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Nesofilcon A versus etafilcon A on the ocular comfort levels in patients with short non-invasive break-up time: A prospective comparative study

Kısa gözyaşı kırılma zamanı olan hastalarda etafilcon A ve nesofilcon A'nın oküler konfor seviyeleri açısından kıyaslanması: prospektif karşılaştırmalı çalışma

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ABSTRACT

Aim: The aim of the study was to compare the two different hydrogel daily disposable contact lenses (HyDDCLs) satisfaction levels in patients with meibomian gland disfunction (MGD) and allergic conjunctivitis accompanied with short noninvasive tear break-up time (NIBUT).

Material and Methods: Fifty patients who had no history of contact lens and had short NIBUT were included to the study into two groups: allergic conjunctivitis findings (group 1) and MGD findings (group 2). All patients used both etafilcon A and nesofilcon A, respectively. The OSDI (Ocular Surface Disease Index) and CLDEQ-8 (Contact Lens Dry Eye Questionnaire- 8) tests were performed by the patients for each lens and the mean scores were compared. In addition, the decisions of all patients regarding the continued use of each lens were questioned.

Results: The mean of total scores of OSDI and CLDEQ-8 were statistically lower in nesofilcon A, significantly. The mean scores of the all OSDI subscales and the CLDEQ-8 subscales of dryness, discomfort, blurred vision and closing eyes were lower in nesofilcon A. Four patients (8%) were not satisfied by any of the lenses. 36 (72%) patients preferred nesofilcon A and remaining 10 (20%) patients preferred etafilcon A to continue.

Conclusion: Due to the hydrophilic structure and low modulus of the HyDDCLs, the satisfaction rate was found to be higher in the study group (92%). HyDDCLs could be a suitable option in cases where ocular surface diseases are accompanied. Hydrogel material with higher water content offers better comfort levels at the end of the day.

Keywords: allergic conjunctivitis, contact lens discomfort, dry eye disease, hydrogel daily disposable contact lenses, meibomian gland disfunction.

ÖZ

Amaç: *Meibomian bez disfonksiyonu (MBD) ve alerjik konjonktivit ile birlikte kısa noninvaziv gözyaşı kırılma zamanı (NIBUT) olan hastalarda iki farklı hidrojel günlük tek kullanımlık kontakt lensin (HyDDCL) oküler konfor seviyelerinin karşılaştırılması.*

Gereç ve Yöntem: *Kontakt lens kullanımı öyküsü olmayan ve NIBUT'si kısa olan 50 hasta alerjik konjonktivit (grup 1) ve MBD (grup 2) bulgularına göre iki gruba alındı. Tüm hastalar sırasıyla hem etafilcon A hem de nesofilcon A kullandı. Hastalara her bir lens için OSDI (Ocular Surface Disease Index) ve CLDEQ-8 (Contact Lens Dry Eye Questionnaire-8) testleri yapıldı ve ortalama puanlar karşılaştırıldı. Ayrıca tüm hastaların her bir lensin kullanımına devam edilmesi ile ilgili kararları sorgulandı.*

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Bulgular: *OSDI ve CLDEQ-8 testlerinden elde edilen toplam puanların ortalaması nesofilcon A için istatistiksel olarak anlamlı derece daha düşüktü. Nesofilcon A için OSDI'nin tüm alt ölçeklerinin ve CLDEQ-8 testindeki kuruluk, rahatsızlık, bulanık görme ve gözlerin kapanması alt ölçeklerinin ortalama puanları daha düşüktü. Otuz altı (%72) hasta kullanıma devam etmek üzere nesofilcon A'yı tercih ederken kalan 10 (%20) hasta devam etmek için etafilcon A'yı tercih etti. Dört hasta ise (%8) her iki lensten de memnun kalmadı.*

Sonuç: *HyDDCL'lerin hidrofilik yapısı ve düşük modulüsleri nedeniyle, etafilcon A ve nesofilcon A için memnuniyet oranı çalışma grubunda (%92) oldukça yüksek bulunmuştur. Bu nedenle oküler yüzey hastalıklarının eşlik ettiği durumlarda HyDDCL'ler uygun bir seçenek olabilir. Daha yüksek su içeriğine sahip hidrojel materyal varlığında oküler konfor seviyeleri çok daha iyi olmaktadır.*

Anahtar Sözcükler: *Allerji konjonktivit, hidrojel günlük kullan-at kontakt lens, kontakt lens konforsuzluğu, kuru göz hastalığı, meibomian bez disfonksiyonu.*

INTRODUCTION

Ocular allergy and dry eye disease (DED) are two different clinical entities affecting the ocular surface and resulting early break-up time in tear film that their clinical manifestations include partly overlapping signs and symptoms with accompanying each other's. In most cases, increased ocular osmolarity in ocular allergy patients causes an increase in evaporation and tear film instability over the cornea and DED symptoms (1). Soft contact lenses (CLs) will inevitably cause or promote ocular surface abnormalities such as DED, meibomian gland dysfunction (MGD) and allergic conjunctivitis in regular users (2). According to the 2017 Tear Film and Ocular Surface Society Dry Eye Workshop II (TFOS DEWS II), contact lens-related dry eye is listed in the iatrogenic subtype category (3).

Preferring the suitable contact lens modalities in the patient group who already had DED and ocular allergy findings. For CL practitioners it is a challenging work to prevent the progression of the disease into more advanced stages. Patients with ocular surface disorders are already prone to present with complications like contact lens related- dry eye and CL related-papillary conjunctivitis (4).

Daily disposable contact lens (DDCL) modalities offer patients the convenience of minimal maintenance and greater satisfaction with no need for the "chemistry set" of cleaning (5). So, it would be appropriate to choose DDCLs instead of conventional monthly or bi-weekly wear CLs to avoid ocular irritations connected to storage solutions for patients with ocular allergies and DED (6). The other important issue is to prefer the right contact lens material. With the advantages of high oxygen permeability, DDCLs in silicone hydrogel materials have become more and more popular in recent times (7). However, hydrogel (Hy) DDCLs still could be a suitable option because of their soft and hydrophilic structures in this patient group. The mechanical complications were reported in lower rates for HyCLs, and these unwanted events seem to be linked to the higher modulus and more hydrophobic behavior of silicon hydrogel contact lenses (SiHyCLs). The friction quantity known to be closely related to the mechanical complications and it is always less for HyCLs than for SiHyCLs (8). Moreover, it was reported that there had been an increase in allergic reactions in the eye with the increased use of SiHy CLs for extended wear (3, 4). So, it may be considered that HyCLs in daily disposable modalities, which are softer and have fewer mechanical effects on the ocular surface, could be a better option in the group of patients with ocular surface abnormalities.

In this study, it was aimed to find the ocular surface comfort levels of two HyDDCLs; nesofilcon A (Biotrue® One Day; Bausch & Lomb incorporated, Rochester, Ny, USA) and etafilcon A (Acuvue Moist® 1-Day; Vistakon, Jacksonville, Fl, USA) accompanied by two different subjective comfort tests in the patient groups with MGD and allergic conjunctivitis. The ocular surface disease index (OSDI) scores and contact lens dry eye questionare-8 (CLDEQ-8) test scores were used to compare these two different HyDDCLs comfort levels.

MATERIALS and METHODS

Patient Recruitment

This prospective study was conducted at Kartal Dr. Lutfu Kirdar City Hospital with fifty participants who visited the contact lens department between

March and August 2020. Patients had no history and experience of CLs underwent a detailed ophthalmic examination before deciding upon the appropriate CL to apply. With the manifest distance correction, monocular best corrected visual acuity (BCVA), monocular contact lens corrected visual acuity (CLVA), spherical, cylindrical and keratometry measurements were noted. In brief, the subjects who were at least 18 years of age, with refractive errors between +4.00 Diopters (D) to −8.00 D, needed no or minimal (<0,50 D) cylindrical refractive corrections, flat and steep keratometry readings were between 40.23 D to 46.65 D were evaluated with further ocular surface parameters for the study group.

The Ocular Surface Monitoring

The tear film stability checked with the average noninvasive break up time (aNIBUT) scores by the Sirius Sheimpflug Camera and the Placido disc topography system (CSO, Italy) and as well as the Schirmer test results. Patients with Schirmer values more than 10 mm (means no lack of tear secretion volume) and the aNIBUT under 10 seconds (means tear film instability) was diagnosed as evaporative type DED according to the TFOS DEWS II pathophysiology report and included to the study group. Patients with aNIBUT between 5-10 seconds were considered as mild DED, while those below 5 seconds were classified as advanced DED (9).

The two major ocular surface diseases accompanying to short aNIBUT in young population were detected (10). While the patients with Meibomian gland dysfunction (MGD) suggested as Group 1, the patients with allergic conjunctivitis findings were included to Group 2.

The patients who had MGD, which is the most common etiology of the evaporative type DED, were detected with the morphologic changes in the Meibomian orifices and gland acini observed by biomicroscopy (9). The anterior and posterior blepharitis finding were also recorded. These patients were recommended medical treatment for 4 weeks with tetracycline pomade, artificial tear drop, sulfacetamide sodium and prednisolone acetate combination drop with oral doxycycline 100 mg for 8 weeks before contact lens fitting.

The patients who had limbal/bulbar hyperemia with/or conjunctival papillae in the anterior segment examination were diagnosed as seasonal/perennial ocular allergy and selected for group 2. They were evaluated in to two activity groups for the treatment requirement. The patients who had only papillary formation in their tarsal conjunctiva without any ocular hyperemia were considered as inactive ocular allergy. On the other hand, the presence of papillae and hyperemia simultaneously were accepted as an indicator of active ocular allergy and medical treatment recommended until the hyperemia was disappeared (11). But the patients who had some of the classic clinical signs of severe seasonal/perennial conjunctivitis like conjunctival chemosis, eyelid edema of both of the eyes were excluded from the study because of the impropriety of CL using without long-time treatment in this patient population. Also, the patients who had clinical signs of vernal/atopic keratoconjunctivitis and severe DED like corneal staining over 2 mm length, 25% width and limbal vascularization were excluded from the study (12).

Overall, patients who had short aNIBUT and had at least one of the signs of allergic conjunctivitis or MGD were included in this study for trying two different Hy DDCLs. After treatment of the ocular surface diseases the aNIBUT was recorded and compared to the initial scores.

Contact Lens Fitting and Subjective Evaluating Procedure

Two different HyDDCLs were used in the patients with MGD and ocular allergy, at a suitable diopter with randomized sorting, respectively. One of these HyDDCLs was etafilcon A (1-Day ACUVUE® MOIST, in 8.5 base curve, 14.2 mm diameter, 58% water content, 25.5 Dk/t, 0.31 MPa modulus) and the other was nesofilcon A (Biotrue® Oneday, in 8.6 mm base curve, 14.2 mm total diameter, 78% water content and 42 Dk/t, 0.50 MPa modulus).

The CL movement on the cornea was controlled by a push-up test. When the patient had no complaints of discomfort and the lens was in an acceptable position on the ocular surface, the first HyDDCL was prescribed, and all the patients underwent an ocular examination after four weeks. At the control visit, they attended the clinic while wearing their CLs; OSDI and CLDEQ-8 questionnaires were translated into Turkish using standard forward and back translation methods as suggested and conducted to all participants (13).

The patients were given a 1-week washout period after using the first CL before starting to

use the second one. Four weeks after using the second HyDDCL, ophthalmic examination, OSDI and CLDEQ-8 tests were repeated. Actually, OSDI identifies the severity of ocular surface diseases in a quantitative manner from 100 of the total score (14). It includes 3 sections and 12 items asking for discomfort symptoms (section 1), functional limitations (section 2) and environmental factors (section3). The OSDI scores before and after contact lens fitting were noted and compared to each other for assessing the HyDDCLs effects to the ocular surface. On the other hand, CLDEQ-8 test was used for the contact lens related satisfaction levels with measuring the irritating symptoms linked to the contact lens usage during all day from 37 of the total score. CLDEQ-8 test is useful to assess the frequency and severity of CL-related discomfort, dryness, blurred vision, closing eye and removing lens with scores that grade each response.

The exclusion criteria were listed as any inflammatory systemic disease, pregnancy, ocular surgery, ocular trauma, severe corneal fluorescein staining, corneal limbal vascularization, ocular surface irregularity, use of topical or systemic drugs, and need of astigmatic refractive correction over -0.50 D.

All the patients were informed about the procedure, and informed consent was obtained according to the Declaration of Helsinki. This study was approved by the local ethics committee (2019/514/148/20; 27.02.2019)

Statistical Analysis

Descriptive statistics of the data are shown with mean ± standard error (M ± SEM). IBM SPSS Statistics version 22.0 software was used for data analysis. The significance level was accepted as $p < 0.05$. The appropriateness of the data with regard to normal distribution was evaluated by q-q plot, histogram, and the Shapiro–Wilk test. Statistical significance control of the differences between two HyDDCLs variables was performed with t-test and Wilcoxon paired two-sample test in dependent groups.

RESULTS

A cohort of fourteen males and thirty-six females with a mean age of 22.08 ± 0.90 years was recruited. The mean spherical refractive error was -3.37 ± 0.8 D. The average of mean keratometry was 44.24 ± 1.2 D.

Table-1 shows results of the initial ocular surface examinations of the all study groups. The initial mean of the aNIBUT was 5.2 ±1 .27 seconds, and the mean Schirmer test value was 15 ± 3.14 mm. After treatment for MDG in group 1, the mean aNIBUT increased from 4.23 ± 0.16 seconds to 7.54 ± 1.12 seconds and then they started to use HyDDCLs. Also, the mean aNIBUT showed improvement (6.65±1.61 seconds to 7.92±1.44 seconds) after allergic conjunctivitis treatment.

Before starting the use of HyDDCLs, the mean of the OSDI score was 24.54 ± 2.60 and the mean score of OSDI was slightly higher in group 1 according to group 2 (p=0.125). After four weeks of contact lens usage, for etafilcon A, the mean OSDI scores was slightly higher in group 1 (44.31±4.23) than group 2 (39.94±2.67) (p=0.063). For nesofilcon A, the mean score of OSDI was 27.64±3.71 in group 1 and 25.84±4.23 in group 2, respectively (p=0.786).

For all patients in the study group, the mean of the total score on the OSDI questionnaire for the etafilcon A was significantly higher than nesofilcon A (p=0.002) (Figure-1, Table-2).

When the OSDI scores evaluated in three sections; the mean scores of the subscales of discomfort and functional limitations were statistically significantly lower for nesofilcon A. The mean score of the subscale of environmental factors was slightly lower in nesofilcon A, but the difference was statistically insignificant (Table-2, Figure-2).

On the other hand, the mean scores of the CLDEQ-8 questionnaire for etafilcon A was statistically significantly higher than for the nesofilcon A scores (p<0.001) (Figure-1). Thus, the mean of total OSDI scores had a significant positive correlation with total CLDEQ-8 mean scores (r=0.640, p<0.002, Spearman's correlation test). Similarly, in the analysis of dryness and discomfort subscales, the mean score of nesofilcon A were lower than etafilcon A. The mean of subscales of blurred vision and closing eyes scores were also lower in nesofilcon A, but these differences were not statistically significant ($p \geq 0.05$). By contrast, the mean score of the removing-lens subscale was lower in etafilcon A than nesofilcon A. (Table-2, Figure-3)

After two periods of using HyDDCLs, 4 patients (8%) were not satisfied with either etafilcon A or nesofilcon A.

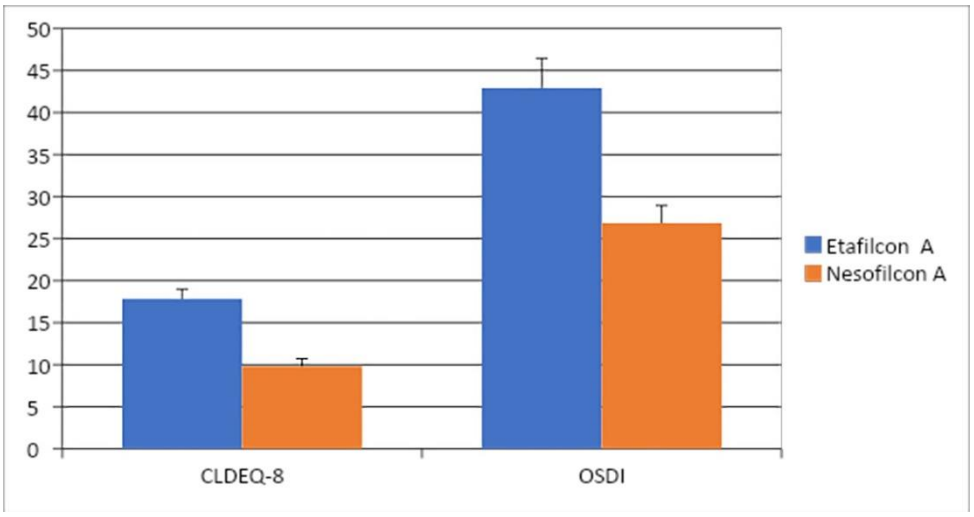

Figure-1. The comparisons of mean score of CLDEQ-8 and OSDI for two HyDDCLs

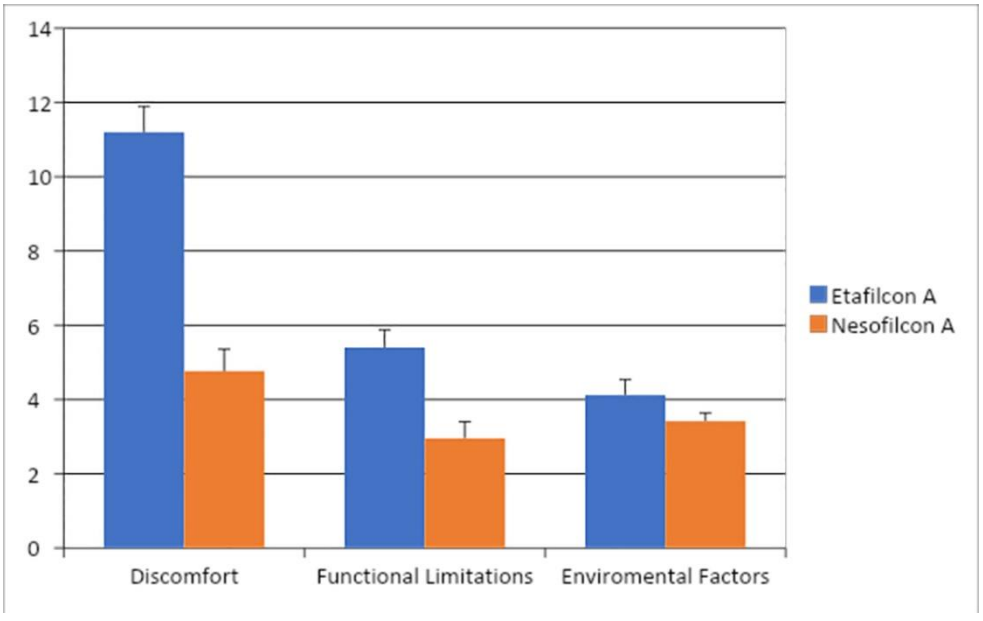

Figure-2. The comparisons of mean score of the OSDI subscales for two HyDDCLs

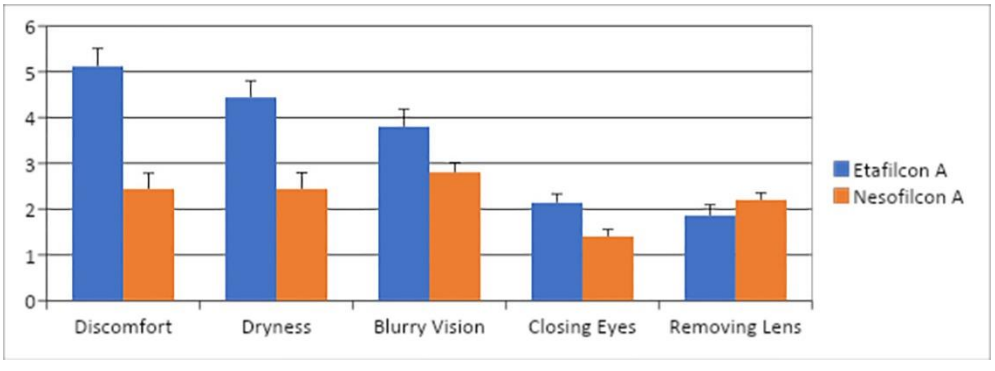

Figure-3: The comparisons of mean score of CLDEQ-8 subscales for two HyDDCLs

Table-1. The initial ocular findings of the study group.

Total (N)	Parameters	N (50)	% (100)
aNIBUT/s	**5 -10**	32	64.0
	5 ≤	18	36.0
Group 1 (22)	**MGD**	22	44.0
	MGD + Hyperemia	8	16.0
	MGD- Hyperemia	14	28.0
	aNIBUT/s; 5 ≤	13	26.0
	aNIBUT/s; 5 -10	9	18.0
Group 2 (28)	**Papillae in conjunctiva**	28	56.0
	Papillae + Hyperemia	12	24.0
	Papillae - Hyperemia	16	32.0
	aNIBUT/s; 5 ≤	5	10.0
	aNIBUT/s; 5 -10	23	46.0
Schirmer	**≥ 10 mm**	50	100

Abbreviations: NIBUT: MGD: Meibomian gland dysfunction; Noninvasive tear break-up time

Table-2: The comparisons of the two questionnaires for two HYDDCLs for all patient in the study group.

	Contact lenses		**p value***
	Etafilcon A	**Nesofilcon A**	
OSDI	**Total Score**	**Total Score**	
	42.92±3.53	26.84±2.10	**0.002**
	Discomfort	**Discomfort**	
	11.20±0.69	4.76±0.60	**<0.001**
	Functional Limitations	**Functional Limitations**	
	5.40±0.48	2.96±0.44	**0.006**
	Environmental Factors	**Environmental Factors**	
	4.12±0.41	3.42±0.22	0.085
CLDEQ-8	**Total Score**	**Total Score**	
	15.80±1.18	9.80±0.92	**<0.001**
	Discomfort	**Discomfort**	
	5.12±0.39	2.44±0.34	**<0.001**
	Dryness	**Dryness**	
	4.44±0.36	2.44±0.35	**0.001**
	Blurred Vision	**Blurred Vision**	
	3.2±3.8	2.40±0.2	0.086
	Closing Eyes	**Closing Eyes**	
	1.8±0.19	1.3±0.15	0.062
	Removing Lens	**Removing Lens**	
	1.86±0.14	2.2±0.23	**0.027**

*Numbers in bold are significant ($p < 0.05$), Wilcoxon t test. Abbreviations: CLDEQ-8: Contact lens dry eye questionnaire-8 item; OSDI: Ocular surface disease index

They decided not to use of either of them due to dryness and/or discomfort at the end of the day. By contrast, 36 of the remaining 46 patients preferred nesofilcon A, and the remaining 10 patients decided to continue with etafilcon A.

In the patients who had less than 5 seconds of aNIBUT (serious DED) before CL fitting procedure (%36), 16 of the 18 patients chose to wear nesofilcon A, while the remaining 2 patients decided not to wear any contact lenses further. Twenty-two (44%) of the 32 patients (64%) with more than 5 seconds of aNIBUT (moderate DED) preferred to wear nesofilcon A, although, 2 patients preferred to wear neither nesofilcon A nor etafilcon A. Thus, aNIBUT was greater than 5 seconds in 10 patients (20%) who selected etafilcon A.

Sixteen patients of group 2 (32%) had papillary formation in conjunctiva without bulbar hyperemia (inactive ocular allergies); 11 of them (22%) preferred nesofilcon A, while the other 5 (10%) had decided to continue with etafilcon A. 12 patients (24%) who had active ocular allergies and one of them chose not to continue wear either of the two lenses; 9 patients preferred nesofilcon A, and the other 2 chose etafilcon A for further usage. During the study period, none of the mechanical or inflammatory complications associated with contact lens wearing was observed in the patient groups.

DISCUSSION

Dry-eye disease and allergic conjunctivitis are two common and multifactorial conditions resulting with tear film instability that affect quality of life negatively. Although, contact lens wearing is a well-described predisposing factor for both entities. In this study, the aim was to demonstrate the subjective patient satisfaction of two different HyDDCLs in patients with decreased tear film stability.

Studies that have investigated the relationship between ocular allergy and DED suggest that the first can predispose the second (9). TFOS DEWS II recently included allergic conjunctivitis among the “probable” (limited information-either not published or published in other than peer-reviewed journals) risk factors for DED (15). In ocular allergic conditions, the tear film is rich in inflammatory cytokines, mediators and neuro-mediators that can maintain chronic inflammation and result diffuse abnormality of the meibomian glands, terminal duct obstruction and/or qualitative/quantitative changes in the glandular secretion. By this way, MGD is reported as a feature of allergic eye disease and may be a source of DED (16). This may result in alterations of the tear film and aNIBUT, symptoms of eye irritation, clinically apparent inflammation (17). The total scores of the two ocular surface comfort tests after contact lens wearing were found higher in group 1 (MDG) than group 2 (allergic conjunctivitis). The mean score of the initial aNIBUT was lower in group 1 than group 2. Therefore, a significant negative correlation was found with aNIBUT levels and both of the test scores. So, the contact lens-related comfort level is more closely related to tear film stability than the type of ocular surface disease.

Both DED and allergic conjunctivitis have a potential to adversely affect the use of contact lenses. These two conditions may occur after the use of contact lenses in people who have not previously had ocular allergy and/or DED, called CLIDE (contact lens-induced dry-eye) (18). The severity of the disease may increase enough to require discontinuation of contact lens use in patients who already had ocular allergy, DED and/or CLADE (contact lens-associated dry-eye) (19, 20). Meibomian glands can also be affected by CL use. Expressibility, number of plugged and expressible orifices, can be adversely affected during the first 2 years of CL wear (21).

Choosing the suitable CL wearing modality for patients with ocular surface problems, such as ocular allergy and DED, is quite troublesome. The CL itself will adversely affect the ocular surface and may increase the severity of the disease in these patients (22). It would be appropriate to prefer CLs for daily wear to avoid solution-related corneal complications and the risk of lipid deposition (23). Actually, higher ocular inflammatory responses, as indicated by higher tear cytokine concentrations and higher conjunctival epithelial metaplasia, were found in wearers of reusable contact lenses than in DDCL wearers. The other management strategies that have been shown to have some degree of effectiveness in patients with ocular surface disease include using lenses with internal wetting agents, topical moisturizing eye drops and limitation of lens wearing time (24).

The most appropriate CL material that presents comfort with safety to patients with ocular surface abnormalities is not always the one. SiHyCLs with their high oxygen permeability may help to maintain the healthy homeostasis of the corneal epithelium and endothelium. But the high

modulus of silicon material, due to the hydrophobic character, leads to more friction on the ocular surface, resulting in more frequent mechanical complications (8, 25). Recent studies have revealed that symptomatic corneal infiltrative events were detected at a higher rate in the SiHyCL group than in the HyCL group (3.4% for Hy extended wear (EW) and 7.2% for SiHy EW8) (26). These results may be explained by the higher lubricity of HyCLs, often attributed to their high water content (affording greater oxygen permeability), high water permeability, low elastic modulus, and their ability to promote a water film at the sliding interface (27). In this context, DDCLs in hydrogel material were preferred for patients with short aNIBUT accompanying by MGD or perennial/seasonal ocular allergies. The rate of preferring to continue with at least one of the HyDDCLs that the patients had tried during the study period was very high (92%). The reasons for failure, as expressed by 8% of study participants, were annoying ocular sensations, such as dryness and discomfort related to CLs and the initial aNIBUT was very low for these patients (3.2s-2.1s).

Although the high-water content in the HyCLs has a better effect on ocular comfort for full-time wearers, with increasing evaporation at the end of the day, the HyCLs may cause to increased dryness of the ocular surface and vision loss by pulling water into them. The success of stabilizing the water component in the contact lens against evaporation appears to be the main parameter determining end-of-day comfort (28). Nesofilcon A (Biotrue® ONE day) was one of the HyDDCLs in the study has 78% water content throughout and a surface that retains water, like the natural tear film, by retarding evaporation. The polymer-bound Surface Active Macromer (SAM) Poloxamer 407 increases in concentration at the surface, forming a permanent component of the lens material (29). The other HyDDCLs, etafilcon A (Acuvue Moist), has a lower water content (58%) and consequently lower oxygen transmissibility. A recent study that compared these two lenses measured water loss over 16 hours of wear, and while the etafilcon A lens continued to lose water (6%) over the 16 hours of wear, the nesofilcon A lens' water loss was consistently below 2% over the course of the day (30). Likewise, the mean scores of two ocular surface comfort tests (OSDI and CLDEQ-8) were found to be lower for the nesofilcon A ($p < 0.002$). Similarly, most of the discomfort subscale scores were found to be higher for etafilcon A, could be linked to the higher modulus of the lens material than nesofilcon A (0.31/0.50MPa) (26) (Table-2).

The low level of dehydration results in a stable tear film over the front surface of the lens, and this characteristic maintains clear visual acuity in patients who complains of blurry vision subsequent to lens dehydration when performing tasks such as working at the computer, driving at night, or being exposed to dry environments (30). Thus, the mean score of the functional limitation subscale of OSDI was obviously lower for nesofilcon A than for etafilcon A ($p = 0.006$), as with the other two subscales of OSDI discomfort and environmental factors. Additionally, for all subscales of CLDEQ-8, the mean scores were clearly higher in etafilcon A, except the subscale on removing the lens. The high modulus of the CLs could be an advantage during removal. All patients with serious DED and active ocular allergy at the beginning, preferred to continue with nesofilcon A, and their scores of both tests suggested that nesofilcon A was more comfortable for patients with severe ocular surface disease.

Although there is no significant difference between group 1 and group 2 in terms of OSDI and CLDE-Q-8 scores of the two HyDDCLs used in the study, the scores for etafilcon A were slightly higher in group 1. The ocular comfort levels with etafilcon A were lower in the patients with MGD who had higher baseline OSDI scores and shorter NIBUT. In this context, the baseline OSDI and NIBUT scores can be considered as one of the significative parameters affecting the contact lens-related discomfort levels for etafilcon A. However, the scores obtained from nesofilcon A practices were quite close in both study groups and patient satisfaction was higher than etafilcon A regardless of baseline OSDI and NIBUT scores.

At the end of the study, 80% of patients stated that they would continue with nesofilcon A, while 12% reported that they were more satisfied with etafilcon A. The fact that nesofilcon A is more comfortable for patients with ocular surface problems may also be related to the fact that nesofilcon A is one of the thinnest (0.10 mm) high water-content Hy DDCLs in the market (31).

Study Limitations

The main limitations of the present study are the small sample size and the use of two lenses only in hydrogel material. Further studies with more patients and different lenses including silicone hydrogel materials with longer-term follow-up are needed for confirmation of these outcomes.

CONCLUSION

The present study has shown that DDCLs in hydrogel materials are a convenient option for patients with ocular surface disease, such as MGD and allergic conjunctivitis. Contact lenses that are more resistant to dehydration due to their high water-content may provide better comfort, vision quality and satisfaction in long term users.

Conflict of interest: The authors declare no conflict of interest regarding this original research.

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