

Glaucoma Therapy: Prescribing Pattern and Cost Analysis

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Abstract

In the present study out of total 200 prescriptions of POAG (primary open angle glaucoma) studied 66% were found to be of monotherapy including timolol, brimonidine, pilocarpine, betaxolol, levobunolol, latanoprost and apraclonidine in 30%, 15%, 6%, 8%, 4%, 1% and 2% of the prescriptions respectively and 34% were found to be of polypharmacy with timolol+pilocarpine, timolol+acetazolamide, timolol+brimonidine and betaxolol+brimonidine in 13%, 4%, 8% and 9% of the prescriptions respectively. 10% drugs were prescribed by generic name. Written instruction to the patients regarding dose and dosing interval was mentioned in 100% prescriptions, but the proper method of instillation was mentioned only in 15% of the prescriptions. Results of the present study clearly indicated urgent need for prescribers to improve their communication skills, to give proper instructions to the patient regarding instillation of drug, as little bit of caution like instillation from the side of the eye in the supine position followed by rolling of the eyeball can decrease the wastage, decrease cost and improve compliance. However, in the present scenario cost of the traditional medications like beta-blockers, pilocarpine etc. is found to be much less than newer medications (prostaglandin analogues, brimonidine). Moreover, in presence of wide cost variation among various brands of the same drug our study could help the ophthalmologist to use all possible measures of pharmacoeconomics while prescribing an antiglaucoma drug.

Key Words

Prescribing Pattern, Generic, Glaucoma.

Introduction

The study of prescribing pattern is a component of medical audit which seeks monitoring, evaluation and necessary modifications in the prescribing practices of the prescribers to achieve rational and cost effective medical care (1). Thus the monitoring of prescription and drug utilizations studies can identify the problems and provide feedback to prescribers so as to create an awareness about irrational use of drugs (2). Glaucoma is

a leading cause of irreversible blindness throughout the world. In India glaucoma constitute 2% of total blindness (3) and Primary open angle glaucoma accounts nearly 50% of the cases (4). The intensity is further magnified by nearly 25% prevalence in the age group of less than 40 years (4). As the therapy for the glaucomas is now in a dynamic phase, evolving as the underlying disease pathology becomes more clearly understood and as new

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pharmacological agents and other treatment modalities become available; the clinicians find themselves in dilemma for choosing an appropriate anti-glaucoma medication from the wide variety of options available (5). Moreover, the management of glaucoma has an enormous impact in our society in terms of patient's morbidity, loss of productivity, number of ophthalmic consultations and health costs, as these patients may have to continue the therapy for the whole life.

However, new glaucoma medications have increased efficacy, reduced dosing frequency and improved side effect profiles; but there is need for comparing the cost of new glaucoma medication with the traditional one. Hence, we conducted the present study to study the prescribing patterns and cost analysis of anti-glaucoma drugs in patients of Primary open angle glaucoma.

Materials and Methods

In the present prospective study two hundred prescriptions of POAG were collected randomly from the patients attending the Ophthalmology OPD of Government Medical College, Jammu after taking well informed consent of the patients. After noting down the required parameters prescriptions were returned back to the patients. Only newly registered prescriptions were entertained.

All the prescriptions were analysed for nature of the anti-glaucoma medication prescribed, percentage of mono-therapy Vs combination therapy prescribed, percentage of fixed dose combination prescribed, number prescribed in generics, duration of therapy mentioned and written instructions to the patients regarding dose, method of instillation and dosing interval of the drug. Each parameter was expressed in percentage.

Cost analysis of different anti-glaucoma medication

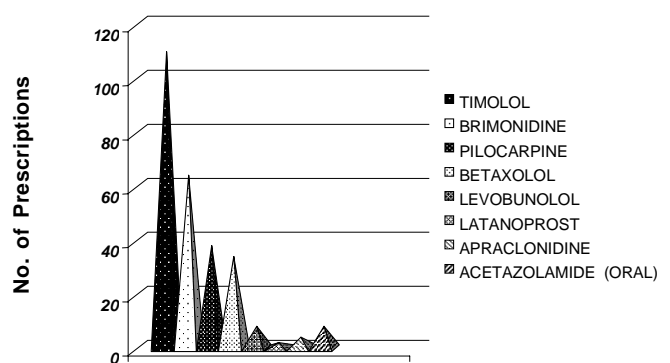
Average cost per ml of different drugs (eye drops) was determined by calculating cost per ml of the various brands mentioned in the Indian Drug Review, May-June,

2003 vol ix number 3. As size of a drop is between 25 to 50 μ l, so on an average about 27 drops constitute 1 ml (6). Assuming use in both eyes for each medication and number of drops required per day (determined by using the manufacturer's recommended daily dosing regimen) we calculated the cost of therapy for a month.

Results

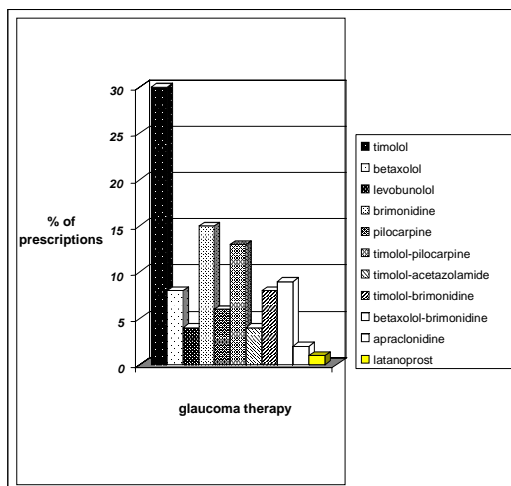
Timolol was found to be the most frequently prescribed drug for glaucoma constituting 55% of total prescriptions. Brimonidine constituted 32%, pilocarpine 19%, betaxolol 17%, acetazolamide 4%, levobunolol 4%, latanoprost 1% and apraclonidine 2% of the prescriptions (figure 1). Acetazolamide was prescribed by oral route, rest all were prescribed by topical route as eye drops.

Fig. 1: Distribution of Anti-Glaucoma Medications.



Sixty eight prescriptions were of polypharmacy. Timolol and pilocarpine constituted 13%, timolol and acetazolamide 4%, timolol and brimonidine 8% and betaxolol and brimonidine 9% of the prescriptions (figure 2). Rest one hundred and thirty two prescriptions were having single prescribed drug including timolol, brimonidine, pilocarpine, betaxolol, levobunolol, latanoprost and apraclonidine in 30%, 15%, 6%, 8%, 4%, 1% and 2% of the prescriptions respectively (figure 2). Only 10% of the prescriptions carried drugs prescribed by the generic name. Written instructions to the patients regarding dose and dosing interval was mentioned in 100% prescriptions, but the proper method of instillation was mentioned only in 15% of the prescriptions. Duration of therapy was mentioned in 70% of the prescriptions.

Fig. 2: Prescribing patterns of various antiglaucoma medications.



Cost analysis

Beta- blockers were found to be cheaper than other anti-glaucoma drugs with lowest price for timolol. However, per ml. cost of pilocarpine was same as that of beta- blockers with more cost for a month therapy (more frequently instilled) (Table1, 2, 3, 4). Among sympathomimetic drugs, the cost of Bimonidine was found to be more than others and Prostaglandin analogues were found to be the costliest among various drug groups available (Table 4).

Table 1: Cost analysis of anti-glaucome drugs.

Timolol	Concentration	ml	Cost/ bottle (Rs.)	Cost/ ml (Rs.)	Dose/ day both eyes (drops)	Cost/ day (Rs.)	Cost/ month (Rs.)
Oculan (Bal pharma)	0.25%	5	13.50	2.7	4	0.4	12.00
Ocupres (sante vision)	0.5%	5	23.00	4.6	4	0.68	20.44
Ocutim (Protec)	0.25%	5	16.19	3.24	4	0.48	14.4
	0.5%	5	27.76	5.55	4	0.82	24.66
	0.25%	5	16.40	3.28	4	0.486	14.57
	0.5%	5	26.50	5.3	4	0.785	23.55
Teemol (Indiana)	0.5%	10	30.00	3	4	0.444	13.33
Timolem (warren)	0.25%	5	16.00	3.2	4	0.474	14.22
Timolet GFS (milmet pharma)	0.5%	5	27.60	5.52	4	0.817	24.53
Timolet plus (milmet)	0.5% gel	3	60.00	20	2	1.481	44.44
	0.25%	5	18.00	3.6	4	0.533	16.00
	0.5%	5	29.25	5.85	4	0.866	26.00
	0.25%	5	18.00	3.6	4	0.533	16.00
	Timolo 10.5% + Pilocarpine 2%	5	75.00	15	4	2.222	66.66

Table 2: Cost analysis of anti-glaucome drugs.

Timolol	Concentration	Ant. (ml)	Cost/ bottle (Rs.)	Cost/ ml (Rs.)	Dose/ day both eyes (drops)	Cost/ month (Rs.)
Betaxolol						
Bulol (cosme Hcl)	0.25%	5	29.05	5.81	4	25.82
Glucoptic (klar sehen)	0.5%	5	29.85	5.97	4	26.53
Iobet (FDC)	0.5%	5	30.20	6.04	4	26.84
Nopres (ochoa)	0.5%	5	30.00	6.000	4	26.66
Ocubeta (sante vision)	0.5%	5	29.33	5.86	4	26.04
Optipres (cipla)	0.5%	5	29.05	5.81	4	25.82
Optipres-s (cipla)	0.5%	5	29.05	5.81	4	25.82
Levobunolol						
Betagan (allergen)	0.5%	5	41.87	8.37	4	37.2
Prostaglandins						
Latanoprost (milmet)	0.005%	2.5	295.00	118.00	2	262.22
Xalatan (pharmacia India)	0.005%	2.5	1142.0	456.801	2	1010.11

Table 3: Cost analysis of anti-glaucome drugs.

Timolol	Concentration	ml	Cost/ bottle (Rs.)	Cost/ ml (Rs.)	Dose/ day both eyes (drops)	Cost/ month (Rs.)
Brimonidine						
Alphagan (Allergan)	2%	5	300.04	60.008	4	266.70
Apraclonidine						
Alfadrops (Cipla)	0.5%	5	40.00	8.00	4	35.55
	1.0%	2	40.00	20.00	4	88.89
Dipiverfine						
Propine (Allergan)	0.1%	5	35.00	7.00	4	31.11
Pilocarpine						
Carpio-miotic (Bell-Pharma)	2.0%	5	32.00	6.40	8	56.88
Locarp (Sante Vision)	2.0%	5	31.50	6.30	8	56.00
Pilagan (Allergan)	2.0%	5	32.66	6.53	8	58.044
Pilocar (FDC)	2.0%	5	25.25	5.05	8	44.88
Pilomax (Milrnet)	2.0%	5	20.00	4.00	8	35.55

Table 3: Average cost of various anti-glaucoma drugs.

Drug	Cost/ml. (Rs.) Mean±SD	Cost/month (Rs.) Mean±SD
Timolol 0.25%	3.24±0.30	14.39±1.34
Timolol 0.5%	6.90±5.36	25.11±8.77
Betaxolol 0.25%	5.81	25.82
Betaxolol 0.5%	5.93±0.097	26.37±0.43
Levobunolol 0.5%	8.37	37.2
Prostaglandin analogue 0.005%	287.40±239.57	638.66±532.37
Pilocarpine 2.0%	5.656±1.1	50.270±9.78
Timolol 0.5% Pilocarpine 2.0%	15.00	66.66
Brimonidine 0.2%	60.008	266.70
Apraclonidine 0.5%	8.00	35.55
Dipivefrine 0.1%	7.00	31.11

Discussion

The pharmacological strategies for the glaucoma treatment fall into two classes: reduction of aqueous humour secretion and enhancement of aqueous outflow. Five general groups of drugs, parasympathomimetics, carbonic anhydrase inhibitors (CAI's), α -agonists, β -blockers and PGF₂ α analogs have been found to be useful in the reduction of IOP (5). In the present study beta-blockers were the most frequently prescribed drugs. Among them timolol maleate was most commonly prescribed beta-blocker in 55% of the prescriptions. Similar patterns regarding beta-blocker's prescribing was reported earlier (6,7). Betaxolol was the second most commonly prescribed beta-blocker in 17% of the prescriptions. Being beta 1-selective and less effective in lowering IOP than timolol, it may be less frequently prescribed as monotherapy (5). Levobunolol constituted only 4% of the prescriptions this may be because of its being recently introduced in the market and being little more costlier than timolol (8). After beta-blockers brimonidine was the most commonly prescribed drug. Brimonidine may lower IOP by stimulation of an imidazoline receptor rather than an α -receptor with favourable effect on retinal blood flow (5, 9, 10, 11, 12). Because of its neuro-protective role it is coming up as preferred drug for glaucoma (5).

The para-sympathomimetics, the first class of drugs introduced in 1870's are not preferred now for the management of glaucoma because of the common associated side-effects like diminished night vision, reduced visual acuity, opacities, myopia and visual field contraction (5, 13). Pilocarpine is still prescribed in 19% of the prescriptions (in 13% as adjuvant to timolol). Acetazolamide a carbonic anhydrase inhibitor is not preferred because of the high incidence (30% to 50%) of systemic adverse effects like paraesthesia, tinnitus, GIT-disturbances, diuresis, bone-marrow depression, renal stone and systemic acidosis (5, 13). However, it was prescribed as an adjuvant to timolol in 4% of the prescriptions. Dorzolamide topical CAI's with lesser systemic side effects was not prescribed (14,15). Only one percent of the prescriptions contained latanoprost (prostaglandin analogue) (5,11). Prescribing under generic name is considered economical and rational but only 10% of the prescriptions were written under a generic name. This figure is lower than that reported by some Indian researchers (16). In polypharmacy timolol and pilocarpine combination being cheaper was the most commonly prescribed one (13% of the total prescriptions). Brimonidine and betaxolol combination was prescribed in 9% of the total prescriptions. This combination is really coming up because of the additive effect in lowering IOP and neuroprotective action (5). No fixed dose combination was prescribed. Although fixed dose combination has the advantage of better compliance, but prescribers were rational in not prescribing it as only one fixed dose combination (Timolel plus) of timolol 0.5% plus pilocarpine 2.0% is available which is irrational as timolol is to be instilled 12 hourly and pilocarpine 6 hourly (13, 17).

The instructions regarding drug instillation is another important aspect of ocular therapy. Patients usually have the habit of applying 2-3 drops in the eye resulting into the wastage, increased cost and poor compliance (7). In our study, written instructions regarding dose and dosing interval were mentioned in 100% prescriptions which is much more than what is reported earlier by Indian scientists (7,17). However, proper method for instillation was mentioned in only 15% prescriptions. It is essential

that patient should know how to instill the drops properly. As the quantity of most eye drops ranges from 25 to 50 μ l, so 60% to 80% of an eye drop over flows and enters the lacrimal drainage and reaches the systemic circulation (6). However, its absorption can be reduced by simple closure of the eye or by applying pressure at the base of nasolacrimal mucosa resulting into lower incidence of systemic side effects and improved compliance (6).

There is urgent need for prescribers to improve communication skills, to give proper instructions to the patient regarding instillation of drug. However, little bit of caution like instillation from the side of the eye in the supine position followed by rolling of the eyeball can decrease the wastage, decrease cost and improve compliance (7). In the present scenario, cost of the traditional medications like beta-blockers, pilocarpine etc. is found to be much less than newer medications (prostaglandin analogues, brimonidine). Whereas, in the western studies, new glaucoma medications are found to be similar in cost as the traditional medications (18). In presence of wide cost variation among various brands of the same drug our study could help the ophthalmologist to use all possible measures of pharmacoeconomics while prescribing an antiglaucoma drug.

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