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Original article

Intraocular Pressure Between Normotensive and Preeclamptic Women in Peripartum period: A case control study from Karnataka

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Abstract

Introduction: Pregnancy involves a number of endocrine interactions. In our study to observe the possibility of physiological changes of IOP which could be a predisposing factor or development, early detection, changes in IOP during pregnancy and also in management of glaucoma during pregnancy. **Objective:** To determine the intraocular pressure between normotensive and preeclampsia women in peripartum period. **Methodology:** The present case control study was carried out at NMCH Raichur involving total 40 pregnant women (20 normotensive s and 20 preeclamptic) in peripartum period. **Results:** Mean prepartum IOP in right eye of the normotensive and preeclamptic patients was 15.38±1.02 and 18.44±1.42 ($p<0.05$). Mean prepartum IOP in left eye of the normotensive and preeclamptic patients was 15.82±1.04 and 19.42±1.88 ($p<0.05$). Mean postpartum IOP in right eye of the normotensive and preeclamptic patients was 15.48±1.04 and 20.52±1.92 ($p<0.05$). Mean postpartum IOP in right eye of the normotensive and preeclamptic patients was 16.02±1.14 and 20.34±1.78 ($p<0.05$). **Conclusion:** Compared with normotensive women, preeclamptic women have significantly increased intraocular pressure in the peripartum period.

Key words: Intraocular Pressure, Normotensive, Preeclamptic Women, Peripartum period

Introduction

Pregnancy implies progressive anatomical and physiological changes that are not only confined to the reproductive organs, but also to all the systems of the body. The tendency of fluid retention affects refraction. As a result, the current spectacles (or) contact lenses may temporarily be either too weak or too strong, depending upon the specific refractive error. Very few reports are available, which indicate the effect of pregnancy on the IOP changes.[1] As compared to normo-tensive women, preeclampsia women have increased IOP in the peripartum period. Ocular and systemic parasympathetic involvement appears earlier than the sympathetic involvement in diabetic patients.[2]

Preeclampsia is a multisystemic disorder of pregnancy characterised by abnormal vascular response to placentation with increased systemic vascular resistance, a hypercoagulable

state and endothelial dysfunction.[3,4] Preeclampsia is defined as elevated blood pressure >140/90 mm Hg taken on two consecutive occasions at least 6 hours apart and the presence of proteinuria after a gestational age of 20 weeks in a previously normotensive and non-proteinuric woman that resolves 6 weeks postpartum. [3,4] Preeclampsia before 32 weeks is said to be early-onset and is associated with increased morbidity. [3,4] The prevalence of preeclampsia is about 5% to 10% of all pregnancies, especially frequent in primigravid women.[4,5] Risk factors for preeclampsia include primi gravidity, family history of preeclampsia, chronic renal disease, chronic hypertension, preceding history of preeclampsia, high body mass index or obesity, antiphospholipid syndrome, diabetes mellitus, extremes of age (<18 or >40), black race, twin gestation and presence of angiotensinogen gene. However, the exact cause of preeclampsia is unknown.[3,4]

Preeclampsia can present with complications in the eye in 30% to 100% of patients.[6] Specifically, visual disturbance develops in 25% of women with severe preeclampsia, but blindness is rare and occurs at an incidence of 1% to 3% in eclampsia. Visual symptoms in preeclampsia and eclampsia include: photopsia, visual field defects, sudden inability to focus, blurred or decreased vision and, in severe cases, complete blindness.[7,8,9] Hence we planned to determine the intraocular pressure between normotensive and preeclampsia women in peripartum period

Objective: To determine the intraocular pressure between normotensive and preeclampsia women in peripartum period.

Materials and Methods

Study setting: Department of ophthalmology at Navodaya Medical College Hospital & Research Center Raichur

Study population: Normotensive and preeclamptic women in peripartal period

Study period: October 2023 to March 2024

Study design: Case control study

Sample size: In total of 40 patients 20 preeclamptic and 20 normotensives

Sampling technique: Simple Random sampling method

Inclusion criteria:

1. Cases: These are the patients diagnosed with preeclampsia (Blood pressure >140/90 mm of Hg on two separate readings > 6 hours apart and >1 + proteinuria
2. Controls: These are the normotensive patients in peripartum
3. Willing to participate in the study with due consent

Exclusion criteria:

1. Glaucoma
2. Contact lens use
3. Corneal disease
4. Conjunctivitis

5. Diabetes mellitus
6. Recent use of steroids and any known renal disease
7. Vasculitis or endocrinopathy

Methods of data collection:

All subjects fulfilling the eligibility criteria were included in the study. Informed consent was taken. Details of the cases were recorded in the prescribed format. History taking and clinical examination was carried out. CT examination was done.

A full ophthalmoscopic examination was performed to exclude any anterior and posterior segment illness. The IOPs were evaluated with the same Goldmann tonometer (Optilasa, S.L., Madrid, Spain). The device was calibrated prior to the study. One drop of 0.5% proparacain was instilled into each eye of the subjects and both inferior conjunctival sacs were touched with a dry fluorescein strip (Biotech, Gujarat, India) to measure the IOP of the eyes; as soon as a value was established it was recorded. The right eye was always measured first. All measurements were performed in the morning between 08:00 AM and 10:00 AM to avoid the diurnal variation of IOP.

Data collection tool and Statistical analysis:

Data was collected by using a structure proforma. Data entered in MS excel sheet and analysed by using SPSS 24.0 version IBM USA. Qualitative data was expressed in terms of proportions. Quantitative data was expressed in terms of Mean and Standard deviation. Association between two qualitative variables was seen by using Chi square/ Fischer's exact test. Comparison of mean and SD between two groups was done by using unpaired t test to assess whether the mean difference between groups is significant or not. Descriptive statistics of each variable was presented in terms of Mean, standard deviation, standard error of mean. A p value of <0.05 was considered as statistically significant whereas a p value <0.001 was considered as highly significant.

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Results

Table 1: Distribution according to demographic and vital variables

	Normotensive	Preeclamptic	p
Mean age	30.42±2.56	31.26±3.06	0.09
Gestational age (weeks)	31.36±4.25	32.40±2.24	0.085
SBP	132.22±8.76	158.22±16.8	0.036
DBP	84.56±8.92	96.3±12.2	0.042

Mean age of the normotensive and preeclamptic patients was 30.42±2.56 and 31.26±3.06 years respectively with no statistically significant difference between two groups ($p>0.05$). Mean gestational age of the normotensive and preeclamptic patients was 31.36±4.25 and 32.40±2.24 weeks respectively with no statistically significant difference between two groups ($p>0.05$). Mean SBP of the normotensive and preeclamptic patients was 158.22±16.8 and 132.22±8.76 mmHg respectively with statistically significant difference between two groups ($p<0.05$). Mean age of the normotensive and preeclamptic patients was 96.3±12.2 and 84.56±8.92 years respectively with statistically significant difference between two groups ($p<0.05$).

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Table 2: Comparison of IOP between cases and controls at prepartum period

Prepartum IOP	Normotensive	Preeclamptic	p
Right eye	15.38±1.02	18.44±1.42	0.001
Left eye	15.82±1.04	19.42±1.88	0.001

Mean prepartum IOP in right eye of the normotensive and preeclamptic patients was 15.38±1.02 and 18.44±1.42 with statistically significant difference between two groups ($p<0.05$) showing the raised IOP in preeclamptic women in our study. Mean prepartum IOP in left eye of the normotensive and preeclamptic patients was 15.82±1.04 and 19.42±1.88 with statistically significant difference between two groups ($p<0.05$) showing the raised IOP in preeclamptic women in our study.

Table 3: Comparison of IOP between cases and controls at postpartum period

Postpartum IOP	Normotensive	Preeclamptic	p
Right eye	15.48±1.04	20.52±1.92	0.001
Left eye	16.02±1.14	20.34±1.78	0.001

Mean postpartum IOP in right eye of the normotensive and preeclamptic patients was 15.48±1.04 and 20.52±1.92 with statistically significant difference between two groups ($p<0.05$) showing the raised IOP in preeclamptic women in our study. Mean postpartum IOP in right eye of the normotensive and preeclamptic patients was 16.02±1.14 and 20.34±1.78 with statistically significant difference between two groups ($p<0.05$) showing the raised IOP in preeclamptic women in our study.

Discussion

In our study, mean prepartum IOP in right eye of the normotensive and preeclamptic patients was 15.38±1.02 and 18.44±1.42 with statistically significant difference between two groups ($p<0.05$) showing the raised IOP in preeclamptic women in our study. Mean prepartum IOP in left eye of the normotensive and preeclamptic patients was 15.82±1.04 and 19.42±1.88 with statistically significant difference between two groups ($p<0.05$) showing the raised IOP in preeclamptic women in our study. **(Table 2)**

Onwudiegwu C et al[10] in their study reported that mean prepartum IOP in right eye of the normotensive and preeclamptic patients was 12.7±3.1 and 14.7±4.4 with statistically significant difference between two groups ($p<0.05$) showing the raised IOP in preeclamptic women in their study. Mean prepartum IOP in left eye of the normotensive and preeclamptic patients was 12.7±3.1 and 14.6±3.9 with statistically significant difference between two groups ($p<0.05$) showing the raised IOP in preeclamptic women in our study.

In our study, mean postpartum IOP in right eye of the normotensive and preeclamptic patients was 15.48±1.04 and 20.52±1.92 with statistically significant difference between two groups ($p<0.05$) showing the raised IOP in preeclamptic women in our study. Mean postpartum IOP in right eye of the normotensive and preeclamptic patients was 16.02±1.14 and 20.34±1.78 with statistically significant difference between two groups ($p<0.05$) showing the raised IOP in preeclamptic women in our study. **(Table 3)**

Onwudiegwu C et al[10] in their study reported that mean postpartum IOP in right eye of the normotensive and preeclamptic patients was 12.7±2.5 and 14.2±2.8 with statistically significant difference between two groups ($p<0.05$) showing the raised IOP in postpartum women in their study. Mean postpartum IOP in left eye of the normotensive and

preeclamptic patients was 12.8±2.5 and 14.0±3.0 with statistically significant difference between two groups ($p<0.05$) showing the raised IOP in preeclamptic women in our study.

Several other studies have evaluated the role of the ocular parameters in the early prediction of maternal and fetal outcomes in preeclampsia. [11,12,13] This study found that intraocular pressure was significantly higher among preeclampsia cases, as reported by previous authors.[14] The ocular parameters in this study were generally similar between the right and left eye, and this similarity has been previously reported. [14] The ocular parameters were similar between women with mild and severe preeclampsia in this study. This finding has also been reported by previous studies, [14] but other studies have shown significantly higher mean values for resistivity index and pulsatility index among preeclampsia cases. [15] There have been inconsistencies in the magnitude and direction of the differences of ocular parameters between preeclampsia cases and controls in previous studies.

Giannina G et al[16] in their study reported that intraocular pressure was higher in the preeclamptic group in the intrapartum (18.8 ± 3.0 vs 15.3 ± 2.7 mm Hg, $p < 0.001$) and postpartum periods (20.2 ± 4.5 vs 15.7 ± 3.6 mm Hg, $p = 0.002$).

Conclusion: Compared with normotensive women, preeclamptic women have significantly increased intraocular pressure in the peripartum period.

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