

**COMPARATIVE STUDY OF TIMOLOL MALEATE AND BRIMONIDINE TARTARATE
IN GLAUCOMA MANAGEMENT IN A TERTIARY CARE HOSPITAL****A. A. Mohamed Yasir Arafath*¹, Fibimol Baby², A. Helan², Issac George² and B. Arul³**¹Assistant Professor, Department of Pharmacy Practice, Vinayaka Mission's College of Pharmacy, Yercaud Main Road, Kondappanaickenpatty, Tamilnadu, India.²V Year Pharm.D Students. Vinayaka Mission's College of Pharmacy, Yercaud Main Road, Kondappanaickenpatty, Tamilnadu, India.³Professor & Head, Department of Pharmacy Practice. Vinayaka Mission's College of Pharmacy, Yercaud Main Road, Kondappanaickenpatty, Tamilnadu, India.***Corresponding Author: Dr. A. A. Mohamed Yasir Arafath**

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ABSTRACT

The most commonly used drugs in the Vinayaka Mission's Kirupananda Variyar Medical College and Hospitals; Salem is β -adrenergic antagonists (β -blockers) and the α 2-adrenergic agonists. So we carried out the study comparing the efficacy, cost effectiveness between timolol maleate 0.5% w/v eye drops and brimonidine tartarate 0.2% w/v eye drops in primary open angle glaucoma. It was a comparative, randomized, retrospective study. The case records of 160 glaucoma patients treated with timolol maleate and brimonidine tartarate in the ophthalmology department were collected during the period of six months. A thorough literature survey was done on the area of the project to review the past work. From this study we conclude that timolol maleate 0.5% w/v shows the greater reduction in the intra ocular pressure and is cheaper and affordable for the glaucoma patients than the brimonidine tartarate 0.2% w/v.

KEYWORDS: Glaucoma, Intra ocular pressure, Timolol maleate, Brimonidine tartarate.**INTRODUCTION**

The glaucoma's are a group of ocular disorders that lead to an optic neuropathy characterized by changes in the optic nerve head (optic disk) that is associated with loss of visual sensitivity and field. It is estimated that three million Americans have glaucoma, but only about half of them know that they have glaucoma. Glaucoma is the leading cause of blindness for people over sixty years old. But blindness from glaucoma can often be prevented with early treatment. When glaucoma develops, usually you do not have any early symptoms and disease progresses slowly. In this way, glaucoma can steal your sight very gradually. Fortunately, early detection and treatment can help preserve your vision.

Glaucoma is an acquired disease of the optic nerve (neuropathy) characterized by specific structural changes with associated visual field defects. More than 60 million people have glaucoma, the second most common cause of blindness worldwide. Glaucoma is primarily classified as open-angle or closed-angle, depending on whether the drainage area for aqueous humor in the front of the eye has an open or closed appearance. Basic and clinical research has shown that damage to the optic nerve in glaucoma depends on intraocular pressure (IOP).^[1-4]

Increased intraocular pressure (IOP), a traditional diagnostic criterion for glaucoma, is thought to play an important role in the pathogenesis of glaucoma, but is no longer a diagnostic criterion for glaucoma. Decreasing IOP reduces both the incidence of glaucoma in individuals without optic nerve damage and the rate of new damage in individuals with glaucoma. Medical and surgical treatments that decrease IOP therefore may prevent visual impairment and blindness. Powerful IOP-lowering medications are currently available that allow many patients to achieve their IOP lowering goals with a single medication. Two commonly used classes of IOP lowering drugs are the β -adrenergic antagonists (β -blockers) and the α 2-adrenergic agonists. The non-selective β -blocker timolol maleate lowers IOP by decreasing aqueous humor production, and the α 2-adrenergic agonist brimonidine tartarate lowers IOP by decreasing aqueous humor production and increasing aqueous humor outflow through the uveoscleral pathway. These two drugs are most widely used, so several studies have been conducted to compare these drugs.^[5-9]

MATERIALS AND METHODS

A retrospective study was carried out in department of ophthalmology over a period of six months from VMKVMC&H tertiary care hospital at Salem, Tamil

Nadu. A suitable data collection form was designed to collect and document the data. The patients are to be selected as per selection criteria and their consents will be taken. Data's were collected from the case sheets of medical records. All demographic data's includes mainly name, age, gender, diagnosis, treatment and follow up was also recorded. The demographic data's were recorded in the data entry form (PROFORMA). And the IOP follow up data's were studied and analysed.

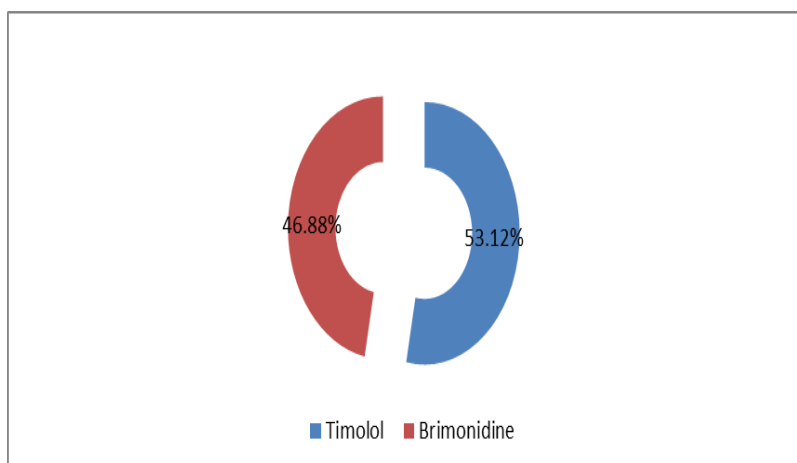
RESULTS

The glaucoma patients were classified according to their gender to know which group of gender is more prone to

the glaucoma. Out of the selected 160 glaucoma patients 109 (68.13%) were male and 51(31.87%) patients were female, which shows that males are more affected with glaucoma than females.

Drug based classification of cases

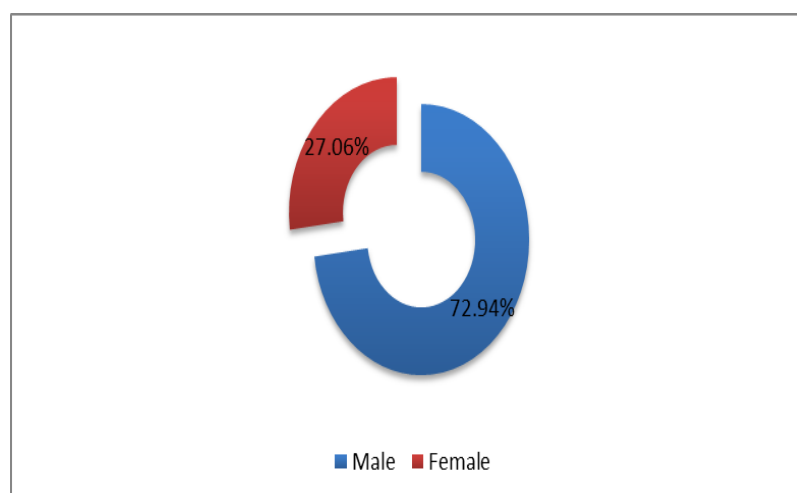
Drug	No of patients	Percentage (%)
Timolol	85	53.12
Brimonidine	75	46.88
Total	160	100



The group1 is Timolol maleate 0.5% w/v treated patients; group2 is Brimonidine tartarate 0.2% w/v treated patients. Timolol maleate 0.5% w/v is used in 85 (53.12%) patients and Brimonidine tartarate 0.2% w/v for 75(46.88%) patients.

Gender wise classification: Patients with Timolol maleate0.5%w/v

Gender	No of patients	Percentage (%)
Male	62	72.94
Female	23	27.06
Total	85	100

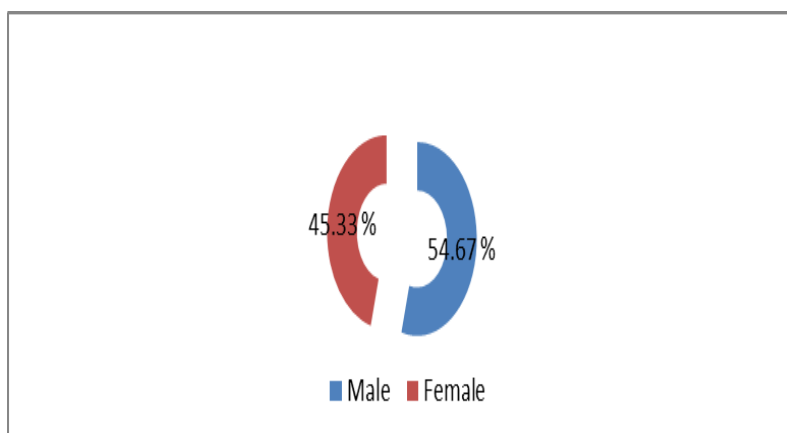


The gender wise distribution of patients those who are treated with timolol maleate 0.5% w/v were taken. Out of the selected 85 glaucoma patients, 62 (72.94%) were

male and 23(27.06%) patients were female, which shows that males are more treated with timolol maleate0.5% w/v than females.

Gender wise classification: Patients with Brimonidine tartarate 0.2% w/v

Gender	No of patients	Percentage (%)
Male	41	54.67
Female	34	45.33
Total	75	100

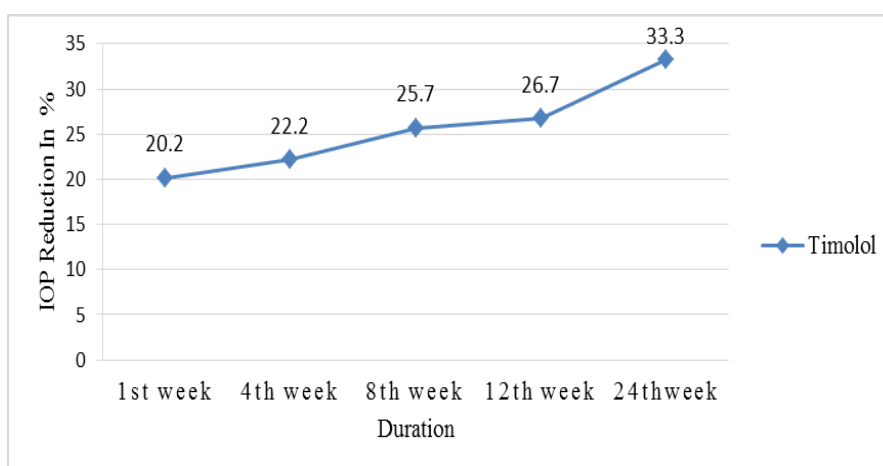


The gender wise distribution of patients those who are treated with Brimonidine tartarate 0.2% w/v were taken. Out of the selected 75 glaucoma patients, 41 (54.67%)

were male and 34 (45.33%) patients were female, which shows that male patients are more treated with Brimonidine tartarate 0.2% w/v than females.

Reduction of IOP in glaucoma patients treated with Timolol maleate 0.5% w/v

Duration	Mean IOP value (in mmHg)	Difference in mmHg	Difference in %
Initial	25.2	-	-
1 st week	20.1	5.1	20.23
4 th week	19.6	5.6	22.22
8 th week	18.7	6.5	25.79
12 th week	18.5	6.7	26.58
24 th week	16.8	8.4	33.33



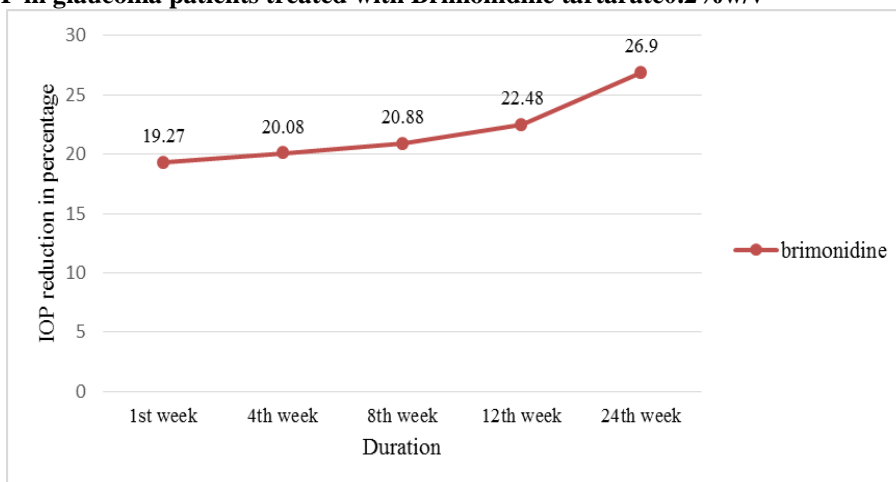
The reduction of intraocular pressure in glaucoma patients treated with timolol maleate 0.5% w/v eye drops during the follow up period was taken. The initial IOP mean value in glaucoma patients was found to be 25.2 mmHg. In the follow up period 1st week shows 20.2% (5.1 mmHg) reduction from initial mean value, in 4th week 22.2% (5.6 mmHg), in 8th week 25.7% (6.5 mmHg),

12th & 24th week 26.7% (6.7 mmHg) and 33.3% (8.4) respectively. The first week of the treatment shows more reduction in intraocular pressure. At the end of follow up period (24th week) 33.3% (8.4 mmHg) of reduction in IOP from initial stage was found in Timolol maleate treated patients.

Reduction of IOP in glaucoma patients treated with Brimonidine tartarate 0.2% w/v

Duration	Mean IOP value (in mmHg)	Difference in mmHg	Difference in %
Initial	24.9	-	-
1 st week	20.1	4.8	19.27
4 th week	19.9	5.0	20.08
8 th week	19.7	5.2	20.88
12 th week	19.3	5.6	22.48
24 th week	18.2	6.7	26.90

Reduction of IOP in glaucoma patients treated with Brimonidine tartarate 0.2% w/v

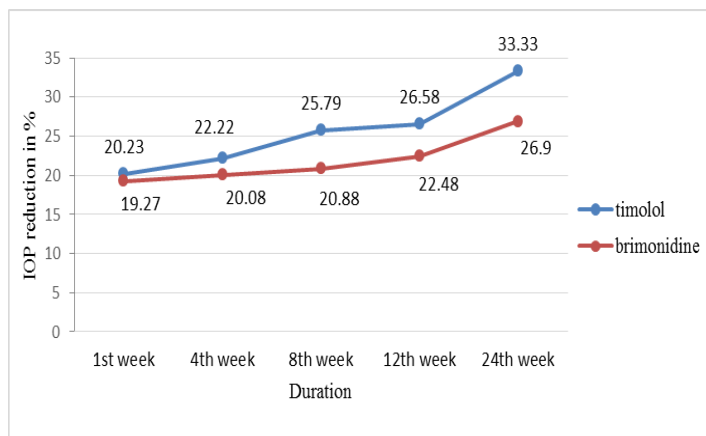


The reduction of intraocular pressure in glaucoma patients treated with Brimonidine tartarate 0.2% w/v eye drops during the follow up period was taken. The initial IOP mean value in glaucoma patients was found to be 24.9 mmHg. In the follow up period 1st week shows 19.27% (4.8mmHg) reduction from initial mean value, in 4th week 20.08% (5 mmHg), in 8th week 20.88% (5.2

mmHg), 12th&24th week 22.48% (5.6 mmHg) and 26.90% (6.7mmHg) respectively. The first weeks of the treatment shows more reduction in intraocular pressure. At the end of follow up period (24th week) 26.90% (6.7 mmHg) of reduction in IOP from initial stage was found in Brimonidine tartarate 0.2% w/v eye drops treated patients.

Comparison of IOP reduction between Timolol maleate 0.5%w/v and Brimonidine tartarate 0.2%w/v in glaucoma patients based on their difference in percentage

Duration	Difference in % IOP patients treated with Timolol maleate 0.5%w/v	Difference in % IOP Patients treated with Brimonidine tartarate 0.2%w/v
1 st week	20.23	19.27
4 th week	22.22	20.08
8 th week	25.79	20.88
12 th week	26.58	22.48
24 th week	33.33	26.90



Compared the reduction of the intraocular pressure in glaucoma patients treated with timolol maleate 0.5% w/v and Brimonidine tartarate 0.2%w/v eye drops during the follow up period was taken. Timolol maleate shows the higher IOP reduction.

Cost of Timolol maleate 0.5%w/v in 5ml with different brands

Brand	Cost for 5ml (in Rs)
Glucomol	49.78
Iotim	44.00
Nyolol	47.50
Optilax	22.00
Average	40.82

The cost of the different brands of the timolol maleate 0.5% w/v in 5ml was found in rupees. For 5ml, Glucomol is Rs.49.78, Iotim is Rs.44.00, Nyolol is Rs.47.50 and Optilax is Rs.22.00. And the average cost of the timolol maleate 0.5% w/v 5ml was found to be Rs.40.82.

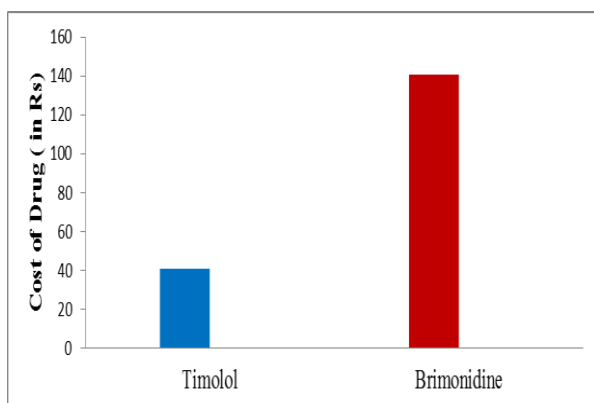
Cost of Brimonidinetartarate 0.2%w/v in 5ml with different brands.

Brand	Cost for 5ml (in Rs)
Alphagan	186.28
Brimodin	107.27
Iobrim	128.50
Brimonist	140.00
Average	140.51

The cost of the different brands of the Brimonidine tartarate 0.2% w/v in 5ml was found in rupees. For 5ml, Alphagan is Rs.186.28, Brimodin is Rs.107.27, Iobrim Rs.128.50 and Brimonist is Rs.140.00. And the average cost of the Brimonidine tartarate 0.2% w/v 5ml was found to be Rs.140.51.

Comparison of Timolol maleate 0.5%w/v and Brimonidine tartarate 0.2% w/v based on Cost.

Drug	Average cost for 5ml (in Rs)
Timolol	40.82
Brimonidine	140.51



The average cost of the timolol maleate 0.5% w/v was compared with the average cost of the Brimonidine tartarate 0.2%.w/v. The timolol maleate 0.5%w/v was found to be the cheaper to the patients.

CONCLUSION

The case records of 160 glaucoma patients treated with timolol maleate and brimonidine tartarate in the ophthalmology department were collected during the period of six months. On classifying the total number of cases based on gender, male patients were found to be more than female patients i.e.68.13% (n=109) were male and 31.87% (n=51) were female. The cases were classified based on their age group the result shows that most of the patients were in 51-60 (45.63%) followed by 41-50 (30%) and other age groups shows 31-40 (15%) and 61-70 (9.37%).

The study population was classified into two groups according to the drug treatment. The majority of patients 53.12% (n=85) is treated with timolol maleate and only 46.88% (n=75) patients treated with brimonidine tartarate.

The intra ocular pressure of the patients during 1st week, 4th week, 8th week, 12th week and 24th week of follow up period are collected and analysed. In the early weeks, Brimonidine tartarate 0.2% w/v effectively decreased intraocular pressure but in the later weeks timolol maleate 0.5% w/v reduced more effectively than brimonidine. At the 24th week timolol maleate treated patient's shows 33.3% reduction in their IOP from the initial reading and brimonidine tartarate treated patient shows only 26.9% reduction.

The cost of the different brands of timolol maleate 0.5% w/v and brimonidine tartarate 0.2% w/v were also analysed. The average cost of 5ml brimonidine tartarate 0.2% w/v (Rs.140.51) is higher than the timolol maleate 0.5% w/v (Rs.40.82).

From this we conclude that timolol maleate 0.5% w/v shows the greater reduction in the intra ocular pressure and is cheaper and affordable for the glaucoma patients than the brimonidine tartarate 0.2% w/v. So, it was concluded that timolol maleate 0.5% w/v was most effective both in reducing the symptoms and in cost effectiveness when compared to brimonidine tartarate 0.2% w/v in the management of primary open angle glaucoma. As glaucoma is the second leading cause of the blindness worldwide it should be treated with the effective and safe drug at the affordable cost.

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