Section: Ophthalmology

Original Research Article

STUDY OF OCULAR FUNDUS CHANGES IN OBSTETRIC CASES WITH UNDERLYING SYSTEMIC DISEASE

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Abstract

Background: Ocular changes during pregnancy are common and often result from benign physiological responses to hormonal and metabolic shifts. However, underlying systemic diseases can exacerbate or cause ocular conditions, necessitating careful monitoring. This study aimed to investigate ocular fundus changes in obstetric patients with systemic diseases, focusing on preeclampsia, gestational diabetes mellitus (GDM), anaemia, and cerebral venous thrombosis (CVT). **Materials and Methods:** The study population comprised 120 obstetric patients with underlying systemic diseases who were admitted to a tertiary care hospital. We employed an observational cross-sectional study design to assess the ocular fundus changes in these patients. Over three months, we systematically collected data from 120 obstetric patients admitted with systemic diseases to this tertiary care facility. **Results:** Most patients with preeclampsia (89.4%) exhibited normal fundus findings, with no cases of grade 1 or grade 2 retinopathy. Only one patient (1.7%) had grade 3 retinopathy, while 3.5% presented with central serous chorioretinopathy. Additionally, one case (1.7%) showed a hyperaemic disc and two cases had bilateral disc oedema. Among the cohort, 40 patients had GDM, with two exhibiting mild non-proliferative diabetic retinopathies. Overall, preeclampsia was the most prevalent condition (47.5%), followed by GDM (33.3%), CVT (10%), anaemia (5%), and PRES (4.1%). **Conclusion:** This study underscores the importance of routine ocular fundus examination for predicting and managing potential adverse outcomes in pregnant women with systemic diseases.

INTRODUCTION

Ocular changes are common during pregnancy, with most being benign physiological responses to metabolic, hormonal, and immunological modifications that support gestation. However, pregnancy can also induce thromboembolic events due to a hypercoagulable state characterised by increased thrombin levels, decreased endogenous anticoagulants, and venous stasis caused by progesterone's effects on blood vessel walls.[1-4] Pregnancy-induced hypertension (PIH), which affects 5-10% of pregnancies worldwide, is a significant cause of retinopathy. Preeclampsia and eclampsia, common complications of PIH, are often associated with Posterior Reversible Encephalopathy Syndrome (PRES).[5-7] Hypertensive retinopathy, often linked to PIH, can indicate the severity of preeclampsia or eclampsia, which poses serious risks to both the mother and foetus. The most accepted theory for the pathophysiology of PRES is vasogenic oedema. Additionally, pregnancy is a notable risk factor for cerebral venous thrombosis (CVT), with a prevalence of 1.2 per 100,000 deliveries.[8,9]

Gestational diabetes mellitus (GDM) can lead to the development or worsening of diabetic retinopathy (DR) during pregnancy. Anaemia, a frequently occurring clinical disorder during pregnancy, often results from iron deficiency. The risk of retinopathy increases with the severity of anaemia, particularly when haemoglobin (Hb) levels fall below 6 g/dL.[1,10] Given these potential complications, it is crucial to understand the physiological changes

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induced by pregnancy that can significantly impact the ocular system. These changes often signal underlying systemic conditions that may exacerbate during pregnancy. Regular ophthalmoscopic examinations are essential for early detection of retinal vascular changes. Such examinations can identify conditions such as hypertensive retinopathy, DR, anaemic retinopathy, and other pregnancy-related ocular issues.

In this study, we examined ocular fundus changes in pregnant women with underlying systemic diseases and their pathophysiology. This study underscores the importance of regular ophthalmologic evaluations in pregnant women to detect and manage potential ocular complications early, ensuring better outcomes for both the mother and baby.

Aim

This study aimed to investigate ocular fundus changes in obstetric patients with systemic diseases, focusing on preeclampsia, gestational diabetes mellitus (GDM), anaemia, and cerebral venous thrombosis (CVT).

MATERIALS AND METHODS

This observational cross-sectional study was conducted on 120 pregnant women at a tertiary care facility over three months. This study was approved by the Institutional Ethics Committee before initiation, and informed consent was obtained from all patients.

Inclusion Criteria

All obstetric patients with underlying comorbidities were included in the study.

Exclusion Criteria

Patients with a history of ocular trauma, surgery, laser treatment, hazy ocular media, and obstetric cases with no comorbidities were excluded from the study.

Methods

Over three months, we systematically collected data from obstetric patients admitted with systemic diseases to this tertiary care facility.

The sample size for this study was 120, providing a substantial cohort for evaluating the prevalence and nature of ocular fundus changes associated with systemic conditions in pregnant women.

Statistical Analysis

Categorical data are summarised as frequencies and percentages. Pie charts were used to represent the data on comorbidities among pregnant women. The collected data were organised and tabulated in an Excel sheet for analysis.

RESULTS

Among preeclampsia cases, most patients (89.4%) exhibited normal fundus findings. No cases of grade 1 or 2 retinopathy were observed. One patient (1.7%) presented with grade 3 retinopathy, characterised by exudative macular detachment. No cases of grade 4 retinopathy were observed. Additionally, two patients (3.5%) displayed central serous chorioretinopathy, a condition marked by the accumulation of fluid under the retina. Another notable finding was a hyperaemic disc observed in one patient (1.7%). Lastly, disc oedema and swelling of the optic disc were identified bilaterally in two cases. [Table 1]

Diabetic retinopathy in pregnancy: Among 120 obstetric females, 40 had GDM, of which 2 were found to have mild NPDR. [Figure 1]

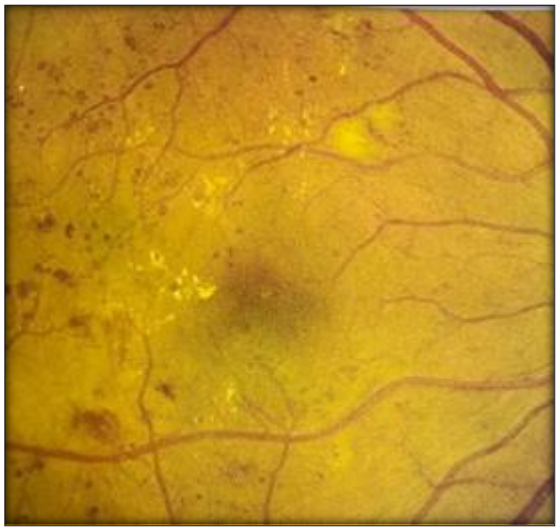

Figure 1: Diabetic retinopathy in pregnancy

Anaemic retinopathy in pregnancy: Of the 6 patients diagnosed with anaemia complicating pregnancy, 1 had anaemic retinopathy observed on fundus examination. [Figure 2]

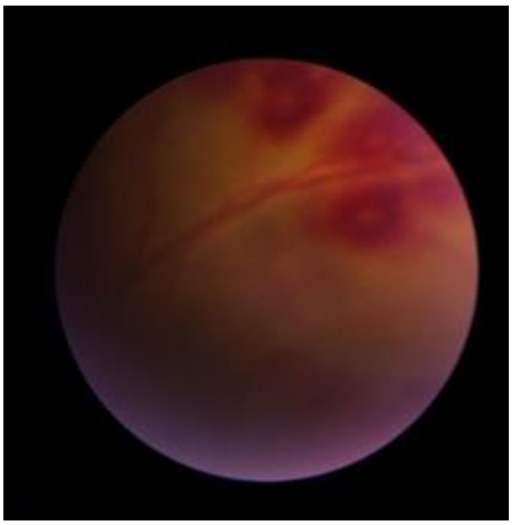

Figure 2: Anaemic retinopathy in pregnancy

Cerebral venous sinus thrombosis (CVT) and pregnancy: Of 120 obstetric cases, 12 had CVT. Seven patients had early papilledema. [Figure 3]

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Figure 3: Cerebral venous sinus thrombosis in pregnancy

Posterior reversible encephalopathy syndrome (PRES): Of 120 obstetric cases, five patients diagnosed with PRES with seizure disorder had normal fundus examination. [Figure 4]

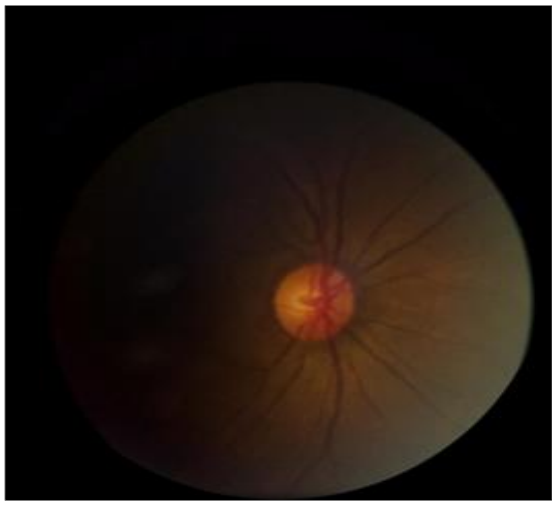

Figure 4: Posterior reversible encephalopathy syndrome in pregnancy

Prevalence of systemic diseases in the obstetric population: The prevalence of systemic diseases in the studied obstetric population was notable. Among the 120 obstetric cases, preeclampsia was the most common condition (47.5%), followed by GDM (33.3%), CVT (10%), anaemia (5%), and PRES (4.1%). [Figure 5]

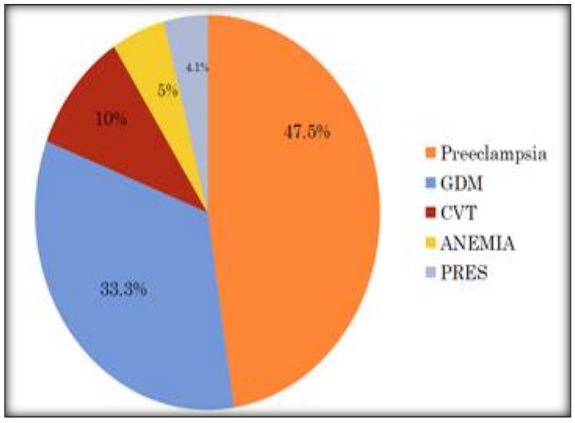

Figure 5: Prevalence of systemic disease in obstetric population

Obstetric cases with fundus abnormalities: Prevalence of various systemic diseases in the studied obstetric population. CVT was the most prevalent condition, affecting 58% of the studied patients. Anaemia was observed in 16.60% of the cases, preeclampsia was present in 10.52% of the cases, and GDM affected 7.50% of the population. [Figure 6]

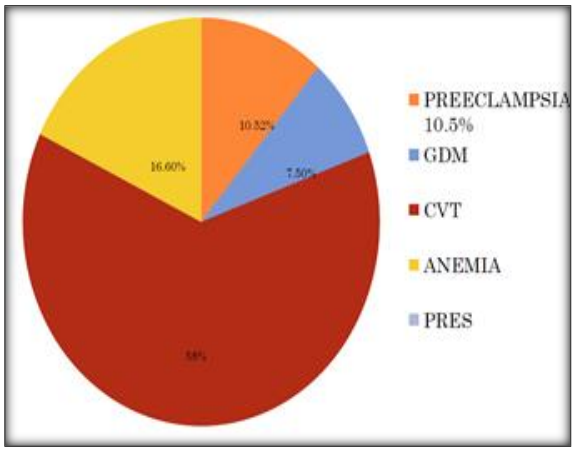

Figure 6: Obstetric cases with fundus abnormalities

Table 1: Ocular Fundus Changes in Preeclampsia Cases

Fundus changes in preeclampsia	Frequency (%)
Normal	51 (89.40%)
Grade 1	None
Grade 2	None
Grade 3 with exudative macular detachment	1 (1.70%)
Grade 4	None
Central serous chorioretinopathy	2 (3.50%)
Hyperaemic disc	1 (1.70%)
Disc oedema (b/l)	2 (3.50%)

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DISCUSSION

Pathological changes during pregnancy include systemic diseases with ocular complications and an increased frequency of certain ocular diseases.[1,11] The findings of this study provide valuable insights into ophthalmologic manifestations among pregnant women with systemic conditions, particularly focusing on those with preeclampsia. Notably, the majority of preeclampsia cases (89.4%) exhibited normal fundus findings, suggesting that although preeclampsia is prevalent in pregnancy, it does not frequently manifest with significant retinopathy detectable via fundus examination. The absence of grade 1 or grade 2 retinopathy in these patients further underscores this observation. However, the presence of one case (1.7%) of grade 3 retinopathy, characterised by exudative macular detachment, indicates that severe retinal changes, though rare, can occur and warrant vigilance.

In a study by Atakapuram, fundus changes were observed in 31 of 150 patients. Retinal changes were seen in 20.66% of patients: 13.53% had Grade 1 hypertensive retinopathy, 5.33% had Grade 2, 0.66% had Grade 3, and 1.33% had Grade 4.5 Nandha et al. reported that fundus findings were observed in 23% of cases with pregnancy-induced hypertension: 13% had Grade I changes, 5% had Grade II changes, 3% had Grade III changes, and 2% had Grade IV changes, with bilateral serous retinal detachment.[12]

A study conducted by Uma et al. observed ocular changes in 57% of the patients with PIH. Hypertensive retinopathy was noted in 23.53% of the patients, with grade 1 hypertensive retinopathy being the most common manifestation (51.16%). Additionally, visual loss was significantly more prevalent, affecting 72% of patients with eclampsia and 12% of those with preeclampsia.[6]

Another significant finding of this study was the incidence of central serous chorioretinopathy, observed in 3.5% of the cases. This condition, characterised by fluid accumulation under the retina, can lead to visual disturbances that affect quality of life and daily activities, particularly during pregnancy. Additionally, among the cohort, 40 patients had GDM, with two showing mild NPDR. The relatively low prevalence of NPDR in GDM patients may be attributed to the shorter duration of diabetes during pregnancy compared to preexisting diabetes, which typically carries a higher risk of retinal complications.

Furthermore, we observed that preeclampsia was the most prevalent condition, affecting 47.5% of cases, followed by GDM (33.3%). In a study conducted by Jayashree et al., it was observed that 13 patients (8.7%) had gestational hypertension, 34 (22.6%) had mild preeclampsia, 71 (47.3%) had severe preeclampsia, and 32 (21.3%) had eclampsia. (2) As a constrictive vasculopathy, preeclampsia is a major cause of maternal and neonatal morbidity and mortality. It has been estimated that the visual system is affected in 30–100% of pregnant women with an established diagnosis of preeclampsia. Preeclampsia occurs in about 5% of pregnant women, and ocular complications have been reported in one-third of these patients.[1,13]

Laxmi et al. observed hypertensive retinopathy in 16.82% of cases. They found significant associations between retinal changes and elevated blood pressure (p=0.001), proteinuria (p=0.001), and the severity of pregnancy-induced hypertension (p=0.026).[14]

This study emphasises the importance of routine ophthalmoscopic examination for detecting and preventing complications. Early detection through these examinations enables timely intervention, reducing severe outcomes for both the mother and baby. Integrating regular ocular fundus examinations into prenatal care can significantly improve maternal and foetal health by early identification and management of vision-threatening conditions.

CONCLUSION

In conclusion, it is crucial for pregnant women with underlying systemic conditions to be referred to ophthalmologists for monitoring throughout pregnancy to prevent any deterioration in their ocular health. This study identified hypertensive retinopathy as the most common vision-threatening retinal vascular disorder during pregnancy, followed by non-proliferative DR, pregnancy-associated venous occlusive disorders of the retina, and central serous chorioretinopathy. Routine ocular fundus examination should be considered a valuable and necessary investigative procedure during pregnancy. Healthcare providers can effectively address concerns and reduce the risk of adverse outcomes by adopting a methodical approach to manage obstetric cases with underlying systemic diseases.

Limitations

Our study was conducted with a sample of 120 females who were primarily in their third trimester and referred to a tertiary care facility from a primary healthcare hospital. This specific population may not represent the broader demographics of pregnant women, potentially limiting the generalisability of our findings. Additionally, the study did not document the course of disease progression from the first trimester, which could provide valuable insights into patients' health trajectories. No follow-up was conducted with these patients after admission, which restricts their ability to assess long-term outcomes or the effectiveness of interventions administered during their hospital stay. Collectively, these factors highlight the need for further research to build on these findings.

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