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Original Research Article

## Maternal and fetal outcomes in pregnancy induced hypertensive patients and normotensive patients

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### ABSTRACT

**Background:** Hypertensive disorder of pregnancy complicates 5 to 8% of pregnancies and is a major cause of maternal and perinatal morbidity and mortality. Hypertensive disorders of pregnancy account for nearly 18% of all maternal deaths worldwide, with an estimated 62000-77000 deaths per year.

**Methods:** This one-year prospective case control study total 200 pregnant women attending antenatal care and admitted in Eclampsia ward fulfilling the inclusion criteria were studied. Fetal and maternal outcomes data recorded and documented. Statistical analysis of data was done by student's t-test and p-value.

**Results:** In PIH 68% women had normal vaginal delivery (p=0.004) 10% women had instrumental delivery. In PIH group 22% women had emergency caesarian section and in normotensive group 10% women had emergency caesarian section. In PIH group 58% delivered at term and 42% had preterm delivery. In normotensive 95% delivered at term and 5% had preterm delivery (p <0.001). PIH group 29% women developed IUGR whereas in normotensive group all women had normal growth velocity (p <0.001). In PIH group 69% mothers had newborn with birth weight <2.5 kg and 31% women had newborn with birth weight >2.5 kg (p=0.0009). While In normotensive group only 9% women had newborn with birth weight <2.5 kg. In PIH group, 24% newborn babies needed NICU admission and in normotensive group only 5% newborn needed NICU admission (p=0.001). In PIH group 76% women had normal maternal outcome (p <0.001). 11% had associated abortion (p=0.0019). In the rest 13% patient develop PRES.

**Conclusions:** We concluded that there is a significant rise of complication in mothers having PIH and also there is an increased risk of delivering low birth weight and preterm babies. The early use of antihypertensive drugs, optimum timing of delivery and strict fluid balance, anticonvulsants in cases of eclampsia will help to achieve successful outcome.

**Keywords:** Caesarian section, Intrauterine growth restriction, Low birth weight, Maternal outcome, Normotensive, Pregnancy-induced hypertension

### INTRODUCTION

Hypertensive disorder of pregnancy complicates 5 to 8% of pregnancies and is a major cause of maternal and perinatal morbidity and mortality. Pregnancy induced hypertension is a syndrome of hypertension appearing after 20 weeks of gestation without proteinuria.

Preeclampsia is pregnancy complicated with hypertension and proteinuria.<sup>1</sup> Hypertensive disorders of pregnancy (HDP) account for nearly 18% of all maternal deaths worldwide, with an estimated 62000-77000 deaths per year.<sup>2</sup> Spectrum of disease ranges from mildly elevated blood pressure with minimal clinical significance to severe hypertension with multi organ

dysfunction. Pre-eclampsia can be dangerous for both mother and infant, being unpredictable in its onset and progression. Pre-eclampsia is a major cause of maternal and perinatal morbidity and mortality.<sup>3</sup> Chief complications which may arise are intra-uterine growth retardation (IUGR) and intra-uterine death due to chronic placental insufficiency, prematurity and birth asphyxia.<sup>4</sup> Maternal risks associated with gestational hypertension include development of uncontrolled hypertension, superimposed preeclampsia, eclampsia, HELLP syndrome (hemolysis, elevated liver enzymes and low platelets), acute renal and hepatic failure, acute pulmonary edema, cerebrovascular accidents, congestive heart failure, intracranial hemorrhages, proteinuria more than 4-5 grams/day, microangiopathic hemolytic anemia, abruptio placentae, deep vein thrombosis (DVT), occipital lobe blindness, post-partum hemorrhages, disseminated intravascular coagulation (DIC) and /or consumptive coagulopathy.<sup>5</sup> Delivery of placenta is the only treatment yet known, indicating placenta is the primary sponsor to the pathogenesis of preeclampsia.<sup>6</sup>

This study was conducted to evaluate the maternal and fetal outcome in pregnancy induced hypertensive patients and normotensive patients in the Department of OBG, Kamla Nehru Hospital for Mother and Child, IGMC Shimla.

Objectives of this study were to comparison of the maternal and fetal outcomes in pregnancy induced hypertensive patients and normotensive patients.

## METHODS

The present study was a prospective case control study done from July 2016 to July 2017 and included two hundred pregnant women attending antenatal care and admitted in Eclampsia ward at Kamla Nehru State Hospital for Mother and Child, attached to Indira Gandhi Medical College, Shimla. A total of two hundred patients were evaluated in this study after obtaining a written informed consent. Women at POG > 22 weeks with Singleton pregnancy were included a hundred Hypertensive women as case group and control group include another hundred normotensive women after

matching the parity and gestation age. Women with chronic hypertension, cardiovascular disorder, renal disease, twin pregnancy, molar pregnancy, chromosomally abnormal fetus, diabetes, auto immune disorder, thrombophilia, Family history of diabetes mellitus and cardiovascular disease were excluded from the study. Detailed history was taken according to proforma. A thorough general physical examination, systemic examination, obstetric examination and pelvic examination was done. Various investigations included complete hemogram, platelet count, liver function tests, renal function tests, coagulation profile, fundus examination and 24-hour quantitative estimation of urine protein.

Obstetric management was done according to standard protocol existing in the department. Anticonvulsant and anti-hypertensive drugs were given according to standard protocol. Details of labour whether induced or spontaneous labour, progress of labour and mode of delivery was noted. Maternal and Perinatal outcome was noted till the time of discharge.

## Statistical analysis

Statistical analysis of data was done by student's t-test and p-value.

## RESULTS

As shown in Table 1, around 68 women (68%) of PIH had normal vaginal delivery ( $p = 0.004$ ). while 10 women (10%) had instrumental delivery ( $p = 0.165$ ). Out of 100 women in PIH group who had spontaneous onset of labour or needed induction of labour 22 women (22%) had emergency caesarian section and in normotensive group 10 women (10%) had delivery by emergency caesarian section ( $p = 0.033$ ). Caesarian rate was more in PIH group because of fetal distress.

As shown in Table 2 out of 100 women in PIH group 58 women (58%) delivered at term and 42 women (42%) had preterm delivery. In normotensive group 95 women (95%) delivered at term and 5 women (5%) had preterm delivery. which was statistically significant ( $p < 0.001$ ).

**Table 1: Mode of delivery in PIH and normotensive.**

| Mode of delivery | PIH, N=100              | %   | Normotensive, N=100 | %   | P value |
|------------------|-------------------------|-----|---------------------|-----|---------|
| Vaginal          | Normal vaginal delivery | 68  | 86                  | 86% | 0.004   |
|                  | Instrumental delivery   | 10  | 4                   | 4%  | 0.165   |
| Caesarian        | 22                      | 22% | 10                  | 10% | 0.033   |

**Table 2: Comparison of term and preterm deliveries in PIH and normotensive.**

|              | Total | Term | %   | Preterm | %   | P value |
|--------------|-------|------|-----|---------|-----|---------|
| PIH          | 100   | 58   | 58% | 42      | 42% | <0.001  |
| Normotensive | 100   | 95   | 95% | 5       | 5%  |         |

As shown in Table 3, 29 women (29%) in PIH group developed IUGR whereas in normotensive group all women had normal growth velocity ( $p < 0.001$ ).

As shown in Table 4, out of 100 women in PIH group, 2 women (2%) had a still birth and the rest 98 (98%) women had Live birth. In normotensive group there was

no still birth though it was statistically insignificant ( $p = 0.447$ ).

Out of 100 women in PIH group, 24 new born babies (24%) needed NICU admission and in normotensive group only 5 new born (5%) needed NICU admission ( $p = 0.001$ ) (Table 5).

**Table 3: Comparison of IUGR in PIH and normotensive.**

|              | Total | IUGR | %   | NO IUGR | %    | P value |
|--------------|-------|------|-----|---------|------|---------|
| PIH          | 100   | 29   | 29% | 71      | 71%  | <0.001  |
| Normotensive | 100   | 0    | 0%  | 100     | 100% |         |

**Table 4: Comparison of still birth in PIH and normotensive.**

|              | Total | Still Birth | %  | Live Birth | %    | P value |
|--------------|-------|-------------|----|------------|------|---------|
| PIH          | 100   | 2           | 2% | 98         | 98%  | 0.477   |
| Normotensive | 100   | 0           | 0% | 100        | 100% |         |

**Table 5: Need for NICU admission in PIH and normotensive.**

|              | Total | Need NICU admission | %   | No need for NICU admission | %   | P value |
|--------------|-------|---------------------|-----|----------------------------|-----|---------|
| PIH          | 100   | 24                  | 24% | 76                         | 76% | 0.001   |
| Normotensive | 100   | 5                   | 5%  | 95                         | 95% |         |

Out of 100 women in PIH group 8 women (8%) had babies with MAS. In normotensive group only 2 women (2%) had babies with MAS and needed admission in NICU ( $p = 0.104$ ) (Table 6).

It was observed that MAS was more prevalent in pregnancy induced hypertension.

Out of 100 women in PIH group 6 women (6%) had babies who had TTNB. In normotensive group, 2 women (2%) had babies with TTNB and needed admission to NICU ( $p \text{ value} = 0.279$ ) (Table 7).

As shown in above table out of 100 new-borns in PIH group 10 babies (10%) had neonatal sepsis and needed admission to NICU ( $p = 0.013$ ) (Table 8).

**Table 6: Meconium aspiration syndrome (MAS) in PIH and normotensive.**

|              | Total | MAS present | %  | MAS not present | %   | P value |
|--------------|-------|-------------|----|-----------------|-----|---------|
| PIH          | 100   | 8           | 8% | 92              | 92% | 0.104   |
| Normotensive | 100   | 2           | 2% | 98              | 98% |         |

**Table 7: TTNB (transient tachypnoea of new-born) in PIH and normotensive.**

|              | Total | TTNB present | %  | TTNB not present | %   | P value |
|--------------|-------|--------------|----|------------------|-----|---------|
| PIH          | 100   | 6            | 6% | 94               | 94% | 0.279   |
| Normotensive | 100   | 2            | 2% | 98               | 98% |         |

**Table 8: Neonatal sepsis in PIH and normotensive.**

|              | Total | Neonatal sepsis present | %   | Neonatal sepsis not present | %   | P value |
|--------------|-------|-------------------------|-----|-----------------------------|-----|---------|
| PIH          | 100   | 10                      | 10% | 90                          | 90% | 0.013   |
| Normotensive | 100   | 1                       | 1%  | 99                          | 99% |         |

It was observed that neonatal sepsis was more in PIH group as compared to normotensive group, it was because of more preterm deliveries and IUGR in pregnancy induced hypertension.

Out of 100 women in PIH group 3 women (3%) had early neonatal death. In normotensive group no early, Neonatal death occurred ( $p = 0.244$ ) in this study. It was observed that early neonatal death was seen in PIH group, because of more preterm deliveries and low birth weight babies. (Table 9).

The birth weight of the new-born in PIH group and normotensive group was compared and it was observed as stated in table 10, that out of 100 women in PIH group 69 mothers (69%) had new-born with birth weight < 2.5 kg and 31 women (31%) had new-born with birth weight > 2.5 kg. which was found to be statistically significant ( $p = 0.0009$ ). While In normotensive group only 9 women (9%) had new-born with birth weight < 2.5 kg and rest 91 women (91%) had new-born with birth weight > 2.5 kg ( $p < 0.001$ ).

**Table 9: Neonatal outcome (early neonatal death) in PIH and normotensive.**

|              | Total | Early neonatal death | %  | No early neonatal death | %    | P value |
|--------------|-------|----------------------|----|-------------------------|------|---------|
| PIH          | 100   | 3                    | 3% | 97                      | 97%  | 0.244   |
| Normotensive | 100   | 0                    | 0% | 100                     | 100% |         |

**Table 10: Birth weight in PIH and normotensive.**

| Birth Wt. | PIH, N=100 | PIH % | Normotensive, N = 100 | Normotensive % | P value |
|-----------|------------|-------|-----------------------|----------------|---------|
| < 2.5 kg  | 69         | 69%   | 9                     | 9%             | 0.0009  |
| > 2.5 kg  | 31         | 31%   | 91                    | 91%            | < 0.001 |

**Table 11: Maternal outcome in PIH and normotensive.**

| Maternal outcome | PIH, N=100 | %   | Normotensive, N=100 | %    | p value |
|------------------|------------|-----|---------------------|------|---------|
| Normal           | 76         | 76% | 100                 | 100% | < 0.001 |
| Abruption        | 11         | 11% | 0                   | 0%   | 0.0019  |
| PRES             | 13         | 13% | 0                   | 0%   | 0.0005  |

Maternal outcomes were evaluated in view of uneventful outcomes, association with abruption and PRES (posterior reversible encephalopathy syndrome). As depicted in the above table, 76% women in PIH group had normal maternal outcome ( $p < 0.001$ ). While around 11 patients out of 100 studied (11%) had associated abruption ( $p$  value = 0.0019). In the rest 13 patients (13%) it was highlighted that PRES was exclusively associated with PIH ( $p = 0.00057$ ) (Table 11).

It was observed that maternal morbidity did increase in PIH group but there was no maternal mortality reported in this study.

## DISCUSSION

In our study 68% of the patients with pregnancy induced hypertension were delivered vaginally while 10% using instruments and rest 22% were delivered via caesarian section. Some studies were found in favor of the above conclusions. In the study conducted by Dyal M et al, 40% of the deliveries of pregnancy induced hypertension were conducted via caesarian section and 20% instrumental deliveries 40% delivered vaginally, while in the study

conducted by Yadav V et al, 55.5% were conducted vaginally and the rest by caesarean section, like in our study, where the major percentage of deliveries were conducted vaginally.<sup>7,8</sup>

In the present study 58% of the patients with pregnancy induced hypertension were delivered as term, 42% were delivered as preterm. In normotensive group 95% women delivered at term and 5% delivered as preterm ( $p < 0.001$ ). Siromani SM et al, conducted a study and concluded that in PIH group 36.99% of women delivered at term and 42% delivered as preterm, in normotensive group 95% women delivered at term and 5% delivered as preterm which was statistically significant ( $p < 0.05$ ).<sup>5</sup> Nadkarni et al, study showed 44.3% preterm deliveries in PIH.<sup>9</sup>

In the present study it was seen that in patient with pregnancy induced hypertension around 69% of the babies had birth weight below 2.5 kg and around 31% with birth weight more than 2.5 kg and this was found to be statistically significant. In another study conducted by Siromani SM et al, it was seen that around 54.67% of babies had birth weight less than 2.5 kg while 45.33% of the babies had birth weight of greater than 2.5 kg ( $p < 0.05$ ).<sup>5</sup> Nadkarni et al study had similar experiences in

their study with an incidence of 51.7% LBW babies.<sup>9</sup> It was concluded that subjects with PIH had more babies with low birth weight as compared to normotensive subjects.

In the present study 24% of neonates of pregnancy induced hypertensive mother needed NICU admission and only 5% neonates of normotensive mother needed NICU admission and this conclusion was found to be statistically significant ( $p = 0.001$ ).

In the study conducted by Siromani SM et al, in PIH group 34.25% neonates needed NICU admission and in normotensive group 16.16% neonates needed NICU admission.<sup>5</sup> Similarly, in the other studies like Ayaz A et al, in PIH 26.02% neonates needed NICU admission and Ara J et al, in PIH need 42% neonate needed admission in NICU, which was comparable to the present study.<sup>10,11</sup>

In the present study in PIH group still births accounted for 2% and live birth for 98% and in normotensive group there were no still births ( $p = 801$ ). Similar result was found in the study conducted by Siromani SM et al, in which still birth was around 2.67% ( $p = 0.447$ ).<sup>5</sup>

In the present study PIH group had 8% newborn with meconium aspiration syndrome and in normotensive group 2% newborn had meconium aspiration syndrome ( $p = 0.104$ ).

Siromani SM et al, conducted a study in which PIH group had 2.73% new-born with MAS and normotensive group had 3.03% new-born with meconium aspiration syndrome ( $p=0.728$ ).<sup>5</sup> This study was comparable to the present study.

In the present study PIH group had 6% babies with transient tachypnoea of new-born and normotensive group had 2% babies with TTNB, which was statistically insignificant ( $p = 0.279$ ).

Similarly, in the study conducted by Siromani SM et al, PIH group had 2.74% babies with transient tachypnoea of new-born and normotensive group had 0% babies with TTNB, which was statistically insignificant ( $p = 0.348$ ).<sup>5</sup> This study was comparable to the present study

In the present study out of 100 women in PIH group 10% newborn need admission to NICU because of neonatal sepsis ( $p=0.013$ ). In normotensive group 1% newborn had neonatal sepsis. In another study conducted by Siromani SM et al, neonatal sepsis was present in 2.74% babies born in PIH group and 1.01% babies born in normotensive group ( $p = 0.789$ ).<sup>5</sup>

In our study it was seen that there were around 3% early neonatal deaths of babies born to pregnancy induced hypertensive mothers and 0% early neonatal deaths in normotensive mother ( $p = 0.244$ ) which was comparable

to the study conducted by Siromani SM et al, where in PIH group, the neonatal deaths were 2.74% ( $p = 0.348$ ).<sup>5</sup>

## CONCLUSION

PIH is a common complication in antenatal women and is a major cause of maternal and foetal, morbidity and mortality. Our study concludes that there is a significant rise of complication in mothers having PIH and also there is an increased risk of delivering low birth weight and preterm babies. The early use of antihypertensive drugs, optimum timing of delivery and strict fluid balance, anticonvulsants in cases of eclampsia will help to achieve successful outcome. The study highlights the importance of institutional deliveries of women combined with effective antenatal care. Hence health education and awareness among the people and primary health workers regarding this health issue is necessary in bringing down the maternal and neonatal morbidity and mortality.

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