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Original Research Paper

Ophthalmology

CHANGES OF INTRAOCULAR PRESSURE IN THE DIFFERENT TRIMESTER OF PREGNANCY

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ABSTRACT

OBJECTIVE: This research targeted to evaluate the physiological changes that occurred regarding intraocular pressure in pregnant women in South Karnataka.

MATERIALS AND METHOD: From a cross-sectional study conducted using the Goldmann tonometer intraocular pressures of 240 women were measured. All these patients were either in their first, second or third trimesters of their pregnancies.

RESULTS: The mean intraocular pressures of their left eye were as follows: Right eye; 1st trimester 15.8 ±1.3, 2nd trimester: 14.4 ±1.9 and3rd trimester: 13.6 ±1.2, with a p<0.001. Values for the left eye were: 1st trimester: 15.3 ±1.5, 2nd trimester: 14.9 ±1.8 and 3rd trimester: 13.6 ±1.5, with a p< 0.001. The mean intraocular pressures measured from both the right and the left eyes of these groups of patients were higher among those who were in their first trimester than the ones in the second and third trimesters.

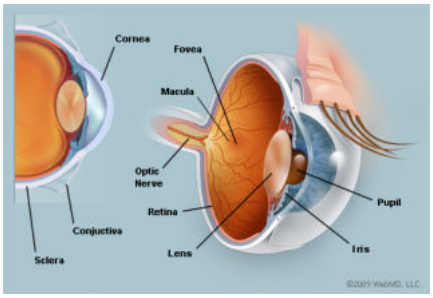
CONCLUSION: When women are pregnant, it is typical for their intraocular pressure to change. However, according to Agrawal et al. (2018), such changes are temporary and regular intraocular pressure returns immediately after the pregnancy. This study, therefore, gives the ranges across which intraocular pressure changes when healthy women become pregnant.

KEYWORDS : Pregnancy, trimester, intraocular pressure

INTRODUCTION

Pregnancy is a physiological process that is both complex and significant in a woman's life because it affects all organic systems of their body. A change in ocular pressure is one of the many physiological changes experienced by a pregnant woman (Gantela, Katta, 2017). Such differences are more pronounced in the third trimester. This is so because hormonal action is at its peak during this period. During pregnancy, the intraocular pressure (IOP) may reduce due to an increased outflow of the aqueous humour of the eye (Naderan, 2018). Alternatively, it could be due to the effects of decreased rigidity of the cornea or as well due to ligaments undergoing physiological relaxation. Additionally, pregnancy hormones may cause vasodilator effects on the eye leading to reduced IOP.

It is vital that pregnant women receive advice on the potential effects of the many physiological changes during pregnancy. This can be possible only if the is an awareness of changes in IOP, corneal sensitivity, visual acuity and refractive status among pregnant women. The primary aim of this research was to determine the physiological variations in the IOP of pregnant women in South Karnataka.



Picture 1: The following picture shows the anatomy of the human eye

MATERIALS AND METHODS

The ethics commission of southern Karnataka state approved of the study. The women who were sampled for the study were given information about all the procedures they would undergo during the study, and they all gave their written informed content to participate in the study. The study was conducted at the South Karnataka Referral Hospital between 1st July 2018 and 20th July 2018. Three hundred pregnant women volunteered to participate in the study, but only 240 of the women were suitable enough for the aim of the research. Twenty-six of the women did not meet the requirements for inclusion in the study, while the remaining 24 refused to take part in the study. Among the criteria for inclusion were that a woman had to be aged between 25-35 years and had to be a resident of South Karnataka. They also had to be attending their ANC clinic at the South Karnataka Referral Hospital, and they had to know the first day of their last menstrual period. Exclusions were based on the presence of already existing ocular conditions before the pregnancy and also the existence of any other systemic diseases which could affect the results of the study. The study groups comprised of women within their first, second or third trimesters of pregnancy. During their antenatal visits to the hospitals, the patients underwent clinical and ultrasonographic examinations during which were expected to give information about their age, parity and whether or not they smoked. Only those who smoked less than four cigarettes per day were while included in the study.

During evaluations of the IOPs of the patients, the same Goldmann tonometer, whose calibration was done before the study, was used for all of them. Each patient received a single drop of 0.5% proparacaine into their eye before the examination. A dry fluorescein strip was also used to touch both inferior conjunctival sacs of the eyes of the patients to measure their IOPS. The first eye was always the first to be examined and the result obtained was immediately recorded. All patients were asked to visit between 8-10 am for their tests because IOPs vary diurnally.

Statistical analyses

Based on the results obtained, parametric tests were preferred for their review. The distribution of normality was tested using the Shapiro-Wilk test while the one-way ANOVA test compared continuous variables in the results. The chi-square test was employed to analyze any categorical variables present with a p-value of <0.05 being considered statistically significant. Whenever there was a statistically significant difference, another test called post-hoc analysis was done between all group pairs with the aim of determining the source of the statistical discrepancy.

RESULTS

80(33.3%) women were in their first trimester, 92(38.3%) and 68(28.3%) in the second and third trimesters respectively. Their average ages were 28.1% ±3.8 years. There was no statistical difference noted in the three age groups because p was 0.163. Their mean parity number was 3.3±0.2. The smokers' mean parity number and their ratios were comparable (0.420 and 0.056respectively).

Table 1 below represents the age distribution of the patients.

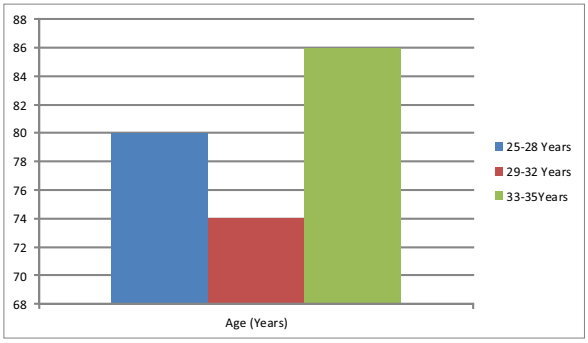
Trimester	1st trimester	2nd trimester	3rd trimester
Number	80	92	68
Percentage	33.3%	38.3%	28.3%

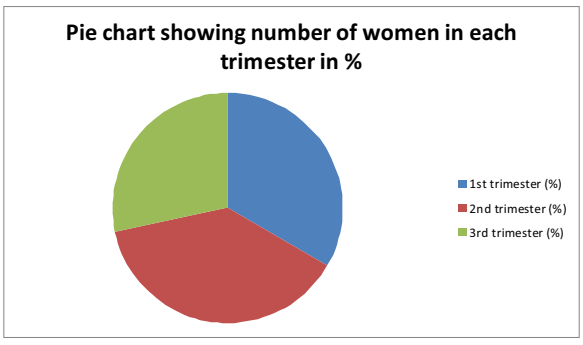
Table 2 shows the IOP values of the study population

Trimester	1st trimester n=80	2nd trimester n=92	3rd trimester n=68	p
Mean IOP right eye mmHg	15.8 ±1.3	14.4 ±1.9	13.6 ±1.2	<0.001
Mean IOP left eye mmHg	15.3 ±1.5	14.9 ±1.8	13.6 ±1.5	<0.001

The mean IOP values for the right and left eyes were higher in the first trimester than in the second and third trimesters. IOP values for the right eyes were 1st trimester: 15.8 ±1.3,2nd trimester: 14.4 ±1.9 and3rd trimester: 13.6 ±1.2, with a p<0.001. Values for the left eye were 1st trimester: 15.3 ±1.5, 2nd trimester: 14.9 ±1.8 and 3rd trimester: 13.6 ±1.5, with a p< 0.001.

Graph showing age groupings for the study group





DISCUSSION

The research aimed at determining the variations of IOPs in pregnant women. The results obtained indicate that IOP reduces as a woman moves from 1st to 2nd and finally to the 3rd trimester of their pregnancy. The 3rd trimester has the lowest IOP values, a result which could be explained by the fact that hormonal effects are more pronounced in a woman as the pregnancy comes towards the end of its term. According to Andreoli, Mieler (2018), the changes in IOP during pregnancy are temporary, and occurrence and normalcy return after delivery. The primary cause of the reduction in IOP during pregnancy remains unknown (El-Baz et al., 2018) and is suspected to result from the effect of multiple factors. Examples of such factors include elevated hormone levels, an increased outflow of fluid and vasodilator effects. Levels of pregnancy hormones like progesterone, estrogen and other placental hormones undergo fluctuations during pregnancy (Somani et al., 2015). Others like estrogen exert the vasodilator effect on vessels thus altering the IOP of a pregnant woman.

The significant limitations of this study included the size of the sample, which was just a small fraction of all the pregnant women in South Karnataka. The study design also hindered the drawing of definitive conclusions regarding the changes in IOP. If conclusive findings are to be made, a longitudinal study design is recommended. However, for this case, it was not possible to collect data consistently during all pregnancy periods because of the inconsistency in antenatal visits by the pregnant women who formed our study sample.

CONCLUSION

IOP changes among pregnant women in their different trimesters are normal and temporary. However, when there is a preexisting ocular condition, such changes may have a significant impact on the patient (Agrawal et al, 2018). Patients with preexisting conditions like glaucoma may have a positive impact on a reduced IOP. Antenatal care providers should be well aware of the changes in IOP so that they avoid misdiagnosis and unnecessary tension on the side of the patient regarding their health status.

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