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TO STUDY THE SUSTAINED EFFECT OF PROSTAGLANBIN INHIBITORS ON INTRAOCULAR PRESSURE IN NORMAL TENSION GLAUCOMA

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ABSTRACT

AIM: To study the sustained effect of prostaglandin inhibiters on intraocular pressure in normal tension glaucoma. **Methods**: A retrospective study was done on 19 eyes of patients of Normal-tension glaucoma(NTG) for a period of 12 months. All patients were treated with once daily topical latanoprost.0.005%. Baseline IOP done by Goldman applanation tonometer were considered and mean IOP reduction were noted at 1,3,6,9,12 months in comparison to baseline mean IOP. **Results:** The mean baseline IOP was 16±2.98 mm Hg. There was a statistically significant reduction in mean IOP from the baseline in 1 month 2.86±0.2 mm Hg ($p < 0.05$) and after 12 months, the reduction was 2.94±0.2 mm Hg ($p< 0.05$). This shows a consistent reduction with once daily instillation of latanoprost. There was a significant higher reduction in intraocular pressures in patients with baseline IOP > 16 mm Hg as compared to patients with baseline IOP of < 16mm Hg ($p <0.05$). **Conclusions:** Latanoprost was found to be well tolerated and significantly reduced IOP in NTG patients along with sustained effect. IOP intraocular pressure, NTG normal-tension glaucoma, CCT central corneal thickness.

INTRODUCTION

In many cases there were progressive cupping and atrophy with the pressures always in the teens. This progressive deterioration was arrested by reduction in pressure below 12 mm Hg. In the Collaborative Normal-Tension Glaucoma Study(CNTGS), pilocarpine 2% alone achieved the required 30% reduction.[8][9]

Prostaglandin analogue like latanoprosts act by simulating uveoscleral outflow to reduce intraocular pressure.[5] Monotherapy of Latanoprost reduces IOP in open angle glaucoma patients and ocular hypertension.The reduction of IOP was recorded between 27.8% and 33 % respectively. There was also significant reduction in IOP in NTG.

METHODS AND MATERIALS

The medical records of 19 patients diagnosed with NTG alone were reviewed retrospectively. All patients were treated with 0.005% latanoprost a day at night alone.

We included the following criteria for the definition of NTG

A mean IOP without treatment consistently equal to or less than 21 mm Hg on diurnal testing, with no single reading more than 24 mm Hg.[1][2]

Open drainage angle on gonioscopy.

Typical optic disc damage with glaucomatous cupping and loss of the neuroretinal rim.

Absence of any secondary cause for a glaucomatous optic neuropathy.

Visual field defect compatible with the glaucomatous cupping (field/disc correlation)

Progression of glaucomatous damage.

NTG is usually a progressive disease although this may not manifest for several years. However, it is not practical to wait till it is progressed before the diagnosis of NTG is made. So the diagnosis was made on the basis of optic nerve and diurnal IOP readings along with visual field defects. Reliable visual field (i.e. false positive rate of 15%, false negative rate of 30% and fixation loss rate of 15% were taken into account). Few patients had visual field defect close to centre whereas other patients had visual field defects away from the periphery.

In addition central corneal thickness was taken in account for the present study. Factors like age, sex, family history of glaucoma, race, drug history, medical history and smoking habit were taken into account.All patients were older than 21 years. The patients who underwent ocular surgeries were excluded. Also, patients on the systemic antidepressants were excluded. Other factors, which can have effect on IOP, optic disc and visual field, like ocular and systemic diseases were

excluded. Gonioscopy was done to rule out angle closure.

Records of pressure at 1, 3, 6, 12 months after treatment with one drop of topical latanoprost 0.005% a day at night were considered. Goldmann applanation tonometer was used to measure IOP objectively.

RESULTS

Demographics were shown in Table 1. The Ratio of 9:10 for male to female was noted. 60.2 years was the mean age of the patients with an SD of 8. The mean duration of treatment of total 19 eyes was 11 ±3.9 months. All the patients had open angle at gonioscopy and mean central corneal thickness was in 530 µm ±20.

Table 1: Baseline characteristics of the treatment group.

	Latanoprost treatment group
AGE	
Mean	60.2
SD	8
Sex	
female	9
male	10
Baseline IOP	
mean	17.2
SD	1.8
Length of treatment	
Mean	11
SD	3.9
Central corneal thickness	
Mean	530
SD	20

Table 2: Mean intraocular pressure in 1 month, 3 months, 6 months and 12 months after latanoprost treatment.

Duration of treatment	IOP measurement estimated	Degree of freedom	F values	P> |F|
Baseline	16	451		
1 month	13.14	451	40.19	<0.0001
3 month	13.28	451	41.64	<0.0001
6 month	13.21	451	41.42	<0.0001
12 month	13.06	451	41.1	<0.0001

(Least square mean)

The mean baseline IOP was 16 ±2.98 mm Hg. Recorded pressure at 1 , 3, 6 ,12 months showed a marked reduction in IOP ($p<0.05$). Reduction in IOP readings was 2.86 mm Hg ±0.2, 2.9 mm Hg ±0.3, 3.1 mm Hg ±0.2and 2.94 mm Hg ±0.2 at month 1, 3, 6, 12 respectively after daily instillation of latanoprost 0.005%.The mean IOP verses time in 19 patients is shown in table 2.The maximum reduction was noted in,1 month and this was maintained throughout the period of 12 months.There was a difference in compliance between the patient noted. Unfortunately compliance was not taken into account in our study. However no association was found between the visual fields mean defect (which is an indicator of disease severity) and response to latanoprost.

Table 3: IOP reduction verses pre-treatment baseline IOP.

	Baseline IOP	>16 mm Hg		Baseline IOP	<16 mm Hg	
Duration of treatment	mean IOP in mm Hg	IOP reduction from Baseline in mm Hg	P> |F|	Mean IOP in mm Hg	IOP reduction from Baseline in mm Hg	P>|F|
Baseline	18.2			12.8		
1 month	14.7	-3.5(19.2%)	<0.0001	11	-1.8(14.06%	<0.0001
3 month	14.5	-3.7(20.3%)	<0.0001	11.2	-1.6(12.5%)	<0.0001
6 month	14.2	-4(21.97%)	<0.0001	11.1	-1.7(13.28%	<0.0001
12 month	14.4	-3.8(20.87%	<0.0001	11.4	-1.4(10.93%	<0.0001

There was a marked reduction in IOP in patients with baseline IOP >16 mm Hg as compared to patients with baseline IOP <16 mm Hg($p<0.05$) [6][7] Table 3.

DISCUSSION

NTG is a disease of elderly. Treatment modalities for NTG causes the reduction in IOP which in turn prevents deterioration of visual field and prevent the neuroretinal rim.[3][4] If IOP is reduced by 30% then progression of NTG can be prevented.

Asymmetric NTG is often associated with asymmetric IOP with an inverse correlation was found between IOP and neuroretinal rim area.

In this study 12 month duration of treatment was included and sustained ocular hypotensive effect of latanoprost was seen. The baseline mean difference was

estimated to be 2.98 mm Hg confirming a significant hypotensive effect of latanoprost in NTG. The treatment duration was for at least 12 months indicating that the ocular hypotensive effect of latanoprost is sustained in NTG. Average CCT in our study was 530 µm ± 20. Similar average CCT was found in their NTG by Copt et al which was less than their primary open angle glaucoma patients.[10]

Systemic blood pressure is strongly correlated with NTG and some crucial factors can be subdivided as 1.systemic hypertention 2.abnormal coagulabiliy of blood 3.abnormal flow of blood 4. other factors like angiotensin conversion. There are large nocturnal decrease and a lower level of diastolic BP in the NTG group. In NTG patients those who were on antihypertensive and who had larger decrease in systolic pressure at night have deterioration in the visual field. Also, in NTG patients there was a greater history of severe blood loss and history of hypotensive shock. An association between optic nerve changes and ischaemic change in the brain was seen. There was a higher incidence of cerebral infract on MRI in NTG patients.

NTG have normal IOP with wide diurnal fluctuation and nocturnal spike as compared to high pressure and normal diurnal in High IOP POAG. Both are disease of elderly with more female preponderance in NTG. Systemic vascular disease like Migrain, diabetes, stroke and cardiac arrythmia are associated with NTG. In NTG there are narrow NRR, thinner inferior NRR and NRR notching. There is more frequently B zone peripapillary atrophy and visual field defects are more central and deeper.

CONCLUSION

A sustained ocular hypotensive effect of latanoprost in eyes with NTG was found after an average treatment period of nearly 1 year. Latanoprost was found to be well tolerated and helped to reduce IOP significantly in NTG patients although many patients had mild conjunctival hyperemia.

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