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Investigative Parameters, Maternal and Neonatal Outcome in Patients with Pregnancy Induced Hypertension: A Hospital Based Observational Study

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ABSTRACT

Background: Pregnancy induced hypertension (PIH) occur in women with pre-existing primary or secondary chronic hypertension, and in women who develop new-onset hypertension in the second half of pregnancy. Preeclampsia is one of the maternal diseases that cause complications to mother and fetus both. **Methods:** An observational cross sectional study was done in ANMMCH, a tertiary care hospital in Gaya, Bihar. All PIH patients were included in the study period of one year. Investigative workup was done after due clinical check up. The maternal outcomes were further divided into normal outcome, Eclampsia and other complications Perinatal outcome measures that was studied include live births, fetal growth restriction (IGUR), still births, neonatal complications and deaths. **Results:** A total of 75 patients of PIH were selected for the study. Maximum (57.3%) were in age group of 25-35 year. 45.3% were from urban area while 22.7% were working. 60% were primigravida. 50.7% were delivered vaginaly. Most common presenting symptom was labour pain, followed by edema and headache. Most common complication was CNS symptom including seizure (Eclampsia) in 16% patients followed by vaginal bleeding in 9.3%. Other complications were pulmonary edema in 8% and HELLP syndrome in 2.2% patients. 5 patients died. Most common neonatal outcome was low birth weight. Renal failure was present in 6.7% patients Visible jaundice was present in 4% patients. **Conclusion:** Preeclampsia is associated with multiple maternal and neonatal complications. Early diagnosis and treatment through regular antenatal check-up is a key factor to prevent hypertensive disorders of pregnancy and its complications. So, complete clinical and biochemical workup is necessary for appropriate management of PIH patients.

Keywords: Pregnancy induced hypertension, Investigation, Maternal complications, Neonatal complications.

INTRODUCTION

Pregnancy induced hypertension (PIH) is one of the major cause of maternal morbidity and mortality leading to 10-15% of maternal deaths, especially in a developing country like India.[1] It may complicate about 3-10% of all pregnancies with variable incidence among different hospitals and countries.[2] However, the parameters of hypertension during pregnancy is not well-documented in Indian literature.

Though exact pathogenesis of pre-eclampsia is unknown, multiple factors have been implicated to have a role in it; the factors being abnormal placental implantation, endothelial dysfunction, maternal immunological tolerance, cardiovascular, genetic, nutritional and environmental factors.[3]

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Unfittingly implanted placenta is suggested as the main reason of gestational hypertension in pregnant women. Consequently correctly embedded placenta facilitates best transferring of oxygen from mother to fetus; otherwise failure in proper growth of placenta in uterus leads to development of pre-eclampsia and eclampsia. Moreover a pregnant woman may have intercurrent diseases associated with gestational hypertension that may become worse and be a potential risk to the pregnancy.[4]

PIH causes important changes of biochemical parameters such as increased levels of blood glucose, urea, creatinine, uric acid, transaminases, lactate dehydrogenase and increased level of proteinuria with hypoalbuminemia which are used as indicator of disease severity. Biochemical changes also include alteration of lipid level, because hypertension is associated with peripheral vascular diseases, so gestational hypertension appears to be crucial justification in changes of lipid.[5]

Keeping these facts in mind, the present study was undertaken to study the investigative parameters, maternal and neonatal outcome in patients with Pregnancy Induced Hypertension.

MATERIALS AND METHODS

An observational cross sectional study was done in ANMMCH, a tertiary care hospital in Gaya, Bihar. The study was carried between July, 2018 to June, 2019. All pregnant women who had blood pressure ≥ 140/90 mmHg after 20 week of gestation with proteinuria (1+ by dipstick) who consulted on obstetrics & gynaecology outpatient department were included in the study group. Blood pressure more than 140/90 mm of hg after 20 weeks of pregnancy defined as gestational hypertension. Preeclampsia is a gestational hypertensive with proteinuria (>300mg/24hour). When convulsions occur in addition to these signs, of preeclampsia the condition is referred to as eclampsia.[6]

An informed consent was obtained from all the patients prior to the participation in this study. Socioeconomic status of patients were evaluated by modified BG Prasad's classification.[7] Patients with hypertensive disorders of pregnancy were evaluated and treatment was given to them according to standard protocol as followed by the hospital policy. Patients were evaluated clinically as well as investigations were done accordingly. Proteinuria was tested daily by dipstick method. Serum uric acid was determined by Method of Caraway (1955, 1963).[8] Complete blood count with platelets and Serum analysis of creatinine, and renal and liver function tests were done by using automated analyser.

On admission, platelet count and protein estimates in urine were done as indicated by the clinical disease behavior. A peripheral smear was done for screening for HELLP syndrome. USG was done and estimation of fetal growth, weight and amount of liquor was carried out. Women were put on antihypertensive drugs and dose adjusted or treatment with additional drugs was done as per individual requirement. Four doses of intramuscular dexamethasone 6 mg, 12 hours apart was given for preterm (less than 4 week) salvageable pregnancies. Women on expectant management were asked to report if they have headache or epigastric pain or vomiting or visual disturbances, those with eclampsia was managed by standard protocol.

Termination of pregnancy was done in eclampsia, uncontrolled hypertension, persisting/progressively deteriorating clinical symptoms or the biochemical markers, occurrence of complications such as placental abruption, eclampsia, renal failure and indication of non-reassuring fetal status. The decision regarding the mode of delivery was based on estimated fetal weight, salvage ability, gestational age, amniotic fluid index, fetal status and Bishop score. The neonates were managed by pedestrians at neonatal intensive care unit (NICU) if needed. All the subjects were monitored, and the investigative parameters were compared with various maternal and fetal outcome.

The maternal outcomes were further divided into normal outcome, Eclampsia and other complications (Abruption, HELLP, renal failure, pulmonary oedema etc). Perinatal outcome measures that will be studied include live births, fetal growth restriction (IGUR), still births, neonatal complications (sepsis, intraventricular hemorrhage, hyperbilirubinemia, necrotizing enterocolitis) and neonatal death.

Data was collected and entered in MS excel. Continuous variables were presented as Mean±SD or Median and interquartile range. The categorical variables were presented as percentages/proportions.

RESULTS

A total of 75 consecutive patients of PIH attending obstetrics & gynaecology out-patient department between July, 2018 to June, 2019 were selected for the study. Out of 75 pregnant patients, maximum 43 (57.3%) were in age group of 25-35 year followed by less than 25 year of age [36% (27/75)]. Among enrolled patients, 45.3% were from urban area while 54.7% were from rural background. Nearly one fourth patients were illiterate. As per occupation of patients, 22.7% were working. According to social class, 28% belonged to higher class I while 45.3% were of poor class V. Among patients, 45 (60%) were primigravida and 30 (40%) were multigravida.

Mean systolic blood pressure of preeclampsia patients was 145±3.3 mm of Hg and mean diastolic blood pressure was 97±1.1 mm of Hg. Out of 75 patients, 50.7% were delivered vaginaly and 49.3% patients by cesarean section. [Table 1]

[Figure 1] shows distribution of patients according to symptoms. Most common presenting symptom was labour pain in 74.7% (56/75) patients followed by edema in 68% (51/75) and headache in 41.3% (31/75) patients. Seizure and visual symptoms were present in 10.7% (8/75) and 5.3% (4/75) patients respectively. Vaginal bleeding was present in 8% (6/75) and jaundice in 4% (3/75) patients.

[Table 2] shows maternal and neonatal outcome. Most common complication was CNS symptom including seizure (Eclampsia) in 16% (12/75) patients followed by vaginal bleeding in 9.3% (7/75) and renal failure in 6.7% (5/75) patients. Other complications were pulmonary edema in 8% and HELLP syndrome in 2 (2.2%) patients. Out of 75 patients, 5 (6.7%) patients died (two patients had pulmonary edema and three patient of postpartum hemorrhage with eclampsia). Most common neonatal outcome was low birth weight (68%). Among all delivered newborn, 45.3% were preterm. APGAR score was less than 7 in 10 (86.7%) patients and more than 7 in 13.3% patients. Neonatal intensive care admission was required for 21.3% neonates and out of them 4 expired. Five newborns were still born.

Renal failure was present in 6.7% patients and all these patients had dearranged urea and creatinine

value along with oligurea. Out of total 75 patients, 15 (20%) had elevated liver enzymes with mean value of ALT and AST was 56±31 IU/L and 53±12 IU/L respectively. Visible jaundice was present in 3 (4%) patients. [Table 3]

Table 1: Socio-demographic and clinical profile of PIH patients (n=75)

Patients characteristics	N	%
Age		
<25 years	27	36%
25-35 years	43	57.3%
>35 years	5	6.7%
Place of residence		
Urban	34	45.3%
Rural	41	54.7%
Education		
Illiterate	19	25.3%
Literate	56	74.7%
Occupation		
Housewife	58	77.3%
Working	17	22.7%
Social class (Modified BG Prasad scale)		
I	21	28%
II+III+IV	20	26.7%
V	34	45.3%
Gravid		
Primigravida	45	60%
Multigravida	30	40%
Mode of delivery		
Caesarean section	37	49.3%
Vaginal	38	50.7%

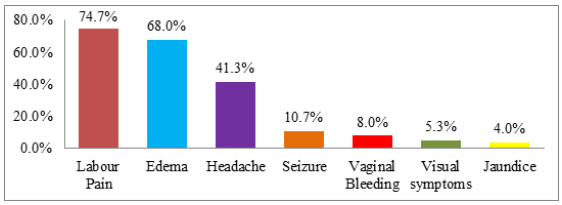

Figure 1: Distribution of patients according to symptoms (n=75)

Table 2: Maternal and Neonatal outcome

Maternal outcome	N (%)
CNS symptoms including seizures	12 (16%)
Eclampsia	8 (10.7%)
Bleeding	7 (9.3%)
Pulmonary edema	6 (8%)
Abruption	5 (6.7%)
Renal failure	5 (6.7%)
Maternal mortality	5 (6.7%)
HELLP	2 (2.7%)
Neonatal outcome	
LBW	51 (68%)
Preterm	34 (45.3%)
Still birth	5 (6.7%)
APGAR< 7	65 (86.7%)
APGAR> 7	10 (13.3%)
NICU admission	16 (21.3%)
Neonatal death	4 (5.3%)

Table 3: Investigation parameters of study patients (n=75)

Parameter	Value
Hemoglobin	8.12±0.8 gm/dl
Platelets	1.92±0.61 lac/cc
Urea	32±4.2 mg/dl
Creatinine	1.6±0.9 mg/dl
Bilirubin	1.8±1.5 mg/dl
ALT (alanine transferase)	56±31 IU/L
AST (aspartate transferase)	53±12 IU/L

DISCUSSION

In the present study, maximum patients were in age group of 25-35 year followed by less than 25 year of age. Solange et al and Patel et al also reported most common age group was 20-34 year (64%) and 18-26 year (56%) respectively.[9,10] In this study, nearly three fourth patients were literate. Sachdeva et al found higher incidence of PIH among literates. Higher incidence observed in literate women correlates with a report which states that those with college education had a 19% great chance of having preeclampsia and PI. Owiredu et al also reported no significant relationship of PIH and educational status.[11,12] As per occupation of patients, more than three fourths were housewives. Tebeu et al reported greater risk of having hypertension during pregnancy for housewives (OR: 2.8; 95%CI:1.1-6.9; P = 0.0167).[13] In this study, 60% patients were primigravida. Patel et al found similar results in their study.[14]

Mean systolic blood pressure of preeclampsia patients was 145±3.3 mm of Hg and mean diastolic blood pressure was 97±1.1 mm of Hg. Sachan et al in their study reported mean systolic blood pressure of 145.32±9.7 mmHg and mean diastolic pressure of 93.72±5.2 mmHg.[15] Jun Zhang et al found that a rise in systolic pressure over 30 mmHg or diastolic pressure over 15 mmHg was associated with a statistically significant complicated pregnancy.[16]

Most common complication was CNS symptom including seizure (Eclampsia) followed by vaginal bleeding in. Other complications were pulmonary edema and HELLP syndrome. 6.7% patients died. Liu et al showed in their study that women with gestational hypertension and proteinuria had an increased risk of placental abruption (unadjusted OR, 4.36; 95% CI, 1.05-18.1) and disseminated intravascular coagulation (unadjusted OR, 6.46; 95% CI, 1.05-39.8). Also, maternal complications (aOR, 2.59; 95% CI, 1.34-5.04) became the single significant factor associated with gestational hypertension and proteinuria.[17] Nankali et al studied 349 severely preeclampsia cases and reported eclamptic seizure (6.3%), HELLP syndrome (0.3%) and placental abruption in 7.7% cases. The most frequent maternal complication (37 cases) reported was coagulopathy (10.6 %).[18]

In present study mean hemoglobin level were 8.12+0.8 gm/dl. Monteiro et al showed that hemoglobin and PCV were lower in PIH subjects with IUGR and IUD as compared to PIH subjects without IUGR and IUD and normotensives controls. Anemia may be associated with IUD and IUGR in PIH patients.[19] In this study, 21.3% of babies required NICU admission for various causes. Pairu et al in their study reported that fetal outcome, pre-

term deliveries, fetal growth retardation (IUGR) and still birth was significantly more frequent in women with preeclampsia as compared to those without pregnancy induced hypertension.[20]

Most common neonatal outcome in this study was low birth weight. Less than half newborns were preterm. Nagar T et al found in their study that most common neonatal outcome was low birth weight 63 (70%). Other results (APGAR score, neonatal intensive care admission and still born) were also similar to our study.[21]

CONCLUSION

Preeclampsia is associated with maternal and neonatal complications. Hence, there is a need to strengthen the neonatal intensive care units (NICU) and also too aware the patients about importance of timely antenatal check-up and health education so that complication can be prevented by early intervention.

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