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Original Research Article

Study of renal and ophthalmic manifestations in hypertensive disorders of pregnancy and its outcome

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ABSTRACT

Background: Hypertensive diseases of pregnancy are commonly manifested in renal and ocular changes. Proper evaluation of findings provided by urine analysis, renal function test, urine output and examination of the optic fundi and visual fields may help in assessing the severity and the need for intervention. The primary objective was to determine the prevalence of retinal and renal manifestations in hypertensive disorders in pregnancy and feto-maternal outcome.
Methods: This prospective study was conducted in VIMS, Ballary, Karnataka, India between 1st March 2014 to 28th February 2015. Detailed history and ocular examination with direct fundoscopy and renal parameters were noted on the mothers admitted and their correlation with feto maternal outcome studied.
Results: 432 patients were included in the study, 41.7% had retinopathy changes on fundoscopy, 31.3% patients had Grade I hypertensive changes. Grade II, III and IV changes were seen in 4.2%, 2.1% and 4.2% respectively. There was an increase in blood uric acid levels with increase in severity of preeclampsia. The incidence of IUFD (8.3%), still born (8.3%) and need for NICU admission were significantly more with the severity of preeclampsia.
Conclusions: Cases of hypertensive disorders in pregnancy with visual disturbances and headache are commonly associated with retinal changes. It is essential to examine every pre-eclampsia patient for ocular manifestations, which is helpful in the management of patient. Maternal urine protein test helps to detect the glomerular insult in the kidney and is a strong predictor of maternal and fetal complications.

Keywords: Eclampsia, Fundoscopy, PIH, Proteinuria, RFT

INTRODUCTION

Hypertension in pregnancy is defined as systolic blood pressure (SBP) ≥140mmHg and/or diastolic blood pressure (DBP) ≥90mmHg, or by increase in SBP ≥30mmHg, or in DBP ≥15mmHg, from preconception or first trimester blood pressure confirmed by two measuring, 6 hours apart.

Ocular sequelae are observed in significant number of patients in hypertensive disorders of pregnancy. Blurring of vision is the most common ocular symptom and focal or generalized narrowing of arterioles is the most common ocular manifestation.[1] Cortical blindness is one of the important causes of blindness in toxemia of pregnancy. The incidence of cortical blindness manifested by hypertensive encephalopathy in preeclampsia is 1 to 15%.[2]

Ophthalmoscopic examination is an essential part of examination of every hypertensive patient. As this is the only site in the body where the effects of high blood

pressure on small vessels can be visualized and assessed.[3] Alteration of normal ratio of vein: arteriolar diameter: due to the arteriolar narrowing, the vein: arteriolar diameter is altered from 3:2 to 3:1. Narrowing of the retinal arteriolesis related to the severity of hypertension.[4]

Renal function is reset at a higher level during normal pregnancy. Renal plasma flow and glomerular filtration rate both increase by 30 to 50%. Therefore serum creatinine levels above 70umol/L (0.8mg/dl) are abnormal in pregnant women and should be investigated.

Proteinuria indicates renal involvement and is one of the hallmarks of preeclampsia. Since the glomerular filtration rate increases by about 50% in normal gestation, a reduction in glomerular filtration rate heralds the one set of preeclampsia even with normal levels of blood urea nitrogen and serum creatinine.[5]

A 24 hour proteinuria collection provides assessment of renal status. Proteinuria of more than 5g/24 hours (or ≥3+ on random samples collected four hours apart) classifies a mother as having severe preeclampsia.[6]

Aims and objectives

- To study the renal and ophthalmic manifestations in hypertensive disorders in pregnancy.
- To study the maternal and perinatal outcome.

Ocular manifestations

Ocular sequelae are observed in 30% to 100% of patients with preeclampsia-eclampsia syndrome. Blurred vision is the most common visual complaint, and focal or generalized arteriolar narrowing is the most common ocular finding in preeclampsia-eclampsia syndrome. Areas of nonperfusion or arterial and venous occlusive disease may also develop.[7,8]

The various pathological changes in different organs of the body in preeclampsia can be studied directly visualizing the ocular fundus and may give a true index of changes in vascular system of brain and retina from fundal change and foetal outcome. Visual symptoms may be the precursor of seizures.[9]

The ocular manifestations in pregnancy can be noted by doing fundoscopic examination, which requires basic understandings of normal fundus to various changes seen in hypertensive disorders. The fundus acts as a gateway to the pathophysiological changes noted elsewhere in the body with respect to systemic changes in preeclampsia and eclampsia syndromes. The fundoscopic examination need basic requirements like dilatation of the pupils with mydriatic agent instillation and need of dark room lights prior to examination proper. The hypertensive retinopathy gradings are done according to Keith Wagener Barker Gradings system.

The prognosis with respect to maternal and foetal outcomes in preeclampsia and eclampsia syndromes been studied with various studies is depicted below.

Table 1: Keith Wagener Barker (1939) classification.

Grades	Fundoscopy changes	Prognosis
Grade I	Mild to moderate narrowing or sclerosis of arterioles	Excellent
Grade II	Moderate to marked sclerosis of retinal arterioles exaggeration of light reflex arterio venous compression changes generalized/localized narrowing of arterioles	Good
Grade III	Retinal arteriolar narrowing and focal constriction; Retinal edema; cotton wool spots; hemorrhage	Poor
Grade IV	Papillodema with associated Grade III changes	Very poor

Progression of retinal changes correlates with progression of preeclampsia and also with the foetal mortality due to similar vascular ischemic changes in the placenta.[10] It is seen that the progression of retinal vascular changes is a sign of increasing severity of preeclampsia and have correlated them with foetal mortality.[11,12]

While most patients recover normal vision within a few weeks of delivery, some have residual retinal pigment epithelial (RPE) lesions in the macula that appear as Elschnig spots or that mimic macular dystrophy or tapetoretinal degeneration.[13] Although rare, optic atrophy may develop if chorioretinal atrophy is widespread. Permanent blindness from retinal vascular changes is rare, and cortical blindness is generally reversible.[14]

The cause of retinal arteriolar narrowing seems to be central retinal artery vasospasm suggested by increased central retinal artery blood flow velocity.[15] When present, the retinal arteriolar attenuation associated with pre-eclampsia generally resolves after delivery, presumably due to normalization of central retinal artery blood flow. Other typical hypertensive retinopathy changes such as hemorrhages, cotton-wool spots, lipid deposits, diffuse retinal edema, and papilledema are generally not seen in pre-eclampsia and should raise suspicion about additional concurrent systemic disease.[16]

Renal manifestations

The renal system undergoes significant physiological and anatomical changes during a normal pregnancy. There is an increased glomerular filtration rate (GFR), which peaks at about the 13th week of pregnancy and can reach levels up to 150% of normal. Therefore, both urea and creatinine levels are decreased. Increased levels of progesterone at the beginning of pregnancy increase relaxation of arterial smooth muscles and so decrease

peripheral vascular resistance, causing a blood pressure fall of approximately 10mmHg in the first 24 weeks of pregnancy.[17]

Urine examination is one of the oldest and frequently performed tests in clinical practice. Proteinuria is a sign of preeclampsia which is defined as ≥300mg of protein in a 24 hour urine collection. It usually correlates with 30mg/dl or a 1+ reading in dipstick in a random urine specimen. Protienuria is also valuable as a sign of severity and a value of ≥5g in 24 hours is one criteria to classify as severe. The 24 hour urine collection for protein is the gold standard in diagnosis of preeclampsia.

A 1+ has a positive predictive value of 92%. Trace level to 1+ proteinuria are acceptable, but levels of 2+ or greater are abnormal. Values considered normal when not pregnant may reflect decreased renal function in pregnancy. Creatinine above 0.8mg/dl and urea above 35mg/dl are indications for further investigation. Urinary protein excretion increases during pregnancy, but never to more than 300 mg/day and, therefore, overt proteinuria is abnormal. Women are at increased risk of UTI because of renal tract dilatation leading to urinary stasis.[18]

METHODS

In this Open Label, prospective, observational study, the admitted patients in the Department of OBG, VIMS, Ballary, from 1st March 2014 to 28th February 2015 were recruited for the study.

Institutional ethical committee clearance was obtained before starting the study. A written informed consent was obtained before the cases included as study sample. Pregnant mothers newly diagnosed with blood pressure of ≥140/90mm Hg were included.

Inclusion criteria

Pregnant mothers with blood pressure of ≥140/90 mmHg and those fulfilling the criteria for hypertensive disorders in pregnancy.

Exclusion criteria

- History oh blurring of vision prior to pregnancy
- History of renal disorder
- Diabetic mothers
- Liver disorders
- Connective tissue diseases
- Twin gestation
- Associated with severe anemia

Statistical analysis

After appropriate data cleaning, the data sheet was transferred and analyzed using SPSS software version-20. To compare the categorical qualitative data variables among the two study groups, Chi-square test and Fisher exact test was used and to compare the continuous quantitative data variable 't' test was used. The P-values were corrected by the Bonferroni method and a P-value <0.05 was regarded as statistically significant.

Ocular examination

After taking history for any eye symptoms, anterior segment was examined with torch light at bedside. Fundus examination was done with direct ophthalmoscopy, on admission after dilating the pupils with 1% tropicamide drops (one drop in each eye at 15 minutes interval for 3 times). Hypertensive retinopathy changes seen in both eyes, was taken as positive findings in that patient. All the findings were noted on a data sheet. The retinal changes (hypertensive retinopathy) were graded according to Keith Wagener classification which was depicted in previous discussion in Table 1.

Renal parameters

Proteinuria was tested using dipstix method and was graded as:

- + = 0.3-1gm/L
- ++ = 1-3gm/L
- +++ = 3-5gm/L
- ++++ = >5gm/L

Serum uric acid levels were measured by colorimetric assay. Serum creatinine and urea levels were measured using standard procedures. During the hospital stay, each patient was managed as per the standard protocol of the Institute. Blood pressure was checked every four to six hours and close monitoring was done for ominous clinical findings such as headache, visual problems, epigastric pain, oliguria, and vomiting.

Fetal weight and amniotic fluid volume were evaluated. Doppler USG or biophysical scoring was done whenever indicated. All women in the study were followed until delivery and maternal and fetal complications were noted.

Statistical analysis

Statistical analysis was performed using SPSS 16.0 software. Unpaired t-test was used to analyze continuous data. Categorical data was compared using chi-square test. P<0.05 was taken as statistically significant. Relative risk was calculated for abnormal UA PI, UA RI, UA S/D, MCA PI and cerebral-umbilical PI ratio. Multivariate regression was used to analyze effect of multiple variables.

RESULTS

A total of 432 patients were observed in our study period of one year starting from 1stMarch 2014 to 28thFebruary

2015. Every patient was subjected to ophthalmic examination proper bedside including fundoscopy and was subjected to renal parameters study including urine albumin, serum urea, uric acid and creatinine values and their correlation with maternal and foetal complication were studied.

Table 2: Age wise distribution of the study subjects.

Age group	Frequency	Percent
20-25 years	342	79.2
26-30 years	81	18.8
>30 years	9	2.1
Total	432	100
Mean ± SD	22.77±3.31	

The mean age of patients was 22.77±3.31 years (range: 19-35 years). Majority of the patients fall in the age group of 20-25 years.

Table 3: Obstetric profile of the study subjects (N=432).

Obstetric profile	Frequency	Percent
Gravida		
I	288	66.7
II	81	18.8
III	36	8.3
IV	27	6.3
Parity		
I	63	14.6
II	36	8.3
III	18	4.2
NA	315	72.9
Living		
0	18	4.2
1	72	16.7
2	18	4.2
3	9	2.1
NA	315	72.9
Abortion		
1	18	4.2
3	9	2.1
NA	405	93.8
Gestation		
<28 weeks	18	4.2
28-32 weeks	45	10.4
33-36 weeks	108	25
>37 weeks	261	60.4
Mean±SD	35.9 ± 4.13	

Table 3 shows majority were primigravida 66.7% (288), multigravida distribution was 33.3% (144) patients. The mean gestational age were 35.9±4.13 weeks the majority of patients with gestational age >37 weeks were 261 patients (60.4%). The distribution between 28-36 weeks was 153 patients (35.4%). Rest were <28 weeks gestation (4.2%).

Table 4: Clinical profile of the study subjects (N=432).

Clinical profile	Frequency	Percent
Pallor		
Yes	153	35.4
No	279	64.6
edema		
Yes	369	85.4
No	63	14.6
Systolic BP group		
Normal	18	4.2
Mild PIH	117	27.1
Severe PIH	297	68.8
Mean±SD	157.71±11.18	
Diastolic BP group		
Mild PIH	234	54.2
Severe PIH	198	45.8
Mean±SD	103.25±8059	
GCS at admission		
11	9	2.1
12	27	6.3
13	9	2.1
14	18	4.2
15	369	85.4
Foetal heart sounds		
Absent	36	8.3
Decreased	9	2.1
Normal	387	89.6
PV examination		
In labour	171	39.6
Not in labour	261	60.4

Table 4 shows clinically anemia in 153 (35.4%). Edema in 85% (369) Mean SBP 157.71±11.18 mm Hg and DBP 103.25±8059 mmHg.

Table 5: Distribution of study subjects based PIH type (N=432).

PIH type	Frequency	Percent
Antepartum eclampsia	90	20.8
Chronic hypertension	9	2.1
Imminant eclampsia	153	35.4
Mild PIH	81	18.8
Severe PIH	99	22.9
Total	432	100

Table 5 shows majority being imminant eclampsia with 153(35.4%), severe preeclampsia 99 (22.9%), mild preeclampsia 81 (18.8%), eclampsia 90 (20.8%) and chronic hypertension 9 (2.1%). Since ours being a tertiary care hospital and majority were referred with severe preeclampsia and imminant eclampsia, so incidence of these are more in our study group.

Table 6: Distribution based on fundoscopic changes (N=432).

Fundoscopy	Frequency	Percent
Normal	252	58.3
Grade I	135	31.3
Grade II	18	4.2
Grade III	9	2.1
Grade IV	18	4.2
Total	432	100

Table 6 shows majority of patients with grade I retinopathy 135 (31%), grade II in 18 (4.2%), grade III in 9 (2.1%), grade IV in 18 (4.2%) patients.

Table 7: Distribution based serum uric acid levels (N=432).

Uric acid levels	Frequency	Percent
Normal	63	14.6
Abnormal	369	85.4
Total	432	100

In Table 7 majority showed raised uric acid levels 369 (85.4%) and normal values in 63 (14.6%) patients.

Table 8: Distribution based on serum creatinine levels (N=432).

Serum creatinine levels	Frequency	Percent
Normal	333	77.1
Abnormal	99	22.9
Total	432	100

Table 8 shows majority of patients with preeclampsia syndrome were having normal range creatinine values, (77.1%) and abnormal in 22.9% patients.

Table 9: Distribution based on neonate outcome (N=432).

Neonate outcome	Frequency	Percent
IUD	36	8.3
Still born	36	8.3
Normal	270	62.5
Neonatal death	90	20.8
Total	432	100

Table 9 shows outcome of babies been delivered normal in 270 (62.5%), neonatal death 90 (20.8%), IUD 8.3% and Still born 8.3%.

Table 10: Association of PIH type, obstetric profile with retinal changes.

Parameter	Retinal changes				
	Gr I (n=135)	Gr II (n=18)	Gr III and IV (n=27)	Normal (n=252)	P value
PIH type					
Antepartum eclampsia	29 (32.2)	9 (10.0)	7 (7.7)	45 (50.0)	0.000
chronic hypertension	0 (0.0)	0 (0.0)	0 (0.0)	9 (100.0)	
Imminant eclampsia	81 (52.9)	9 (5.9)	20 (17.6)	42 (27.4)	
Mild PIH	4 (4.9)	0 (0.0)	0 (0.0)	77 (99.1)	
Severe PIH	14 (18.2)	4 (4.04)	0 (0.0)	81 (81.8)	
Age group					
20-25 years	117(34.2)	18 (5.3)	27 (7.9)	180 (52.6)	0.000
26-30 years	18 (22.2)	0 (0.0)	0 (0.0)	63 (77.8)	
>30 years	0 (0.0)	0 (0.0)		9 (100.0)	
Gravida					
Primigravida	72 (25.0)	9 (3.1)	27 (9.4)	180 (62.5)	0.000
Multigravida	63 (43.8)	9 (6.3)	0 (0.0)	72 (50.0)	
Gestation					
<28 weeks	0 (0.0)	9 (50.0)	9 (50.0)	0 (0.0)	0.000
28-32 weeks	9 (20.0)	0 (0.0)	9 (20.0)	27 (60.0)	
33-36 weeks	72 (66.7)	0 (0.0)	9 (8.3)	27 (25.0)	
≥37 weeks	54 (20.7)	9 (3.4)	0 (0.0)	198 (75.9)	

In mild preeclampsia (Table 10) 4 (4.9%) suffered grade I changes, severe preeclampsia 14 (18.2%) suffered grade I and 4 (4.04%) suffered grade II changes, imminant eclampsia 90 (20.3%) suffered grade I and II changes, 20 (4.6%) suffered grade III and IV changes. Retinopathy was noted more in age group 20-25 age group. Primigravida affected were more compared to multigravidas. Table 11 shows that serum creatinine is

normal in majority of the preeclampsia subjects and that its abnormality is in correlation with the severity of preeclampsia. Table 12 shows serum uric acid is abnormal in majority of the preeclampsia cases and it also showed progressive increase in value in correlation with severity of the disease.

Table 11: Association of PIH type, obstetric profile with serum creatinine levels.

Parameter	Serum creatinine levels		
	Abnormal (n=99)	Normal (n=333)	P value
PIH type			
Antepartum eclampsia	36 (40.0)	54 (60.0)	0.000
chronic hypertension	9 (100.0)	0 (0.0)	
Imminant eclampsia	45 (29.4)	108 (70.6)	
Mild PIH	0 (0.0)	81 (100.0)	
Severe PIH	9 (9.1)	90 (90.9)	
Age group			
20-25 years	72 (21.1)	270 (78.9)	0.016
26-30 years	27 (33.3)	54 (66.7)	
>30 years	0 (0.0)	9 (100.0)	
Gravida			
Primigravida	45 (15.6)	243 (84.4)	0.000
Multigravida	54 (37.5)	90 (62.5)	
Gestation			
<28 weeks	18 (100.0)	0 (0.0)	0.000
28-32 weeks	9 (20.0)	36 (80.0)	
33-36 weeks	36 (33.3)	72 (66.7)	
≥37 weeks	36 (13.8)	225 (86.2)	

Table 12: Association of PIH type, obstetric profile with serum uric acid levels.

Parameter	Serum Uric acid levels		
	Abnormal (n=369)	Normal (n=63)	P value
PIH type			
Antepartum eclampsia	72 (80.0)	18 (20.0)	0.000
chronic hypertension	9 (100.0)	0 (0.0)	
Imminant eclampsia	144 (94.1)	9 (5.9)	
Mild PIH	45 (55.6)	36 (44.4)	
Severe PIH	99 (100.0)	0 (0.0)	
Age group			
20-25 years	297 (86.8)	45 (13.2)	0.053
26-30 years	63 (77.8)	18 (22.2)	
>30 years	9 (100.0)	0 (0.0)	
Gravida			
Primigravida	243 (84.4)	45 (15.6)	0.386
Multigravida	126 (87.5)	18 (12.5)	
Gestation			
<28 weeks	18 (100.0)	0 (0.0)	0.006
28-32 weeks	45 (100.0)	0 (0.0)	
33-36 weeks	90 (83.3)	18 (16.7)	
≥37 weeks	216 (82.8)	45 (17.2)	

Table 13 shows the severity of disease is associated with progressive increase in urine albumin values.

Table 14 shows IUDs were common in imminant eclamsia group, neonatal death was common in antepartum eclampsia group and in imminant eclampsia group, still born more common in severity of the disease progression, majority outcome was normal in 270 preeclampsia patients. Table 15 shows the maternal outcome, death occurred in 9 cases (2.1%), among complications: eclampsia in 20% (90), abruption in 4.2% (18), HELLP 4.2% (18), ARF in 1.2 % (5) cases, pulmonary edema 6.5% (28) cases and one case of retinal detachment seen.

Table 13: Association of PIH type, obstetric profile with urine albumin levels.

Parameter	Urine albumin			
	1+ and 2+ (n=117)	3+ and 4+ (n=306)	Traces (n=9)	P value
PIH type				
Antepartum eclampsia	18 (20.0)	72(80.0)	0(0.0)	0.000
chronic hypertension	0 (0.0)	0 (0.0)	9 (100.0)	
Imminant eclampsia	27 (17.6)	126 (82.4)	0 (0.0)	
Mild PIH	63 (77.8)	0 (0.0)	18 (22.2)	
Severe PIH	0 (0.0)	90 (90.9)	9 (9.1)	
Age group				
20-25 years	90 (26.3)	252 (73.7)	0 (0.0)	0.000
26-30 years	27 (33.3)	45 (55.6)	9 (11.1)	
>30 years	0 (0.0)	9 (100.0)	0 (0.0)	
Gravida				
Multigravida	27 (18.8)	108 (75.0)	9 (6.3)	0.000
Primigravida	90 (31.3)	198 (68.8)	0 (0.0)	
Gestation				
<28 weeks	0 (0.0)	18 (100.0)	0 (0.0)	0.000
28-32 weeks	9 (20.0)	36 (80.0)	0 (0.0)	
33-36 weeks	9 (8.3)	99 (91.7)	0 (0.0)	
≥37 weeks	99 (37.9)	153 (58.6)	9 (3.4)	

Table 14: Association of PIH type, obstetric profile with Neonate outcome.

Parameter	Neonate outcome				
	IUD (n=36)	Neonatal death (n=90)	Still born (n=36)	Normal (n=270)	P value
PIH type					
Antepartum eclampsia	0 (0.0)	27 (30.0)	18 (20.0)	45 (50.0)	0.000
Chronic hypertension	0 (0.0)	0 (0.0)	0 (0.0)	9 (100.0)	
Imminanteclampsia	18 (11.8)	36 (23.5)	18 (11.8)	81 (52.9)	
Mild PIH	9 (11.1)	9 (11.1)	0 (0.0)	63 (77.8)	
Severe PIH	9 (9.1)	18 (18.2)	0 (0.0)	72 (72.7)	
Age group					
20-25 years	27 (7.9)	81 (23.7)	36 (10.5)	198 (57.9)	0.000
26-30 years	0 (0.0)	9 (11.1)	0 (0.0)	72 (88.9)	
>30 years	9 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	
Gravida					
Primigravida	9 (3.1)	45 (15.6)	36 (12.5)	198 (68.8)	0.000
Multigravida	27 (18.8)	45 (31.3)	0 (0.0)	72 (50.0)	
Gestation					
<28 weeks	18 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0.000
28-32 weeks	18 (40.0)	18 (40.0)	0 (0.0)	9 (20.0)	
33-36 weeks	0 (0.0)	27 (25.0)	18 (16.7)	63 (58.3)	
≥37 weeks	0 (0.0)	45 (17.2)	18 (6.9)	198 (75.9)	

Table 15: Maternal outcome.

Outcome variable	Frequency	Percentage
Maternal outcome		
Uneventful	423	97.9
Death	9	2.1
Maternal complications		
Antepartum eclampsia	90	20.8
Abruptio placenta	18	4.2
HELLP syndrome	18	4.2
Acute renal failure	5	1.2
Pulmonary edema	28	6.5
Retinal detachment	2	0.5

DISCUSSION

In present study 432 patients were included, out of which 342 were preeclamptic and 90 eclamptic patients. Mean age of the patients in our study was22.77 ± 3.31 years and 79% of the patients were between the age groups of 20-25 and 18.8%were aged between 25-30 years who had retinopathy findings of 48.8% and 83.3% respectively. Hypertensive fundus changes were observed in 41.7%. This correlates with study by Tadin et al 2001[19]. Tadin from Croatia have reported 45% of retinal changes in their study of 40 patients with PIH. They found a statistical correlation between proteinuria, blood pressure and hypertensive retinopathy. They stated that hypertensive retinopathy is a valid and reliable prognostic factor in determining the severity of preeclampsia; examination of fundus is a valuable and necessary diagnostic procedure in pregnant women with preeclampsia.

Out of the visual symptoms blurred vision is most common followed by photopsia, scotomata and diplopia. In our study, we didn't come across any patients complaining of photopsia or scotoma, but 21 % had blurred / sudden diminution of vision. Anterior segment examinations including extraocular movements and pupillary responses were normal in all our patients. Our study showed that presence of fundus changes in a patient of pregnancy-induced hypertension was significantly associated with low birth weight ($P<0.05$), still born and need for NICU admission, but was not associated with fetal outcome in terms of gestational period (less than 37 weeks), 1 minute Apgar score (less than 5), Statistically significant relationship was found with fundus findings in the forms of retinal Edema, macular Edema and retinal detachment changes. ($P<0.05$). Retinal haemorrhage, soft exudates Purstcher's like retinopathy were not encountered in our study; nor did we find any case of cortical blindness (Prado et al 2002). Encountered one case of retinal detachment whose follow up was lost as the patient was referred to higher centers for management.

In our study, majority of the patients had arteriolar narrowing which were supported by studies conducted by Hallum [20] where the most common ocular finding was constriction of arterioles occurring in approximately 75% of patients with pre-eclampsia having retinopathy changes. Our study co-relates with previous study which states arteriolar narrowing (31.3% in our study) is the most common fundus finding in patients with pre eclampsia.[21]

In our study, all 432 patients had proteinuria and it ranged from 1+ to 4+. Patients with severe proteinuria (4+) have greater chance of developing retinopathy than less severe proteinuria. There is significant association was found between retinopathy grade and proteinuria with P value of 0.03. In study by Tandon and Kishore, serum uric acid level in mild preeclampsia ranged from 4.6 to 6.4 mg% with an average of 5.2 mg% whereas in severe preeclampsia it ranged from 4.2 to 8.0 mg% with a mean value of 5.63 mg%. Our study is also supported Gupta et al study which reported that retinopathy was found to be significantly associated only with serum uric acid levels among all lab parameters. They showed retinal changes showed a positive association with uric acid.[22]

A couple of studies investigated association between maternal proteinuria and fetal outcome in patients of preeclampsia. In two of these studies, adverse fetal outcome was associated with amount of proteinuria. Our study correlated with the increase in incidence of materno-fetal complication with increase in range of proteinuria. 36% of our patients had complications associated with preeclampsia, this correlates with the study conducted by Archana Kumari, Avinash Chakrawarty et al, on 200 preeclampsia patients [23]

CONCLUSION

Hypertension induced by pregnancy is one of the most common complications of pregnancy, occurring in about 10% of all pregnancies. It remains a leading cause of maternal and fetal morbidity and mortality worldwide. Hypertensive diseases of pregnancy are commonly manifested in renal and ocular changes. Proper evaluation of findings provided by urine analysis, renal function test, urine output and examination of the optic fundi, visual acuity, and visual fields may help in assessing the severity of the disease and the need for obstetric intervention. Furthermore, renal and ocular changes are important guides in the differential diagnosis of hypertensive disorders of pregnancy. Renal and ocular lesions have also been found to have important prognostic implications.

Fundoscopy of retina is a simple, non-invasive, safe and reliable procedure to interpret the vascular changes. Therefore, it may be concluded that the degree of hypertensive retinopathy in women with preeclampsia is a valid and reliable prognostic factor that gives valid prognostic information on assessment of the severity of pre eclampsia and neonatal outcome.

Maternal spot urine protein test helps detect the severity with the likely glomerular insult in the kidney and is a strong predictor of maternal and fetal complications.

Our findings suggest the degree of hypertensive retinopathy in women with preeclampsia is a valid and reliable prognostic factor that gives valid prognostic information on assessment of the severity of pre eclampsia and neonatal outcome.

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