Section: Ophthalmology

Original Research Article

A COMPREHENSIVE ASSESSMENT OF PRESCRIPTION PATTERNS AND RATIONAL DRUG USE IN PRIMARY OPEN ANGLE GLAUCOMA USING WHO PRESCRIBING INDICATORS

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ABSTRACT

Background: Glaucoma is a chronic optic neuropathy characterized by progressive degeneration of retinal ganglion cells and their axons, leading to irreversible vision loss if not adequately managed. The primary therapeutic approach involves the reduction of intraocular pressure. Given the chronic nature of the disease and the necessity for lifelong treatment, medication adherence is crucial for preventing disease progression and preserving visual function. A comprehensive evaluation of drug utilization patterns is essential to ensure the rational use of medications. The objective is to evaluate the prescribing patterns of antiglaucoma medications in patients diagnosed with primary open-angle glaucoma, with an emphasis on assessing adherence to rational drug use principles.

Materials and Methods: This cross sectional study was conducted in Ophthalmology Department. 100 patients were included and data were collected from OP card and analyzed.

Results: In the management POAG, β-blockers, particularly timolol, were the most frequently prescribed drug. Combination therapy was prevalent, with 68% of patients receiving multiple medications to achieve optimal IOP control. Notably, 32% of prescriptions included FDCs, with dorzolamide-timolol being the most commonly prescribed FDC. Topical administration remained the predominant route, aligning with standard clinical practices. Generic medications were utilized in 38% of prescriptions, reflecting a cost-effective approach. However, only 11% of prescriptions comprised drugs exclusively listed in the World Health Organization's Essential Medicines List, indicating potential areas for standardization and rational drug use. Importantly, all prescriptions included instructions regarding dosage, duration, and frequency of administration, ensuring comprehensive patient guidance.

Conclusion: β-blockers and prostaglandin analogs are the most frequently prescribed groups. Topical administration remains the predominant route, with β-blockers such as timolol being the most commonly utilized, often in combination with other agents . The use of fixed-dose combinations (FDCs) is on the rise, reflecting a trend towards more streamlined and cost-effective treatment regimens.

Keywords: Primary open angle glaucoma; Rational drug prescription; FDC; WHO prescribing indicators.

INTRODUCTION

Glaucoma, an optic neuropathy, is the leading cause of permanent blindness.[1,2] Glaucoma accounts for up to 8.2% of total visual loss in the world. Raised intraocular pressure is an important known risk factor.[3-5] The aim of treatment is to control IOP. Reduction of IOP with less complications or adverse

effects remains the mainstay therapy for the first-line treatment of glaucoma.[6] Many anti glaucoma drugs achieve this. The preferred method is topical monotherapy.[7] Initial management of glaucoma includes topical medications to control IOP. The drugs commonly used to reduce IOP in glaucoma include topical prostaglandin analogues, beta-blockers, alpha-agonists, carbonic anhydrase inhibitors, and parasympathomimetics. In view of the high prevalence rates and the fact that medication is the primary line of treatment in POAG, an understanding of prescribing patterns can provide an insight into rational use of antiglaucoma drugs.[8]

World Health Organisation (WHO), in 1993, developed core prescribing indicators to measure the degree of polypharmacy, the degree to which prescribing practice confirmed to the Essential Drug List, the tendency to prescribe drugs by generic name, and the overall level of use of antibiotics and injections.[9] The concept of 'Rational use of drugs' has been introduced which is defined by WHO as 'Patients receive medication according to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community'.Drug utilization studies (DUS) can provide insights into a pattern, quality, determinants and outcomes of drug use.[10] The main aim of drug utilization research is to facilitate rational drug use (RDU). This observational study was undertaken to find out the various groups of drugs prescribed to a patient with POAG and to assess the prescriptions using WHO core prescribing indicators.

MATERIALS AND METHODS

This was a cross sectional study, conducted in Ophthalmology Department, Govt. Medical College Thrissur. Study period was 1 year from March 2021 to February 2022 with a sample size of 100. The study was initiated after approval from the Institutional Ethics Committee, Government Medical College, Thrissur. Diagnosed glaucoma patients fulfilling the inclusion criteria and having none of the exclusion criteria were included in this study.

Inclusion criteria

a) Patients, of either gender, who were diagnosed with primary open angle glaucoma by the ophthalmologist.
b) Age: above 40years
c) Patients who give consent for the study

Exclusion criteria

a) Patients with other ocular conditions along with POAG
b) Post laser or Trabeculectomy patients

Informed written consent was obtained from all patients. Relevant data including demographic parameters, co-morbidities, drug details like name of the drug, class, route of administration, type of therapy and instructions written were noted. Data were entered to windows excel sheets and analyzed using SPSS V.20 software. Qualitative data was expressed in percentage. Quantitative data was expressed as mean and standard deviation.

RESULTS

Demographic characteristics

Gender wise distribution

Among the 100 study subjects 61% were males and 39% were females. The age wise distribution of the study population revealed that the maximum number of patients belonged to the age group of 60 -70 years(37%) The mean age of the study population was 61 years with SD 10.

Drug prescription pattern

Multi-drug therapy is mostly observed in treatment of glaucoma. Most of the patients were on more than one drug. As shown in the figure 1, beta blockers and prostaglandin analogues were the most commonly prescribed medications in the study population.

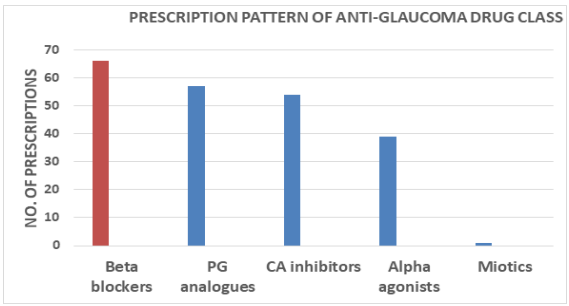

Figure 1: Prescription pattern of antiglaucoma drug class

Commonly prescribed drugs

As shown in the figure 2 below, among the total drugs prescribed, Timolol(66%) was the most frequently prescribed drug, followed by Bimatoprost(57%), Dorzolamide(49%) and Brimonidine(38%).

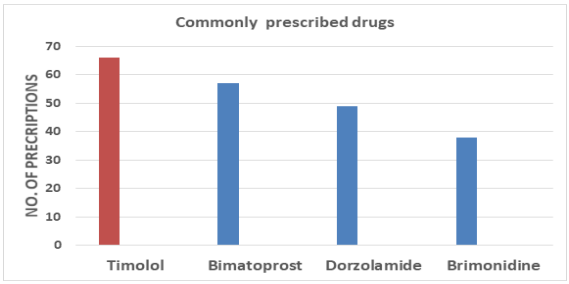

Figure 2: Commonly prescribed drugs

No. of antiglaucoma drug(s)/patient

32% of patients were prescribed only one drug while 30% were on 2 drugs and 28% were on 3 drugs. Only 10% were on 4 drugs as depicted in [Table 1].

Table 1: Number of Antiglaucoma Drugs Received per Patient.

Number of Drugs	Percentage of Patients
1	32%
2	30%
3	28%
4	10%

Percentage of administration through different routes: 97% of prescriptions contained only topical preparations. Only 3% of prescriptions had both topical and oral medications.

Table 2: Percentage of Administration Through Different Routes.

Route of Administration	Percentage of Prescriptions
Topical	97%
Topical & Oral	3%

Prescription pattern based on generic & brand name
As shown in figure 3 below, out of 100 prescriptions, 38 prescriptions had only generic names.50% of prescriptions contained both generic and brand names while 12% of prescriptions had only brand names.

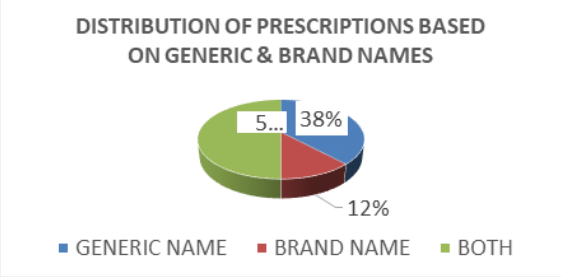

Figure 3: Prescription pattern based on generic & brand names

Distribution based on WHO EDL
As shown in figure 4 below, only 11% of prescriptions had drugs exclusively from EDL.

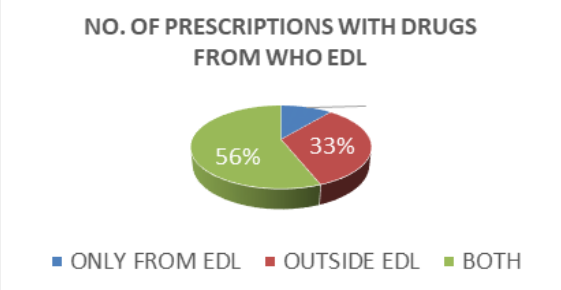

Figure 4: Distribution based on WHO EDL

DISCUSSION

Glaucoma is the leading cause of blindness in India. The mainstay of glaucoma therapy is to reduce intraocular pressure by use of medications. Anti-glaucoma drugs either decrease the aqueous humor secretion or increase the aqueous outflow. Five general groups of drugs β- blockers, prostaglandin analogues, carbonic anhydrase inhibitors (CAI's), α-agonists, and Parasympathomimetics, are useful in the reduction of intraocular pressure.
POAG is a chronic optic neuropathy often requiring lifelong treatment. Patient compliance, adherence and persistence with therapy play a vital role in improved outcomes by reducing morbidity and the economic consequences that are associated with disease progression. Hence it is important to periodically evaluate the prescribing patterns and drug utilization of antiglaucoma drugs.
Information from drug utilisation studies helps us to review the prescribing patterns, cost of treatment and their tolerability profile. This also helps to provide necessary feedback to the clinician and to evaluate the pattern of drug use with respect to the current recommendations or guidelines for the treatment of the condition. The primary aim of the current study was to assess the pattern of drug usage in primary open angle glaucoma.
The sample size of the current study was 100. In our study, the number of male patients were more than females, 61% were males and 39% were females. In the study conducted by Advani M et al, 66% were males and 34% were females. In the study by Jauhari et al, 64% were males compared to 36% females. Majority of studies conducted in India point towards a higher prevalence in males.
The maximum prevalence of POAG was seen in the age group of 60-70 years. 37% belonged to this group. The mean age was found to be 61.64 years. This was similar to the pattern observed by Maitra A et al However, studies Jauhari et aland Yadav et al, showed that more patients were below 60 years.
Out of 100 patients,71% were follow up patients.29% were new patients. Since my study setting is a tertiary care centre, it has more referral cases and it points towards the predominance of follow up patients.
It was observed that beta blocker was prescribed in 66% of prescriptions, making it the most commonly prescribed class of anti-glaucoma drug followed by prostaglandin analogues (57%), carbonic anhydrase inhibitors (54%) and alpha agonists (39%). Least commonly prescribed were the miotics (1%). Betablocker predominance is visible in other similar studies also. Since the introduction of β blockers in the treatment of glaucoma, they are the most frequently prescribed drug groups. Studies by Ocansey et al and Advani et al showed same predominance of beta blockers while study by Jauhari et al showed equal predominance of both betablockers and carbonic anhydrase. In the study conducted by Jauhari et al only 1% prescriptions

contained PGAs. Increase in the usage of PG analogues is an important finding here in contrast to some old studies.

In my study, Timolol was most commonly prescribed (66%) anti-glaucoma drug, as in many other studies. This may be because timolol is also prescribed with other drugs concomitantly or as a fixed dose combination. Bimatoprost (57%) is the second most commonly prescribed drug. Prostaglandin analogues have been found to be superior in efficacy to all other topical classes of glaucoma medications. However, a study reporting trends in Australia and New Zealand in 2006 has shown that although prostaglandin analogues were the first-choice drugs, ophthalmologists favoured β blockers because of cost, government restrictions and familiarity.

In our study, 32% of prescriptions contained FDCs. Timolol + dorzolamide was the most commonly prescribed FDC. Similar finding was observed in another Indian study which found that 26.66% of total prescriptions had FDCs and timolol + dorzolamide was the most commonly prescribed amongst them. It is more convenient (both easier and faster) to instil 1 drop of a FDC than 2 drops from separate bottles of individual drugs. Use of FDCs thus improve compliance by reducing the number of instillations per day. FDCs offer benefits of convenience, cost and safety. In Jammu study, no FDC was prescribed as only one FDC - timolol 0.5% and pilocarpine 2% was available. This study shows rising trend of use of FDC as more rational FDCs are available.

Average number of drugs prescribed in our study was 2.16 which is in unison with other such study conducted in India which reported it as 2.02. It has been endorsed that average number of drugs per prescription should be ≤2. It is advisable to keep the number of drug prescriptions as low as possible since higher figures lead to an increased risk of drug interactions and an increase in hospital cost due to errors of prescribing.

In our study, only 32% were on monotherapy, majority were on combination therapy (68%). Similarly in the study conducted by Jauhari et al 60% were on combination therapy. Since glaucoma is a progressive condition two or more anti-glaucoma drugs are required eventually to control IOP and disease progression. This trend is in accordance with the international council of ophthalmology (ICO) guidelines for glaucoma 2015.

Out of 100 prescriptions, 97 prescriptions contained only topical drugs. Only 3 prescriptions had oral drugs. Acetazolamide was the only drug prescribed by oral route. Topical administration of drugs for eye disease minimizes their side effects.

In 38% of prescriptions, all the drugs were written in generic names. In a study conducted in U.P by Quazzi et al 100% of drugs were written in brand name. There is evidence to suggest that generic medicines are as good as branded medicines with regard to bioequivalence and therapeutic equivalence. Medical council of India had called upon doctors practicing medicine to prescribe drugs with generic names, as far as possible

In the present study 11% of prescriptions contained drug exclusively from WHO EDL. Timolol is the only drug prescribed from the WHO EDL. 56% of prescriptions had drugs from both inside and outside EDL. This point towards the high need for revising the EDL according to present days prescription trends.

The written instructions regarding dose, dosing interval and duration of therapy were mentioned in all the prescriptions. Study of Yadav et al has reported similar result whereas in another study by Biswas N et al instructions were missing in 22.1% of the total number of drugs prescribed.

Strength and limitations: Glaucoma is a chronic, progressive condition which needs lifelong treatment. Cost effectiveness and convenience to patients are two important factors to be considered while prescribing drugs. This study provides a framework for continuous prescription audit in the outpatient department of Ophthalmology, providing regular feedback to the prescribers, thus improving efficacy and promoting rational drug use.

The study is confined to a small population coming in Ophthalmology department of a tertiary care hospital which may not represent the general population.

CONCLUSION

On the basis of observations mentioned overall prescribing pattern is satisfactory. Though PG analogues are the first line drugs, due to high cost and non-availability in hospital formulary, Beta blockers were the most frequently prescribed class of drugs. Dorzox – T can be included in hospital formulary since it is the most common FDC prescribed. Sensitization of physician regarding prescribing in generic name is essential.

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