VOLUME-9, ISSUE-6, JUNE-2020 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Ophthalmology

EVALUATION OF IOP CHANGES DURING PREGNANCY

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ABSTRACT

Aim: To evaluate the changes in intraocular pressure (IOP) during pregnancy

Design: Prospective Cohort study

Place and duration of study: Peripheral hospital in North India (Feb 2018- Dec 2019)

Methods: Measurement of Intraocular pressure IOP using a Goldmann Applanation tonometer (GAT) during first, second, and third trimester of pregnancy and puerperium in 470pregnant women who attended the Obstetrics & Gynaecology Outpatient Department (OPD) in a peripheral hospital in North India.

Exclusion Criteria

1. Pre-existing Diabetes mellitus (DM), Hypertension (HTN), Glaucoma
2. Excessive blinking
3. Twin pregnancy

Inclusion criteria -Healthy Pregnant women of age group 20-40 years with a known Last MenstrualPeriod (LMP) and irrespective of the parity.

Results: The mean intraocular pressures values measured from both eyes were significantly higher in first trimester and puerperal period than in the third trimester ($p<0.001$).There was no significant difference in the IOP values between the 2 eyes. Parity had no significant effect on the IOP changes.

Conclusion: Changes in the intraocular pressure in pregnancy are common and temporary. This study shows the baseline changes in the intraocular pressure during pregnancy in healthy women. Decrease in intraocular pressures as seen in various stages of pregnancy and puerperal period. Physiologic changes should be kept in mind in order to prevent misdiagnoses during routine antenatalinvestigations.

KEYWORDS : Pregnancy, Intraocular pressure, Goldman Applanation Tonometry (GAT)

INTRODUCTION

Pregnancy in is a complex physiological process and leads to a wide spectrum of effects on all organic systems. The ocular changes are part of this spectrum. The majority of alterations in the ocular system arise from metabolic, hormonal, and immunologic changes provoked by pregnancy.There are studies that have shown decrease in intraocular pressure (IOP) inpregnancy. [1,2]The aim of our study was to show the changes in IOP in pregnancy.

MATERIALS AND METHODS

This study adheres strictly to the tenets of the Declaration of Helsinki, and a prior approval of the institutional ethical committee was taken. Written informed consent was taken from all the patients. A total of 535 pregnant women in the Obstetrics and Gynaecology Outpatients Department(OPD) were evaluated for suitability during the research period from Feb 2018-Dec 2019. 30patients did not meet the inclusion criteria and 29 patients refused to participate in the study. Six patients were excluded from the study during IOP measurement because of excessive blinking. In total, 470patients were included in the research.

The inclusion criteria included healthy pregnant women of age group 20-40 years with a known last menstrual period and irrespective of the parity.

The exclusion criteria included the following

1. Pre-existing Diabetes mellitus (DM), Hypertension (HTN),Glaucoma
2. Excessive blinking
3. Twin pregnancy
4. Pre-ecclampsia

The study groups consisted of pregnant women in the first, second, third trimesters and these were defined as per the standard nomenclature intofirst 14 weeks, 14-28 weeks and last third of pregnancy respectively. The period from the end of labour till the complete involution of the uterus is complete, usually between 3 and 6 weeks is defined as the puerperal period. Clinical and ultrasonography examinations were performed during antenatal screening. Each patient's age, parity and smoking status was recorded. A detailed ophthalmoscopicexamination was performed to exclude any anterior and posterior segment pathologies. The IOPs were evaluated with Goldmann tonometer. The IOP readings were recorded between 8 AM and 10AM to avoid the diurnal variation of IOP.

Table 1. Demographics of the study groups

(a) Age group distribution of Study population

Age group	Number of pregnant females
20-25	125(31.25%)
25-30	165(41.25%
30-35	95(23.75%)
35-40	15(3.75%)

(b) Study population according to parity

Parity	Number of pregnant females
Primigravida	200(50%)
G2P1L1	140(35%)
G3P2L2	60(15%)

(c) Distribution of patients according to the gestational period

Period	Number
Ist trimester	104(26%)
2nd Trimester	135(33.75%)
3rd trimester	86(21.5%)
Puerperium	75(18.75%)

Table 2: MEAN IOP VALUES OF THE STUDY POPULATION

EYE	IST trimester IOP+-SD	2ND Trimester IOP+-SD	3rd Trimester IOP+-SD	Puerperal period IOP+-SD	p value
Right eye	15.5+- 2.5	14.4+-1.4	13.9+-1.6	14.7+1.9	p<0.001
Left eye	15.3+-1.6	14.3+-1.4	13.9+-1.6	15.3+-2.2	p<0.001

RESULTS AND ANALYSIS:

The statistical package for the social sciences (SPSS) version was used. Categorical variables were compared with the chi-square test. A p value <0.05 was considered statistically significant. Table 1 showsthere were 104(26 %) patients in the 1st trimester, 135 (32.3%) patients in the 2nd trimester, 86 (21.5%) patients in the 3rd trimester and 78(17.25%) patients in the puerperal period.The p value of the same was not statistically significant(p value=0.167). Table 2summarizes the mean IOP values of the studied population. The mean IOP values measured from the right eye were significantly higher in the first trimester and puerperal period than in the third trimester (15.5+-2.5 mmHg, and 14.7+- 1.9 mmHg vs. 13.9+-1.6mmHg, respectively; p<0.001). The mean IOP values measured from the left eye were significantly higher in the first trimester and puerperal periodthan in the second and third trimesters (15.3+-1.6, and 15.3+- 2.2mmHg, vs. 14.3+-1.4 mmHg and 13.9+-1.6 mmHg, respectively(p<0.001).

DISCUSSION:

TheOcular changes in pregnant women are physiologic responses to the homeostatic adaption of the human body can incite physiological responses in the pregnant women and the ocular changes are part of these responses.[3] Ocular manifestations of pregnancy can be grouped into three categories: physiologic changes, pregnancy-specific eye disease, and modifications of pre-existing eye disease. The decrease in IOP during pregnancy is likely multifactorial.[4]It is estimated that during pregnancy, IOP diminishes up to 10%, with this reduction being marked in the third quarter. The reductions not only occur throughout the pregnancy but also persist for several months postpartum. Potential mechanisms for this IOP reduction included greater aqueous uveo-scleral outflow facility due to hormonal changes, hormone induced blockage of ocular hypertensive effect of endogenous corticosteroids, decreased episcleral venous pressure from reduction of venous pressure in the upper limbs and mild metabolic acidosis resulting from gestation. Specifically, increased levels of estrogen,progesterone and relaxin may decrease IOP and increase the coefficient of facility of aqueous outflow leading to ocular hypotensive effect.These changes in IOP usually return to pre-pregnancy levels several months after delivery.[5-7]

In our study it is seen that the mean IOP levels recorded in 1st trimester are 1.6 mm Hg higher than 3rd trimester values. This in consonance with the study of Calbert IP, et al where the mean IOP of first trimester patients was on average 2 mmHg higher than that of third trimester patients.[8]Our study results showed a gradual, statistically significant fall of intraocular pressure during pregnancy. This is in consonance with previously conducted studies. [8-9] These changes are frequently temporary and returned to normal levels after delivery.[10]

CONCLUSION

Changes in the IOP in pregnancy are common and temporary. However, these may have an impact on the progression of a pre-existing ocular disease. Differentiating pathological eye disease from physiologic ocular changes is crucial in formulation of individualized treatment or preventive plan and thus constitutes the mainstay of obstetric ophthalmology.

Ethical Standards

The current study has been approved by the ethics committee of the institute and has therefore been performed in accordance with the ethical standards laid down in the 1964 declaration of Helsinki and its later amendments.

Conflict of Interest

The authors declare that they have no conflict of interest.

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