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Review Article

Eye in pregnancy

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ABSTRACT

Hormonal, metabolic, hemodynamic, vascular and immunological changes that occur during pregnancy can affect the function of the eye. These changes are commonly transient, but in some cases they may be permanent and have consequences even after childbirth. The ocular effects of pregnancy may be physiological or pathological and can be associated with the development of new ocular pathology or may be modifications of pre-existing conditions. The most common physiological changes are alterations of corneal sensitivity and thickness, decreased tolerance to contact lenses, decreased intraocular pressure, hemeralopia and refractive errors. Possible posterior segment changes include worsening of diabetic retinopathy, central serous chorioretinopathy, increased risk of peripheral vitreochorioretinal dystrophies and retinal detachment. Thus, it should be kept in mind that the presence of any ocular symptoms in a pregnant woman requires ophthalmologic examination and further management. Knowledge of these ocular changes can help to differentiate the physiological changes from ocular manifestation of systemic disease and diseases pertaining to the eye in a pregnant woman. This article explains the effects of ocular changes in pregnancy.

Keywords: Diabetes, Eye, Glaucoma, Ocular changes, Pre-eclampsia, Pregnancy

INTRODUCTION

The ocular changes that occur in pregnancy are commonly transient in nature but occasionally can be permanent. In addition to the physiological changes in ocular tissues in pregnancy, pathological eye conditions have also been reported. While pregnancy can worsen pre-existing ocular conditions such as diabetic retinopathy, it can have beneficial effects in women with glaucoma and uveitis. Disorders arising in pregnancy, such as preeclampsia and eclampsia, can also present with visual symptoms.

In this article we review the following:

- Ocular changes and disorders that develop during pregnancy.
- The effects of pregnancy on pre-existing eye disorders.
- Disorders of the eye associated with pregnancy related disease.
- Neuro-ophthalmological changes in pregnancy.
- Disorders related to labour and delivery.
- Miscellaneous issues related to pregnancy.

OCULAR CHANGES AND DISORDERS THAT DEVELOP DURING PREGNANCY

Chloasma and ptosis

Chloasma, also called the 'mask of pregnancy', is a blotchy, brown discolouration that can occur around the eyelids. It is caused by increased pigmentation related to

increased estrogen and progesterone. These changes tend to fade in the postpartum period.

Ptosis (drooping of the eyelids) has been reported during and after normal pregnancy and is thought to be related to fluid retention and hormonal changes.[1] It requires no treatment.[1]

Ocular motility defects and Graves' disease

Ocular motility defects can present for the first time during pregnancy. Undertaking a search for preexisting underlying conditions may help to clarify the diagnosis.[2] The initial onset of Graves' disease (exophthalmos) can occur during pregnancy and pre-existing disease can be aggravated early in pregnancy. The treatment requires careful evaluation of the various treatment modalities, as these can pose risks to the fetus.[2,3]

Effects on the cornea, lens and intraocular pressure

Corneal sensitivity has been found to decrease in most pregnant women and it usually returns to normal by eight weeks postpartum. This can be related to an increase in corneal thickness caused by corneal oedema.[4] In one study,[5] a decrease in tear production occurred during the third trimester of pregnancy in approximately 80% of pregnant women.[5]

In most studies a decrease in intraocular pressure has been reported. The curvature of the crystalline lens can increase, causing a myopic shift in refraction. A transient loss of accommodation has been seen during and after pregnancy and in relation to breastfeeding.[2]

The retina and choroid

The retinal arterioles, venules and capillary bed have been reported as being unchanged during normal pregnancy.[2]

Changes in the visual field

There are conflicting reports on changes in the visual field. The reported defects are concentric constriction, bitemporal constriction, homonymous hemianopia and central scotoma. The proposed mechanism is an increase in size of the pituitary gland but only when affecting the optic chiasm.

THE EFFECTS OF PREGNANCY ON PRE-EXISTING EYE DISORDERS

Disorders of uveal tissue

The immunosuppressive effects and high steroid levels present in pregnant women may cause improvement of uveitis during pregnancy but there is a risk of exacerbation postpartum. The development of anterior uveitis associated with ankylosing spondylitis can be more common in the early postpartum period.[2] Postpartum endogenous candidal endophthalmitis, presumed to be related to intravascular dissemination around the time of delivery, has been reported.[6] Choroidal haemangiomas have been reported to undergo rapid growth during pregnancy but some can regress postpartum.[2]

Uveal melanomas

Early studies observed that uveal melanomas can present for the first time during pregnancy or grow rapidly during pregnancy. However, recent evidence suggests that estrogen and progesterone do not have any role in the development or progression of uveal melanomas.[7] There is no evidence that a woman with uveal melanoma should terminate her pregnancy to avoid metastasis to the fetus.[2]

Diabetic retinopathy

This is the most common ocular condition modified by pregnancy[8] and it is considered an independent risk factor for its development and progression. Studies have demonstrated that as much as 50% of nonproliferative retinopathy can show worsening which often improves by the third trimester and postpartum. Approximately 5-20% of women develop proliferative changes; the risk is higher in those women who have had severe nonproliferative retinopathy at the beginning of their pregnancy. Components of retinopathy that increase most commonly are haemorrhages and microaneurysms. Evidence suggests that treatment of proliferative disease with laser photocoagulation before pregnancy can reduce the likelihood of progression by 50%.[4]

Other factors that affect the progression include:

- The duration of diabetes
- The amount of retinopathy at conception
- The level of glycaemic control
- The presence of coexisting vascular disease.[8]

Gestational diabetes poses a very low risk for development of retinopathy.

Glaucoma

Pregnant women with pre-existing glaucoma may show improvement. Acute angle-closure glaucoma, which causes a painful red eye and reduced vision, has been reported during labour.[10] The opinion of an ophthalmologist should be sought early in pregnancy so that glaucoma can be carefully monitored and all treatment options can be discussed with the woman. There is a paucity of data on the safety of glaucoma medications for pregnant and lactating women, hence the minimum amount of medical treatment should be prescribed and punctual occlusion should be advised to reduce systemic absorption of the eye drops.[11]

Beta-blockers (for example, timolol, levobunolol, betaxolol, carteolol) should be avoided or used in the lowest possible dosage in the first trimester of pregnancy. They should be discontinued 2-3 days before delivery to avoid beta-blockade in the infant. Topical and systemic carbonic anhydrase inhibitors (for example, acetazolamide, dorzolamide, brinzolamide) are contraindicated because of potential teratogenic effects.[12]

Ocular toxoplasmosis

Pregnant women with active toxoplasmic retinochoroiditis are usually concerned about the possibility of transmitting toxoplasmosis to the fetus. Congenital toxoplasmosis in the fetus results only from an active infection of the mother that develops during that pregnancy. The presence of active toxoplasmic retinochoroiditis or chorioretinal scars in the mother is regarded as evidence of congenital infection of the mother herself and does not indicate a new active infection. In recurrent disease, there are usually pre-existing maternal antibodies believed to protect the fetus. Women with active infection during pregnancy should be monitored every three months by screening (i.e. ophthalmoscopy) and their offspring followed up systematically.[13]

Retinitis pigmentosa

Retinitis pigmentosa does not always progress uniformly. There can be periods of more rapid worsening alternating with periods of relatively little change. It, therefore, becomes difficult to interpret whether changes reported are merely coincidental or truly related to pregnancy.[2]

DISORDERS OF THE EYE ASSOCIATED WITH PREGNANCY-RELATED DISEASE

Pre-eclampsia and eclampsia

Pre-eclampsia generally occurs in the second half of pregnancy and is characterised by hypertension and proteinuria. Visual disturbances, including scotoma, diplopia, diminished vision and photopsia, are reported in 25% of women with severe pre-eclampsia and in 50% of women with eclampsia. In the postpartum period, visual changes can be a sign of impending seizure in a woman with pre-eclampsia.[14] The most common ophthalmological abnormality is retinal arterial spasm and narrowing. This vascular change is reversible in most women. The focal arteriolar narrowing may progress to a more generalized narrowing of the retinal arterioles, which usually resolves postpartum.[15] Other changes associated with retinopathy include haemorrhages, cotton wool spots, retinal oedema and papilloedema which are seen primarily in women with an underlying chronic systemic disease.

HELLP syndrome

Approximately 10% of women with severe preeclampsia develop the HELLP syndrome. It is characterised by haemolysis, elevated liver enzymes and low platelets. The syndrome is associated with poor maternal and fetal outcome. Ocular findings include bilateral serous retinal detachment with yellow/white subretinal opacities and sometimes vitreous haemorrhage.

Occlusive vascular disorders

Pregnancy is associated with a hypercoagulable state and this can affect the retina and choroid. Thrombotic thrombocytopenic purpura (TTP) is rare but can develop in association with pregnancy. Visual symptoms occur in approximately 10% of these women and are generally related to serous retinal detachment, arteriolar constriction and optic disc oedema. Other ocular findings such as retinal haemorrhages, exudates, subconjunctival haemorrhages, anisocoria (unequal pupils), motility disturbances, ischaemic optic neuropathy, homonymous hemianopia and scintillating scotoma may be noted.[2]

Disseminated intravascular coagulation (DIC) can occur with severe pre-eclampsia, abruptio placenta and retention of a dead fetus. The choroidal involvement causes a serous retinal detachment, which resolves with the resolution of DIC, leaving retinal pigment changes as a permanent feature.

Central serous chorioretinopathy

This is characterised by the accumulation of subretinal fluid at the posterior pole of the fundus, creating a circumscribed area of serous retinal detachment. It is a complication that can occur in an otherwise normal pregnancy. The onset of visual symptoms usually occurs during the third trimester. However, it can also develop during the first and second trimesters.[16] The woman typically develops metamorphopsia (image distortion), a positive scotoma and micropsia (images appear smaller) if the central macular area is involved, otherwise the woman is usually asymptomatic.[16] The detachment resolves spontaneously towards the end of the pregnancy or soon after delivery. It may or may not recur during subsequent pregnancies.[16] Medical treatments have no proven influence on the disease and laser photocoagulation is recommended only in selected cases.[17]

NEURO-OPHTHALMOLOGICAL CHANGES IN PREGNANCY

Intracranial disorders

Some of the symptoms which are normal in pregnancy, such as nausea and vomiting, are the same as those of intracranial disorders. They should be included in the differential diagnoses of pregnant women with visual

acuity loss, visual field loss, persistent headaches or oculomotor palsies.

Venous sinus thrombosis

Pregnancy and the puerperium have been recognised as periods of increased susceptibility to venous sinus thrombosis. Significant increased risk is associated with caesarean delivery, increasing maternal age, hyperemesis gravidarum, intercurrent infection and maternal hypertension.[18] Common signs and symptoms are headache, focal or generalised seizures, paresis and papilloedema. The initial treatment should be intravenous heparin, with thrombolysis reserved for women who develop secondary deterioration.

Pituitary adenomas and meningiomas

Pituitary adenomas tend to grow rapidly and can cause symptoms such as headache, visual field changes and visual loss.[19] However, asymptomatic pituitary adenomas are relatively more common.[4,19] It is recommended that pregnant women with pituitary adenomas and micro-adenomas have regular ophthalmic follow-up care with visual field assessment to rule out enlargement. In pregnant women with prolactinomas one treatment option is bromocriptine, which has been shown not to have any increased risk to the fetus. Corticosteroid therapy has also been reported as a treatment option.

Meningiomas have been reported to enlarge rapidly and cause severe symptoms. The ophthalmic findings reported are decreased visual acuity, visual field defects (for example, bitemporal hemianopia), oculomotor palsies and disc oedema. These conditions depend on the location of the tumour. They commonly present during the second half of pregnancy and tend to resolve postpartum; they can, however, recur in subsequent pregnancies.[2]

Pseudotumour cerebri (benign intracranial hypertension)

This is characterised by increased intracranial hypertension without localising neurological signs. Typical symptoms include headache, transient visual obscuration, papilloedema and sixth nerve palsy. It is most prevalent in women, particularly obese women, in their childbearing years but it does not appear to be more frequent during pregnancy.[20] Visual outcome and management is not different during pregnancy, except that treatments such as acetazolamide, which can pose a risk to the fetus, should not be used.[12]

Optic neuritis and neuropathy

There appears to be a decreased incidence of optic neuritis during pregnancy, perhaps because of the immunosuppressive effects. Optic neuropathy has been reported with hyperemesis gravidarum. In a woman with multiple sclerosis the relapse rate may decrease in the third trimester and increase during the early postpartum period.[21]

Other neuro-ophthalmologic disorders

The development of Horner's syndrome may be a more common side effect of epidural anaesthesia in pregnant women than in non-pregnant women. It can occur early in pregnancy or during labour at term. It is generally transient in nature but can be associated with maternal hypotension.[22] Trigeminal nerve palsy can also develop in association with epidural anaesthesia in pregnant women.[22] There may be a change in the frequency of migraine attacks during pregnancy.[23]

Disorders related to labour and delivery

A retinopathy similar to Purtscher's retinopathy has been reported within 24 hours of childbirth.[24] It is characterised by widespread cotton wool spots with or without intraretinal haemorrhages, which represents arteriolar obstruction. The woman may experience severe unilateral or bilateral visual loss. Bilateral retinal arteriolar occlusions from amniotic fluid particles have been reported.[25] The rapid rise of intravenous pressure during delivery may cause a Valsalva maculopathy, with sudden decreased vision from a pre-retinal, subretinal or vitreous haemorrhage. High myopia or previous retinal detachment surgery are not considered contraindications to spontaneous vaginal delivery.[26,27] If there is retinal detachment, assistance during labour (for example, caesarean section, forceps delivery) would be preferable.[26] Orbital varices and haematomas have been reported during labour or in the early postpartum period. These can be associated with pain and diplopia.[2,28]

Refractive issues

Despite successful use of contact lenses previously, many women develop intolerance in pregnancy. This can be caused by a change in corneal curvature, an increase in corneal thickness/oedema or a change in tear film. It is best to delay fitting new contact lenses until several weeks postpartum. A woman can have intolerance during one pregnancy but not during another.[4,5] Since stable refractions have been documented for most women, it is not a contraindication to prescribing corrective lenses. However, the usual advice is to wait at least several weeks postpartum, if possible, before obtaining a new spectacle prescription. The results of refractive eye surgery shortly before, during or after pregnancy cannot be predicted adequately. Current recommendations are to delay surgery and wait until refraction is stable in the postpartum period.[28]

CONCLUSION

Pregnancy can have an impact on the course of a pre-existing ocular disease, or it can be associated with the

development of a new disorder. Although most disorders reverse, at least in part, by several months postpartum, some can have a permanent effect on vision. It is important for clinicians to have a firm understanding of the various ocular changes associated with pregnancy and the implications they may have for management.

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