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Comparison of latanoprost 0.005% and travoprost 0.004% in patients with primary open angle glaucoma and ocular hypertension

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Abstract

This study compares the hypotensive effect of latanoprost 0.005% and travoprost 0.004% solutions in primary open-angle glaucoma or ocular hypertensive patients. In this prospective, multicenter clinical trial, 100 patients received either latanoprost once daily in the evening (n = 50), or travoprost once daily in the evening (n = 50). Efficacy was compared across treatment groups over 6 months. Mean intraocular pressure at the first visit in the latanoprost 0.005% group was 26.2 mmHg (SD ± 1.9 mmHg), and 17.5 mmHg (SD ± 1.2 mmHg) at the fifth visit (after 6 months). In the travoprost group, the mean intraocular pressure in the first visit was 26.3 mmHg (SD ± 1.9 mmHg), and 18.4 mmHg (SD ± 1.5 mmHg) in the fifth visit. In both groups, there was a statistically significant difference in intraocular pressure between the first and firth visits, for both eyes. Both latanoprost and travoprost showed similar hypotensive effect with the first one being slightly more potent in reducing the IOP.

Keywords: primary open-angle glaucoma, latanoprost, travoprost, intraocular pressure.

Introduction

Glaucoma is the leading cause of irreversible blindness in the world. Intraocular pressure (IOP) is considered a major risk factor for the development of glaucomatous optic neuropathy (1-3). Primary open-angle glaucoma (POAG) is the most common form of glaucoma in the European population (4).

Currently, lowering IOP is the only approved approach for preventing glaucoma formation in ocular hypertensive (OHT) patients and to prevent or delay

glaucomatous progression in POAG patients (5). Elevated IOP is usually managed initially with medical therapy. The most popular drugs include — blockers, carbonic anhydrase inhibitors, α-agonists, miotics, and prostaglandin analogs (PGs). PGs are the most potent ocular hypotensive medications used in the treatment of POAG and OHT (6).

Several clinical trials have compared the efficacy and safety of different PGs (15-27). However, the results of these studies have not been consistent. Over the last decade, some meta-analyses have evaluated PGs for glaucoma treatment (7-9), but they have all reported different conclusions regarding their efficacy. For example, a head-to-head evaluation of PGs by Oghenowede Eyawo (7) has reported that PGs have similar IOP-lowering effects, but differing hyperemia effects. Moreover, Aptel (8) has demonstrated that bimatoprost has a greater efficacy compared to latanoprost and travoprost; while according to Denis (9) travoprost might have greater efficacy in lowering IOP compared to latanoprost. As such, there is a clear lack of consensus in the existing literature around level of effictiveness of PGs in IOP reduction.

Methodology

This study recruited 100 patients referred to Glaucoma Service of University Clinical Center of Kosovo. We included patients with a clinical diagnosis of ocular hypertension or primary open-angle glaucoma. We also included only patients who had demonstrated best corrected Snellen visual acuity of 20/200 or better in each eye, and who had an intraocular pressure ≤30 mmHg in both eyes. We excluded patients who had other primary or secondary glaucoma not listed in the inclusion criteria; any abnormality preventing reliable applanation tonometry; any known opacity or patient uncooperativeness that restricted adequate examination of the ocular fundus or anterior chamber in either study eye; or a concurrent infectious/noninfectious conjunctivitis, keratitis or uveitis in either eye.

Qualifying patients were assigned to two categories: those who received latanoprost 0.005% once daily in the evening (n=50), and those who received travoprost 0.004% once daily in the evening (n=50). In the study, we included both eyes of patients and all the patients have received glaucoma medications for the first time. This study was conducted according to the guidelines of the Declaration of Helsinki.

Efficacy was compared across treatment groups over 6 months. We measured IOP using a Goldmann applanation tonometer for each eye between 8 a.m. and 10 a.m. at baseline (day 0) and four control visits: control 1 (after 1 week), control 2 (after 4 weeks), control 3 (after 12 weeks) and control 4 (after 6 months).

The data was analyzed by statistical package SPSS 22.0. The data obtained are presented as arithmetic mean and standard deviation for quantitative data and as a percentage for qualitative data. The Kruskal-Wallis test was used for statistical analysis. A p-value of =0.05 was considered to be statistically significant.

Results

We included 100 patients with POAG or ocular hypertension in our study, of which 57 were female and 43 were male. Patients included in the research were divided into two groups, each containing 50 patients: (1) latanoprost group and (2) travoprost group. By gender, both groups had slightly more females without significant differences between groups (P> 0.05). Similarly, we did not observe a difference between groups in terms of the age of the participants or the baseline IOP.

The mean values of IOP (mmHg) of both groups were similar 26.2 vs. 26.3 mmHg (Table 1). Withdrawn patients included one (latanoprost) for lack of efficacy and four (three travoprost and one latanoprost) for adverse events such as conjunctival hyperaemia, ocular discomfort and dry eye sensation.

	LATANOPROST group (n=50)	TRAVOPROST group (n=50)	P-value
Gender N (%)			
Male	22 (44.0)	21 (42.0)	0.999
Female	28 (56.0)	29 (58.0)	
Age (year)			
Mean ± SD Rank	64.6 ± 10.6 (42 - 91)	70.6 ± 10.5 (47 - 93)	0.068
Mean Baseline IOP (mmHg)			
Mean ± SD Rank	26.2 ± 1.9 (23.0 - 30.0)	26.3 ± 1.9 (23.0 - 30.5)	0.958

Table 1: Comparison of clinical and demographic characteristics between groups

One week after the application of the therapy we observed a decrease in IOP for both groups (22.4% for the latanoprost group and 21.0% for the travaprost group), without significant difference between groups. The decrease in IOP continued in both groups even after four weeks, again without a significant difference in effect. After 12 weeks, however, we did observe a significant difference (P = 0.043). In the latanoprost group, the mean IOP was reduced by 30.9% in comparison with the baseline measurement, while the mean IOP of the travoprost group was reduced by 28.3%. The difference was greater after 6 months, where mean IOP of the latanoprost group was reduced by 33.0% relative to the baseline, and by 29.7% in the travoprost group. The difference in IOP lowering efficacy between each treatment group was statistically significant (P = 0.033, Table 2).

Discussion

Prostaglandin analogues are currently the most prescribed antiglaucoma monotherapy by virtue of their potent IOP reduction and good tolerability. Some clinical trials (13-15), have revealed that the 2 PGs included in this study, i.e. travoprost. and latanoprost have the same efficacy.

Several clinical studies have evaluated the clinical efficacy of travoprost 0.004% and latanoprost 0.005% in lowering IOP. Netland and coworkers concluded that travoprost was equal or superior to latanoprost with mean intraocular pressure over visits and time of day ranging from 17.7 to 19.1 mm Hg (travoprost 0.004%), 18.5 to 19.2 mm Hg (latanoprost). For all visits pooled, the mean intraocular pressure at 4 p.m. for travoprost was 0.7 mmHg (0.0015%, P = .0502) and 0.8 mmHg (0.004%, P = .0191) lower than for latanoprost. Based on a criterion of 30% or greater intraocular pressure reduction from diurnal baseline, or intraocular pressure 17 mm Hg or less, travoprost 0.004% had an overall response of 54.7%, compared with 49.6% for latanoprost (10).

A randomized trial of PGs was carried out by Franks et al, where 110 patients were randomized, of whom 106 patients were evaluable (travoprost, n = 50; latanoprost/timolol, n = 56). There were no statistically significant differences at baseline between the treatment groups, based on age group or sex. Mean IOP values were not statistically different between groups at baseline or during treatment. In the pooled results for 9 a.m. assessment at weeks 2 and 6, mean (SEM) IOP reductions for travoprost and latanoprost/timolol were 7.0

	LATANOPROST group (n=50)	TRAVOPROST group (n=50)	P-value
Mean and % IOP change from baseline (mmHg) (Mean ± SD), (Rank)			
Baseline	-	-	
1 weeks	5.9 ± 2.0 (2.0 - 9.5) (22.4%)	5.6 ± 2.0 (2.0 - 11.5) (21.0%)	0.316
4 weeks	7.7 ± 2.1 (3.0 - 12.0) (29.1%)	7.1 ± 2.2 (3.0 - 11.0) (26.6%)	0.071
12 weeks	8.2 ± 2.1 (4.5 - 12.0) (30.9%)	7.5 ± 2.4 (3.0 - 12.0) (28.3%)	0.043
6 months	8.8 ± 2.3 (4.0 - 8.8) (33.0%)	7.9 ± 2.1 (4.0 - 7.9) (29.7%)	0.038
Mean IOP (mmHg) (Mean ± SD), (Rank)			
Baseline	26.2 ± 1.9 (23.0 - 30.0)	26.3 ± 1.9 (23.0 - 30.5)	0.958
1 weeks	20.4 ± 1.8 (15.0 - 23.5)	20.7 ± 1.8 (16.5 - 24.0)	0.318
4 weeks	18.6 ± 1.8 (15.0 - 22.0)	19.2 ± 1.6 (16.0 - 22.0)	0.067
12 weeks	18.1 ± 1.7 (14.5 - 21.5)	18.8 ± 1.5 (16.0 - 22.5)	0.045
6 months	17.5 ± 1.2 (14.5 - 19.5)	18.4 ± 1.5 (14.5 - 21.0)	0.0006

Table 2: Comparison of IOP parameters between groups at all timepoints

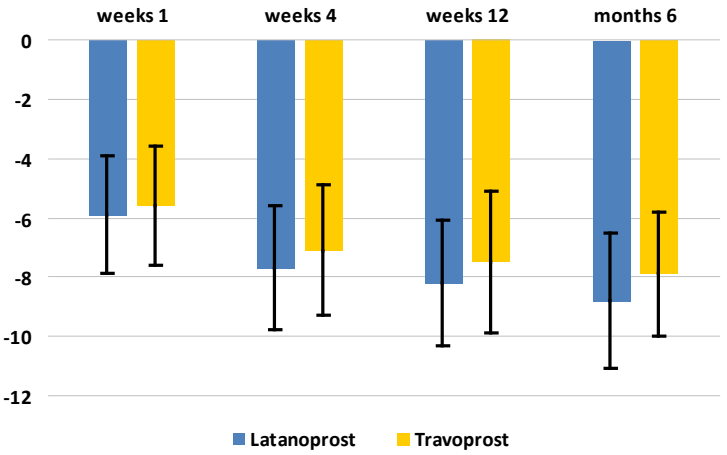

Chart 1: Mean IOP change from baseline (mmHg)

(0.5) and 6.4 (0.5) mm Hg, respectively (P = NS) (11).

In the study of Topouzis and coworkers, travoprost 0.004%/timolol 0.5% ophthalmic solution produced mean IOP levels that are statistically noninferior to latanoprost 0.005%/timolol 0.5% ophthalmic solution. Furthermore, at 9:00 a.m., 24 hours after dosing, IOP was statistically lower for travoprost 0.004%/timolol 0.5% pooled across all visits. Based on this report, travoprost 0.004%/timolol 0.5% fixed combination ophthalmic solution is an effective treatment for reducing IOP (12).

Conclusion

Our results underline the efficacy of both travoprost and latanoprost in lowering IOP. In light of the statistically significant difference in effect, our results suggest that latanoprost 0.005% might be slightly more effective than travoprost 0.004% for lowering IOP in patients with POAG and OHT. In clinical settings, the appropriate use of medicine is very important for patients. Efficiently lowering the intraocular pressure of glaucoma patients to a safe level is essential to them. These results may be useful for determining the optimal strategy for individual patients.

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