & Methods: This prospective, cross-sectional study recruited 200 pregnant women (> 20 weeks of gestation) from January 2022 to April 2022 which were segregated in two categories. Group I which included 100 pregnant women with hypertensive disorders. Group II included 100 normal pregnancies without hypertension. Maternal & neonatal outcomes were recorded.

Results: No statistically significant difference was observed between the two groups with respect to baseline demographic characteristics (age, parity, socioeconomic status, mode of delivery) ($p > 0.05$). In Group I, 53% had gestational hypertension, 25% had mild preeclampsia, 15% had severe preeclampsia, 6% had eclampsia with 1% maternal mortality observed in woman with eclampsia. Maternal complications noted were HELLP syndrome (1.6%), 3.7% cases had pulmonary edema (2.8%), cerebral hemorrhage (3.2%), abruption placenta (6.3%) & postpartum hemorrhage (6.3%). In Group I, neonatal mortality was 5%, In Group I, 28% preterm neonates observed as compared to 8% in Group II. Neonatal weight was <1.5 kg in 7% in Group I while 3% in Group II. In group I <7 Apgar score was observed in 26% cases and neonatal complications in 24% while in Group II these were 12 % & 9% resp.

Conclusion: Hypertensive disorders like eclampsia & severe preeclampsia are associated with significantly worst maternal & fetal outcome. Compromised utero-placental blood flow and ischemia could lead to fetal hypoxia & respiratory distress.

Keywords: Gestational hypertension, Eclampsia, Preeclampsia, Maternal & neonatal outcomes

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Introduction

Gestational hypertension is a leading cause of negative maternal & fetal outcomes. Cunningham 2018 found hypertension in around 5% to 10% of all pregnancies which was combined with hemorrhage and infection. [1] There are variations in maternal morbidity which could be attributed to their socioeconomic status. Prakash et al in 2006 noted hypertensive incidence to be 5.38%, along with preeclampsia in 44%, eclampsia in 40%, and hemolysis, elevated liver enzymes, and low platelet count (HELLP) syndrome in 7% of patients with maternal and perinatal mortality to be 5.5% & 37.5% respectively. [2] Pal A 2011 reported maternal mortality in eclamptic females in India to range from 8%-14% . [3]

With proper monitoring & timely intervention eclampsia & its complications can be avoided. The leading causes of maternal mortality in developing countries are eclampsia, disseminated intravascular coagulation, accidental hemorrhage acute renal failure, pulmonary edema & HELLP syndrome . [4]

Fetal complications exist due to duration of the disease, severity of preeclampsia, and degree of proteinuria, [5] which can lead to preterm & hypoxia. [6] Compromised uteroplacental circulation can lead to low birth weight babies, fetal distress, accidental haemorrhage, intrauterine growth restriction (IUGR), intrauterine death (IUD), low APGAR score, intensive care admission(NICU) and early neonatal death. [7] Treatment interventions should be focused to lengthen the duration of gestation as much as possible which may improve the neonatal survival rates. Experienced medical professionals, NICU facilities, frequent monitoring of maternal & neonatal parameters can lead to positive maternal & fetal outcomes. [8]

Thus, this prospective case control study was conducted to evaluate the maternal and perinatal mortality rates, assess the

association between adverse maternal and perinatal outcomes with the type of hypertensive disorder, degree of hypertension, gestational age, mode of delivery, and demographic characteristics and neonatal outcomes.

Material & Methods

This prospective, cross-sectional study recruited 200 pregnant women (> 20 weeks of gestation) from January 2022 to April 2022 which were segregated in two categories. Group I (Case group) which included 100 pregnant women with hypertensive disorders. Group II (Control Group) included 100 normal pregnancies without hypertension. Pregnancies with chronic hypertension complicated by diabetes mellitus, severe anaemia, collagen vascular diseases, heart disease, primary renal disease, convulsions, estimated birth weight <500 grams other than cephalic presentation, Rh-negative mothers ,multiple pregnancy, fetal growth restriction in previous pregnancies. Hypertension during pregnancy was defined as a sustained systolic blood pressure (SBP) of 140 mm Hg or more and/or a diastolic blood pressure(DBP)of 90 mmHg or more on 2 occasions at least 6 hours apart but within 7 days.[9]

A complete demographic profile ,detailed history of present and previous pregnancies, including last menstrual period, expected date of delivery, and period of gestation were recorded. Regular monitoring of fetal heart rate was done. Investigations done were non stress test, ultrasonography (USG), umbilical and cerebral Doppler. USG was done for the checking placental location & maturity, fetal weight & growth, levels of amniotic fluid, biophysical profile(BPP).

The patients were managed as per standard operating guidelines of obstetrics. Complete rest, dietary & drug regimens included antihypertensives, magnesium sulphate according to the Pritchard

regimen for the treatment of hypertension & eclampsia. Subsequently pregnancies were terminated & delivery done. In gestational hypertension & mild preeclampsia, induction of labour was done at 37 weeks. In compromised maternal conditions, caesarian section were done <37 weeks as evident from if unripe cervix, fetal distress, deranged doppler studies, severe IUGR, meconium staining of liquor.

Parameters monitored

1. To evaluate the maternal and perinatal mortality rates
2. To assess the association between adverse maternal and perinatal outcomes with the type of hypertensive disorder, degree of hypertension, gestational age, mode of delivery, and demographic characteristics.
3. Neonatal monitoring for one week-number of live births/IUD, Maturity(term/preterm), Birth weight, Apgar score, NICU admissions and early neonatal death.

Statistical analysis

The collected data was tabulated & put to statistical analysis. The data was presented as frequency and percentage. The data was expressed as mean & standard deviation. Pearson's Chi Square test was used for

analysis. P-value <0.05 was considered statistically significant.

Results

No statistically significant difference was observed between the two groups with respect to baseline demographic characteristics (age, parity, socioeconomic status, mode of delivery) ($p > 0.05$). In Group I, 53% had gestational hypertension, 25% had mild preeclampsia, 15% had severe preeclampsia, 6% had eclampsia with 1% maternal mortality observed in woman with eclampsia. Maternal complications noted were HELLP syndrome (1.6%), 3.7% cases had pulmonary edema (2.8%), cerebral haemorrhage (3.2%), abruption placenta (6.3%) & postpartum haemorrhage (6.3%).

Higher IUD were observed in Group I with no statistically significant difference between the two groups. Neonatal mortality was 5% in Group I as compared to 2% in Group II. In Group I, 28% preterm neonates observed as compared to 8% in Group II. Neonatal weight was <1.5 kg in 7% in Group I while 3% in Group II. In group I <7 Apgar score was observed in 26% cases and neonatal complications in 24% while in Group II these were 12% & 9% resp. Higher neonatal mortality was observed in severe preeclamptic & eclamptic mothers ($p < 0.05$).

Table 1 Neonatal outcomes

Parameters	Group I (Cases) (n, %)	Group II(Controls) (n, %)	P value
Neonatal outcome in terms of mortality			
Live birth	95	98	>0.05
Intrauterine Deaths	5	2	
Maturity at Birth			
Term	72%	92%	<0.05
Preterm	28%	8%	
Weight of Neonate (kg)			
<1.5	7%	3%	<0.05
1.5-2.5 kg	28%	11%	
>2.5 kg	65%	86%	
Apgar score at 5 min			
<7	26%	12%	<0.05

	>7	74%	88%	
Neonatal Outcome				
	No complication	71%	89%	<0.05
	NICU admission	24%	9%	

Discussion

Hypertensive disorders of pregnancy are categorized as chronic hypertension existing before the pregnancy, during pregnancy like pre-eclampsia/eclampsia & gestational hypertension, and those aggravated by pregnancy such as pre-eclampsia superimposed on chronic hypertension. [10] Among these eclampsia is a major cause of high maternal and fetal mortality and morbidity, especially in underdeveloped & developing nations. Approximately 50,000 annual maternal deaths are attributed to eclampsia. [11]. In a study by Panda S et al 2021, the incidence of hypertensive disorders in pregnancy was 7.3%. In an Indian population Mehta et al. found the incidence to be 6.9%. [12]

In the present study, in Group I, 53% had gestational hypertension, 25% had mild preeclampsia, 15% had severe preeclampsia, 6% had eclampsia with 1% maternal mortality observed in woman with eclampsia. Similar results were reported by Panda S et al 2021 where 5460 deliveries were studied gestational hypertension was noted in 27.6% cases, mild preeclampsia in 27.6%, severe preeclampsia in 33.6% & eclampsia in 11.2%. [12] Subki AH et al. preeclampsia in 54.9%, gestational hypertension in 29.5% & eclampsia in 8.0%. [13]

In the present study, maternal complications noted were HELLP syndrome (1.6%), 3.7% cases had pulmonary edema (2.8%), cerebral hemorrhage (3.2%), abruption placenta (6.3%) & postpartum hemorrhage (6.3%). Most maternal complications were observed in severe preeclampsia and eclampsia cases. Similarly Panda et al study noted HELLP syndrome in 1.9%, pulmonary edema in 3.7%, a cerebral

hemorrhage in 3.9% & acute renal failure in 0.7%, abruption placenta in 7.4% & postpartum hemorrhage in 5.7%. [12] In the study by Seyom et al., 12.4% of cases had HELLP syndrome, 7% had ARF, 2% had abruption placentae, and 7% had PPH.[14]

In the present study, 1% maternal mortality observed in woman with eclampsia. Consistent with other studies Panda et al observed 2.9% maternal deaths. Bridwell et al study reported 0.3% maternal mortality in females with gestational hypertensive disorders. [15] Moodley et al reported cerebral hemorrhage (50%) & pulmonary edema (17.2%) to be leading cause of death while Panda S et al reported the same in 33.3% & 66.6% of the cases. [16] The severity of proteinuria can be an predictor of poor maternal outcomes. Also in women belonging to lower socioeconomic status higher mortality was reported. Mackay AP et al 2001 stated preeclampsia at 28 weeks or prior has higher chances of negative maternal outcomes. [17]

In the present study, higher intrauterine deaths were observed in Group I with no statistically significant difference between the two groups ($p > 0.05$). Neonatal mortality was 5% in Group I as compared to 2% in Group II. Similarly, Vats K & Paul M 2016 noted 6 intrauterine deaths in cases as compared to 2 in control group which was not statistically significant. 8 However, Pawar DS et al study observed IUD in 13.68% cases. [18]

In the present study, in Group I, 28% preterm neonates observed as compared to 8% in Group II. Consistent to these results Vats K & Paul M 2016 observed preterm delivery in 26.53% cases compared to 9% in controls ($p < 0.05$). 20 preterm deliveries (out of 26) were in preeclampsia and

eclampsia group. [8] Similarly, Yadav S et al [19] & Bangal VB et al [20] reported preterm delivery rate as 28.8% & 37% in patients with gestational hypertension.

In the present study, In Group I >2.5 kg birth weight was observed in 65% cases, 1.5-2.5 kg in 28% & <1.5 kg in 7% cases. The difference between two groups was statistically significant. Similarly, Vats K & Paul M 2016 observed birth weight >2.5kg in 68.4%, weight between 1.5kg-2.5kg in 25.5% and weight <1.5kg in 6.1% cases. Causes of low birth weight were IUGR & preterm delivery. [8] Similarly results have been reported by Sachan R et al [21] & Gawde A et al [22] study.

In the present study, in group I <7 Apgar score was observed in 26% cases and neonatal complications in 24% while in Group II these were 12 % & 9% resp. Similarly, Vats K & Paul M 2016 reported Apgar score <7 at 5 minutes after birth in 24.5% of cases as compared to 13% in control group. [8] Sachan R et al noted an Apgar score <7 in 16.9% while Doddamani G B et al noted it to be 38.6% in cases. Most important fetal complication was hypoxia due to decreased utero-placental blood flow and ischemia leading to respiratory distress. [21] 25.53% neonates in cases group as compared to 11.2% in control group were required to admit in NICU in Vats K & Paul M 2016 study [8]. Consistent to these findings, Wolde Z et reported 22.52% of babies requiring NICU admission and death of 9% live babies. [23]

Early detection & early referral can help prevent complications of gestational hypertension. Further, improved quality of health care for pregnant women with hypertensive disorders. Easy accessibility to laboratory facilities, frequent maternal and fetal monitoring, availability of antihypertensive and other drugs; NICU facilities with neonatal resuscitation are some of the recommended approaches to decrease the health burden of the country. [24]

Conclusion

Adverse maternal, fetal & neonatal outcomes are associated with pregnancies associated with various hypertensive disorders. Higher reported cases observed in associated with preeclamptic & eclamptic women. Risk stratification should be undertaken to identify high risk groups & proper management to avoid such complications. Also routine antenatal screening & community level health education should be done.

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