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## Review Article

## Ophthalmic considerations in pregnancy



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## ABSTRACT

The eyes are our window to the world and offer us an island of vision in the sea of darkness. Equally, the eyes are also a window to peep into what is going on in the milieu interior.

Pregnancy is a natural state of physiological stress for the body. Each organ system of the body in a pregnant lady behaves at variation than in a non-pregnant state. A complex interplay exists between how the pregnancy affects the eye and how ocular physiology and pathology may lead to the modification of the management of pregnancy. Added to this is the effect of systemic conditions on the eye which gets modified by pregnancy.

An awareness of the interaction of Ophthalmology and Obstetrics for the benefit of the mother and the child requires a basic understanding of these complex interactions. This article aims at presenting to the reader in a simplified and organized manner the common ophthalmic issues encountered in a pregnant woman, their management and the effect of various ophthalmic medication on the fetus.

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“The woman about to become a mother, or with her newborn infant upon her bosom, should be the object of trembling care and sympathy wherever she bears her tender burden or stretches her aching limbs.... God forbid that any member of the profession to which she trusts her life, doubly precious at that eventful period, should hazard it negligently, unadvisedly or selfishly.”

- Oliver Wendell Holmes

## Introduction

Pregnancy is a physiological situation which places abnormal stress and demands on a body otherwise maintained in harmony between the milieu interior and exterior, with or without medications. Each organ system of the body in a pregnant lady behaves at variation than in a non-pregnant state. The physiological, hematological, hormonal, immunological, metabolic changes in the body of a pregnant lady merit a special consideration, as also the eye.<sup>1</sup> The maternal

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endocrine system and the placenta (the hormone factory) along with other changes cause ocular abnormalities which are reversible and rarely permanent.

In pregnancy, the risks to the fetus preclude the conduction of certain tests, mainly invasive. In addition various, pre-existing diseases in a non-pregnant lady may behave differently, some getting aggravated or ameliorated. The prescription to a pregnant lady also requires special considerations.

The effects of pregnancy on the eye can be divided into:

1. The physiological changes which occur during pregnancy
2. Disorders of the eye occurring due to pregnancy
3. Disorders of the eye already present but getting modified by the pregnancy.

Any or all of these can lead to visual symptoms (Table 1). The following paragraphs bring out these vagaries involved in treating ophthalmic disorders in a pregnant lady<sup>1</sup> and the effect of use of various ophthalmic drugs on the fetus.

## Physiological ophthalmic changes in pregnancy

### Intra Ocular Pressure (IOP) modifying changes

The IOP is known to decline in pregnancy to the tune of 10%, with the peak decline in the 12th to 18th week in the ocular hypertensive group. This drop may last for several months post-partum period.<sup>2</sup> The pregnant ladies also have a reduced diurnal fluctuation in their IOP as compared to their pre-pregnancy diurnal variation.<sup>3</sup>

This drop in IOP in pregnancy is a result of an increased outflow facility, caused by an increased uveo-scleral outflow and a decrease in the episcleral venous pressure consequent to the decreased venous pressure in the upper part of the body. While, pregnancy induced acidosis adds to this IOP fall, change in ocular rigidity is not a factor in this IOP fall as the measurements by indentation and applanation have been comparable. Thus the pre-existing glaucoma tends to improve during the pregnancy. Hørven and Halvard found a moderate decrease in intra ocular pressure during both the second part of pregnancy and the first two months after delivery.

**Table 1 – Causes of vision loss in pregnancy.**

1. Central Serous Chorioretinopathy (CSCR)
2. Pre-eclampsia with retinitis/macular edema
3. Pre-eclampsia with exudative retinal detachment (macula off)
4. Cortical blindness
5. Retinal vascular occlusion
6. Intra-cranial venous thrombosis
7. Optic neuropathies
  - Ischemic
  - Compressive
  - Inflammatory
8. Retinal ischemia following severe
9. Recurrent hemorrhage (diabetes mellitus)
10. Vitreous hemorrhage (diabetes mellitus)
11. Psychogenic disturbances

Dynamic tonometry performed in pregnant women revealed increased corneal indentation pulse (CIP) amplitudes in the first part of pregnancy, however, a steady decrease occurred thereafter until the CIP amplitudes at term measured one third of the non-pregnant value.<sup>2</sup> The CIP amplitudes were still below the normal average half a year after delivery. The form of the CIP amplitudes changed in pregnancy, with a marked decrease in the relative crest time during the entire pregnancy and was so characteristic that the authors suggested that dynamic tonometry might be introduced as a diagnostic test for pregnancy!

### Eyelids & conjunctiva

Chloasma, the “mask of pregnancy” is generally limited to the cheeks, but may extend on to the eyelids and fades post-partum. Conjunctival blood vessels show an increased granularity due to the decreased blood flow rate.

### Cornea & refraction

The corneal sensitivity progressively decreases in pregnancy and reaches its pre-pregnancy levels 4–6 weeks after delivery. A 3% increase in corneal thickness with insignificant fluctuation through each trimester of pregnancy has been seen and its return to baseline thickness shortly after delivery suggests a hormonal influence on corneal fluid retention.<sup>4</sup> This increase in pachymetry values is thought to be due to corneal edema, and this also causes a change in refractive index of the cornea, thus changing the refraction. A pregnant contact lens user might land up with contact lens intolerance due to increased corneal thickness, altered tear composition and consequent corneal edema. It is ideal to abstain from contact lenses during pregnancy and early post-partum and if unavoidable refitting with a custom made soft contact lenses 1.2 mm flatter than flat K. For this reason, prescription/re-prescription of spectacles should be deferred till at least 2 months post-partum. Laser surgery for the refraction correction is contraindicated.

In pregnancy, Krukenberg's spindle is seen without the associated outflow obstruction or rise in IOP (Fig. 1). This occurs generally in the first two trimesters of pregnancy and the spindle decreases in size or vanish in the third trimester and early post-partum period. The increased outflow facility and the increased progesterone levels inherent in the third trimester help in clearing the pigment from the angle, preventing an IOP rise.<sup>2</sup>

There is a transient loss of accommodation in pregnancy and occasionally accommodative weakness and paralysis has been described during lactation. Tear production tends to decrease during the pregnancy with altered composition leading to dry eyes, infection and local trauma.

### Visual fields

There is a physiological increase in the size of the pituitary gland in pregnancy, but this increase itself is not sufficient to cause a visual field defect unless accompanied by an abnormal anatomical relationship between the optic chiasma and the pituitary gland. Various, visual field changes like bitemporal

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