Section: Ophthalmology

Original Research Article

A CLINICAL STUDY OF OCULAR CHANGES IN PREGNANT WOMEN ATTENDING TERTIARY CARE HOSPITAL, GUNTUR

Koruprolu V Manga Laxmi[1], Sampath Kumar Ambati[1], Karna Moulika[1]

[1]Assistant Professor, Department of Ophthalmology, Surabhi Institute of Medical Sciences, Siddipet, India

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Corresponding Author:
Dr. Koruprolu V Manga Laxmi,
Email: kvmlakshmi5@gmail.com

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Abstract

Background: Pregnancy induces physiological and pathological changes in ocular function, challenging observation and quantification. This study aims to understand ocular alterations in pregnant women, with a specific focus on the impact of hypertensive disorders. This study aimed to assess the incidence of ocular changes in pregnancy, examine the effects of systemic conditions such as pregnancy-induced hypertension and anemia, and investigate fundus alterations specifically in cases of pre-eclampsia and eclampsia. **Materials and Methods:** A prospective observational study was conducted at a tertiary care hospital, enrolling 107 pregnant women between October 2014 and September 2016. Clinical evaluations and follow-ups were performed at various intervals post-delivery. Data, including demographic details, ocular examinations, blood pressure, and hemoglobin levels, were collected and analyzed using SPSS version 21. **Result:** The study participants (mean age 23.24 ± 2.525 years, gestational age 37.43 ± 2.128 weeks) predominantly exhibited optimal visual acuity (90.65% at 6/6). Hypertensive retinopathy was observed in 16.82% of cases. Significant associations were found between retinal changes and elevated blood pressure (p=0.001), proteinuria (p=0.001), and the severity of pregnancy-induced hypertension (p=0.026). **Conclusion:** This tertiary care hospital study reveals a notable association between ocular changes in pregnant women and hypertensive disorders, particularly preeclampsia and eclampsia. Thorough ocular assessments, especially in hypertensive pregnancies, are crucial for timely intervention. Future population-based studies will further enhance our understanding of ocular health during pregnancy.

INTRODUCTION

Pregnancy can cause changes in the functioning of the eye in health, and in disease as it modifies other non-reproductive systems of the body. These changes are difficult to observe and quantify for a number of reasons. Changes in metabolism, hormonal profile & blood circulation that normally occur during pregnancy can affect the functioning of mother's eyes. Visual changes in pregnancy are commonly transient in nature but occasionally can be permanent.[1]

Approaches to separating effects of pregnancy from the course of the disease itself might include, estimating the expected number of pregnant women with the disease based on disease prevalence for women in that age group, and comparing this with the actual number and percentage of pregnant women with the disease. Secondly comparing the natural course of a disease in pregnant and non-pregnant women. These approaches require a good deal of epidemiological and natural history information, much of which is not available. Yet this information is important both for managing ocular disorders in pregnant women and gaining insight into the pathophysiology of disease.[2]

The effects of pregnancy on the eye fall into three categories, Non pathological or physiological changes like changes in intraocular pressures, corneal sensitivity and thickness, and visual function can occur, Pathological conditions reported to develop during pregnancy include central serous chorioretinopathy, hypertensive and vascular disorders and uveal melanoma and pregnancy also can affect pre-existing ocular conditions such as diabetic retinopathy, tumors, and uveitis and can have beneficial effects on such pre-existing conditions as glaucoma. Hence the effects of pregnancy on eyes are studied in this study.[3,4]

The primary objective of the study was to evaluate the incidence of various ocular changes related to pregnancy. Present study was also aim to analyze

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the effects of systemic conditions like pregnancy induced hypertension and anemia and investigate the fundus changes in pre-eclampsia & eclampsia.

MATERIALS AND METHODS

Study Design: This prospective observational study was conducted between October 2014 and September 2016 at the Department of Ophthalmology, Government General Hospital, Guntur. Pregnant women referred from the Department of Obstetrics were enrolled after obtaining written consent. Clinical evaluations were performed at presentation, and follow-up assessments occurred at 1 week, 6 weeks, 3 months, 6 months, and 1 year post-delivery. A sample size of 107 pregnant women was included.

Inclusion and Exclusion Criteria:

All pregnant women aged 20-29 years with lack of history of medications during pregnancy except for administered supplements were enrolled in this study. Women with age less than 20 years or more than 30 years and women with acute illness, chronic diseases, and metabolic disorders were excluded from the study.

Assessment of ocular changes: Comprehensive data collection was meticulously undertaken throughout the study to capture a detailed understanding of ocular health in pregnant women. Each participant's ocular history was thoroughly documented, providing insights into pre-existing conditions and potential contributing factors. Visual acuity was systematically assessed using Snellen's chart, offering quantitative measures of vision. Color vision was scrutinized through the administration of Ishihara charts, ensuring a comprehensive evaluation of the participants' visual capabilities. Ocular movements were meticulously examined in all nine gazes, providing valuable information about the integrity of extraocular muscles. The anterior segment was carefully scrutinized using a slit lamp, allowing for a detailed assessment of structures such as the cornea, iris, and lens. Intraocular pressure, a critical parameter, was measured using the Goldmann Applanation tonometer. Dilated fundus examination, conducted with a direct ophthalmoscope and +90 Diopter slit-lamp biomicroscopy, offered a thorough examination of the posterior segment. Fundus photography, utilizing the Zeiss Fundus camera, was selectively employed in patients exhibiting ocular manifestations, ensuring a visual record for further analysis. Additionally, participants' blood pressure was diligently recorded with a sphygmomanometer at each visit, providing a comprehensive overview of systemic health.

Statistical analysis: All relevant data and examination findings were meticulously recorded in separate data collection forms at each visit, ensuring a robust dataset for subsequent analysis and interpretation. Data was entered in excel and analysed using SPSS version 21. Descriptive statistics was expressed in frequency/percentages for categorical variable and mean/SD for continuous variable. Association between the variables were analysed using Chi square test and p value less than 0.05 was considered significant.

Ethical Considerations: This prospective observational study adhered to rigorous ethical standards to safeguard the well-being and rights of the participating pregnant women. Ethical approval was obtained from the Ethical Committee at Guntur Medical College, Government General Hospital, Guntur, underscoring the commitment to ethical conduct. Informed consent was obtained from each participant, ensuring comprehension of the study objectives, procedures, potential risks, and the voluntary nature of participation. Confidentiality measures were implemented, with participant data stored securely and accessible only to authorized personnel. The principle of respect for autonomy was upheld, allowing participants the freedom to refuse specific examinations or procedures without compromising the overall quality of care received. Beneficence and non-maleficence were central to the study, emphasizing the promotion of well-being and minimizing harm throughout the research process. The ethical considerations observed in this study underscore a commitment to the ethical principles of transparency, respect for autonomy, confidentiality, and the overall welfare of the participants.

RESULTS

The mean age and gestational age of the study participants were 23.24 ±2.525 years and 37.43 ± 2.128 weeks. The majority of the patients are in the age group of 21 to 25 years (74.8%). [Figure 1]

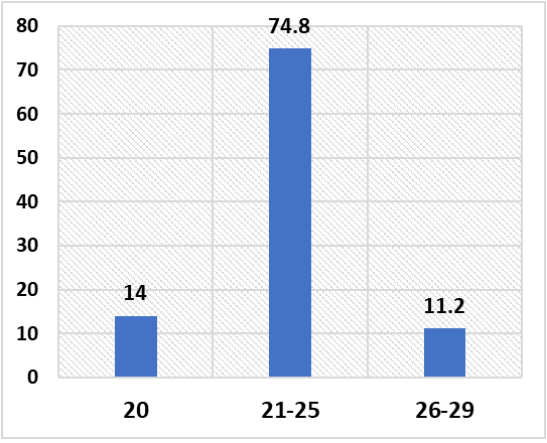

Figure 1: Age distribution of the study participants

Out of the total 107 cases, 53 (49.53%) were primigravida, and 54 (50.46%) were multigravida. The distribution of pregnant women based on hemoglobin (Hb) levels reveals a diverse representation across various categories. Among the

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107 cases studied, 16.8% of participants exhibited Hb levels greater than 10 gm%, while 19.6% fell within the range of 10-9 gm%. The most prevalent category was Hb 9-7 gm%, encompassing 45.8% of the cases. A notable proportion, 17.8%, displayed Hb levels below 7 gm%.

A remarkable 90.65% of participants exhibited optimal visual acuity at 6/6 for both eyes. A smaller proportion, constituting 8.41%, fell within the range of 6/9 to 6/60, indicating a varying degree of visual impairment. Notably, a minimal percentage of 0.9% exhibited visual acuity below 6/60 for both eyes.

Hypertensive retinopathy was the predominant ocular manifestation (16.82%), roth spots 1.9%, cranial neuropathies0.9%, serous retinal detachment 0.9%, central serious chorioretinopathy 0.9% and conjunctival haemorrhage 0.9% were noted [Table 1].

Retinal vascular changes were the predominant manifestations in pregnancy induced hypertension. Optic nerve and other changes occurred less frequently [Table 2]. Majority women present with systolic blood pressure between 140-159 mm of Hg (37.4%). showing distribution of range of diastolic blood pressure in pregnant women where majority of patients (46.7%) are having DBP in between 90-99mm of Hg [Table 3]. A significant association between blood pressure and retinopathy changes was observed [Table 4]. Incidence of retinopathy in preeclampsia were 14 (18.91%), in eclampsia were 4(66.66%) noted in total 80 cases of pregnancy induced hypertension (Table 5). In this study it was found that roth spots were present in 10.5% of the women with Hemoglobin < 7 gm% [Table 6].

Significant retinopathy changes in 16.82 %, mostly they are in grade I hypertensive retinopathy. Probably due to early initiation of therapy. [Figure 2]

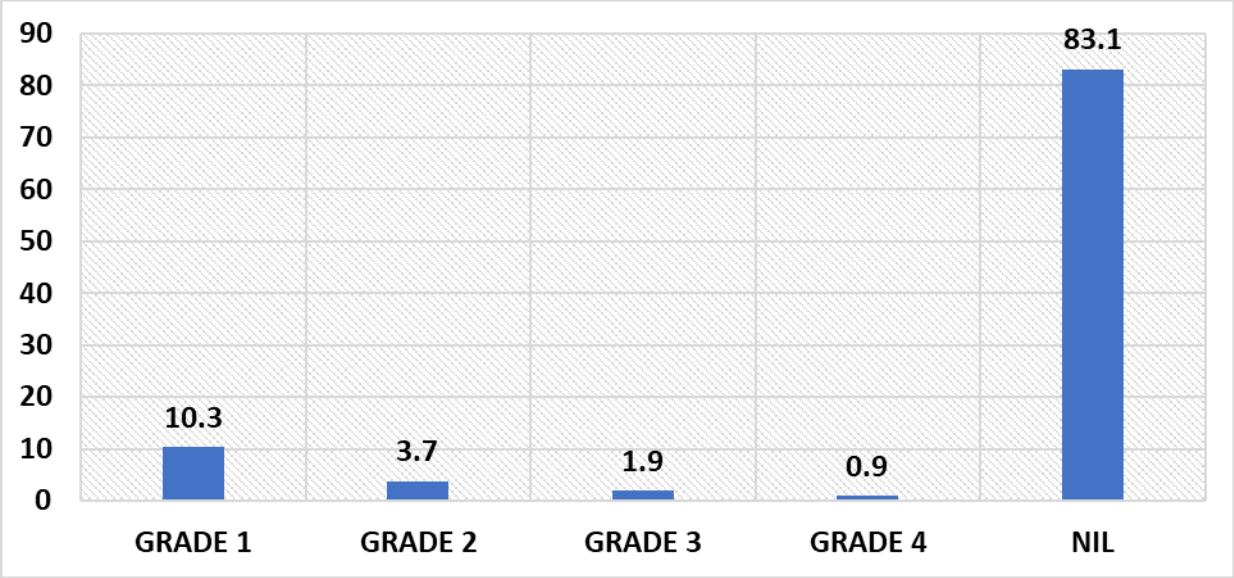

Figure 2: Grades of Hypertensive retinopathy

Table 1: Various ocular manifestation

Ophthalmic manifestation	No of cases	Percentage (%)
Hypertensive retinopathy	18	16.82
Roth spots	2	1.9
Conjunctival haemorrhages	1	0.9
CSCR	1	0.9
SRD	1	0.9
Neuropathy	1	0.9
Nil	83	77.6
Total	107	100

Table 2: Various fundus changes

Fundus changes	No of cases	Percentage (%)
Vascular changes	17	15.9
Vascular +optic disc changes	1	0.93
Others (CSCR, SRD, ROTH SPOTS)	4	3.73
Nil	85	79.43
Total	107	100.0

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Table 3: Blood pressure in study participants

Blood pressure	Range	No of cases	Percentage (%)
Systolic Blood pressure (mmHg)	<120	27	25.2
	120-139	26	24.3
	140-159	40	37.4
	>160	14	13.1
Diastolic Blood pressure (mmHg)	<80	27	25.2
	80-89	6	5.6
	90-99	50	46.7
	>100	24	22.4

Table 4: Relationship between Blood Pressure Levels and Retinopathy (Keith - Wagner & Barker Classification)

Blood pressure	Range	Retinopathy changes						P value
		G1	G2	G3	G4	Nil	Total	
Systolic Blood pressure (mmHg)	<120	1	0	0	0	26	27	<0.001
	120-139	0	0	0	0	27	26	
	140-159	7	3	0	0	30	40	
	>160	3	1	2	1	6	14	
Diastolic Blood pressure (mmHg)	<80	1	0	0	0	26	27	<0.001
	80-89	0	0	0	0	6	6	
	90-99	3	1	0	0	46	50	
	>100	7	3	2	1	11	24	

Table 5: Incidence of retinopathy in pregnancy induced hypertension

Pregnancy Induced Hypertension	Retinopathy changes						P value
	G1	G2	G3	G4	Nil	Total	
Pre-eclampsia	10	3	1	0	60	74	0.026
Eclampsia	1	1	1	1	2	6	

Table 6: Association between hemoglobin in gm% and Roth spots

Hb in gm%	Roth spots present	Nil	Total	P value
>10	0	18	18	0.024
9 – 10	0	21	21	
9 – 7	0	49	49	
< 7	2	17	19	
Total (%)	2 (1.9%)	105 (98.1%)	107	

Most of the pregnant women maintained good visual acuity in spite of retinal vascular changes due to hypertension. Only women who had grade IV hypertensive retinopathy presented with vision <6/60. The analysis of our study revealed a notable positive association between retinal changes and several parameters. Specifically, there was a statistically significant positive correlation between the presence of retinal changes and elevated blood pressure (p=0.001), proteinuria (p=0.001), and the severity of pregnancy-induced hypertension (PIH) (p=0.026). Conversely, our findings indicated that age (p=0.69) and gravidity (p=0.76) did not demonstrate a significant association with the occurrence of retinopathy in the studied population. These results underscore the importance of monitoring blood pressure, proteinuria, and the severity of PIH in relation to retinal changes during pregnancy, while also suggesting that age and gravidity may not be significant contributors to the observed retinal alterations in our study cohort.

DISCUSSION

In this study, we aimed to ascertain the incidence of various ocular manifestations in pregnancy, examining a cohort of 107 pregnant women. A notable proportion of our participants sought medical attention during the late third trimester, presenting with complications associated with hypertensive disorders in pregnancy. Our findings indicated that approximately 22.42% of the patients exhibited significant ocular changes. The majority of cases, comprising 74.76%, were linked to hypertensive disorders, including preeclampsia and eclampsia. Among these, hypertensive retinopathy changes were observed in 22.50%, with grade I hypertensive retinopathy being the most prevalent at 13.37%. Additional ocular manifestations included roth spots, third nerve palsy, central serous chorioretinopathy, serous retinal detachment, and conjunctival hemorrhage.

Furthermore, we investigated the correlation between the grade of hypertensive retinopathy and the severity of preeclampsia, finding a statistically significant association. Our results also demonstrated a significant correlation between systolic and diastolic blood pressure, proteinuria, and retinopathy. Conversely, age and gestational age exhibited weaker correlations with hypertensive retinopathy. When comparing our findings with previous studies, our study correlated with Rasdi et al,[5] but differed from Reddy et al,[6] and Tadin et al,[7] potentially attributed to early treatment and regular antenatal check-ups.

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Analyzing hypertensive retinopathy changes specifically in pregnancy-induced hypertension, our study correlated with Rasdi et al,[5] showing a 22.5% incidence. We further compared our results with Reddy et al,[6] finding differences in the incidence of hypertensive retinopathy changes in preeclampsia and eclampsia. The present study correlated with the severity of eclampsia when compared to Reddy et al,[6]

Examining Grade, I hypertensive retinopathy changes in pregnancy-induced hypertension, our study correlated with Reddy et al,[6] highlighting a higher incidence of Grade I changes. Finally, our study supported existing data on fundoscopy signs of hypertensive disorders in pregnancy, showcasing various retinal findings.

Regarding anemia, our study identified varying degrees, with 19.6% exhibiting mild, 45.85% moderate, and 17.8% severe anemia. The occurrence of anemia may be attributed to factors such as acute blood loss during delivery and chronic blood loss from inflammation and infections. However, retinal changes were rarely observed in cases of iron-deficiency anemia or anemia due to blood loss.

Despite the valuable insights gained from our study, it is essential to acknowledge its limitations, including a significant patient dropout of nearly 25% and the inherent constraints of a hospital-based study. Future research efforts should consider population-based studies for a more comprehensive understanding of this clinical entity.

CONCLUSION

In summary, our study at a tertiary care hospital in Guntur revealed a predominant association of ocular changes in pregnant women with hypertensive disorders, notably preeclampsia and eclampsia. Hypertensive retinopathy was the primary manifestation, demonstrating a significant positive correlation with elevated blood pressure, proteinuria, and the severity of pregnancy-induced hypertension. Age and gravidity did not show a notable association with retinopathy. The findings underscore the importance of thorough ocular assessments, particularly in hypertensive pregnancies, for timely intervention. Additional population-based studies are essential for a comprehensive understanding of ocular health during pregnancy.

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