Original Article

Comparison of Intraocular Pressure Lowering Effect of 0.5% Levobunolol and 0.5% Timolol Maleate after Nd: YAG Laser Capsulotomy

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Purpose: To evaluate the efficiency of timolol maleate compared to levobunolol, in the prevention of the intra-ocular pressure (IOP) after Nd: YAG laser posterior capsulotomy.

Material and Method: This study was conducted on 50 patients in the department of Ophthalmology, Shaikh Zayed Hospital Lahore. The patients were randomly assigned to receive either 0.5% timolol maleate, 1 drop 12 hourly for 5 days after Nd: YAG laser capsulotomy or 0.5% levobunolol, 1 drop 12 hourly after the procedure.

Results: There were no statistically significant differences between the two groups regarding the IOP pre-YAG and 2 hours, first day and 7 days after the laser treatment (p values, respectively: 0.077, 0.085, 0.36, and 0.60).

Conclusion: The results of this study suggest that 0.5% timolol maleate is as safe and effective as levobunolol in the prevention of the IOP elevation after Nd: YAG laser posterior capsulotomy.

Posterior capsular opacification is one of the major complication after the extracapsular cataract extraction or phacoemulsification[1]. Posterior capsular opacification is caused by proliferation and migration of residual lens epithelial cells which can produce visual loss through two mechanisms[2]. They can form swollen, abnormal shaped lens cell called Elschnig's pearls, which migrate over the posterior capsule into the visual axis[3]. Standard treatment of posterior capsular opacification

consists of opening the posterior capsule using a Neodymium: Yatrium – Aluminium - Garnet laser (Nd: YAG laser) [4,5]. YAG laser works on the principle of photodisruption. The laser shots produce plasma around the target spot which bursts producing a shock wave resulting in a hole in the posterior capsule[6]. The Nd-YAG laser in pulse mode was adopted for use in ophthalmology, and the first posterior capsulotomy in the human eye was performed[7]. The Nd-YAG laser capsulotomy is a very simple procedure which can be performed on outdoor basis, so it saves a lot of inconvenience and time both on the part of surgeon as well as patient[9]. The rise in intraocular pressure can be controlled by using topical ß-blockers[8]. Topical 0.5% timolol maleate and 0.5% levobunolol are ß-blockers, which effectively known to control the rise of intraocular pressure[9].

0.5% timolol maleate and 0.5% levobunolol are both commonly used topical ß-blockers with very good results in lowering IOP and used twice daily. All the ß-blockers are the preferred medication in lowering IOP after YAG laser capsulotomy because of their easy dosage and reliable results.

This study was conducted to evaluate the efficiency of timolol maleate compared to levobunolol in the prevention of the intra-ocular pressure (IOP) after Nd: YAG laser posterior capsulotomy.

MATERIAL AND METHODS

The study was conducted in post cataract surgery patients reporting with posterior capsule thickening at the Ophthalmology Outpatient Department of Shaikh Zayed Hospital, Lahore from 2004 to 2005. A total of 50 patients undergoing Nd-YAG laser capsulotomy were divided into two groups of 25 patients each by simple randomization. Twenty five patients in group A was given 0.5% levobunolol after laser treatment, 1 drop 12 hourly for 5 days. The other 25 patients in group B was given 0.5% timolol maleate after laser treatment, 1 drop 12 hourly for 5 days. The patients were subjected to intraocular pressure measurements in mm of Hg on Goldman's applanation tonometer every time by same person and on the same apparatus. In this study, the patient underwent Nd-YAG laser capsulotomy by VISU YAG II plus (ZEISS) laser with capsulotomy corneal contact lens.

The statistical analysis was performed using a Student's t test for non correlate populations and a Paired Student's t test to compare the mean IOP between the two groups. A p value <0.05 was considered as statistically significant.

RESULTS

The mean IOP before any medication or treatment (pre-YAG) was 13.11 ± 2.72 mmHg in the timolol maleate group and 13.06 ± 2.49 mmHg in the levobunolol group showing no statistical difference between the groups (p value 0.90). Mean values of IOP in each interval are listed in Table 1.

There were no statistically significant differences between the two groups regarding the pre YAG mean IOP, two hours, 1st day and seven days after treatment (p=0.077, 0.085, 0.036, and 0.60, respectively).

The levobunolol group had a significant decrease in IOP, two hours after the laser treatment (p=0.0006 and 0.0009), as compared to baseline. No statistically significant decrease was observed 1st day after treatment (p=0.28) but there was a significant decrease in seven days after the laser treatment (p=0.0095).

In the timolol maleate group there was no significant decrease in the IOP measures two hours and 1st day after the laser application (p=0.063 and 0.77) as compared to the baseline. No statistically significant increase in IOP was observed seven days after the procedure (p=0.065).

There was no significant differences in the IOP of the two groups at the various intervals (p=0.074, two hours after, 0.40, 1st day after and 0.54, seven days after the treatment).

In the levobunolol group, 8% of the patients had an IOP increase higher than 5mmHg two hour after the laser and 10% after 1st day. After seven days of treatment 16% of the patients had an increase in IOP compared to the baseline.

In the timolol maleate group, 6% of the patients had an IOP higher than 5 mmHg two hour after the laser, 8% after 1st day. Seven days after the laser treatment, 8% had IOP values 5 mmHg above baseline.

DISCUSSION

In ophthalmology, Nd: YAG laser posterior capsulotomy is a routine procedure, since up to 40% of the patients submitted to cataract surgery with IOL implantation develop posterior capsule opacification despite the progress made in surgical techniques[1,3].

Although Nd: YAG laser is considered to be a safe procedure, it can cause several complications, namely retinal detachment, iritis, macular edema, IOL cracks and pits and IOP spike[1,2].

In the present study we compare the preventive effect of 0.5% timolol maleate to 0.5% levobunolol in patients undergoing Nd: YAG laser for posterior capsule opacification after extracapsular cataract extraction and posterior chamber intraocular lens implantation.

The groups were comparable regarding gender, age and mean baseline IOP. There were no statistical differences between the two groups in IOP measurement before treatment, showing that the study population was homogeneous.

In addition, there were no statistically significant differences between the groups as concerns the IOP increase or decrease at the various intervals.

The results obtained suggest that the effect of 0.5% timolol maleate is similar to 0.5% levobunolol in the prevention of the IOP spike after Nd: YAG laser posterior capsulotomy.

Table 1: IOP mean values comparison between 0.5% Timolol maleate and 0.5% Levobunolol groups before and after YAG laser capsulotomy

	Pre-YAG (baseline)	2 hour Post YAG	1st day	1st week
Timolol maleate	13.06±2.49	12.21±3.65	12.68±3.81	14.11±4.
Levobunolol	13.11±2.72	13.02±3.18	13.12±3.27	13.82±4.15
P value	0.90	0.07	0.08	0.03

IOP Intraocular pressure

Table 2: IOP changes, comparison between 0.5% Timolol maleate and 0.5% Levobunolol groups before and after YAG laser capsulotomy

	Pre-YAG (baseline	2 hour Post YAG	1st day	1st week
Timolol maleate				
IOP change		0.85±3.14	-0.38±3.49	0.90±3.99
Range	(9-22)	(7-24)	(6-28)	(6-30)
Levobunolol				
IOP change		0.08±3.15	0.02±3.46	0.71±4.19
Range	(6-20)	(6-22)	(6-23)	(7-28)

In this study, the incidence of IOP increase above 10 mmHg, observed in both groups (1.04% in the levobunolol group and 0.82% in the timolol maleate group), is lower than the incidence described in the literature with other drugs. These findings support the hypothesis that either 0.5% timolol maleate or 0.5% levobunolol can be safely chosen as prophylactic medications for Nd: YAG laser procedures. The proven efficacy of different intraocular pressure lowering agents in preventing IOP spikes after laser procedures provides alternative treatments that allow the physician to indicate the best prophylactic medication for each patient, according to their ocular and medical history.

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