



Review

Ocular changes during pregnancy

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Abstract**Purpose:** To summarize available literature on physiologic and pathologic ocular changes during pregnancy.**Methods:** Narrative review of literature.**Results:** Ocular changes occur commonly during pregnancy. Although most of these are benign physiologic responses to the metabolic, hormonal, and immunologic modifications to adopt the gestational product, there is some serious pathology that may develop, exacerbate, or even resolve over the course of pregnancy which requires prompt diagnosis and management. The pathological eye conditions can be classified into preexisting pathologies and emerging ocular diseases. Regardless of the different mechanisms by which these ocular changes occur, the key point is the establishment of an effective perinatal screening program to monitor the new development or successive progression of these ocular abnormalities. Irrespective of the visual health status of the pregnant women, regular perinatal eye examination should be scheduled in order to assure continuous surveillance of healthy eyes. Treatment of pathologic ocular conditions or functionally disturbing benign changes relies on an appropriate patient selection.**Conclusions:** Discriminating pathological eye disease from physiologic ocular changes is important in order to establish an individualized treatment or preventive plan and constitutes the mainstay of obstetric ophthalmology. This individualized approach should always weigh the ocular benefits of treatment to the mother against the potential harms to the fetus.Copyright © 2017, Iranian Society of Ophthalmology. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).**Keywords:** Eye; Gestation; Ophthalmic change; Pregnancy; Visual change; Visual system**Introduction**

Impairment of visual acuity during pregnancy is supposed to be a rare occurrence; however, ocular changes include a wider spectrum of physiologic and pathologic conditions which might present different symptoms and require different treatments. Ocular changes during pregnancy occur due to physiological

responses to cope with the gestational product. While up to 15% of these pregnancy-induced changes are benign, a few pathological conditions might affect the eyes. On the other hand, the severity of these ocular changes is largely affected by the health status of the pregnant women, e.g. in a diabetic or hypertensive pregnancy.¹

Affected ocular structures during pregnancy include eyelid, conjunctiva, cornea, lens, retina, optic nerve/tract, and orbit.² Retinal changes in diabetic and hypertensive women can worsen with pregnancy and may correlate with the severity of gestational diabetes mellitus (GDM) or eclampsia. Additionally, hormonal changes in pregnancy may lead to increased corneal thickness and curvature which can lead to or worsen keratoconus,^{3,4} decreased intraocular pressure (IOP), and improve glaucoma slightly.^{4,5} Other ocular changes include chloasma, subconjunctival hemorrhage, increased thickness of lens and subsequent refractive errors, enlargement of the pituitary gland

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and optic nerve compression, and increased volume of intra-orbital contents by growing hemangioma.²

The aim of this review article is to summarize available data in the literature on the pregnancy-induced ocular changes to discriminate between benign and pathological conditions.

Methods

A comprehensive literature review was conducted in PubMed/Medline from January 1975 to July 2017 to identify original studies in English language regarding ocular changes during pregnancy. The following MeSH terms were used: (“ocular” OR “vision” OR “ophthalmologic” OR “ophthalmic” OR “eye” OR “visual acuity” OR “refractive error” OR “astigmatism” OR “anterior segment” OR “intra-ocular”) AND (“pregnancy” OR “gestational” OR “pregnant women” OR “obstetrics” OR “maternal”). Moreover, the following text words were used as well: “pregnancy and the eye”, “ocular complications in pregnancy”, “ocular changes in pregnancy”, “ocular disease in pregnancy”, “refractive changes in pregnancy”, “anterior segment changes in pregnancy”, “eyelid in pregnancy”, “retina and pregnancy”, “treatment of the eye during pregnancy”, and “treatment of the ocular disease during pregnancy” In each text words, the words “eye”, “ocular,” and “ophthalmic” were used instead of each other. In addition, the citations from the above searches were also included. The title and abstract of the identified articles were screened for relevancy. Of these, full-texts of the relevant articles were retrieved for eligibility, and relevant studies reporting data on any ocular changes in pregnant women were included in this review. The primary endpoint of this review was the classification of ocular changes during pregnancy.

Results

In the initial search, 2857 articles were found. After evaluating the title and abstract of those articles, 2653 articles that did not meet the inclusion criteria were excluded. The full-text of the remaining 204 articles were studied and included in this review. In the current study, the ocular effects of pregnancy were divided into physiologic changes, pathologic changes, and changes in preexisting ocular diseases.

Physiologic changes during pregnancy

All of the ocular structures are affected during pregnancy. The most important changes are summarized in [Table 1](#).

Eyelid changes during pregnancy

Chloasma or melasma, which is a hypermelanosis of sun-exposed areas, commonly occurs during pregnancy with a possibility of solo involvement of eyelids and often resolves postpartum.⁶ Eyelid retraction as a result of underlying sinus disease⁷ and ptosis due to the presence of blepharophimosis, ptosis, and epicanthus inversus syndrome⁸ have also been reported. However, the latter is a coincidence with pregnancy rather than a consequence of the gestational changes. Unilateral ptosis has been reported during pregnancy and after normal delivery due to fluid and hormonal effects on levator aponeurosis which resolves postpartum.⁹ Interestingly, enlargement of the pituitary gland during pregnancy might result in the over-expansion of a preexisting undiagnosed prolactinoma leading to ocular symptoms such as ptosis.^{2,10}

Corneal changes during pregnancy

Keratometry studies have shown increased values in central and thin corneal thicknesses in the second and third trimesters of pregnancy which are most likely due to water retention, and usually returns to the normal value with delivery.¹¹ These changes produce temporary refractive changes during pregnancy and need special attention for refractive eye surgery. The surgery may be postponed to ensure refractive stability. On the contrary, some studies have demonstrated progression of keratoconus during pregnancy which persists even after delivery.^{4,12} Different timing during pregnancy for keratometry and measurements of corneal values may be a reason for these conflicting findings in the literature. Nevertheless, refractive change is a transient finding during pregnancy, which might resolve after delivery.^{13–15}

Moreover, contact lens intolerance has been reported during pregnancy, so contact lens prescription should delay until several weeks postpartum. Dry eye is also reported during pregnancy. This condition is caused by disruption of lacrimal

Table 1
Physiologic changes during pregnancy.

Condition	Effect
Chloasma	May worsen during pregnancy but resolves spontaneously postpartum.
Contact lens intolerance	May presents during pregnancy and resolves postpartum.
Dry eye	May presents during pregnancy and resolves postpartum.
Intraocular pressure (IOP)	Decreased in IOP toward the end of pregnancy which returns to baseline values postpartum.
Krukenberg spindles	Develop early in pregnancy and usually tend to decrease in size during the third trimester and postpartum.
Lens changes	A decrease in lens autofluorescence is reported. Increased liquid volume during pregnancy might result in development or exacerbation of cataracts.
Ptosis	Unilateral ptosis during pregnancy and after normal delivery which resolves postpartum.
Refractive changes	Increasing in central and thinnest corneal thicknesses in the second and third trimesters of pregnancy which returns to the normal value with delivery.

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