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Original Research Article

Study of fetal outcome in hypertensive disorders of pregnancy in a tertiary care maternity hospital of Delhi

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ABSTRACT

Background: Hypertensive Disorders of Pregnancy is a multifactorial disorder that seriously endangers the safety of the fetus during pregnancy. This study was conducted to study the perinatal outcome of this grave disorder in pregnancy and thus reducing the perinatal morbidity and mortality by prevention and proper management of this condition.
Methods: A "prospective case-control observational study" was conducted in the department of Obstetrics and Gynaecology, Kasturba Hospital, New Delhi.100 pregnant women presenting with hypertension from January 2014 to December 2014 were taken as cases and compared with 100 pregnant women (age and parity matched) in terms of perinatal outcome.
Results: As many as 6 cases with hypertensive disorder of pregnancy had intrauterine death of fetus as compared to 2 intrauterine death of fetus in controls. Birth weight >2.5kg was recorded in 68.4% of cases while 25.5% had weight between 1.5kg-2.5kg and 6.1% had weight <1.5kg as compared to controls which had 85% >2.5kg, 13% between 1.5kg-2.5kg and 2% had <1.5kg.The low birth weight in cases was due to IUGR and/or prematurity. 24.49% of babies of cases with hypertensive disorder of pregnancy had Apgar score <7 at 5 minutes after birth as compared to only 14% of control babies with Apgar <7. 25.53% of neonates born to cases were admitted in NICU whereas only 11% of neonates born to controls were admitted in NICU (p=.014). 4.3% of neonates born to cases ended up in early neonatal death while there was no early neonatal death among controls.
Conclusions: Thus low birth weight due to prematurity/IUGR and fetal hypoxia were the main reasons for fetal morbidity in hypertensive disorders of pregnancy.

Keywords: Hypertensive disorders of pregnancy, Fetal outcome at birth, IUD, Preterm delivery, Low birth weight, Low APGAR score, Admissions in NICU, Early neonatal deaths

INTRODUCTION

Hypertensive disorders of pregnancy has remained a significant public threat in both developed and developing countries, contributing globally to maternal and perinatal morbidity and mortality.[1,2] In India, the incidence of this threatening condition was 5.38%.[3]

Majority of foetal complications occur due to prematurity and hypoxia.[4,5] Foetal complications are related to the severity of preeclampsia, duration of the disease and degree of proteinuria.[6] Spasm of the uteroplacental circulation leads to fetal distress, accidental haemorrhage, IUGR, IUD, low birth weight, low APGAR score, NICU admissions and early neonatal death.[7] Perinatal morbidity is increased due to spontaneous preterm labour or iatrogenic preterm induction.

Expectant management with temporizing treatment should be performed when possible to lengthen gestation which may be associated with enhanced perinatal survival.[8] Good intensive care, close monitoring during

labour and availability of expert NICU facilities is required for better fetal and neonatal outcome.

METHODS

We conducted a hospital based prospective case control study at Kasturba hospital from January 2014 to December 2014.

100 pregnant women with singleton pregnancy with cephalic presentation with hypertension attending the antenatal outpatient department in Kasturba Hospital were taken as cases. Hypertension during pregnancy is defined as a sustained systolic blood pressure of 140 mm Hg or more and/or a diastolic blood pressure of 90 mmHg or more on 2 occasions at least 6 hours apart but within 7 days.[9] Exclusion criteria included pregnancies complicated with diabetes mellitus, severe anaemia, heart disease, primary renal disease, collagen vascular diseases, epilepsy, patients with any presentation other than cephalic, with multiple pregnancy, Rh-negative mothers, estimated birth weight <500 grams, major fetal anomaly.

100 normal pregnancies without hypertension matched with cases at the time of admission in respect of age, parity, gestational age were taken as controls.

Fetal monitoring consisted of DFMC, FHR monitoring, NST, umbilical and cerebral Doppler. USG was done for the fetal weight, serial growth, AFI, BPP, placental location and maturity.

Treatment included rest, dietary changes, control of blood pressure by using antihypertensives (methyldopa, labetalol or nifedipine) and obstetric management. In patients of Eclampsia, treatment was given for control of BP, control of seizures by anticonvulsants ($MgSO_4$ was used as the anticonvulsant of choice and Pritchard regimen was followed: 4gm of 25% $MgSO_4$ I.V was given slowly over 5-10 minutes and 5gm of 50% $MgSO_4$ I.M was given into each buttock followed by 5gm 50% $MgSO_4$ I.M 4hrly in alternate buttock) and control of complications. Ultimately pregnancy was terminated and delivery was conducted.

In mild preeclampsia and gestational hypertension termination of pregnancy was done by inducing labour at 37 weeks as at this gestational age, the maternal and fetal risks during expectant management clearly outweigh potential benefits to the fetus. In patients <37 weeks of gestation, termination of pregnancy was warranted only if maternal condition deteriorated or if there was fetal compromise.

Pregnancy was terminated by LSCS for urgent termination for maternal sake as in acute fulminating preeclampsia and eclampsia when cervixes was not ripe and also for fetal sake when fetus was in jeopardy as indicated by deranged Doppler studies (reverse diastolic flow), severe IUGR, meconium staining of liquor or fetal distress.

The neonate was followed up till 1 week and fetal outcome was analysed in terms of number of Live births/ IUD, Maturity(term/preterm), Birth weight, Apgar score, NICU admissions and early neonatal death.

Collected data was coded into variables, entered into statistical software and analysed using SPSS version 16. Tests of significance like chi-square and Fisher's exact test were used when suitable. Multiple logistic regressions were used to calculate adjusted odd's ratio.

RESULTS

As many as 6 cases with hypertensive disorder of pregnancy had intrauterine death of fetus of which 5 deaths occurred in women with preeclampsia and only 1 in patient with gestational hypertension. In the control group, 2 mothers had intrauterine death of fetus. The difference was statistically not significant (p=0.279) (Table 1).

Table 1: Fetal outcome at birth among study subjects.

Outcome	Cases (n=100) No. (%)	Controls (n=100) No. (%)
Live birth	94 (94)	98 (98)
Intrauterine death	06 (06)	02 (02)
Total	100	100

(χ^2 = 2.083, p=0.279)

Among 98 cases, 26 mothers had preterm babies whereas 73.5% women delivered babies at term. In controls only 9% women had preterm delivery. This difference was found to be statistically significant (p=0.001) (Table 2).

Table 2: Maturity at birth among study subjects.

Maturity at birth	Cases (n=98) No. (%)	Controls (n=100) No. (%)
Term	72 (73.5)	91 (91)
Preterm	26 (26.5)	09 (09)
Total	98 (100)	100 (100)

(χ^2 = 10.453, p=0.001)

Table 3: Fetal weight in grams at birth of babies delivered to study subjects.

Fetal weight (kg)	Cases No. (%)	Controls No. (%)
<1500	06 (6.1)	02 (02)
1500-2500	25 (25.5)	13 (13)
>2500	67 (68.4)	85 (85)
Total	98 (100)	100 (100)

(χ^2 = 9.921, p=0.012)

Majority of cases (68.4%) delivered babies having birth weight >2.5kg while 25.5% of babies born to cases had weight between 1.5kg-2.5kg. 6.1% of mothers gave birth to babies having weight <1.5kg. 85% of babies born to controls weighed >2.5kg followed by 13% between

1.5kg-2.5kg and 2% having weight <1.5kg.The difference in birth weights was found to be statistically significant (p=0.012). The low birth weight in cases was due to both IUGR and prematurity (Table 3).

Apgar score <7 at 5 minutes was seen in 24.5% of babies born to mothers with hypertensive disorder of pregnancy as compared to only 13% of the control babies. This difference was found to be statistically significant (p=0.03) (Table 4).

Table 4: Apgar score at 5 minutes of babies delivered to study subjects.

Apgar score	Cases (n=98) No. (%)	Controls (n=100) No. (%)
<7	24 (24.5)	13 (13)
>7	74 (75.5)	87 (87)
Total	98 (100)	100 (100)

(χ^2 = 4.30, p=0.045)

Of the 94 live births in cases with hypertension, 24 (25.5%) were admitted in NICU. 4 (4.3%) babies out of these 24 NICU admissions had early neonatal death. Of the 98 live births in controls, only 11 were admitted in NICU and discharged to mother side. There was no case of early neonatal death among controls. The difference in the rate of NICU admission in cases and controls was statistically significant (p=0.014) (Table 5).

Table 5: Neonatal outcome of live babies delivered to study subjects.

S no.	Neonatal outcome	Cases No. (%)	Controls No. (%)
1	No complication	70 (74.5)	87 (88.8)
2	NICU admission	24 (25.5)	11 (11.2)
	Total	94 (100)	98 (100)

(χ^2 = 6.589, p=0.014)

Of these 24 babies of cases admitted in NICU, 17 were admitted due to low birth weight (12 of them also had respiratory distress) followed by 7 due to MSL and respiratory distress. Duration of stay was less than 48 hours in 7 babies, less than or equal to a week in 12 babies and more than a week in 5 babies. During their NICU stay 5 babies were diagnosed to have sepsis, 4 were diagnosed to have hyperbilirubinemia, 3 were diagnosed to have hypoglycemia and one baby was diagnosed to have necrotizing enterocolitis. Majority of these morbidities occurred in preterm low birth weight babies.

Of the 4 early neonatal deaths that in NICU, 3 occurred due to very low birth weight and respiratory distress and 1 due to meconium aspiration syndrome and respiratory distress. All 4 were having severe respiratory distress and were put on ventilator but could not be revived.

Perinatal mortality was 10% (6 IUD+4 early neonatal deaths) in our study.

DISCUSSION

Fetal outcome among study subjects

Out of all the cases, 6 mothers had intrauterine death of babies. Out of these 6 mothers, 4 presented with intra uterine death of babies and 2 intrauterine death of babies resulted due to maternal mortality. All the other cases delivered live babies. In controls, 2 mothers had intrauterine death of baby. This difference was not statistically significant. In a study done by Pawar DS et al, 13.68% cases had IUD.[10] Of the 6 of IUD, 5 occurred in preeclampsia group and 1 in gestational hypertension group. Severe and uncontrolled preeclampsia can thus lead to grave fetal consequences.

Maturity at birth among study subjects

Preterm delivery was seen in 26.53% of cases with hypertensive disorder of pregnancy whereas in controls only 9% were delivered as preterm. This difference was found to be statistically significant (p=0.001). Similar rates were found by Yadav S et al and Bangal VB et al who found the Preterm delivery rate to be 28.8% and 37% in cases with hypertension respectively.[11,12]

Table 6: Studies comparing preterm delivery rate in pregnant women with hypertensive disorders of pregnancy.

Sr. no.	Study	Preterm delivery rate
1	Yadav S et al[11]	28.8%
2	Bangal VB et al[12]	37%
3	Our study	26.5%

Of the 26 preterm deliveries in cases 20 preterm deliveries occurred in preeclampsia and eclampsia group. This indicates the greater need to terminate pregnancy in this group by induction or caesarean sections.

Fetal weight in grams at birth of babies delivered to study subjects

Birth weight >2.5kg was recorded in 68.4% of cases while 25.5% had weight between 1.5kg-2.5kg and 6.1% had weight <1.5kg as compared to controls which had 85% >2.5kg, 13% between 1.5kg-2.5kg and 2% had <1.5kg. This difference was found to be statistically significant (p=0.012). The low birth weight in cases was due to both IUGR and/or prematurity. Similarly in a study done by Sachan R et al, 43.70% of cases had weight >2.5kg, 50% had weight 1.5kg-2.5kg, 6.33% had weight <1.5kg.[13] Also Gawde A et al study had 75% cases with fetal birth weight ≥2.5kg and 25% cases had fetal birth weight <2.5kg.[14]

Table 7: Studies comparing fetal birth weight in pregnant women with hypertensive disorders of pregnancy.

Sr. No.	Study	≥ 2.5kg	< 2.5kg
1	Sachan R et al[13]	43.7%	56.3%
2	Gawde A et al[14]	75%	25%
3	Our study	68.4%	31.6%

In patients with hypertensive disorder of pregnancy, the growth retardation of the fetus occurs due to decreased utero-placental blood flow and ischemia. Prematurity occurs due to iatrogenic termination of pregnancy before term.

Apgar score at 5 minutes of babies delivered to study subjects

In the current study, statistically significant 24.5% of babies of cases with hypertensive disorders of pregnancy had Apgar score <7 at 5 minutes after birth as compared to 13% of control babies with Apgar <7 (p=0.03). Similar results were found in a study by Sachan R et al where 16.90% of babies had Apgar <7 while in a study done by Doddamani G B et al at Bagalkot found that 38.6% of babies had Apgar <7.[13,15]

Table 8: Studies comparing APGAR score at 5 minutes of birth of babies delivered to pregnant women with hypertensive disorders of pregnancy.

Sr. No.	Study	Apgar score <7
1	Sachan R et al[13]	16.9%
2	Doddamani GB et al[15]	38.6%
3	Our study	24.5%

Fetal hypoxia at birth, diagnosed by Apgar score <7 is the most important and most common fetal complication occurring at birth in hypertensive disorders of pregnancy. This is due to decreased utero-placental blood flow and ischemia in cases with hypertensive disorder of pregnancy and greater rates of induction leading to increased risk of fetal distress.

Neonatal outcome of babies delivered to study subjects

In the present study, 24 (25.53%) neonates born to cases were admitted in NICU whereas only 11 (11.2%) of neonates born to controls were admitted in NICU. This difference was statistically significant (p=0.014). 4 (4.3%) neonates admitted in NICU born to cases ended up in early neonatal death while there was no early neonatal death among neonates of controls. Similar results were found by Wolde Z et al who observed that 22.52% of live babies required NICU admission and 9% of live babies ended up in neonatal death.[16] While Pawar DS et al found that 34.6% of live babies born to cases with hypertensive disorder of pregnancy required NICU admission and 9.88% of live babies ended up in neonatal death.[10]

Table 9: Studies comparing NICU admissions and early neonatal death in babies born to women with hypertensive disorders of pregnancy.

Sr. No.	Study	NICU admission	Early neonatal death
1	Wolde Z et al[16]	22.5%	9%
2	Pawar DS et al[10]	34.6%	9.88%
3	Our study	25.5%	4.3%

Of the 4 early neonatal deaths that occurred in NICU, 3 occurred due to very low birth weight and respiratory distress and 1 occurred due to meconium aspiration syndrome and respiratory distress. All 4 were having severe respiratory distress and were put on ventilator but could not be revived.

Perinatal mortality was 10% (6 IUD+4 early neonatal deaths) in our study. Similarly in a study done by Yadav S et al perinatal mortality was 14.8%.[11]

Chronic uteroplacental insufficiency in hypertensive disorders of pregnancy leads to IUGR, preterm delivery and fetal hypoxia. Also high rates of preterm termination of pregnancy for feto-maternal sake in hypertensive mothers results in preterm babies. Thus low birth weight due to prematurity/IUGR and fetal hypoxia are the main reasons for NICU admissions and early neonatal death in babies born to mothers with hypertensive disorders of pregnancy.

CONCLUSION

Pregnancies complicated with hypertension are associated with adverse fetal and neonatal outcome in terms of prevalence of intrauterine growth restriction, prematurity, low birth weight, low APGAR score at birth, early neonatal death, high rates of admission to NICU and the need for resuscitation. Perinatal morbidity is increased due to spontaneous preterm labour or iatrogenic preterm induction. Low birth weight due to prematurity/IUGR and fetal hypoxia are the main reasons for NICU admissions and early neonatal death in babies born to mothers with hypertensive disorders of pregnancy.

Expectant management with temporizing treatment should be performed to lengthen gestation which may be associated with enhanced perinatal survival. Good intensive care, close monitoring during labor, judicious timing of delivery and NICU facilities is required for better fetal and neonatal outcome in these cases.

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