

### **Prevalence of Migraine in Patients with Normal Tension Glaucoma**

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#### **Abstract**

Normal-tension glaucoma (NTG) is a form of open-angle glaucoma characterized by glaucomatous optic neuropathy in patients with IOP measurements consistently lower than 21 mmHg. The etiology of NTG is unclear. Contributing factors may include vasospastic events, hypoperfusion, nocturnal hypotension, hypercoagulability and increased blood viscosity, and genetic factors. NTG has also been associated with migraine headaches, Raynaud's phenomenon, diffuse cerebral ischemia and various autoimmune disorders. Vasospasm associated with migraine has been recognized as a risk factor for NTG. We did a retrospective comparative study between patients diagnosed with POAG and NTG (50 patients in each group) to study the prevalence of migraine in patients with NTG and to establish migraine as a risk factor for normal tension glaucoma. A history of migraine was obtained from all patients either at present or previously. The study showed an increased prevalence of migraine in patients with Normal tension glaucoma stating a definite association. 42% of patients with normal tension glaucoma gave a history of migraine at some point in their lives though presently they were symptom free with a female preponderance of 30% as compared to only 11% among patients with open angle glaucoma. A detailed study of

other causes of ocular vasospasms may be needed to prove a definitive etiology.

**Keywords:** glaucoma, Vasospasm, NTG.

#### **Introduction**

Normal-tension glaucoma (NTG) is a form of open-angle glaucoma characterized by glaucomatous optic neuropathy in patients with IOP measurements consistently lower than 21 mmHg. The etiology of NTG is unclear. Contributing factors may include vasospastic events, hypoperfusion, nocturnal hypotension, hypercoagulability and increased blood viscosity, and genetic factors. NTG has also been associated with migraine headaches, Raynaud's phenomenon, diffuse cerebral ischemia and various autoimmune disorders.

Vasospasm is an abnormal vascular response to stimulus as a result of dysfunction of vascular endothelium and substances that mediate vessel tone. Vasospasm of the smooth muscle in cranial blood vessels leads to the release of serotonin causes inflammation of tissues surrounding the brain and contributes to the headache in migraine. This vasospasm has also been associated with normal tension glaucoma

#### **Purpose of the Study**

To explore the prevalence of migraine among patients with normal tension glaucoma and to examine migraine as a risk factor of NTG.

**Materials and Methods**

We did a comparative study among two groups of 50 patients each. Group A diagnosed with Normal tension glaucoma and group B diagnosed with Primary open angle glaucoma in patients presenting to the ophthalmology department of Sree Balaji medical college and hospital between March 2016 and Feb 2017. A history of migraine was obtained from all patients either at present or previously. History of classical migraine with one sided headache, nausea, vomiting and visual aura.

**Inclusion criteria**

**Group A**

Patients diagnosed with Normal tension glaucoma (IOP less than 21mmof Hg with optic disc and visual field changes and open angles on gonioscopy) – 50.

**Group B**

Patients diagnosed with Primary open angle glaucoma(IOP more than 21 mm of Hg with optic disc and visual field changes and open angles on gonioscopy)

**Exclusion criteria**

- Ocular hypertension.
- Patients with shallow angles with previous angle closure.
- Patients with history of topical steroid use and history of ocular trauma and surgery.
- Patients showing evidence of secondary glaucoma (Pigment dispersion, psuedoexfoliation and uveitis)
- Patients with other causes of headache including uncorrected refractive errors, sinusitis, tension headache and Cluster headache.

**Results**

In Group A in the 50 patients 27 were male and 23 were female. Twenty two patients gave a history of migraine for which they had taken treatment. Among them were 15 female and 7 male patients.

In Group B in the 50 patients 29 were male and 21 were female. Only 6 patients gave a history of migraine ,4 were female and 2 male patients.

	No of patients	Male	Female	Positive Migraine	Percentage
Group A	50	27	23	22 (15 female and 7 male)	42%
Group B	50	29	21	6 (4 female and 2 male)	11%

**Discussion:**

Gasser et al were the first to propose that vasospasm associated with migraine, Raynauds phenomenon and prinzmetals angina could be an important risk factor in the development of normal tension glaucoma.<sup>1</sup> Mohammed Abu Hegazy et al in their study showed that migraine was more common in patients with normal tension glaucoma. They also added that in patients with low tension glaucoma, females were associated with higher prevalence of migraine than males.<sup>2</sup> CD Phelps and JJ Corbett in their study concluded that migraine was associated with normal tension glaucoma and could play a significant role in its pathogenesis.<sup>3</sup> Emer Henry et al in a study found an impairment of peripheral endothelium-mediated vasodilatation in normal pressure glaucoma. These findings support the concept of a generalized vascular endothelial dysfunction in patients with this condition.<sup>4</sup> The Beaver Dam Eye study showed no association between migraine and primary open angle glaucoma. The Collaborative Normal tension Glaucoma study showed that migraine was associated with an increased risk of progression in patients with normal tension glaucoma.<sup>5</sup>

Ocular vasospasm has been combined with digital vasospasm and patients have shown evidence of normal tension glaucoma with visual field defects.<sup>6</sup>

### Conclusion

The epidemiology of migraine is rather difficult to study because of a lack of a definitive diagnostic test and one has to rely on the patients history though not all these symptoms need to be present in every patient. Moreover migraine tends to regress with advancing age. Most of our patients were elderly over fifty years of age and gave a positive history of migraine much earlier than the diagnosis of glaucoma. It is unclear as to whether migraine could be a sole cause of normal tension glaucoma or a mere association. However there has been an increased prevalence of migraine in our study with Normal tension glaucoma stating a definite association. 42% of patients with normal tension glaucoma gave a history of migraine at some point in their lives though presently they were symptom free with a female preponderance of 30% as compared to only 11% among patients with open angle glaucoma. A detailed study of other causes of ocular vasospasms may be needed to prove a definitive etiology.

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