ORIGINAL ARTICLE

A STUDY OF THE ASSOCIATION BETWEEN PATTERNS OF EYE DROP PRESCRIPTION AND MEDICATION USAGE IN GLAUCOMA SUBJECTS

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ABSTRACT

Introduction: To investigate the association between patterns of eye drop prescription and medication usage in patients with glaucoma.
Methodology: Sixty two patient who were diagnosed glaucoma and were on any topical anti glaucoma medication were included in the study and the pattern of eye drop instillation was studied with the help of a questionnaire at Dhiraj General Hospital, Piparia, Vadodara, Gujarat. The questionnaire determined how patients routinely used medications, including the method of eye drop administration, number of eye drops per instillation, accuracy of eye drop placement, weekly frequency of eye drop application, and their awareness of local side effects.
Results: Of 60 patient 34 patients (56.67%) instilled medication by their own, 36 patients (60%) instilled drop accurately at first attempt, 51 patients (85%) instilled drop in sitting position, 22 patients (33.67%) patients instilled one drop at a time. 47 patients (78.33%) kept a gap of less than 2 minutes, 9 patients (15%) instilled another drop between two to four minutes and 4 patients kept interval of more than four minutes between different drug instillation. Only 3 patients (5%) were familiar with the local side effects of the drug.
Conclusion: From our study we conclude that there is a huge scope in the area of patient education regarding glaucoma. The findings in our study suggest a need to better educate our patients by providing them detailed information about its administration and its importance. This would help to improve patient compliance and increase the efficiency of anti-glaucoma treatment.

Keywords: Glaucoma, Prescription, Ophthalmology, Eye Drops

INTRODUCTION

Glaucoma is chronic, progressive, multifactorial optic neuropathy caused by a group of ocular conditions which lead to damage of optic nerve with loss of visual field. The most common risk factor known is raised intraocular pressure.[1]

Glaucoma is not curable, and vision lost cannot be regained. With medication and/or surgery, it is possible to halt further loss of vision. Since open-angle glaucoma is a chronic condition, it must be monitored for life. Proper administration of medicines is as important as the proper choice of medicines for a successful treatment, since, whatever the effectiveness of the medicine is, the benefit from the treatment depends on the correct administration.[2]

For some years authors have suspected that a substantial proportion of patients with chronic glaucoma fail to comply with medical advice. Noncompliance is particularly hazardous in glaucoma because of the continuing possibility of blindness. And yet the nature of the disorder and its therapy might well foster noncompliance. The patient's collaboration in treatment is obviously mandatory if his intraocular pressure is to be kept under control and visual loss prevented.[3,4]

The purpose of the study was to determine how commonly patient with glaucoma do not comply with the doctors' prescription.

METHODOLOGY

Our study is a non comparative, observational, cross sectional and questionnaire based study. We obtained due permission from the ethics committee of the institute and started our study thereafter. We have examined a total of 60 patients after obtaining an informed written consent. Primary data like name, age, sex, socioeconomic status and residential address were recorded. Patients were examined by whole of our team. For examination we used Snellen's chart to check visual acuity. We examined refraction with autorefractometer, trial set with cycloplegic refraction.

Anterior segment examination was done with slit lamp biomicroscope and posterior segment with ophthalmoscopes (direct and indirect). For screening of glaucoma, we measured intra-ocular pressure with NCT (non-contact tonometer) and with Goldmann applanation tonometry, followed by gonioscopy using Zeiss 4 mirror indentation gonioscope and ultrasound pachymetry. Visual field analysis was performed using Humphrey's automated perimeter.

RESULTS

Of 60 patients included in the study 35 (58.3%) were male and 25 (41.67%) were female.

Table 1: Sex wise distribution of patients

Sex	No. (%)
Male	35 (58.3)
Female	25 (41.7)

Table 2: Practices of eye drop instillations by patients

Variable	Inaccurate	Accurate	p-Value
Self instillation	19	15	
Family member	5	21	0.004
Total	**24**	**36**	

Table 3: Number of drops instilled

Variable	One drop	Two drops	p-Value
Self	5	29	0.00005
Family Member	17	9	

Table 4: Interval between eye drop instillation

Interval	No. (%)
< 2 mins	47 (78.3)
2- 4 mins	9 (15.0)
> 4 min	4 (6.7)

34 patients (56.67%) instilled medication by their own and family members of patient instilled drops in 26 patients (33.33%). 36 patients (60%) instilled drop accurately inside the eye at first attempt and 24 patients (40%) failed to do so. However accuracy in those patients in whom family member instilled drops was quite high (80.76%) compared to that of self instilling (44.11%).(p=0.004)

51 patients (85%) instilled drop in sitting position while 9 patients (15%) instilled drop in supine position.

The number of patients instilling one drop at a time were only 22 (33.67%) and those using two drops were 38 (66.33%). Family member instilling the drop had higher percentage (65.38%) of instilling one drop compared to those who were self instilling (14.7%). (p = 0.00005)

47 patients (78.33%) kept a gap of less than 2 minutes interval between two eye drops. 9 patients (15%) instilled another drop between two to four minutes after instilling one. Only 4 patients kept interval of more than four minutes between different drug instillation.

Only 3 patients (5%) were familiar with the local side effects of the drug.

DISCUSSION

The success of the Glaucoma treatment is highly dependent on the patient compliance and the process of eye drop instillation.[5, 6, 7, 8] By this study our purpose was to investigate the association between patterns of eye drop prescription and medication usage in patients with glaucoma with the help of a questionnaire. Of 60 glaucoma patients included in the study we found that 34 (56.67%) instilled medication by themselves. Self medication has many problems associated with it. One such problem is a proper drug placement. As enquired through the questionnaire it was found that of these 34 patients, only 15 patients instilled the medication at first attempt and rest 19 patients had to instill another drop of a costly medication. Even those 15 patients who claim to instill the drop at the first attempt cannot be completely thought to be unbiased as this is a questionnaire based study. Of the remaining 26 patient, where family member instilled the medication it was found that 21 of them were sure of instilling the medication properly at first attempt and also remaining 5 patient required another drop only at times.

In one of the study, significant differences were found between the group of patients who instilled their eyedrop into the inner canthal region and those who instilled their eye drop into the inferior conjunctival cul-de-sac, in visual field defect severity and IOP measurements. The visual field defect severity and IOP were lower in the inferior conjunctival cul-de-sac group compared to the inner canthal region group.[5, 6, 9, 10]

Therefore, patients should be adequately instructed about the proper techniques for eye drops instillation and motivated to take help of a family member instead of self instilling the drop as self instilling cannot be as accurate compared to another person instilling the drop.

Another disadvantage of self instilling the medication is the wastage of costly Glaucoma medications as self instillation is more prone to improper placement of the drug often than not requiring another drop to be

used. As glaucoma treatment is a lifelong process, it is a heavy financial burden to the family. Wastage of the drug would definitely add to this burden which possibly, is one of the important factors responsible for termination of treatment leading to blindness.[11, 12, 13]

One of the important factors in eye drop instillation is touching of the nozzle to the eye or lids leading to bottle contamination, infection and inadvertent trauma. In a study of 70 POAG patients on self-administration of anti glaucoma medication, fifty-three patients (75.7%) touched the tip of the bottle to the globe or periocular tissue. Only 6 patients (8.57%) were able to correctly instill the eye drops (squeeze out 1 drop and instill it into the conjunctival sac without bottle tip contact).[14]Bottle contamination adds to the wastage and also can lead to more dangerous situations like corneal ulceration.[15]

It wound not be erroneous to assume that the compliance of patient self administering the drop would be less than the patient taking help of the family members as two people would be responsible for the task. Respecting the view that the members of family are emotionally attached it would not be incorrect to believe that timing of the drug instillation would be maintained correctly if such a person is made responsible as compared to self. This gap would be more evident where the patient is illiterate and has a family member who can understand the depth of Glaucoma disease severity. A hidden advantage of making family members responsible for the task is incorporating awareness regarding glaucoma and its medication into them. It is a well accepted fact that family history of glaucoma is a risk factor for the same. So imparting knowledge to the families having a glaucoma patient by involving them in the task of eye drop instillation to the patient would definitely be fruitful.

Another aspect of eye drop instillation is hygiene. Though simple but an important step in proper eye drop instillation is washing hands. Unwashed hands may touch the eye while instilling the drop and impart infection to the eye. Also the unwashed hand may touch the nozzle and the bottle may get contaminated. In our study only 6 patients/relatives (10%) washed their hands before eye drop instillation. As many of our patients belong to the rural area it is a clear cut reflection of lack of awareness about the hygiene in rural population. Hence it is very necessary to educate the patients to maintain their hygiene by introducing them to the side effects otherwise.[16,17,18,19]

38 patients (63.3%) instilled two drops at a time. The normal volume of a conjunctival cul de sac is 7 micro litre which increases to 30 micro litre after instillation of a drop temporarily. Most commercially available eye drops have drop size equal to 30-75 micro litre which means even a single drop exceeds the capacity of conjunctival cul de sac, so that excess drains into the lacrimal sac and onto the skin. If eye drops spill during administration, the risks of blepharitis and eyelid pigmentation increase.Hence there is no added benefit of instilling more than one drop. Rather it adds to the side effect and the economic burden. This leads to early emptying of the medication and hence drug delivery is missed until the new drops are purchased. Thus questioning the patient about the period of lasting the bottle would help the ophthalmologist getting an idea of improper drug instillation. Those patients can be educated regarding the same.

Time period between two glaucoma medications is an important factor regulating drug efficacy.[20] 47 patients (78.3%) kept a gap of less than two minutes between instilling two different medications. It is advisable to keep a gap of four to five minutes between two drops.[6,21,22] This will keep the first drop from being washed out by the second before it has had sufficient time to work. Only 4 patients (6.6%) kept a gap greater than four minutes. Since most of the anti-glaucoma medications lead to dryness, all the patients were prescribed a lubricating drop along with the glaucoma medication, Hence all the patients even those who were on a single anti glaucoma medication were considered for this question.

Last question in the questionnaire in this study was to enquire about the knowledge regarding the side effects of the glaucoma medications. Only 3 patients (5%) were aware about it. Glaucoma medications have multiple local side effects but IOP lowering benefits of the medications are not outweighed by these local side effect.Conjunctival allergies, conjunctival injection, corneal epithelium disorders, blepharitis, ocular pemphigoid are few local side effects of anti glaucoma medications.[10, 15, 23, 24, 25] Patients often discontinue the medication when they suffer from local side effects of medication. Educating patients on the various adverse reactions associated with anti-glaucoma eye drops willmake patients recognize that a minor adverse event does not necessarily mean they should discontinue medication use and hence the patient compliance will improve.

The limitation of the study was that it was a questionnaire based cross sectional study so we could not evaluate the impact of instillation pattern on IOP. We need more long term studies to evaluate the rate of glaucoma progression associated with different instillation patterns. Since most of the patients are from rural area, the results of the study cannot be applied to general population.

CONCLUSION

From our study we conclude that there is a huge scope in the area of patient education regarding glaucoma. The findings in our study suggest a need to better educate our patients by providing them detailed information about its administration and its importance.

This would help to improve patient compliance and increase the efficiency of anti-glaucoma treatment.

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