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Research Article

TO STUDY THE DRUG USE PATTERN IN PRIMARY OPEN-ANGLE GLAUCOMA IN A TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

Objective: To study the drug utilization pattern in patients suffering from primary open-angle glaucoma (POAG) in a tertiary care teaching hospital.

Methods: It is a prospective study done on 50 patients of POAG (comprising of individuals belonging to any age group). This study was carried for a period of 2-month, and the data included patient's demographic details and the drugs prescribed. Data were analyzed for drug use pattern.

Results: After screening the prescriptions of patients, it was found out that out of total 50 prescriptions, 30 were males, and 20 were females. Out of 50 prescriptions, prostaglandins (58%) were most commonly prescribed. β-blockers (16%) were also prescribed. Fixed dose combination constituted 60% of the prescriptions. Instructions about the route, frequency, and duration of treatment were present in all prescriptions. Drugs prescribed by their generic names were 18.75% and about 81.25% of the drugs were prescribed by their brand names.

Conclusions: Fixed drug combination of timolol and dorzolamide was the most frequently prescribed combination. Prescribers must be aware of importance of prescribing drugs with generic names.

Keywords: Primary open-angle glaucoma, Intraocular pressure, Fixed dose combination.

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INTRODUCTION

Glaucoma is a condition that involves distinctive changes in the optic nerve and visual field [1]. It is marked by raised intraocular pressure (IOP) that compresses and damages the optic nerve. Once the optic nerve is damaged, it fails to carry the visual information to the brain and these results in a clinically progressive loss of peripheral visual field and ultimately vision. Primary open-angle glaucoma (POAG) is defined as chronic optic neuropathy with characteristic changes in the optic disc and visual field. This optic nerve damage can ordinarily be alleviated and inhibited by sufficiently reducing IOP by various antiglaucoma medications [2,3].

Risk factors for POAG include older age, black race, family history (first-degree relative), thinner central corneal thickness, myopia, diabetes mellitus, high blood pressure, thyrotoxicosis, corticosteroid responsiveness, and elevated IOP [4,5].

Prevalence of POAG varies in different populations. Glaucoma is estimated to affect about 6.48 million [6]. In general, it affects about 1 in 100 of the general population (of either sex) above the age group of 40 years. It forms about one-third cases of all glaucomas [4]. In India, there are approximately 11.2 million persons aged 40 years and older suffering with glaucoma [7].

All the drugs prescribed for glaucoma will be recorded including its dosage form, route of administration, frequency of administration, indications for which prescribed and duration of therapy. The aim of treatment of POAG is to lower IOP to a level where (further) visual loss does not occur. The IOP needs to be maintained at a lower level of 11-20.5 mm Hg [8]. Drugs used for POAG may be single drug therapy or combination topical therapy. Role of oral carbonic anhydrase inhibitors, hyperosmotic agents, and neuroprotective agents are also undertaken. Single drug therapy includes topical β-blockers (decreases aqueous secretion), prostaglandin analogs (increases the uveoscleral outflow), adrenergic drugs (increases aqueous outflow/decreases aqueous production and increases uveoscleral outflow), carbonic anhydrase inhibitors (decreases aqueous production), and pilocarpine (opens trabecular meshwork and increases aqueous outflow). In combination topical therapy, if one drug is not effective, then combination of two drugs, one drug which decreases aqueous production and other drug which increases aqueous outflow may be used [4]. The drug utilization 90% (DU 90%) index was introduced as a simple, inexpensive, and flexible method for assessing the quality of the drug prescriptions. It identifies the drugs accounting for 90% of the volume of the prescribed drugs after ranking the drug used by volume of defined daily dose [9]. Third world countries spend 30-40% of their total health budget on drugs, some of which are useless and expensive and double their expenditure on drugs on every 4 years while GNP (gross national product) doubles every 16 years [10].

Periodical auditing of DU pattern is vital for promotion of rational use of drugs. The newer glaucoma medications have advantages such as increased efficacy, reduced dosing frequency, and improved side effect profile. Studies related to DU in glaucoma reported from India are scarce [11]. Hence, this study was undertaken to determine the prescribing pattern of antiglaucoma drugs in Outpatient Department (OPD) of a tertiary care teaching hospital.

METHODS

It is a prospective study done on 50 patients with POAG (comprising of individuals belonging to any age group), enrolled in the OPD of Ophthalmology (glaucoma clinic), Bhaskar General Hospital. Institutional Ethics Committee clearance was obtained before starting the study, and informed consent form was obtained from the patient during the study. This study was carried for a period of 2-month, i.e. 8 weeks, and data were recorded.

The importance and need for the study will be explained to each patient. After obtaining the informed consent, the data will be collected from patients, who were diagnosed with POAG by the ophthalmologist. Prescriptions of patients treated for glaucoma during the study will be audited, and they are collected from OPD. All the drugs prescribed for glaucoma will be recorded including its dosage form, route of administration, frequency of administration, indications for which prescribed and duration of therapy. These prescriptions will then be analyzed to check the average number of drugs per prescription, number of encounters with antibiotics, anti-inflammatory drugs and other agents, dosage form of drugs, the frequency of drug administration and the duration of therapy (mentioned or not) and whether the drugs will be prescribed in generic or proprietary names.

Type of study

Open-label, prospective study.

Sample size

Number of patients enrolled in the study are 50 suffering with POAG attending the OPD of Ophthalmology, Bhaskar General Hospital over a period of 2 months.

Study design

The following data will be collected from the prescriptions of patients suffering with POAG and are recorded in the study. Patient particulars, history, diagnosis, drugs - the dosage, frequency, and duration of treatment, comorbid conditions, generic or brand prescription information. The results will be tabulated, and statistical analysis will be carried out.

Selection criteria

A. Inclusion criteria
   - Patients of any age group
   - Patients of either gender
   - Patients treated in the ophthalmology department for glaucoma.

B. Exclusion criteria
   - Patients who will be diagnosed with other ophthalmological conditions.

Statistical analysis

Data collected were analyzed by Chi-square test. Statistical analysis showed positive correlation with *p<0.05.

RESULTS

After screening prescription of patients, it was found out that out of total 50 prescriptions, 30 were males, and 20 were females. In the 50 analyzed prescriptions, 16 drugs were prescribed. Analysis of the prescriptions showed that the average number of drugs per prescription was 2.02 (Table 1). Regarding the dosage forms (Fig. 1), it was found that the maximum number of drugs prescribed were in the form of eye drops (93.3%), followed by tablets (6.67%), whereas capsules, ointments, syrups, and injections were accounting to 0% (Table 2). The antibiotics, anti-inflammatory, and antiallergic drugs, mydriatics and cycloplegics, miotics, multi-vitamins, lubricant, and miscellaneous eye drops prescribed were "nil." The dosage form indicated was 100%. The frequency of drug administration indicated to all the drugs is 100%. Similarly, the drugs prescribed by their generic names were 18.75% and about 81.25% of the drugs were prescribed by their brand names (Table 3).

Table 1: Number of drugs prescribed per prescription

Number of drugs per prescription	Number of prescriptions n (%)
One	16 (32%)
Two	20 (40%)
Three	11 (22%)
Four	3 (6%)
Total	50 (100%)

Table 2: Major therapeutic agents and dosage forms of antiglaucoma drugs

Dosage form	Major therapeutic agent
Drops 14 (93.33%)	Timolol (Iotim) Betaxolol (Iobet) Brimonidine (Alphagan, Brimocom, Combigan) Latanoprost (Xalatan, Latanoprost) Travoprost (Travatan) Bimatoprost (Lumigan, Careprost) Dorzolamide (Dorzox, Misopt)
Ointments	-
Oral 1 (6.67%)	Acetazolamide (tablet diamox)

Table 3: Analysis of prescriptions of patients with respect to different parameters

S. No.	Drug use indicators	Results
1	Total number of prescriptions	50
2	Average number of drugs per prescription	2.02
3	Percentage of dosage forms recorded	100%
4	Percentage of frequency of therapy recorded	100%
5	Percentage of duration of therapy recorded	-
6	Percentage of drugs prescribed by generic name	18.75%
7	Percentage of drugs prescribed by brand name	81.25%

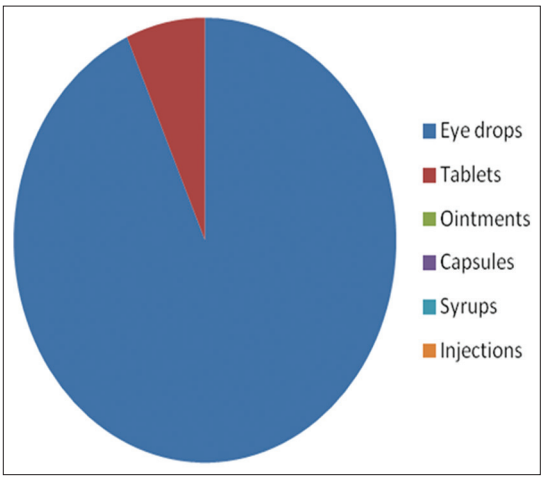

Fig. 1: Formulation of medication

DISCUSSION

After screening of 50 POAG patients prescriptions, it was found that there was no sex preponderance (M:F=3:2). Among the patients and the maximum number of patients belong to the age group of 50-65 years. These findings showed that glaucoma is usually not sex-linked but may be age related. The study was also a part of the prescription audit. Patients with POAG were treated by various drugs in different dosage forms, and ongoing medical treatment was modified according to chemical response and most common drugs prescribed were β-blockers, carbonic anhydrase inhibitors, prostaglandin analogs, α-adrenergic drugs. The highest used drugs are carbonic anhydrase inhibitors. It has been recommended that the limited number of drugs prescribed per prescription should be "two" and that justification for prescribing more than two drugs would be required because of increased risk of drug interactions [12]. In this study, the average number of drugs per prescription was 2.02. Therefore, it is advisable to keep the number of drug prescriptions as low as possible since higher figures lead to

increased risk of drug interactions, increased hospital cost of errors of prescribing [12-14]. The frequency, dosage, and duration of drug therapy are the three important parameters, if not clearly recorded, can result in indiscriminate and injudicious use of drugs. The present study showed that the dosage and frequency recorded in the prescriptions was 100%, but the duration of therapy was not recorded in any. When the various dosage forms were compared, it was found that eye drops were commonly prescribed followed by tablets. The results were similar to other studies, in which the maximum number of drugs prescribed was in the form of eye drops, followed by tablets [15]. This finding supports the use of topical preparations for treating POAG as they have site-specific action, less systemic absorption resulting in fewer side effects and convenient for the patient use. Percentage of drugs prescribed in POAG by their generic names in our study were 18.25%, which is almost similar to one study (19%) as well as contrast (53.6%) to some other studies [16,17] while the brand names were 81.75%. It suggests the popularity of brand names among the medical practitioners of the institute and the influence of pharmaceutical companies. Prescriptions by brand names could possibly result in prescribing errors because the brand names of many pharmacologically different drugs may sound alike and spell similar. As a matter of fact, generic drugs are less expensive as compared to brands that contain the same active ingredient. So, the prescriptions of generic drugs should be emphasized to facilitate cheaper and better treatment for the patient. Our study is in accordance with the WHO recommendation that average number of drugs per prescription should be "two." There was no evidence of polypharmacy. The common prescription writing errors were minimum. Hence, our study on analysis of prescriptions of POAG patients showed a remarkable restraint on prescribing, no polypharmacy and no irrational drug combinations. Statistical analysis showed a positive correlation with $p<0.05$. However, there is a need for awareness to use more generic prescriptions as it could facilitate cheaper treatment for patients. Further studies are needed to delineate treatment of glaucoma [18].

CONCLUSION

Fixed drug combination of timolol (β-blocker) and dorzolamide (carbonic anhydrase inhibitors) was most frequently prescribed combination.

The percentage use of brand drugs is very high; hence, it is necessary to make prescribers aware of the importance of prescribing drugs with generic names.

Polypharmacy is not seen, and prescription errors were minimum in our study which concludes with overall impression of rational prescription.

Thus, periodical auditing of the prescriptions will help to measure the impact of the intervention on the prescribing pattern and improve rational pharmacotherapeutics.

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