EVALUATION OF PROPHYLAXIS OF DRY EYE SYNDROME ASSOCIATED WITH SOFT CONTACT LENSES

The purpose of the paper was to investigate the possibilities of dry eye syndrome prevention associated with soft contact lenses wearing. The algorithm of dry eye syndrome diagnostics and soft contact lenses selection has been developed based on the results of this work. The research showed that “Slezol Forte” is highly effective in the prevention of dry eye syndrome associated with wearing of soft contact lenses.

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Keywords: Dry eye syndrome, soft contact lenses, “Slezol Forte”, prevention

UDC: 617.711-004.1:617.751+616-08

Introduction

Due to the increased rates of urbanization and technological progress the number of working-age people with refractive errors rises constantly. Wearing contact lenses is one of the modern methods of visual acuity correction; though the most modern lenses have several drawbacks. According to some authors, patients’ refusal of soft contact lenses (SCL) wearing in 20% of cases is associated with discomfort and intolerance (Brzhesky and Somov, 2003; Fonn, 2007; Khaireddin, 2013; Nichols and Sinnott, 2006; Stapleton, Stretton, Papas, and Skotnitsky, 2006).

In particular, 72% of contact lens users in the USA and 53% in the UK noted on eye dryness as the main reason of refusing SCL wear. If contact lens users have problems as they wear the lenses there is a great likelihood of reducing the period of lenses wearing, and moreover, the risk of serious corneal complications increases greatly (Khaireddin, 2013; Chen, Wang, Shen, Cui et al., 2011; Stapleton, Marfurt, Golebiowski, Rosenblatt et al., 2013). These circumstances indicate the necessity of prophylactic measures to prevent the development of dry eye syndrome (DES) associated with the SCL use.

Currently, the arsenal of ophthalmological medications for DES prevention has been replenished with the combined drug “Slezol Forte” (World Medicine Ophthalmics, UK). The medication contains dextran 70 - 1mg and hypromellose - 3mg. Hypromellose is a protector of the corneal epithelium, it has a lubricating and softening effect, and high viscosity which increases the duration of the contact of the solution with the cornea. The refractive index of the solution is similar to one of natural tear. It helps to restore the stability and reproduction of the optical characteristics of the tear film. “Slezol Forte” comprises dextran, which in combination with natural tear increases the tear film stability. The drug compensates tear deficit and improves corneal hydration.

The purpose of the study was to investigate the possibility of prevention of dry eye syndrome associated with soft contact lenses using.

Materials and methods

The study involved 60 patients (120 eyes) with myopia and compound myopic astigmatism without syndromic xerosis who used the SCL for the first time, who have been screened in the outpatient department of the 2nd clinic of TMA from 2011 to 2013. Patients groups were comparative for gender (30 male and 30 female) and age (16-40 years). For the correction of visual acuity they used “BAUSCH & LOMB” (USA) silicone
hydrogel SCL, which are characterized by high moisture content (66%) and maximally providing the preservation of the corneal physiology.

Patients were divided into 2 groups: group 1 (control group) consisted of 30 patients (60 eyes) who used SCL for the correction of myopia and compound myopic astigmatism, group 2 (study group) included 30 patients (60 eyes) with the same diagnosis who also used SCL as well as “Slezol Forte” eye drops with a view of DES prevention 2 times a day 15 minutes before putting on the SCL.

All patients were conducted the history taking, common ophthalmological examination (visual acuity test, biomicroscopy, direct ophthalmoscopy, tonometry, perimetry), objective examination (decrease or absence of the tear meniscus at the eyelid margins, presence of conjunctival mucous secretions in the form of threads, local swelling of bulbar conjunctiva with superimposing on the free edge of the eyelid, flaccid conjunctival hyperemia, inclusions polluting the tear film). The obtained data was evaluated by a three-point scale: 0 - absence of the sign, 1 - subtle manifestations of the sign, 2 - distinct appearance of the symptom, 3 - pronounced manifestations of it (Brzhesky and Somov, 2003). All patients were also asked to complete one of the versions (Uzbek or Russian) of the Ocular Surface Disease Index (OSDI) adapted questionnaire (Bakhritdinova and Makarova, 2008).

Calculation of the OSDI was performed according to the following formula:

\[
OSDI = \frac{\text{[sum of scores of answers to all questions $\times 100$]}}{\text{[total number of all answered questions $\times 4$]}}
\]

The criterion for the DES diagnosis according to OSDI questionnaire is the number of points gained: from 16.8 to 28.1 points - mild, from 28.2 to 43.7 - average, more than 43.8 points - severe DES.

Further there were a special examinations performed; they included functional tests of Schirmer I (total tear production), Schirmer II (basic tear production, modified Jones test) and Norn test (tear break time).

The survey was conducted before the SCL application, after 6 months and 1 year after the start of the SCL use for visual acuity correction.

**Results and discussion**

According to the results of anterior segment biomicroscopy the objective signs of DES were detected in 30% of patients at 6 months and in 62% after 12 months of SCL use, while in patients in the study group this ratio did not exceed 10% both at the beginning and in the end of the study.

**TABLE 1. THE RESULTS OF THE QUESTIONNAIRE AND FUNCTIONAL TESTS FOR SCL USERS**

<table>
<thead>
<tr>
<th></th>
<th>Control group</th>
<th>Study group</th>
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<tbody>
<tr>
<td></td>
<td>Before SCL use</td>
<td>In 6 months</td>
</tr>
<tr>
<td>OSDI questionnaire</td>
<td>8.1±0.2</td>
<td>23.0±0.3</td>
</tr>
<tr>
<td>Norn test (sec)</td>
<td>16.4±0.4</td>
<td>15.2±0.5</td>
</tr>
<tr>
<td>Schirmer I test</td>
<td>15.2±0.8</td>
<td>10.5±0.7</td>
</tr>
<tr>
<td>Jones test</td>
<td>14.8±0.3</td>
<td>10.6±0.4</td>
</tr>
</tbody>
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According to the questionnaire, the ocular surface disease index in the control group increased from 8.1±0.2 to 23.0±0.3 points after 6 months of SCL using, and to 31.4±0.3 after 1 year. In the study group the fluctuations were not significant (Table 1). Thus, all the respondents with the DES identified according to the questionnaire gave positive responses (from 1 to 4 points) to the overwhelming majority of questions.

Adapted OSDI questionnaire can significantly reduce the time of admission and facilitate the diagnosis of DES associated with SCL using in a clinic which is an important advantage of this questionnaire. Based on these results, we proposed the rationalization proposal (Republic of Uzbekistan, Rationalization proposal No.650 dated 11.09.2013, “The SCL associated DES diagnostic method using an adapted version of the OSDI questionnaire,” Bilalov, Avanesova, and Hodjaeva; Uzbekistan).

On the background of “Slezol Forte” use all the patients reported subjective comfort at SCL using, there were almost no complaints about the feeling of dryness and foreign body sensation. Majority indicated the absence of fatigue and visual comfort while using the computer.

6 months of SCL using caused a statistically significant (p<0.05) decrease in the precorneal tear film stability. Tear break time (TBT) which was determined by the Norn test decreased by 7.2%, in a year - by 20.5%. The Norn test at routine instillation of “Slezol Forte” remained almost unchanged (Table 1).

The study of the summary tear production using Schirmer I test after 6 months of SCL using showed a statistically significant decrease in total tear production for 30.5% (p
<0.05), in a year - for 50.1%. Against the background of “Slezol Forte” use at baseline, in 6 months and in a year the Schirmer I test data remained almost the same (Table 1).

Jones test indicators in the control group decreased significantly after 6 months of SCL using for 28.1% and for 46.9% in a year after the start of the SCL use for visual acuity correction. The basic tear production in the study group remained virtually unchanged (Table 1).

Thus, the results of this study revealed the statistically significant reduction in total and basic tear production, precorneal tear film stability at SCL using. The impact of SCL on the surface of the eye results in the rise of objective data performance and results of the OSDI questionnaire. These changes are signs of symptomatic dry eye that occurs in SCL using. Use of “Slezol Forte” as an artificial tear enabled to reduce the risk of DES, improve the tear film state and improve the subjective comfort at SCL wearing. The results of the study allow us to recommend the drug as an effective means for DES prophylaxis in the SCL users.

Based on the studies of adapted version of the OSDI questionnaire we have developed an algorithm of diagnosis and prevention of DES associated with wearing the SCL (Figure 1).

**Conclusion**

The studies have shown that “Slezol Forte” instillation is highly effective for the prevention of dry eye associated with soft contact lenses wearing.

**References**


