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RESEARCH ARTICLE

CLINICAL STUDY OF RETINAL CHANGES IN PREGNANCY INDUCED HYPERTENSION

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Abstract

Background: Pregnancy induced hypertension, is the commonest form of life-threatening complications of pregnancy. Pregnancy is described as the only physiological state in which most physiological parameters are abnormal. The anatomical, physiological and biochemical adaptations that take place in a woman during the short span of human pregnancy are profound. Compared with normotensive gravidas, patients with elevated blood pressure have significantly greater maternal and foetal mortality and morbidity. The clinical and laboratory characteristics of hypertension associated with pregnancy are difficult to differentiate from those of hypertension independent of pregnancy.

Objective: The objective of this study was to study the prevalence and risk factors of ocular fundus changes among pregnant women with PIH.

Materials and Methods: A hospital- based, cross- sectional study was carried out among 130 pregnantwomen with PIH. History of symptoms related to the eyes, age, and gravida was recorded. Torchlight was used to examine the anterior segment. One percentage of tropicamide was used to dilate pupils. Direct ophthalmoscope was used to examine the fundus. Blood pressure was measured as per the standard guidelines. Urine sample was taken to look for the presence of proteins in urine.

Results: The majority belonged to 18 to 35years (50%) and the majority (54.6%) had gestational age >37 weeks. The majority (75.38%) had gestational hypertension. The prevalence of retinopathy among pregnant women with PIH was 13.7% Grade I retinopathy was most commonly seen in 7.7% of cases followed by Grade II retinopathy in 2.7% of the cases, grade 3 in 1.4% and grade 4 in 0.6%. one patient had exudative retinal detachment. Age was not found to be associated with retinopathy among pregnant women with PIH. The prevalence of retinopathy among women with preeclampsia was 31.7% and in eclampsia was 40 %, compared to only 7.07% in women with gestational hypertension and this difference was statistically significant ($P < 0.05$). The prevalence of retinopathy among women with blood pressure >150/100 mmHg was 45.4% compared to only 2.6% in women with bloodpressure<150/100 mmHg and this difference was statistically significant ($P < 0.05$). The prevalence of retinopathy

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among women with severe proteinuria (+++) was 66.6% compared to 44.5% in women with moderate proteinuria (++), 22.7% among women with mild proteinuria (+) and only 5.5% in women without proteinuria. These differences were statistically significant ($P < 0.05$)

Conclusion: The prevalence of retinopathy among pregnant women with PIH was high. High blood pressure and severe proteinuria and preeclampsia were significantly associated with retinopathy.

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Introduction:-

The management of pregnancy- induced hypertension (PIH) among pregnant women is not simple for obstetricians. PIH can lead to mortality not only among pregnant women but also during the perinatal period. It is an important cause of maternal morbidity during the gestational period. [1- 7]. PIH can be categorized as "gestational hypertension, preeclampsia, severe preeclampsia, and eclampsia." It is commonly seen after 20 weeks of gestation if no other causes are present like renal disease, already a known case of hypertension, etc., PIH is a hypertensive disorder of pregnancy. The systolic and diastolic blood pressure is >140 and 90 mmHg, respectively. The reading should be taken in the sitting position with a gap of 4 h. If the reading is more than normal in both measurements, then it is high blood pressure among pregnant women. Along with this high blood pressure, if there is the presence of generalized oedema in combination with proteinuria with >300 mg in 24 h, the diagnosis of PIH is made. When proteinuria is high or significant along with high blood pressure andoedema, it is called preeclampsia. [8,9] Pregnant women with preeclampsia but without any diseases of the cerebrum when develops convulsions, it is called eclampsia. PIH can affect the eyes of most pregnant women. [5- 7] Hence, an eye examination should be done for all pregnant women with PIH. It helps in the early diagnosis of anyeye problems due to PIH and proper management ofthe case. However, the single examination is of not muchuse. Hence, pregnant women should be asked to undergoregular eye screening at regular intervals. This helps infinding the effect of PIH on the eyes, its severity, and howthe patients are responding to the underlying treatment. [3,5- 7] There is dysfunction of the vascular endothelium amongpregnant women with PIH. There can be further leakagefrom the capillaries and vasospasm if the condition is leftuntreated. The vascular changes occurring in the retina willnot always correspond with the control of hypertension. However, these vasospastic changes are reversible. Afterdelivery, the affected vessels of the retina can come backto normalcy.[10] Hence, it is important to know the prevalence of ocularfundus changes among pregnant women with PIH aswell as to know the risk factors which are associated withthe ocular fundus changes among pregnant women withPIH. Therefore, the present study was carried out to studythe prevalence and risk factors of ocular fundus changesamong pregnant women with PIH.

Materials And Methods:-

A hospital- based cross- sectional study was carried out inobstetric ward of Govt Lal Ded Hospital Srinagar fromSeptember 2017 to July 2018. Pregnant women wererecruited for the present study who were admitted in theobstetrics ward. The institutional ethics committee approval was obtainedbefore the study. Written informed consent was taken fromall eligible pregnant women after explaining the natureof the study. Allpregnant women with ocular fundus changes were treated as per the standard guidelines. After the study, a regular follow- up examination in thedepartment of ophthalmology was done in department of ophthalmology. During the study period, 145 pregnant women with PIH.Pregnant women having confirmed diagnosis of PIH andbelonging to the age group of 22 - 41years irrespectiveof gestational age were included in the present study.Known cases of hypertension before pregnancy, historyof convulsions in the recent past, complicated cases ofpreeclampsia, and patients with associated diseases suchas diabetes, HIV, disorders of the thyroid gland, anddisorders of the haematological system were excluded fromthe present study. Known cases of kidney disease were alsoexcluded from the study. History of symptoms related to the eyes, age, and gravidastatus was recorded. Torchlight was usedto examine the anterior segment, and the findings werenoted down. One percentage of tropicamide was usedto dilate the pupils. Direct ophthalmoscope was used toexamine the fundus. On fundus examination, it was takenas a positive eye finding if there are changes suggestive ofhypertensive retinopathy. Blood pressure was measured ina sitting position using only one arm twice at an intervalof 4 h as per the standard guidelines of blood pressuremeasurements. Urine sample was taken to look for thepresence of proteins in the urine. The sample collection wasdone using the standard protocol. Urine sample was sentto the hospital laboratory and the results were collected. The dipstick method was used to assess the proteinuria. The proteinuria was taken as 1+ if the urine protein wasup to 30 mg/dl, ++ if the urine

protein was 31–100 mg/dl,3+ if it was 101–300 mg/dl, and 4+ if it was >300 mg/dlas per the instructions from the manufacturer. "PIH was graded as gestational hypertension, preeclampsia, and eclampsia." Keith–Wagener classification [12] was used tograde the retinal changes. The grading is discussed in detailas follows. In Grade I, there is generalized attenuation ofthe small branches of the arteries but it is mild in nature. In Grade II, there is attenuation of the arterioles which isfocal and there is more severity compared to Grade I. InGrade III, there are findings of Grade II plus haemorrhagesand hard exudates, and cotton wool spots are seen. InGrade IV, there are findings of the Grade III plus andthere is swelling of the optic disc. [12] Data were entered into a Microsoft Excel spreadsheet. Alldata were categorical and hence Chi- square test was applied. For the significance of differences in the proportions, P< 0.05 was taken as statistically significant. OpenEpiStatistical Software version 3.01was used for the Chi- squaretest and P value.

Results:-

The majority of pregnant women were in the age groupof 22–31 years (85.38%) [Table 1]. The majority of pregnant women (54.6%) had a gestationalage of >37 weeks [Table 2]. The majority of the patients (75.38%) had gestational hypertension. 41patients had pre-eclampsia and 5 patients had eclampsia [Table 3]. The prevalence of retinopathy among pregnant womenwith PIH was 13.7%. Grade I retinopathywas most commonly seen in 7.7% of cases followed byGrade II retinopathy in 2.7% of the cases, grade 3 in 1.4% and grade 4 in 0.6%. one patient had exudative retinal detachment. Age was not found to be associated with retinopathyamong pregnant women with PIH. The prevalenceof retinopathy among women with preeclampsia was 31.7%and in eclampsia was 40 %, compared to only 7.07% in women with gestationalhypertension and this difference was statisticallysignificant (P < 0.05). The prevalence of retinopathy amongwomen with blood pressure >150/100 mmHg was45.4% compared to only 2.6% in women with bloodpressure<150/100 mmHg and this difference wasstatistically significant (P < 0.05). The prevalence ofretinopathy among women with severe proteinuria (+++) was 66.6% compared to 44.5% in women with moderateproteinuria (++), 22.7% among women with mildproteinuria (+) and only 5.5% in women withoutproteinuria. These differences were statisticallysignificant (P < 0.05) [Table 5].

Table 1:- Age distribution in the study group.

Age	Number of cases (%)
22-26	52(35.38)
27-31	72(50)
32-36	15(10.76)
>36	6(3.84)

Table 2: - Distribution as per gestational age.

Gestational age in weeks	Number of cases (%)
27-31	5(3.07)
32-36	61(42.30)
>37	79(54.6)

Table 3:- Distribution as per the severity ofpregnancy- induced hypertension.

Severity of PIH	Number of cases (%)
Gestational hypertension	99(75.38)
Pre eclampsia	41(23.84)
Eclampsia	5(0.76)

Table 4:- Prevalence of retinopathy in the present study.

Grades of retinopathy	Number of patients (%)
No changes	125 (86.42%)
Grade 1	11(7.58)
Grade 2	4(2.75)
Grade 3	2(1.3)
Grade 4	2(1.3)
Retinal detachment	1(0.6)

Table 5:- Associationof various factors with retinopathy among pregnantwomen with pregnancy- induced hypertension.

Variables	Retinopathy			p
	Yes	No		
Age				
22-26	7(13.46)	45(86.52)	2.4465	0.294
27-31	29(40.27)	43(59.7)		
31-36	4(26.6)	11(73.33)		
>37	2(33.3)	4(66.6)		
Severity of PIH				
Gestational hypertension	7(7.07)	92(92.9)	11.58	0.001
Preeclampsia	13(31.7)	28(68.2)		
Eclampsia	2(40)	39(60)		
Blood pressure				
>150/100	15(45.45)	18(54.54)	34.68	<0.001
<150/100	3(2.6)	109(97.3)		
Proteinuria				
Nil	8(5.5)	137(94.4)	23.62	<0.001
+	5(22.7)	17(77.27)		
++	4(44.5)	5(55.5)		
+++	4(66.6)	2(33.4)		

Discussion:-

In the present study, the majority of pregnant womenwere in the age group of 23–31 years (85.38%). Theincidence of PIH as well as positive fundus findings ismore common in the age group of 22-31 years. Theprobable reason for the higher incidence in the youngerage group could be non-compensatory hypertension. The arteriolar sclerosis of retinal arterioles in elderlypatients precludes the development of fundus changesin PIH. Tadinet al. [13] observed that the mean age ofthe study participants in their study was 29.1 years. Similarly, the mean age of the participants as observedbyJaeffe and Schatz [14] was 28 years. We also observedthat the mean age of pregnant women in the presentstudy was 27 years. The prevalence of retinopathy among women with preeclampsia was 31.7% and in eclampsia was 40 %, compared to only 7.07% in women with gestational hypertension and this difference was statistically significant ($P < 0.05$). These findings are similar to previousstudies.[13- 18] The prevalence of ocular fundus changes was13.7% in a study from Nepal which was conducted among153 study participants by Karki et al.[15]We found that the prevalence of retinopathy among women withblood pressure >150/100 mmHg was 45.4% compared toonly 2.6% in women with blood pressure <150/100 mmHg,and this difference was statistically significant ($P < 0.05$).The prevalence of PIH among women with bloodpressure>150/100 mmHg was 86.2% compared to only42.8% in women with blood pressure <150/100 mmHg,and this difference was statistically significant ($P < 0.05$)as reported by Reddy et al.[11] Similar findings were alsoreported by Tadin et al. [13]). The prevalence of retinopathy among women with severe proteinuria (+++) was 66.6% compared to 44.5% in women with moderate proteinuria (++), 22.7% among women with mild proteinuria (+) and only 5.5% in women without proteinuria. ($P < 0.05$). Reddy et al. [11] also foundthat as the severity of proteinuria increased, the prevalenceof retinopathy also increased among pregnant women withPIH. Similar findings were also reported by Tadinet al. [13]

Conclusion:-

The prevalence of retinopathy among pregnant womenwith PIH was high. High blood pressure, severe proteinuria, and preeclampsia were significantly associated withretinopathy. As the severity of proteinuria increased, theprevalence of retinopathy also increased among pregnantwomen with PIH.

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Conflicts of interest:
There are no conflicts of interest.

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