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ORIGINAL RESEARCH

To determine the fundus changes and fetomaternal Outcomes in Pregnancy Induced Hypertension

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Abstract

Aim: To determine the fundus changes and fetomaternal Outcomes in Pregnancy Induced Hypertension.

Methods: This prospective studywas carried out in the department of Obstetrics and Gynaecology, Bebe Nanki Mother and Child Care Centre, Govt. Medical College, Amritsar. We enrolled a total of 100 patients considering inclusion and exclusion criteria which were as follows. All patients who fulfilled the diagnostic criteria of PIH was included in the study. Labour records were maintained according to the proforma and follow up was done for maternal and perinatal outcome.

Results: In our study most of patients had eclampsia 33 (33%), 28 (28%) had gestational hypertension, 24 (24%) had pre eclampsia and 15 (15%) had severe preeclampsia. Out of 22 patients with complications of PIH were in the form of PPH in 4 (18.2%), Recurrent fits in 4 (18.2%), Coagulation Disorder in 2 (9.1%), Pulmonary Odema in 1 (4.5%), Renal Failure in 1 (4.5%), HELLP Syndrome in 2 (9.1%), ARDS in1 (4.5%), Aspiration Pneumonia in 2 (9.1%), Abruption in 5 (22.8%). In our study out of 28 patients of gestational hypertension only 1 patient was suffered from PPH. Out of 24 patients of preeclampsia, only 1 patient was suffered from pulmonary oedema. Out of 15 patients of severe preeclampsia, 6 patients were having maternal morbidity. 2 had PPH, 1 had renal failure, 1 had HELLP syndrome, 1 had coagulation disorder and 1 patient suffered from abruption. Out of 33 patients diagnosed as eclampsia, 14 patients had complications in the form of PPH (1 patient), recurrent fits (4 patients), coagulation disorders (1 patient), ARDS (1 patient), aspiration pneumonia (2 patients) and abruption (4 patients). In our study total maternal morbidity was to the extent of 22%. In our study male neonate constituted a significant larger population in total births, in live births, in IUD and in perinatal deaths. In our study still birth rate was found to be 198.01/1000 births and perinatal mortality was found to be 395.06/1000 live births.

Conclusion: fundus evaluation in PIH is an important procedure to predict adverse maternal and fetal outcome.

Keywords: Fundus Changes, Fetal Outcomes , maternal outcomes, Pregnancy Induced Hypertension

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Introduction

Pregnancy-induced hypertension (PIH) is a hypertensive disease that arises after 20 weeks of pregnancy in the absence of other reasons of increased blood pressure (BP) (≥140/90 mm of Hg measured twice with a 6 hour gap). Preeclampsia is diagnosed when PIH is linked with significant proteinuria (protein in urine ≥0.3 g/in 24 h). When preeclampsia is accompanied by seizures, it is classified as eclampsia. [1] This disease's pathological alterations seem to be linked to vascular endothelial dysfunction and its repercussions (generalized vasospasm and capillary leak). Ocular involvement is prevalent in PIH, occurring in up to 100% of cases. [2] Blurred vision, photopsia, scotomas, and diplopia are common symptoms. Seizures may be preceded by visual symptoms. [3] Progression of retinal alterations corresponds with PIH[4] progression as well as foetal mortality owing to comparable vascular ischemia changes in the placenta. PIH affects almost every organ system in the body, including the ophthalmic, cardiovascular, renal, endocrine, and central neurological systems. Vasospastic alterations are reversible, and following delivery, vasospasm of the retinal vessels returns to normal. The involvement of the visual system is related to the extreme toxaemia. A spasm and constriction of the retinal arteries is the most typical abnormality noticed.[5]

Materials and methods

Present study titled "To study the fundus changes and its association with maternal and fetal outcomes in pregnancy induced hypertension" was a prospective study, which was carried out in the department of Obstetrics and Gynaecology, Bebe Nanki Mother and Child Care Centre, Govt. Medical College, Amritsar. We enrolled a total of 100 patients considering inclusion and exclusion criteria which were as follows.

Inclusion criteria

All patients who fulfilled the diagnostic criteria of PIH was included in the study.

Exclusion criteria

In this study following patients were excluded.

1. All patients with secondary causes of hypertension.
2. All patients with Renal disorders.

Method of study

Informed consent was taken from each patient prior to the start of the study. The patients were examined antenatally for detection of any rise of blood pressure and presence of albumin in urine in their regular visits for antenatal check-up. The patients who fit into any of the above said categories of pregnancy induced hypertension were selected for the study. Labour records were maintained according to the proforma and follow up was done for maternal and perinatal outcome.

Fundoscopoy

Both pupils were dilated with 1% tropicamide eye drops and fundus examination was done by ophthalmologist with direct ophthalmoscope in a semi dark room in the ward. Hypertensive retinopathy changes seen in right or left or both eyes, were taken as positive findings in that patient. Age, para, gravida, blood pressure, proteinuria were noted. All the findings were noted on a data sheet. The retinal changes (hypertensive retinopathy) were graded according to Keith Wagener classification.

Grade I	Mild to moderate narrowing of sclerosis of arterioles
Grade II	Moderate to marked sclerosis of retinal arterioles

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	Exaggeration of light reflex
	Arterio venous compression changes
	Generalized/ Localized narrowing of arterioles
Grade III	Retinal arteriolar narrowing and focal constriction; retinal odema, cotton wool spots, hemorrhage.
Grade IV	Papillodema with associated Grade III changes

After this admitted patients were examined every day i.e. routine check-up, blood pressure, urine examination and fetal heart monitoring till delivery.Careful antenatal, intranatal and post partum records were maintained as stated in the proforma.

The baby in each case was thoroughly examined for any sign of dysmaturity and congenital malformations. All babies were followed up till seven days after birth for any perinatal complications. The perinatal outcome in terms of fetal distress (APGAR score at birth), birth weight, gestation at delivery, IUFD, perinatal death was studied and the morbidity and mortality assessed.

Results

The Present study was conducted on 100 patients attending the department of Obstetrics and Gynaecology, Bebe Nanki Mother and Child Care Centre, Govt. Medical College, Amritsar. Patients were classified as gestational hypertension, pre eclampsia, severe pre eclampsia, eclampsia according to national high blood pressure educational programme (NHBPEP-2000 and ACOG-2002). All patients and babies were closely followed up. Maternal outcome was assessed at 10^{th} day, 1 month and 3 months after delivery. Fetal outcome was seen at birth and 7 days after birth.

Table I: Showing maternal outcome according to types of PIH

Diagnosis	No. of cases	%age
Gestation Hypertension	28	28.0-
Preeclampsia	24	24.0
Severe Preeclampsia	15	15.0
Eclampsia	33	33.0
Total	100	100.0

In our study most of patients had eclampsia 33 (33%), 28 (28%) had gestational hypertension, 24 (24%) had pre eclampsia and 15 (15%) had severe preeclampsia.

Table 2: Showing distibution of patients according to age among different types of PIH

Age Group	Total		Gestational Hypertension		Preeclampsia		Severe Preeclampsia		Eclampsia	
	No. of cases	Percentage	No. of cases	Percentage	No. of cases	Percentage	No. of cases	Percentage	No. of cases	Percentage
≤25	67	67.0	19	67.9	16	66.7	7	46.7	25	75.8
26-30	24	24.0	8	28.6	6	25.0	5	33.3	5	15.2
31-35	7	7.0	1	3.6	2	8.3	3	20.0	1	3.0
>35	2	2.0	0	0.0	0	0.0	0	0.0	2	6.1
Total	100	100.0	28	100.0	24	100.0	15	100.0	33	100.0

Mean Age 24.86±4.05; $x^{2:}$ 12.1; df: 9; p : 0.206 (Non Significant).

A total of 100 patients were examined, majority were ≤25 years 67 (67%), 24 (24%) patients were ranged between 26 to 30 years, 7 (7%) patients were ranged between 31 to 35 years and

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only 2 (2%) patients were >35 years old. Mean age of patients was 24.86±4.05.Out of 28 patient of gestational hypertension 19 (67.9%) were ≤ 25 years, 8 (28.6%) patients were between 26-30 years of age, 1 (3.6%) patients was between 31-35 years of age.Out of 24 patients of preeclampsia 16 (66.7%) were ≤ 25 years, 6 (25%) were between 26-30 years of age, 2 (8.3%) patients were between 31-35 years of age.Out of 15 patients of severe preeclampsia 7 (46.7%) were ≤ 25 years, 5 (33.3%) were between 26-30 years of age, 3 (20%) were 31-35 years of age.Out of 33 patients of eclampsia 25 (75.8%) were ≤ 25 years of age, 5 (15.2%) were between 26-30 years, 1 (3%) were between 31-35 years old and 2 (6.1%) were 35 years old.In our study there is no significant correlation between age of patients and severity of PIH (p<0.206, non significant).

Table 3: Distribution of patients according to fundus changes among different types of PIH

Fundus Examination	Total		Gestational Hypertension		Preeclampsia		Severe preeclampsia		Eclampsia	
	No. of cases	Percentage	No. of cases	Percentage	No. of cases	Percentage	No. of cases	Percentage	No. of cases	Percentage
Nil	48	48.0	23	82.1	15	62.5	4	26.7	6	18.2
Grade I	31	31.0	5	17.9	8	33.3	8	53.3	10	30.3
Greade II	10	10.0	0	0.0	0	0.0	1	6.7	9	27.3
Grade III	6	6.0	0	0.0	1	4.2	1	6.7	4	12.1
Grade IV	5	5.0	0	0.0	0	0.0	1	6.7	4	12.1
Total	100	100.0	28	100.0	24	100.0	15	100.0	33	100.0

x^2 :45.5; df : 12; p : 0.000 (Significant)

Out of 100 patients fundus changes were present in 52 (52%) patients. 48 (48%) patients in this study did not have any fundus changes. Out of 52 (52%) patients grade I changes were seen 31 (31%) patients, grade II changes were seen in 10 (10%) patients, grade III in 6 (6%) patients and grade IV changes were seen 5 (5%) patients.Out of 28 patients of gestational hypertension, only 5 (17.9%) patients were having fundus changes which were of grade I. Out of 24 patients of preeclampsia, 9 patients were having fundus changes out of which 8 (33.3%) patients were having grade I changes and 1 (4.1%) patients was having grade III changes.Out of 15 patients of severe preeclampsia, 12 patients were having fundus changes out of which 8 (53.3%) patients were having grade I changes and 1 (6.7%) patients was having grade II changes, 1 (6.7%) patient was having grade III changes and 1 (6.7%) patient was having grade IV changes.Out of 33 patients of eclampsia, 27 patients were having fundus changes out of which 10 (30.3%) patients were having grade I changes and 9 (27.3%) patients were having grade II changes, 4 (12.1%) patient were having grade III changes and 4 (12.1%) patient were having grade IV changes.In our study there is significant correlation between fundus changes and severity of PIH (p<0.05)

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Table 4: Showing various maternal complications during antipartum intrapartum and postpartum period among different types of PIH

Complication	Total		Gestational Hypertension		Preeclampsia		Severe preeclampsia		Eclampsia	
	No. of cases	Percentage	No. of cases	Percentage		Percentage	No. of cases	Percentage	No. of cases	Percentage
PPH	4	18.2	1	100.0	0	0.0	2	40.0	1	7.1
Recurrent Fits	4	18.2	0	0.0	0	0.0	0	0.0	4	28.6
Coagulation disorder	2	9.1	0	0.0	0	0.0	1	20.0	1	7.1
Pulmonary Oedema	1	4.5	0	0.0	1	100.0	0	0.0	0	0.0
Renal Failure	1	4.5	0	0.0	0	0.0	1	20.0	0	0.0
HELLP Syndrome	2	9.1	0	0.0	0	0.0	1	0.0	1	7.1
ARDS	1	4.5	0	0.0	0	0.0	0	0.0	1	7.1
Aspiration Pneumonia	2	9.1	0	0.0	0	0.0	0	0.0	2	14.3
Abruption	5	22.8	0	0.0	0	0.0	1	20.0	4	28.6
Total	22	100.0	1	100.0	1	100.0	6	100.0	14	100.0

Out of 22 patients with complications of PIH were in the form of PPH in 4 (18.2%), Recurrent fits in 4 (18.2%), Coagulation Disorder in 2 (9.1%), Pulmonary Odema in 1 (4.5%), Renal Failure in 1 (4.5%), HELLP Syndrome in 2 (9.1%), ARDS in1 (4.5%), Aspiration Pneumonia in 2 (9.1%), Abruption in 5 (22.8%). In our study out of 28 patients of gestational hypertension only 1 patient was suffered from PPH.Out of 24 patients of preeclampsia, only 1 patient was suffered from pulmonary oedema.Out of 15 patients of severe preeclampsia, 6 patients were having maternal morbidity. 2 had PPH, 1 had renal failure, 1 had HELLP syndrome, 1 had coagulation disorder and 1 patient suffered from abruption.Out of 33 patients diagnosed as eclampsia, 14 patients had complications in the form of PPH (1 patient), recurrent fits (4 patients), coagulation disorders (1 patient), ARDS (1 patient), aspiration pneumonia (2 patients) and abruption (4 patients). In our study total maternal morbidity was to the extent of 22%. Maternal morbidity was significantly more in patients with severe preeclampsia and eclampsia.

Table 5: Showing causes of maternal mortality among different types of PIH

Causes of Mortality	Total		Gestational Hypertension		Preeclampsia		Severe preeclampsia		Eclampsia	
	No. of cases	Percentage	No. of cases	Percentage	No. of cases	Percentage	No. of cases	Percentage	No. of cases	Percentage
Pulmonary Oedema	1	33.3	0	0	1	100.0	0	0.0	0	0.0
HELLP	1	33.3	0	0	0	0.0	1	100.0	0	0.0
Aspiration Pneumonia	1	33.3	0	0	0	0.0	0	0.0	1	100.0
Total	3	100.0	0	0	1	100.0	1	100.0	1	100.0

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Out of 100 patients with PIH, 3 patients died in our study. All the 3 patients were primigravida. Out of which 1 was of preeclampsia, 1 was of severe preeclampsia and 1 was of eclampsia.First patient was primigravida, 24 years old at 34 weeks period of gestation, she was diagnosed to have preeclampsia with anaemia. Emergency LSCS done because of fetal distress and an alive female baby was delivered, patient developed breathlessness and shifted to ICU, where she died on postoperative day of 7 with pulmonary edema. Second patient was primigravida, 31 years old at 39.4 weeks period of gestation with severe preeclampsia with HELLP syndrome with IUD. Emergency LSCS done for obstructed labour, dead female baby was delivered. She died on postoperative day 3rd due to HELLP syndrome leading to renal shutdown. Third patient was primigravida, 22 years old at 36.4 week period of gestation with eclampsia with aspiration pneumonia. Patient was intubated. Labour was induced. Emergency LSCS done because of fetal distress. She delivered an alive female baby. Patient shifted back to ICU on postoperative day 2. She had deranged renal profile and swelling over face and neck. Patient died on postoperative day 7 because of aspiration pneumonia. Maternal mortality rate due to pregnancy induced hypertension was found to be 37.5 per thousand live births (Maternal Mortality=3, Live Births = 80).

Table 6: Showing sex distribution of all the babies (live, dead, perinatal deaths)

	Males		Females		Total	
	No. of cases	%age	No. of cases	%age	No. of cases	%age
Total	60	100.0	40	100.0	100	100.0
Live	46	76.7	34	85.0	80	80.2
Perinatal Death	6	15.2	4	14.7	10	14.8
IUD	14	23.3	6	15.0	20	19.8

Total 100 neonates were born out of which 60% were males and 40% were females. Out of 60 males, only 40 survived, intrauterine death accounted for 14 (23.3%) and 6 (15.2%) babies died in the perinatal period due to various causes like prematurity, jaundice, septicemia, respiratory distress, IUGR. Among the females babies, 30 survived, 6 (15%) were intrauterine deaths and 4 (14.7%) died in perinatal period.In our study male neonate constituted a significant larger population in total births, in live births, in IUD and in perinatal deaths. In our study still birth rate was found to be 198.01/1000 births and perinatal mortality was found to be 395.06/1000 live births.

Discussion

Pregnancy induced hypertension is still the commonest cause of perinatal and maternal morbidity and mortality in the under privileged population. Since PIH is considered a ‘‘DISEASE OF THEORIES”, many causes or factors contribute to the development of PIH and to its poor prognosis. Seizure to delivery interval, respiratory distress and acute epigasric pain are common signs and symptoms preceding a poor maternal outcome. Growth retardation, prematurity, scanty liquor amni, fetal heart irregularity especially late deceleration indicating placental insufficiency, accidental haemorrhage (abruption placentae), all contribute to dismal perinatal outcome.

In PIH various pathological changes in different organs of the body can be studied directly visualizing the ocular fundus and may give a true index of changes in vascular system of brain and retina.[6]

Present study was undertaken as a joint venture of department of Obstetrics and Gynaecology and department of Ophthalmology, Govt. Medical College, Amritsar with aim to study fundus changes in PIH patients and its complications in maternal and fetal. The study was conducted in 1 ½ years involving 100 patients who fulfilled the diagnostic criteria of PIH. These patients were subjected to detailed history, examination and investigation including

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fundus examination. Patients were followed up till delivery and three months thereafter. Maternal outcome was assessed at 10 days after delivery, 1 month and 3 months after delivery. Fetal outcome was seen at birth and 7 days after birth.

In our study of 100 patients, majority of patients had eclampsia 33(33%), 28(28%) had gestational hypertension, 24(24%) had preeclampsia and 15(15%) had severe preeclampsia. Majority of patients had no antenatal check up until they first presented with complications.

Out of 100 patients, fundus changes were present in 52 (52%) patient which correlate with study done by Reddy SC et al[7], who had reported fundus changes in 53.4% patients of PIH.

Table 7: Prevalence of retinal changes in PIH patients in various studies were:

Study	Prevalence of retinal changes in PIH patients
Tadin et al[8]	45%
Rasdi et al [9]	21.5%
Karki et al [10]	13.7%
Reddy et al[7]	53.4%
Our study	52%

Out of 28 patients of gestational hypertension, only 5 (17.9%) patients were having fundus changes. Out of 24 patients of preeclampsia, 9(37.5%) patients were having fundus changes. Out of 15 patients of severe preeclampsia, 12(80%) patients were having fundus changes. Out of 33 patients of eclampsia, 27(81.8%) patients were having fundus changes .In our study, fundus changes were more in patients with preeclampsia and eclampsia. .Grade III and grade IV changes in our study were seen more in severe preeclampsia and eclampsia patients as seen in study by Kamath RK et al.[11] In our study grade I changes were most common and were seen in 31% patients which correlates with study by Reddy SC et al[7]in which retinal changes (hypertensive retinopathy) were noted in 46 (59%) patients ,out of which grade I were seen in 41 (52.6%) and grade II in 5 (6.4%).

In our study total maternal morbidity was to the extent of 22%. Maternal morbidity was significantly more in patients with severe preeclampsia and eclampsiaComplications were in the form of PPH in 4 (18.2%), Recurrent fits in 4 (18.2%), Coagulation Disorder in 2 (9.1%), Pulmonary Odema in 1 (4.5%), Renal Failure in 1 (4.5%), HELLP Syndrome in 2 (9.1%), ARDS in1 (4.5%), Aspiration Pneumonia in 2 (9.1%), Abruption in 5 (22.8%). This is in accordance with study by Pillai SS et al[12] in which PPH were in 23.6% patients followed by partial HELLP in 19.9%' A study by Mattar F et al[13] had 11% incidence of HELLP and 10% incidence of abruption placenta. In study by Revathy K et al,[14] 5 patients had abruption placenta , out of them 4 had fundus changes (80%).

In our study fundus changes of patients with complications were seen in 20 (90.9%) patients and majority of them had grade IV fundus changes which is in correlation with Study by Revathy K et al[14] which showed significant association between fundus changes and maternal complications, as seen in our study. Maternal mortality rate due to pregnancy induced hypertension was found to be 37.5 per thousand live births (Maternal Mortality=3, Live Births = 80) in our study. All the patients had fundus changes. Patient who died due to Pulmonary Odema had grade IV fundus changes and the one with HELLP Syndrome had grade III and one with Aspiration Pneumonia had grade II fundus changes.

Total 100 neonates were born in our study, out of which 60% were males and 40% were female. In mothers with males babies fundus changes were seen in 33% patients and in mothers with females babies fundus changes were seen in 19% patients. Fundus changes were more in mothers of male babies.

Out 80 neonates born live, 25 (27%) babies were admitted to hospital for various reasons like severe prematurity 5 (18.5%), respiratory distress 8 (29.6%) babies, IUGR 8 (29.6%), jaundice 2 (7.4%) and septicemia 4 (14.8%), out of which, 5 (18.5%) babies were of mothers with gestational hypertension, 4 (14.8%) babies were of mother with preeclampsia, 6

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(22.2%), babies were of mothers with severe preeclampsia, 12 (44.5%) babies were of mothers with eclampsia. Perinatal morbidity was more among babies of mothers with eclampsia.

Conclusion

Preeclampsia and eclampsia continue to be significant causes of maternal and fetal morbidity and mortality. Though prevention is not possible, it is important to recognize early warning symptoms and signs so that life threatening complications can be averted. Fundus examination at regular intervals can assess the severity of the disease and also response to treatment instituted thereby improving the fetomaternal outcome by managing the pregnancy judiciously. Further fundus evaluation in PIH is an important procedure to predict adverse maternal and fetal outcome.

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