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DRUG UTILIZATION STUDY OF ANTIGLAUCOMA DRUGS IN A TERTIARY CARE TEACHING HOSPITAL, BAREILLY

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ABSTRACT

Prescription pattern analysis or drug utilization studies are important as they promote rational use of drugs. The present study was carried out at Ophthalmology Deptt of this Institute with the aim to study the drug prescribing patterns for Glaucoma, a treatable nonreversible disease of eye. It was an open labeled, observational, prospective study. Total 170 patients were included during the study period of 6 months. Data were analyzed for demographic details & prescriptions pattern. Out of 170 prescriptions, 126 (74.11%) were of open angle glaucoma & 44 were of narrow angle glaucoma(25.88%). Out of 126 prescriptions, 116 received drug therapy & rest were advised for surgery. Monotherapy was given to 63 (54.31%) patients, while others 53 (45.68%) were on combination therapy. The most commonly used group of drugs was prostaglandin analogs(PGA), which constituted 75.86% of all prescriptions followed by β blockers(55.17%). Bimatoprost(64.51%) & timolol (53.12%) were most commonly prescribed drugs among PGAs & β blockers respectively. Brimonidine, dorzolamide, brinzolamide were other drugs added as adjuvants. In combination therapy, 2 or 3 drugs were given either as fixed dose combination(FDCs) or as concurrent medication. FDCs constituted 34.48% of total prescriptions ,may be because they are rational, convenient & cost effective. Most common FDC used was timolol 0.5% + bimatoprost 0.03%. Drugs were prescribed by

brand names only that is a matter of concern. Prescribing by generic name should be encouraged.

Key words: Prescription pattern, antiglaucoma drugs, Prostaglandin analogs, β blockers, Fixed Dose Combination.

INTRODUCTION

Glaucoma is said to be 'sneak thief of sight'. It is one of the leading causes of treatable non-reversible blindness [1] & therefore, early diagnosis & prompt treatment is essential to prevent irreversible visual impairment. Glaucoma is a group of disorders that progressively damage the optic nerve in the eye & without treatment can cause visual disability & eventual blindness.[2] Appropriate management of these patients reduces the burden of ocular health problems.[3] Over 60.5 million people are affected by glaucoma worldwide & it is estimated to affect 79.6million by the year 2020.[4] The estimated prevalence of glaucoma for India is 11.9 millions.[5] Drug utilization research has been defined by WHO as the marketing distribution, prescription & use of drugs in a society with special emphasis on the resulting medical, social & economic consequences.[6] It aims to promote the rational use of drugs. There are powerful exploratory tools to ascertain the role of drugs & their assessment is important for clinical educational & economic purposes.[7]

The medical treatment of glaucoma targets at two mechanisms that lower intraocular tension(IOT). These are 1) decreasing aqueous humour production & 2) increasing its drainage. Various antiglaucoma drugs are available that include β blockers, prostaglandin analogues, α agonists, carbonic-anhydrase inhibitors, mannitol, glycerine & miotics.[8,9] These drugs are prescribed according to patient acceptability, tolerability & cost. These drugs act on one or both of the mechanisms. When target IOT is not achieved by single drug then another drug acting through different mechanism is added, therefore, fixed dose combinations (FDCs) are rational and frequently prescribed. There are few studies in India which cover drug utilization pattern of glaucoma. Therefore, this study was planned to explore the prescribing pattern of antiglaucoma drugs in out patient department of Ophthalmology of a tertiary care teaching hospital.

Subjects & methods

Institutional Ethical Committee approval was obtained prior to the conduct of this study. It was an open labeled, prospective observational study being conducted in the department of Ophthalmology, Shri Ram Murti Smarak Institute of Medical Sciences (SRMSIMS), 950

bedded, tertiary care teaching hospital, Bareilly. 170 glaucoma prescriptions were analyzed for 6 months i.e. from June,2013 to November, 2013. Data were collected in a proforma from patients regarding their demographic details, final diagnosis & complete prescription containing drugs name, dose, route of administration, frequency & duration of treatment.

Diagnosis of glaucoma was made by Ophthalmologist clinically, measuring tension of eys as well as by using various investigations. All prescriptions were notified for the number of patients of open angle glaucoma & narrow angle glaucoma, the ratio of males versus females, number of patients advised for surgery, antiglaucoma medication prescribed, number of prescriptions containing monotherapy & combination therapy, fixed dose combinations(FDCs), number of adverse drug events that precipitated & number of drugs prescribed by generic name.

All parameters are expressed in percentages.

RESULTS

Out of 170 patients 70 (41.17%) were male & 100 were female (58.82%). Of 170 patients, 126 (74.11%) were diagnosed as primary open angle glaucoma (POAG) & 44 (25.88%) were as narrow angle. Only open angle glaucoma cases' prescriptions were taken into account. Out of 126 POAG, 65(51.58%) were male patients & 61 (48.41%) were female.

All patients are divided into three age groups, 1) <40yrs 2) 40-60 yrs 3) >60 yrs. Maximum patients 94 (55.29%) were between the age group of 40-60yrs (table I). In this age group 62(65.95%) were female while 32(34.04%) were male.

Out of 126 patients, 116 were given drug therapy and 10 (8.62%) were advised for surgery i.e trabeculectomy. Out of 10, 8 surgeries were success but 2 were qualified success i.e antiglaucomatous drug therapy had to be added after surgery to achieve optimum tension (fig I). Of 116 patients, 66(56.89%) were female & 50(43.10%) male. Target tension in these patients was achieved by medication either by monotherapy or combination therapy (fig I). All patients received drug in the form of eye drops. 63 patients (54.31%) received monotherapy (table II) and prostaglandin analogs (PGA) were most commonly prescribed drugs (75.86%) followed by β blockers (55.17%) (fig II). Among PGAs, bimatoprost (64.51%) was most commonly prescribed followed by travoprost & latanoprost . Among β

blockers, timolol (53.12%) was most commonly prescribed drug followed by betaxolol & levobunolol.

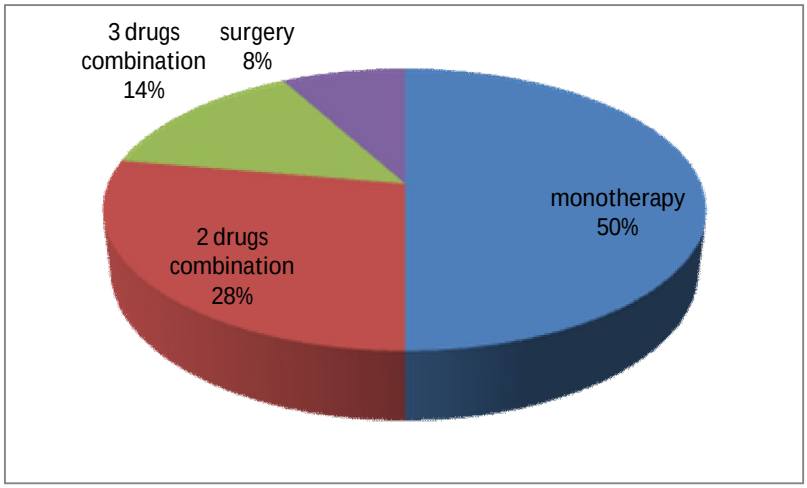

Fig I: Distribution of Subjects in Various Antiglaucoma Therapy

Table I: Gender Differences in Different Age Groups of Glaucoma Patients

Age	Male	Female	Total(%)
<40yrs	5	9	14(8.23%)
40-60yrs	32	62	94(55.29%)
>60yrs	33	29	62(36.47%)
Total	70	100	170(100%)

Table II: Percentage of Different Drugs Used in Monotherapy for Glaucoma Patients

S.No.	Drug name	% of total single drugs (n=63)
1.	Bimatoprost	18 (28.57%)
2.	Timolol	15 (23.80%)
3.	Betaxolol	10 (15.87%)
4.	Latanoprost	08(12.69%)
5.	Levobunolol	05 (7.9 %)
6.	Travoprost	03 (4.76%)
7.	Brimonidine	02 (3.17%
8.	Dorzolamide	02(3.17%)

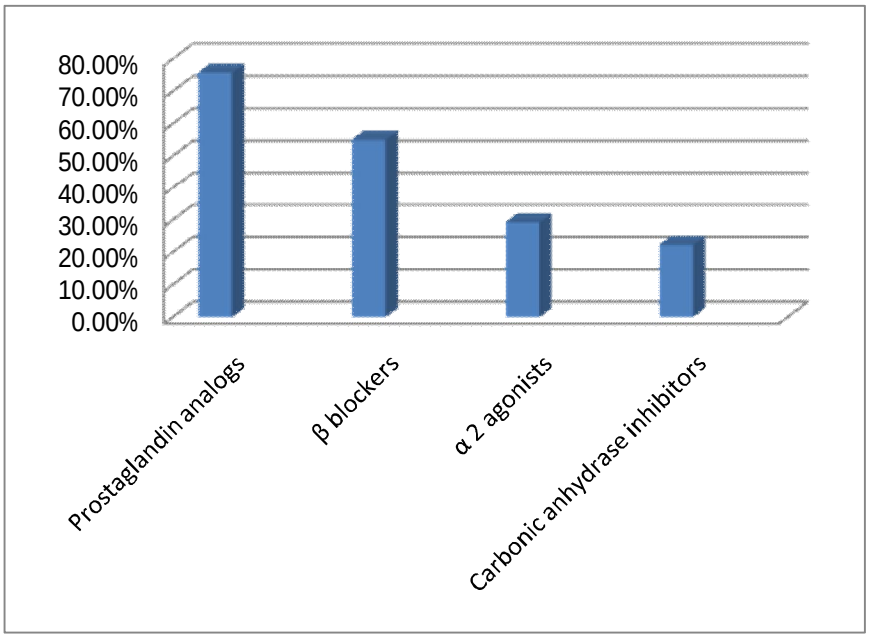

Fig II: Percentage of Different Groups of Antiglaucoma Drugs Used

Combination therapy was prescribed to 53 patients (45.69% of total prescriptions). Out of these, 35 were given 2 drugs & 18 were given 3 drugs either concurrently or in fixed dose combination (FDC) (table III). 40 patients(75.47% of combination therapy) received FDC & 13 patients (24.52% of combination therapy) concurrent medication. Most commonly prescribed drug combinations were bimatoprost and timolol (8 out of 13 patients; 61.53%) followed by timolol & dorzolamide. Most common triple drug combination (10 out of 18 prescriptions) used was timolol + bimatoprost + brimonidine (55.55% of triple drug combination). Most commonly prescribed FDC was timolol 0.5% + bimatoprost 0.03% (14 out of 40; 35%) followed by, timolol 0.5% +dorzolamide 2.0%, timolol 0.5% + travoprost 0.005%, timolol 0.5% + brimonidine 0.2% (fig III).

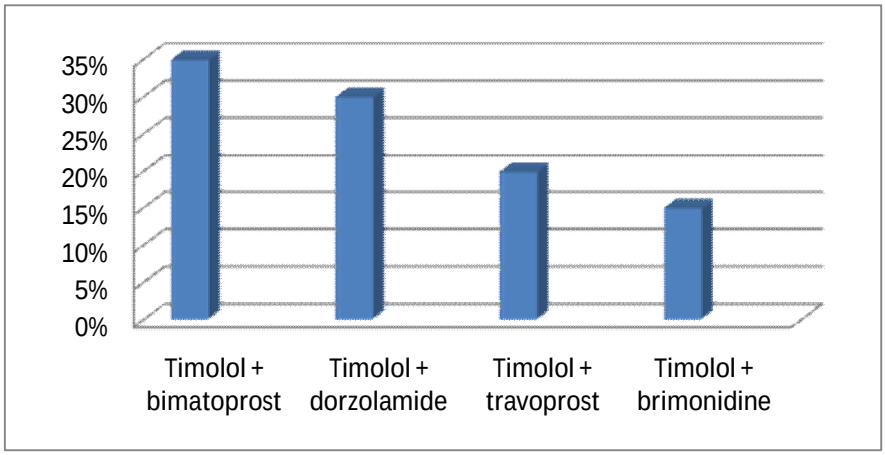

Fig III: Percentage of FDCs of Antiglaucoma Drugs Used

Table III: Percentage of Use of Concurrent and Fixed Dose Combinations in Glaucoma Therapy

S.No.	Combinations of drugs	% of total combinations (n=53)
1.	(Timolol + bimatoprost)	08 (15.09%)
2.	(Timolol + dorzolamide)	05 (9.43%)
3.	(Timolol + travoprost)	04 (7.54%)
4.	(Timolol + latanoprost)	01 (1.88%)
5.	(latanoprost + brimonidine)	01 (1.88%)
6.	(Timolol + brimonidine)	01 (1.88%)
7.	(Timolol + bimatoprost)+ dorzolamide	10 (18.86%)
8.	(Timolol + brimonidine)+ brinzolamide	06 (11.32%)
9.	(Timolol + latanoprost) + dorzolamide	02 (3.77%)
10.	Bimatoprost + timolol	07 (13.2%)
11.	Timolol + dorzolamide	04 (7.5%)
12.	Bimatoprost + betaxolol	01 (1.88%)
13.	Timolol + brimonidine	01(1.88%)

Mild drug allergy was observed especially with brimonidine that required change of drug. Darkening & growth of eye lashes were observed with most of the patients with PGA that did not require discontinuation of drug.

DISCUSSION

Glaucoma, a state of progressive optic nerve damage, is broadly divided into primary open angle glaucoma & angle closure glaucoma. POAG has insidious onset & usually it is painless while angle closure glaucoma presents with abrupt onset with pain & redness in eye. In either type, intraocular tension(IOT) has to be reduced by reducing aqueous humour formation (reduces tension acutely) or by increasing its drainage (effective for long term control. Various antiglaucoma drugs act on one or both the mechanisms & bring the raised IOT down. The groups of drugs used are prostaglandin analogs(PGA), β bockers, α agonists, carbonic anhydrase inhibitors(CAI) & miotics. Out of these, PGA have been found to be most efficacious drug among other antiglaucoma drugs.[10]

Irrational drug use of drug is a common occurrence through out the world.[11] To promote rational drug usage, drug utilization studies or prescription pattern analysis are important. These studies prevents irrational drug use, thus potential hazards for the patients in terms of adverse drug reactions & expense of treatment can be minimized.

In the present study, out of 170 patients, 126 patients were enrolled as patients of primary open angle glaucoma accounting for its greater prevalence as also observed by RK Suman et al. [12] Their prescriptions were analyzed. It was observed that most of the patients fall into age group of 40-60 years(55.29%) as also concluded by AK Yadav & V Patel.[13] All drugs were prescribed as topical administration, no oral drug was given. Topical administration minimizes the risk of systemic side effects. However, use of topical β blockers especially nonselective, in patients of preexisting cardiac & pulmonary(bronchial asthma) diseases may prove to be hazardous. So, prior history is essential while using these drugs.

54.31% patients received monotherapy & most frequently prescribed group of drugs came out to be PGA (75.86%) (bimatoprost, latanoprost & travoprost). Among all PGAs, bimatoprost was most frequently prescribed (64.51%) as also noted by RK Suman et al., & AK Yadav et al. [12,13] Bimatoprost is most economical [14] & it was followed by travoprost & latanoprost. Travoprost is quite expensive drug & with latanoprost cold chain has to be maintained. In accordance with this study, studies conducted in Australia & Japan have shown PGA as first line drug, [15,16] but in contrast, few studies stated that β blockers were most frequently prescribed.[12,13]

After PGA, next group to be prescribed was β blockers (55.17%). In this group, drugs used were timolol, betaxolol & levobunolol. Timolol was most frequently prescribed drug followed by timolol & levobunolol. Because of β 1 selectivity, betaxolol can be safely given to patients of respiratory disease. However, timolol being cheaper preferred in patients of low socioeconomic status after proper history. Levobunolol is expensive drug so, less used.

Alpha 2 agonists (brimonidine) formed 29.31% & CAI (dorzolamide & brinzolamide) formed 22.41% of total prescriptions. Miotics & oral therapy was not used in these prescriptions. Combination therapy was given when target intraocular tension (IOT) was not achieved by single drug. 45.68% of total prescriptions contained combination of 2 or 3 drugs either concurrently or as fixed dose combination(FDC). 30.17% of total prescriptions contained 2 drugs, most common combination was bimatoprost & timolol while it was timolol & oral

acetazolamide in a study [13] & 34.48% contained FDCs in our study. In other studies, this percentage is lower, 12.9% & 26.66% . [12,13] Since, FDC for glaucoma medication are rational & they offer benefits in terms of convenience, cost & safety, higher percentage of FDCs can be said to be beneficial. Most common FDC used in this study was timolol(0.5%) & bimatoprost(0.03%) (35% of total FDCs) followed by timolol (0.5%) & dorzolamide(2%)(30% of total FDCs) while it was latanoprost & timolol and timolol & dorzolamide in other two studies[12,13]. no FDC was prescribed in another study. [17]

A third drug was also added if target IOT was not achieved by two drugs (15.51% of total prescriptions). Most common triple drug therapy used was timolol +brimonidine +bimatoprost; while it was timolol + brimonidine + acetazolamide in another study.[13] 100% drugs were prescribed by brand names as also commented by other studies.[12,13] The reason being ophthalmologists prefer to give same brand name drug to a patient who is responding adequately & according to them, change of brand changes efficacy of drug.

CONCLUSION

Bimatoprost was most commonly prescribed drug as a monotherapy followed by betaxolol. Most common concurrent combination was bimatoprost & timolol. Most common FDC used was timolol0.5% +bimatoprost(0.03%). These findings vary from region to region, no generalization can be made. However, these inferences may provide a lead for monitoring rational drug usage. Prescribing by brand name is a matter of concern, otherwise prescribing habits of Ophthalmologists in this Institute are appropriate to a great extent.

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