Frequency of Dry Eye in Glaucoma Patients Using Topical Anti-Glaucoma Therapy

NESR FAROOQ1, HAZIF WAQAR AHMAD GAHURI2, ASAD ZAMAN KHAN3, ABDUL BARI KAKAR4, MUHAMMAD AMIN5, CHAKAR TAJWIDI6
1Assistant Professor of Ophthalmology, Shalimar Medical & Dental College, Lahore
2Senior Registrar of Ophthalmology, Lahore Medical & Dental College, Lahore
3Assistant Professor of Ophthalmology, Vision Pakistan Clinic, Lahore
4Assistant Professor Ophthalmology, Sheikh Khalifa Bin Zayed Al-Nahyan Medical Complex, Quetta
5Assistant Professor of Ophthalmology, Loralai Medical College, Loralai
6Assistant Professor Ophthalmology, Mekran Medical College, Turbat
Correspondence to: Dr. Nesr Farooq. E-mail: nesrfarooqaeed133@yahoo.com Cell: 0321-4845759

ABSTRACT
Aim: To determine the prevalence of dry eye in glaucoma patients using topical anti-glaucoma therapy.

Setting: A prospective observational study

Place and duration of study: Department of Ophthalmology, Shalimar Medical & Dental College Lahore from 1st November 2020 to 30th April 2021.

Methodology: Ninety patients of both genders were enrolled. Detailed demographics of enrolled cases age, sex and body mass index were recorded after taking informed written consent. Patients using topical anti-glaucoma therapy for more than 8 months and having symptoms of stinging and burning sensations itching, watering, irritation, due to regular use of topical antiglaucoma drugs were presented. Basal Schrimer's test and tear film break-up time test was used to measure the frequency of dry eye syndrome as mild, moderate and severe.

Results: There were 60 (66.7%) females and 30 (33.3%) patients were males. Mean age of the patients were 45.61±7.66 years with mean BMI 26.24±8.71 kg/m². We found that 40 (44.4%) patients had burning and stinging sensations, itching found in 21 (23.3%), dry eye symptoms were found in 16 (17.8%) patients and watering and irritation found in 13 (14.4%). According to tear film break-up time test 20 (22.2%) cases did not show dry eye syndrome and 19 (21.1%) patients were normal in Basal Schrimer's test.

Conclusion: Use of topical anti-glaucoma medication resulted in dry eye syndrome as well as a decrease in the tear film's stability.

Keywords: Anti-glaucoma therapy, Basal Schrimer's test, Tear film break-up time, Anti-glaucoma therapy, Dry eye syndrome

INTRODUCTION
Ocular surface disease (OSD), also known as dry eye, is a multifactorial eye illness. Ocular surface dehydration due to inadequate tear production is the hallmark of the condition. Inflammation of the ocular surface is a sign of the condition, as are pain, visual impairment, and tear film instability. World-wide prevalence ranges from 5 to 50%, with 6.8% in the United States. In elderly adults and women, it is more common (8.8% vs. 4.5%).

Ocular and systemic drugs are two of the risk factors for developing dry eye disease (DED). It's customary to use single or several hypotensive eye drops to treat glaucoma. Dry eye illness can be triggered or worsened by using hypotensive eye drops for a lengthy period of time. Because of this, glaucoma sufferers are twice as likely to develop DED.

Dry eye syndrome is an important component of ocular surface disease. Dry eye is a multi-factorial disease of the tears and the ocular surface that is characterized by discomfort, vision impairment as well as tears film disturbances that have the potential to injure the surface of the eye. Incidence of dry eye syndrome rises with age, anti-glaucoma medication use, and duration. In order to measure glaucoma patients’ ocular surface health, numerous objective procedures have been explored. TBUT, Schrimer’s Test, Fluorescein Clearence Test (FCT), Rose Bengal ocular surface staining, biomicroscopy, impression cytology, and confocal microscopy are some of the tests available.

First-line treatment for people with primary open-angle glaucoma (POAG) involves medical management. As a typical treatment, topical hypotensive drops are used for a longer period of time and at varying doses. Other side effects of these drugs may include allergic reactions, OSD (Ocular Surface Disease), tear film abnormalities, corneal epitheliopathy and punctate keratitis as well as chronic inflammation, impaired wound healing, and a high prevalence of a squamous metaplasia in diabetic and hypertensive patients. Because of this, glaucoma therapy may not be as effective, resulting in irreparable damage to the eyes. Inflammation and OSD (ocular surface disease) are common side effects of long-term use of IOP lowering medications. These include burning/stinging, foreign-body sensation, eyelid itching and wetness as well as itching of the eyelids following instillation.

Corneal innervation is essential for corneal epithelial integrity, proliferation, and wound healing. Several neuropeptides are secreted by the subbasal nerve plexus and stromal keratocytes. According to research, these diffusible substances enhance epithelial development, proliferation, differentiation, collagen type VII formation, DNA synthesis, neurite survival, and keratocyte proliferation. As a result of corneal innervation changes, the epithelium’s wound healing ability is impaired, resulting in dry eye syndrome.

The aim of this study is to determine the prevalence of dry eye in glaucoma patients using topical anti-glaucoma therapy.

MATERIALS AND METHODS
This descriptive/observational study was conducted at Department of Ophthalmology, Shalimar Medical & Dental College Lahore from 1st November 2020 to 30th April 2021 and comprised of 90 patients. Patients detailed demographics age, sex and body mass index were recorded after taking informed written consent. Patients had rosacea and blepharitis problems and those did not give any written consent were excluded. Patients were aged between 18-65 years. Patients using topical anti-glaucoma therapy for more than 8 months and having symptoms of stinging and burning sensations itching, watering, irritation, due to regular use of topical antiglaucoma drugs were presented in this study. TBUT was measured by placing a tiny fluorescein strip in the lower fornix of the eye. Before opening their eyes and blinking, the patients were asked to close their eyes for a few seconds. The cornea was then...
scanned with a Cobalt blue slit light after the strip was removed. A second-by-second timer was used to determine how long it took between the last blink and the first dry spot to appear in a tear film. A patient with dry eye was defined as one who had a TBUT of less than 11 seconds. Minor dry eye syndrome was defined as TBUT 10-8 sec in those individuals with mild dry eye syndrome. Dry eye syndrome was moderate in individuals with TBUT 7 to 5 seconds and severe in those with less than 4 seconds.

In the Schirmer’s II test, a short piece of Schirmer’s strip was inserted under a drop of local anaesthetic into the lower eyelid (inferior fornix). It was removed after 5 minutes and the moisture content measured. 15 mm of Schirmer’s strip was normally wet after 5 minutes. Patients with Schirmer’s strip wetting values less than or equal to 14 mm were classified as dry eye patients. A wetting score between 14 and 9 mm indicates mild dry eye, whereas 8 to 4 mm indicates more severe dry eye. Wetness readings of less than 4 mm of strip were considered serious dry eye syndrome. Complete data was analyzed by SPSS 23.

RESULTS

There were 60(66.7%) females and 30(33.3%) patients were males. Mean age of the patients were 45.61±7.66 years with mean BMI 26.24±8.71 kg/m². Forty (44.4%) patients had burning and stinging sensations, itching found in 21(23.3%), dry eye sensations were found in 16(17.8%) patients and watering and irritation found in 13 (14.4%) [Table 1]. According to Tear film break up time test, 25(27.8%) patients had mild dry eye, 29(32.2%) had moderate, 16(17.8%) had severe and 20(22.2%) cases had no dry eye syndrome (Table 2). According to Basal Schirmer’s test, 19 (21.1%) patients were normal while 24 (26.7%) cases had mild dry eye syndrome, 34 (37.8%) had moderate and 13(14.4%) had severe dry eye syndrome (Table 3).

Permission was granted from Ethical Review Board.

Table 1: Baseline details and symptoms of enrolled cases (n=90)

<table>
<thead>
<tr>
<th>Variable</th>
<th>No.</th>
<th>%</th>
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<tbody>
<tr>
<td>Mean age (years)</td>
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</tr>
<tr>
<td>Mean BMI (kg/m²)</td>
<td>26.24±8.71</td>
<td></td>
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<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>60</td>
<td>66.7</td>
</tr>
<tr>
<td>Female</td>
<td>30</td>
<td>33.3</td>
</tr>
<tr>
<td>Symptoms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burning and stinging</td>
<td>40</td>
<td>44.4</td>
</tr>
<tr>
<td>Itching</td>
<td>21</td>
<td>23.3</td>
</tr>
<tr>
<td>Watering &amp; irritation</td>
<td>16</td>
<td>17.8</td>
</tr>
<tr>
<td>Dry eye sensations</td>
<td>13</td>
<td>14.4</td>
</tr>
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</table>

Table 2: Frequency of dry eye syndrome after Tear film break-up time test (n=90)

<table>
<thead>
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<th>Dry eye syndrome after tear film break-up</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>25</td>
<td>27.8</td>
</tr>
<tr>
<td>Moderate</td>
<td>29</td>
<td>32.2</td>
</tr>
<tr>
<td>Severe</td>
<td>16</td>
<td>17.8</td>
</tr>
<tr>
<td>Normal</td>
<td>20</td>
<td>22.2</td>
</tr>
</tbody>
</table>

Table 3: Frequency of dry eye syndrome after Basal Schirmer’s test (n=90)

<table>
<thead>
<tr>
<th>Dry eye syndrome after Basal Schirmer’s test</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>24</td>
<td>26.7</td>
</tr>
<tr>
<td>Moderate</td>
<td>34</td>
<td>37.8</td>
</tr>
<tr>
<td>Severe</td>
<td>13</td>
<td>14.4</td>
</tr>
<tr>
<td>Normal</td>
<td>19</td>
<td>21.1</td>
</tr>
</tbody>
</table>

DISCUSSION

Opioids are always the first line of defence against glaucoma, but they can also have an adverse effects on the ocular surface when used for a longer period of time.16 Preservatives in ocular solutions are still being studied to determine the extent of their toxicity.17 They can cause dry eye syndrome, subconjunctival fibrosis and epithelial cell death when used for an extended period of time.

REFERENCES


CONCLUSION

The use of topical anti-glaucoma medication resulted in dry eye syndrome, as well as a decrease in the tear film's stability. Conflict of interest: Nil