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Original Research Article.

Comparative Analysis of Efficacy of Timolol Maleate and Timolol - Brimonidine Combination in Lowering the Intraocular Pressure in Primary Open Angle Glaucoma: An Institutional Based Study

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ABSTRACT

Background: Target IOP levels are not always achieved with the use of one agent, however, and many patients require combination therapy. The present study was conducted to compare the efficacy of timolol maleate and timolol - brimonidine combination in lowering the intraocular pressure (IOP) in primary open angle glaucoma (POAG).

Materials and Methods: This comparative study between the efficacy of Timolol Maleate versus Timolol-Brimonidine combination. In group I, the concentration of the monotherapy was 0.5% w/v Timolol Maleate and in group II, the concentration of the combination therapy was 0.2% w/v Brimonidine Tartrate and 0.5% w/v Timolol Maleate. The data collected was analyzed using Descriptive and Inferential statistics, and the Statistical Software used for Data Analysis was SPSS.

Results: Monotherapy of Timolol is seen to lower the IOP in 6 days, whereas the Timolol-Brimonidine combination therapy lowers the IOP in 3 days. After reaching a I.O.P of 12mmHg, which is the normal IOP, both the drugs are used for maintenance therapy. Adverse effects were reported with the usage of both the drug therapies. Dryness of eyes was seen in 6.66% of the patients in both cases. With the Timolol-Brimonidine combination therapy, redness of eyes was also seen in 6.66% of patients, which was not reported in case of monotherapy of Timolol.

Conclusion: The present study concluded that Timolol monotherapy provides the same result as the Timolol-Brimonidine combination therapy and also lesser adverse as redness of eyes was absent in monotherapy patients.

Keywords: Timolol Maleate, Timolol – Brimonidine, Intraocular Pressure, Primary Open Angle Glaucoma.

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INTRODUCTION

Glaucoma is a group of diseases characterized by a progressive form of optic nerve damage. This is generally, but not necessarily, associated with raised (>21mm Hg) intra ocular pressure (IOP) but the etiology is unknown and there are many risk factors. The chief therapeutic measure is to lower the IOP, either by reducing the secretion of aqueous humor or by promoting its drainage.[1] A positive correlation has been reported between the reduction of intraocular pressure (IOP) and a decrease in the incidence or stabilization of glaucoma. Evidence of the absence, or retardation of loss, of visual field and even improvement in the sensitivity levels due to the reduction in IOP have also been reported.

Additionally, a reduction of IOP in patients with ocular hypertension (OHT) might be associated with a decrease in the risk of progressing to primary open-angle glaucoma (OAG).[2] The importance of controlling intraocular pressure (IOP) in glaucoma has been firmly established. It is also well known that many patients require 2 or more medications to reach their target IOP. Accordingly, the mainstay of therapy for primary open-angle glaucoma (POAG) and ocular hypertension (OHT) consists of IOP-lowering agents such as prostaglandin analogues/ prostamide, b-blockers, and a2- adrenergic receptor agonists, which are often used in combination due to their complementary

mechanisms of action.[3,4] Timolol is the prototype of ocular beta blockers. It is nonselective and has no local anaesthetic or sympathomimetic activity. The ocular hypotensive action (20-35% fall in IOP) becomes evident within 1 hour and lasts for 12 hours.[1] Brimonidine, a selective a2 agonist ocular hypotensive agent, acts by reducing aqueous humour production and increasing uveoscleral outflow.[5] Compared with timolol in patients with open angle glaucoma or ocular hypertension, brimonidine dosed twice daily produces similar or significantly lower IOP levels when measured 2 hours after a morning dose. Twelve hours after the evening dose (trough), mean decreases in IOP are consistently and significantly greater in timolol treated patients, support- ing the brimonidine labelling recommendation of three times daily dosing.[6] The present study was conducted to compare the efficacy of timolol maleate and timolol - brimonidine combination in in lowering the intraocular pressure (IOP) in primary open angle glaucoma (POAG).

MATERIALS AND METHODS

This comparative study between the efficacy of Timolol Maleate versus Timolol-Brimonidine combination was conducted in Department of Pharmacology, Krishna Mohan Medical College and Hospital, Mathura, Uttar Pradesh, India. Institutional ethical committee clearance was obtained and written informed consent was taken from all patients. Patients of Primary Open Angle Glaucoma (POAG) were included in the study. Person has other complications relating to IOP, Person who were taking additional medication to lower IOP, When I.O.P is higher than normal, but person doesn't show signs of glaucoma, Patients with a history of bronchial asthma, COPD and cardiac diseases were excluded from the study. The total number of cases comprises 60, with 30 in each group. In some patients both their eyes were involved, hence I.O.P was measured separately. In group I, the concentration of the monotherapy was 0.5% w/v Timolol Maleate and in group II, the concentration of the combination therapy was 0.2% w/v Brimonidine Tartrate and 0.5% w/v Timolol Maleate. Both drugs were instilled in the affected eye, twice daily (once in morning and once at night), for a period of four weeks. The measurement of IOP was done every three days in the morning by using Goldmann Applanation Tonometry, which is the gold standard procedure for the measurement of IOP. Once the IOP was lowered to 12mmHg, the drugs were continued to be instilled twice daily for the remaining duration of the study, as a part of the maintenance therapy. The data collected was analyzed using Descriptive and Inferential statistics, and the Statistical Software used for Data Analysis was SPSS V25.0.

Table 1: Comparison between both groups with respect to the efficacy of lowering the I.O.P in POAG

No. of days	Group I (N=45) Measured mmHg	Group II (N=45) Measured mmHg
0	25	25
3	18	13
6	13	13
9	13	13
12	13	13
15	13	13
21	13	13
28	13	13

Table 2: Comparison between Timolol Maleate and Timolol- Brimonidine combination with respect to the adverse effects

Adverse effects	Group I (N=45)	Group II (N=45)
Dryness of eyes	3(6.66%)	3(6.66%)
Redness of eyes	0(%)	3(6.66%)

RESULTS

The total number of cases comprises 60, with 30 in each group. In some patients both their eyes were involved, hence I.O.P was measured separately. In group I, the concentration of the monotherapy was 0.5% w/v Timolol Maleate and in group II, the concentration of the combination therapy was 0.2% w/v Brimonidine Tartrate and 0.5% w/v Timolol Maleate. While 50% of the patients in both the groups had POAG in both their eyes, the remaining patients developed POAG in either the right eye or the left eye. Monotherapy of Timolol is seen to lower the IOP in 6 days, whereas the Timolol-Brimonidine combination therapy lowers the IOP in 3 days. After reaching a I.O.P of 12mmHg, which is the normal IOP, both the drugs are used for maintenance therapy. Adverse effects were reported with the usage of both the drug therapies. Dryness of eyes was seen in 6.66% of the patients in both cases. With the Timolol-Brimonidine combination therapy, redness of eyes was also seen in 6.66% of patients, which was not reported in case of monotherapy of Timolol.

DISCUSSION

Reduction of elevated IOP is the only proven approach to protect against visual field loss in patients with open-angle glaucoma (OAG) or OHT, making ocular hypotensive agents critical to the management of these patients. If single-agent therapy is insufficient, a second hypotensive drug is added, which can produce an additional IOP decrease.[7] The 2-drug combination can be comprised of two individual agents or a fixed-combination (FDC) product. A systematic review confirmed that these two types of glaucoma therapies produce equivalent efficacy.[8]

Monotherapy of Timolol is seen to lower the IOP in 6 days, whereas the Timolol-Brimonidine combination therapy lowers the IOP in 3 days. After reaching a I.O.P of 12mmHg, which is the normal IOP, both the drugs are used for maintenance therapy. Adverse effects were reported with the usage of both the drug therapies. Dryness of eyes was seen in 6.66% of the patients in both cases. With the Timolol-Brimonidine combination therapy, redness of eyes was also seen in 6.66% of patients, which was not reported in case of monotherapy of Timolol.

In a large study (n = 3333) of patients taking glaucoma medications, the majority (79%) reported that they were satisfied with their eye drops; however, nearly 1 in 10 patients (9%) were likely to have their medication changed at their next visit due to side effects.[9]

Patients who continued timolol as monotherapy upto the end of the study had shown significant IOP reduction from baseline.[10]

Reis R, et al concluded that Brinzolamide 1% and timolol maleate 0.5% treatment were both associated with a significantly greater reduction in IOP compared with brimonidine 0.2% when administered as a nonfixed adjuvant to travoprost 0.004% in the treatment of patients with OAG and OHT whose IOP was inadequately controlled with travoprost monotherapy. All treatments were well tolerated.[2]

CONCLUSION

The present study concluded that Timolol monotherapy provides the same result as the Timolol-Brimonidine combination therapy and also lesser adverse as redness of eyes was absent in monotherapy patients.

REFERENCES

1. Tripathi KD. Essentials of Medical Pharmacology. 7th ed. Replika Press; 2013.

2. Reis R, Queiroz CF, Santos LC, Avila MP, Magacho L. A randomized, investigator-masked, 4-week study comparing timolol maleate 0.5%, brinzolamide 1%, and brimonidine tartrate 0.2% as adjunctive therapies to travoprost 0.004% in adults with primary open-angle glaucoma or ocular hypertension. Clinical therapeutics. 2006 Apr 1;28(4):552-9.

3. Heijl A, Leske MC, Bengtsson B, Hyman L, Hussein M. Reduction of intraocular pressure and glaucoma progression: results from the Early Manifest Glaucoma Trial. Arch Ophthalmol. 2002; 120:1268e1279.

4. Kass MA, Heuer DK, Higginbotham EJ, et al. The Ocular Hypertension Treatment Study: a randomized trial determines that topical ocular hypotensive medication delays or prevents the onset of primary open angle glaucoma. Arch Ophthalmol. 2002; 120:701e713.

5. Toris CB, Gleason ML, Camras CB, et al. Effects of brimonidine on aqueous humor dynamics in human eyes. Arch Ophthalmol 1995; 113:1514–917.

6. Garc´ıa-Sa´nchez J, and the Spanish Latanoprost Study Group. Efficacy and side effects of latanoprost monotherapy compared to adding dorzolamide to timolol in patients with glaucoma and ocular hypertension—a three-month randomised study. Eur J Ophthalmol 2000; 10:198–204.

7. Webers CA, Beckers HJ, Nuijts RM, Schouten JS. Pharmacological management of primary open-angle glaucoma: Second-line options and beyond. Drugs Aging 2008;25:729-59.

8. Cox JA, Mollan SP, Bankart J, Robinson R. Efficacy of antiglaucoma fixed combination therapy versus unfixed components in reducing intraocular pressure: A systematic review. Br J Ophthalmol 2008;92:729-34.

9. Beckers HJ, Schouten JS, Webers CA, van der Valk R, Hendrikse F. Side effects of commonly used glaucoma medications: Comparison of tolerability, chance of discontinuation, and patient satisfaction. Graefes Arch Clin Exp Ophthalmol 2008;246:1485-90.

10. Watson PG, Barnett MF, Parker V, Haybittle J. A 7 year prospective comparative study of three topical beta blockers in the management of primary open angle glaucoma. Br J Ophthalmol 2001;85:962-8.

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