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NORMAL TENSION GLAUCOMA IN A PREGNANT FEMALE : CASE REPORT

Opthalmology

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ABSTRACT

Normal tension glaucoma (NTG) is a disease associated with normal intraocular pressure(IOP) (10 mmHg – 21 mmHg) that may lead to irreversible blindness if misdiagnosed or left untreated over a period of time. The author observed a patient with NTG diagnosed for first time in her third trimester of pregnancy. The initial visual field analysis results showed visual field defects with normal IOP. Although the patient was known case of Hypertension, a condition associated with optic nerve head damage, the patient's visual field defects were found to have progressed by the end of pregnancy. It is therefore important for ophthalmic professionals to apply due diligence when examining patients with NTG in order to expedite intervention and prevention of visual impairment and blindness.

KEYWORDS

Normal tension glaucoma, antiglaucoma agents, pregnancy

INTRODUCTION:

Glaucoma is a leading cause of irreversible blindness affecting more than 60 million people worldwide.(1) In the past, glaucoma was defined as a progressive bilateral neuropathy of the optic nerve fibres because of, in part,(2) elevated intraocular pressure (IOP).(3,4) In recent times, IOP is no longer included in the definition of glaucoma as it is now considered a risk factor for the development of the disease.(5) As a result, glaucoma is now defined as a group of diseases of the optic nerve which result in a loss of retinal ganglion cells in a characteristic pattern of optic neuropathy which causes characteristic optic nerve head (ONH) cupping and visual field loss.(6) It is currently recognized as a chronic non-curable condition which is often asymptomatic. Unfortunately, if left untreated, it eventually leads to severe loss of vision and poor quality of life.(5,7) Treatment, which consists mainly of drugs or surgical procedures to lower IOP, attempts to avoid significant vision loss during the patient's lifetime.(7,8)

Approximately 6.6% of the normal population in the world may have an IOP greater than 21 mmHg without primary POAG.(9) The risk factors for the development of POAG include elevated IOP, myopia > 3 D, old age, male gender, African American, Hispanic and Latino ethnicity, low socioeconomic status, alcohol use and smoking, positive family history, genetic factors, systemic hypertension, type 2 diabetes, cholesterol and coronary heart disease, and vasospastic diseases.(5) However, individuals with ocular hypertension may have higher baseline IOP, thinner central corneal thickness, older age, higher vertical cup disc ratios (CD/R) and higher pattern standard deviation values with standard automated perimetry.(10,11) Therefore, IOP alone cannot be used to diagnose or rule out the presence of glaucoma. The outlined risk factors as well as corneal parameters should also be considered.

As indicated above, historically, glaucoma was a disease only associated with increased IOP that if left untreated could lead to blindness.(12) Contrary to this belief, population-based studies(13,14,15) have now revealed that some of the patients diagnosed with glaucoma actually had IOPs that were within the normal range. On average, these studies showed that normal tension glaucoma (NTG) occurs in roughly 30% – 40% of all patients diagnosed with glaucomatous visual field defect.(16,17,18) Recently a study by Kim et al.(19)indicated that IOP of less than 21 mmHg accounted for 94.4% of all glaucomatous cases in their prevalence study among rural Korean adults.

Glaucoma occurs most commonly in adults over the age of 40, but will occasionally occur in females of childbearing age. Often, women will have pre-existing glaucoma which originally began in childhood (i.e., congenital glaucoma or anterior segment dysgenesis), or glaucoma secondary to uveitis, diabetes, etc. The treatment of glaucoma in and around pregnancy offers the unique challenge of balancing the risk of vision loss to the mother with potential harm to the fetus or newborn. This therefore suggests that early diagnosis in these cases may help in eliminating visual impairment and blindness because of NTG. In view of the challenges associated with early diagnosis of NTG, thus leading to timeous intervention, the author presents for educational purposes a case report of a hypertensive patient diagnosed as NTG seen in pregnancy.

Case Report:

A 28-year-old woman presented at the OPD for a routine eye examination during her pregnancy. Following history, it was established that the patient had never been seen by any eye healthcare professional before and that she was a known case of hypertension. Unaided visual acuity (VA) measurements were normal with both eyes recording 6/6. IOP measurements, using the Goldmann applanation tonometer, showed 16 mmHg and 14 mmHg for the right and left eyes, respectively. According to Kouchaki,(20) more studies are needed to evaluate the effect of different individual corneal properties and their clinical relevance on the IOP measurement. Therefore, for the purpose of this case report, corneal properties and related biomechanical factors were not considered.

Ophthalmoscopy revealed CD/R of 0.5 and 0.6 for the right and left eyes, respectively with the asymmetrical narrowing of the neuro-retinal rim of the ONH in both eyes (Figure 1,2).

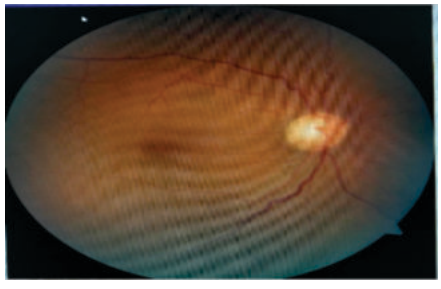

Figure 1: Fundus photograph showing NRR thinning in right eye

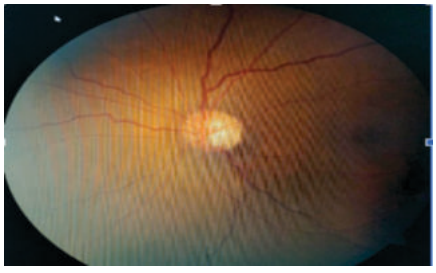

Figure 2. Fundus photograph showing NRR thinning with Inferior notching present in left eye

Visual field analysis test results revealed mild peripheral visual field loss in both eyes with superior arcuate scotoma in left eye. (Figure 3)

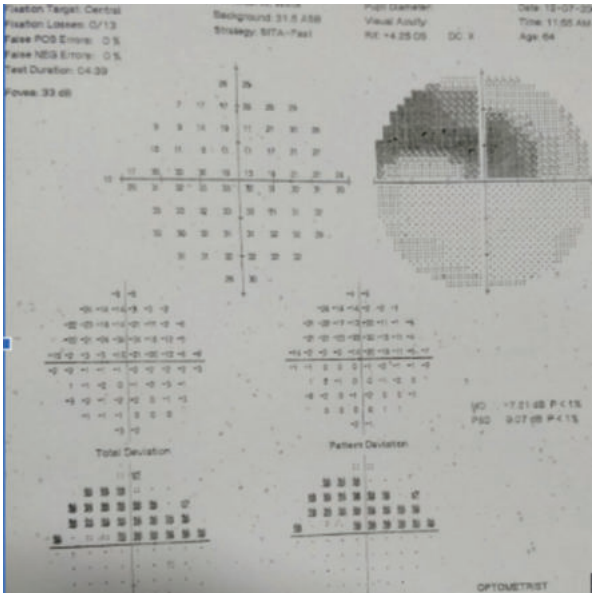

Figure 3: Humphrey visual field showing Superior arcuate scotoma in left eye.

Optical coherence tomography (OCT) results showed Retinal Nerve fibre layer (RNFL) thinning in inferior quadrant of left eye (Figure 4) which clinically correlated with superior Visual field defects seen on Humphrey visual field analysis.

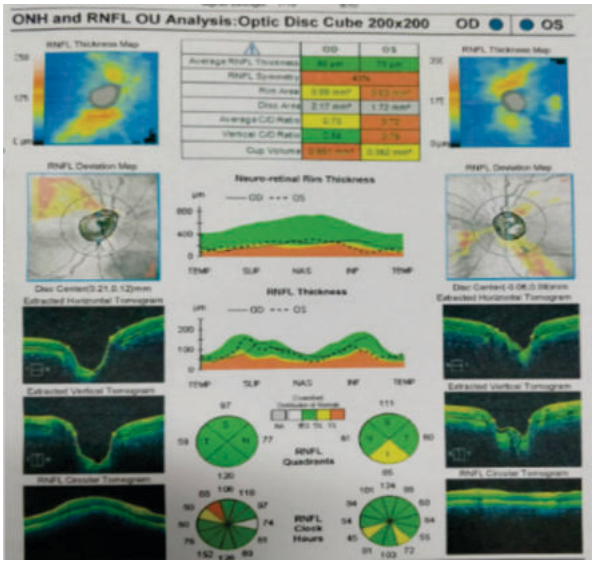

Figure 4: OCT Optic nerve head(ONH) and RNFL showing nerve fibre layer thinning in inferior quadrant of left eye .

The patient was then started on Alphagan 0.15% (Brimonidine tartrate ophthalmic solution), one drop twice a day indefinitely and had controlled IOP. She underwent a normal vaginal delivery. Patient has shown no further progression of visual field loss since past one year.

DISCUSSION

The pathogenesis of NTG remains unclear and it is believed that the interaction of a variety of systemic factors may be involved in the onset and progression of this disease.(2) The development of glaucomatous optic neuropathy in general likely results from several factors that are mechanical, vascular or neurodegenerative in origin. Despite the lack of a single identifiable causal process, increased intraocular pressure has been identified as the most important modifiable risk factor in open angle glaucoma. The pathologic changes that occur in normal tension glaucoma are even less understood, but likely share contributing factors with all POAG. A host of causative factors independent to IOP have been suggested including systemic and local vascular dysregulation, hematologic abnormalities, impaired CSF circulation resulting in stagnation and decreased optic nerve protection, and structural anomalies including structural weakness of the lamina cribrosa. Drance and colleagues described two forms of NTG: 1) a non-progressive form typically associated with a transient episode of vascular compromise, and 2) a progressive form thought to result from a chronic vascular insufficiency at the optic nerve. (21)

It has been theorized that the disease process in NTG results from an enhanced sensitivity to what would otherwise be physiologic IOP, resulting in glaucomatous damage of the optic nerve. This enhanced sensitivity may be due to impaired optic nerve blood flow, a higher translaminar pressure gradient (IOP-ICP) due to lower ICP, or a structurally abnormal lamina cribrosa, which cannot withstand a normal range of IOP. This theory of enhanced sensitivity is useful, at least conceptually, to rationalize the impact of IOP in a disease process that may indeed have an IOP independent underlying etiology. The evidence for a role of IOP contributing to the disease comes from the Collaborative Normal Tension Glaucoma Study(22,23), which showed a slowing of disease progression in patients achieving a 30% or more reduction of already normal IOP.

Patients with systemic conditions that result in ischemic vascular disease such as diabetes, Hypertension and patients with a history of stroke have been shown to be at increased risk for bilateral NTG compared to unilateral NTG. Recently, a disease entity termed primary vascular dysregulation (PVD) has been described pointing to retinal and optic nerve vasculature dysregulation as a potential risk factor for NTG. (24)

Vascular dysregulation is also known to occur during pregnancy. There exist theoretical concerns around labor-associated Valsalva causing increase in maternal IOP, however normal vaginal labor has not been shown to alter IOP in healthy women. (25) Patients with glaucoma should undergo standard obstetric care during labor and delivery, as there is no evidence to support recommending Caesarean section (C-section) or elective pregnancy termination specifically for glaucoma. The exception to this is for patients who are in the early postoperative period from a tube surgery or trabeculectomy, and for these patients C-section should be discussed with the patient's obstetrician.

CONCLUSION:

Glaucoma should be managed carefully in pregnant females. Untreated or under-treated glaucoma could potentially lead to loss of vision; and although risk assessment for a pregnant patient with glaucoma is difficult because of the lack of safety data, the potential benefits gained from the treatment are likely to outweigh any increase in risk to both the mother and the fetus. Optimum treatment for glaucoma in pregnancy must not be withheld so as to prevent any further deterioration in progressive vision loss and quality of life.

Brimonidine, beta-blocker, or topical carbonic anhydrase inhibitors, can be used with caution. Avoidance of prostaglandins may decrease the risk of premature labor, which is particularly important early in the third trimester. Late in the third trimester, brimonidine should be discontinued because it can induce central nervous system depression in newborns. Beta-blockers should be used with careful fetal growth and heart rate monitors. Topical carbonic anhydrase inhibitors should be used with careful monitoring of acidosis status. (25)

Statement of Ethics

Study adhered to the tenets of the Declaration of Helsinki. Written Informed consent was obtained from patient for publication of this case report.

Conflicts of Interest

Authors have no conflict of interest in this study.

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