

A COMPARATIVE STUDY OF INTRAOCULAR PRESSURE LOWERING EFFECT OF 2% DORZOLAMIDE AND 0.5% TIMOLOL IN POAG

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ABSTRACT

BACKGROUND

Glaucoma is an optic neuropathy in which there is characteristic structural damage to the optic nerve head associated with widespread progressive ganglion cell death, nerve fibre loss and typical visual field defects.

MATERIALS AND METHODS

The patients were selected from the Outpatient Department of Ophthalmology, Nalanda Medical College, Patna. A total of 100 cases of primary open-angle glaucoma were selected from those attending the outpatient department. They were divided into various groups and comparative study was done. Group 1- IOP between 20-30 mmHg. Group 2- IOP above 30 mmHg. Group 1 had total 60 patients whereas group 2 had total 40 patients. Each group were further divided into subgroups A and B. Subgroup A included those on timolol maleate (0.5%), whereas subgroup B those on dorzolamide hydrochloride (2%). Patients who had intraocular surgery and those on systemic beta blockers were excluded from this study. Patients were instructed not to administer their eye drops on the morning of the checkup visits in order to measure drug efficacy 12 hours after previous evening dose.

RESULTS

Group 1- There was a mean reduction of 6.2 ± 1.85 (22.94%) and 5.55 ± 1.68 (21.38%) mm of Hg in right and left eye respectively with timolol, whereas dorzolamide group showed a reduction of 3.91 ± 1.69 (14.04%) respectively in right and left eye. Group 2- There was a mean reduction of 4.72 ± 2.97 (15.73%) and $5.3s7 \pm 1.24$ (16.26%) in right and left eye respectively with timolol, whereas dorzolamide group showed a reduction of 4.30 ± 1.41 (12.90%) and 4.12 ± 2.08 mmHg (12.56%) in right and left eye, respectively.

CONCLUSION

Timolol maleate (0.5%) has an edge over dorzolamide hydrochloride (2%) as far as IOP lowering effect is concerned.

KEYWORDS

Primary Open-Angle Glaucoma/Timolol/Dorzolamide/Intraocular pressure/Compliance.

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BACKGROUND

Glaucoma is an optic neuropathy in which there is characteristic structural damage to the optic nerve head associated with widespread progressive ganglion cell death, nerve fibre loss and typical visual field defects.

It is a symptom complex characterised by a raised intraocular pressure, which the eyeball is not able to sustain and leads to anatomical, physiological and pathological changes in the eye. Raised intraocular pressure is usually, but not invariably an important associated risk factor. Von Graefe was pioneer in glaucoma classification and classified the disease into congestive and non-congestive forms. But,

it was Henderson who in 1908, contrary to popular prevailing belief showed that glaucoma is present even in eyes with open angle. Shields gave a modern and elaborate classification of glaucoma.

Of all the forms, primary open-angle glaucoma is by far the most common. It follows an insidious course and by the time patient reaches the clinician with symptoms considerable damage has already taken place. Medical treatment forms the basis of management of primary open-angle glaucoma with the availability of a number of antiglaucoma medication. The topical antiglaucoma drugs include cholinergic agents, adrenergic agonists, prostaglandin analogues and carbonic anhydrase inhibitors, whereas hyperosmotic drugs and acetazolamide are systemically administered agents.¹

Beta blockers are the agent of choice for first line management of glaucoma and timolol remains the gold standard against, which other agents are compared. These drugs act by decreasing aqueous production. Used twice daily in the strength of 0.5%, it lowers IOP by 25%. But, being a non-selective beta blockers, it is prone to produce

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side effects especially in patients with congestive heart failure, heart block, bradycardia, hypotension, asthma and COPD.

Dorzolamide, a carbonic anhydrase inhibitor has emerged as a new therapeutic option. Being a topical agent, it is free from systemic side effects seen with systemically administered acetazolamide. It acts by decreasing aqueous humour secretion by ciliary processes and lowers IOP by 13-24%. Studies have shown dorzolamide to improve retinal microcirculation and hence halt the progression of the disease.^{2,3}

Aims and Objectives

1. Comparing the efficacy of dorzolamide in comparison to timolol in lowering the intraocular pressure in patients of primary open-angle glaucoma.
2. The safety and adverse effect of dorzolamide in comparison to timolol.
3. The patient compliance of dorzolamide in comparison to timolol.

MATERIALS AND METHODS

Selection of Cases- A total of 100 cases of primary open-angle glaucoma were selected from those attending the Outpatient Department of Nalanda Medical College and Hospital, Patna.

Each case was examined properly and findings were recorded.

The history of each case was meticulously recorded regarding ocular or systemic illness and complaints suggestive of narrow angle and open angle glaucoma.

All patients selected for the study were examined for their cardiovascular status, heart rate and pulse rate were counted in supine position, blood pressure were also recorded.

Complete external examination was done with the help of torch light and slit lamp.

Distant visual acuity was tested on an illuminated Snellen's chart at a distance of 6 metres with and without full optical correction.

Intraocular pressure recording was done with Schiottz tonometer. The average of three readings was noted.

Gonioscopy was done in each case with the help of Goldmann three mirror contact gonioscopes to exclude the cases with narrow anterior chamber angle.

Visual field examination was done with the help of Humphrey field autoanalyzer.

Group 1- IOP between 20-30 mmHg.

Group 2- IOP above 30 mmHg.

Group 1 had total 60 patients, whereas group 2 had total 40 patients.

Each group were further divided into subgroups A and B.

Subgroup A included those on timolol maleate (0.5%), whereas subgroup B those on dorzolamide hydrochloride (2%).

Patients who had intraocular surgery and those on systemic beta blockers were excluded from this study.

The patients suffering from obstructive pulmonary disease or hypertension/hypotension were kept in dorzolamide group, because of the fact that timolol causes adverse effects like exaggeration of asthma, heart block or systemic hypotension.

The patients were instructed not to administer their eye drops on the morning of checkup visits in order to measure drug efficacy 12 hours after the previous evening dose.

RESULTS

Group 1- A total of 60 patients were included in this group, 30 in subgroup 1A and 30 in subgroup 1B. The mean pretreatment IOP was 27.02 ± 3.86 and 25.95 ± 2.16 mmHg. The mean pretreatment IOP was 24.88 ± 2.86 and 23.29 ± 2.83 mmHg in right and left eye respectively in Group 1B. At the end of 24 weeks of treatment, it was 20.82 ± 2.46 and 20.40 ± 1.60 mmHg in right and left eye respectively with timolol. The mean IOP at the end of 24 weeks was 20.90 ± 1.73 and 20.02 ± 1.86 mmHg in right and left eyes, respectively.

There was a mean reduction of 6.2 ± 1.85 (22.94%) and 5.55 ± 1.68 (21.38%) mm of Hg in right and left respectively with timolol, whereas dorzolamide group showed a reduction of 3.91 ± 1.60 (15.99%) and 3.27 ± 1.69 (14.04%) respectively in right and left eye.

Group 2- A total of 40 patients were included in this group, 20 in subgroup 2A and 20 in subgroup 2B. The mean pretreatment IOP was 30.0 ± 6.31 and 33.02 ± 1.09 mmHg in right and left eye, respectively in group 2A. The mean pretreatment IOP was 33.33 ± 2.53 and 32.79 ± 4.31 mmHg in right and left eye respectively in group 2B. At the end of 24 weeks of treatment, it was 25.28 ± 3.59 and 27.65 ± 2.18 mmHg in right and left eye respectively with timolol. The mean IOP at the end of 24 weeks were 29.03 ± 2.65 and 28.67 ± 3.56 mmHg in right and left eyes, respectively.

There was a mean reduction of 4.72 ± 2.97 (15.73%) and 5.37 ± 1.24 (16.26%) mm of Hg in right and left respectively with timolol, whereas dorzolamide group showed a reduction of 4.30 ± 1.41 (12.90%) and 4.12 ± 2.08 mmHg (12.56%) respectively in right and left eye.



Figure 1. Tonometry with Schiottz Tonometer



Figure 2. Disc Evaluation with 90D



Figure 3. Automated Tonometry

DISCUSSION

The Hippocratic aphorisms include the term glaucoma, which was used to describe blindness coming in advanced years associated with a glazed, 'sea-coloured' appearance of the pupil.^{4,5}

Timely and adequate control of glaucoma is very important to prevent further silent loss of vision. The treatment of glaucoma is primarily directed towards lowering intraocular pressure. This can be brought about by conservative medical treatment, laser therapy or by surgery.⁵

Initially, patients with glaucoma are treated with ocular hypotensive agents. If the IOP is not sufficiently lowered or the disease progresses as estimated by decay of visual fields or increasing excavation of optic disc, then argon laser trabeculoplasty or surgical filtering procedure trabeculectomy must be performed.^{6,7}

In present study, a total of 100 cases of primary open-angle glaucoma were selected from those attending the

Outpatient Department of Nalanda Medical College and Hospital, Patna.

Each case was examined properly and findings were recorded.

The history of each case was meticulously recorded regarding ocular or systemic illness and complaints suggestive of narrow angle and open-angle glaucoma.

All patients selected for the study were examined for their cardiovascular status, heart rate and pulse rate were counted in supine position, blood pressure were also recorded.

Complete external examination was done with the help of torch light and slit lamp.

In the present study, there was a mean reduction of 6.2 ± 1.85 (22.94%) and 5.55 ± 1.68 (21.38%) mm of Hg in right and left respectively with timolol, whereas dorzolamide group showed a reduction of 3.91 ± 1.60 (15.99%) and 3.27 ± 1.69 (14.04%) respectively in right and left eye.

CONCLUSION

Dorzolamide has an edge over timolol as far as reduction of intraocular pressure is concerned. Compliance to dorzolamide in hypertensive patients as well as in asthmatics is good in comparison to timolol.

The adverse effects of dorzolamide were less than timolol.

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