ORIGINAL RESEARCH

A comparative analysis of preserved and preservative-free hydroxypropyl methylcellulose-dextran-containing eyedrops in patients with dry eye disease

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ABSTRACT

Background: Inflammation of the lacrimal glands and ocular surface is a common symptom of dry eye syndrome (keratoconjunctivitis sicca). Early identification may help identify a potentially fatal problem because dry eye symptoms might be a sign of a systemic disease. The present study compared preserved and preservative-free hydroxypropyl methylcellulose-dextran-containing eyedrops in patients with dry eyes. **Materials & Methods:** 70 patients of dry eyes disease of both genderswere divided into 2 groups of 35 each. Group I were prescribed dextran 70, 1 mg/ml and hypromellose, 3 mg/ml hydroxypropyl methylcellulose (HPMC) and group II 0.3 g HPMC and 0.1 g of dextran 70, with 0.01% benzalkonium chloride (BAK). The Schirmer test, corneal and conjunctival staining, tear break up time (TBUT), and the Ocular Surface Disease Index (OSDI) questionnaire were all conducted at baseline and at 6 weeks. **Results:** Group I had 15 males and 20 females and group II had 21 males and 14 females. The mean corneal score at baseline was 1.49 and 1.25 and at 6 weeks was 0.58 and 0.49 in group I and II respectively. OSDI score at baseline was 43.2 and 40.2 and at 6 weeks was 32.5 and 23.3 in group I and II respectively. TBUT (sec) at baseline was 7.9 and7.5 and at 6 weeks was 7.2 and 8.9 in group I and II respectively. Conjunctival score at baseline was 6.2 and 7.8 and at 6 weeks was 5.6 and 5.2 in group I and II respectively. The mean schirmer test (mm) at baseline was 6.1 and 6.01 and at 6 weeks was 6.7 and 7.1 in group I and II respectively. The difference was significant ($P< 0.05$). **Conclusion:** Eyedrops containing dextran and hydroxypropyl methylcellulose were effective in lowering the symptoms of dry eyes condition, whether they were stored or not.

Key words: Dry eyes, dextran, hydroxypropyl methylcellulose

INTRODUCTION

Inflammation of the lacrimal glands and ocular surface is a common symptom of dry eye syndrome (keratoconjunctivitis sicca). Early identification may help identify a potentially fatal problem because dry eye symptoms might be a sign of a systemic disease.[1] Additionally, people with dry eye are more likely to experience difficulties after standard operations like laser refractive surgery and are susceptible to potentially blinding infections like bacterial keratitis.[2] Environmental factors like cigarette smoke, dry climates, inflammatory diseases like vascular and allergy, hormonal imbalances like perimenopausal women and patients undergoing hormone replacement treatment, and contact lens wear can all contribute to the development of dry eye.[3]

One of the first lines of treatment for dry eye condition is artificial tears. To counteract the inflammatory character of the illness, they can be used in conjunction with other therapies such oral omega-3 essential fatty acid supplements, mucin secretagogues, short-term steroids, and daily cyclosporine A.[4] Patients and health care systems incur significant costs as a result of many treatment options and frequent eye care appointments. Artificial tears continue to be the cornerstone of DES treatment because of their minimal side effect profile and non-invasive nature.[5] Nearly all tear substitutes instantly alleviate the symptoms and replace the moisture layer of tears. One common preservative found in ophthalmic medicines is benzoalkonium chloride (BAK). Products containing benzalkonium chloride

may be beneficial for people with mild dry eyes.[6,7]The present study compared preserved and preservative-free hydroxypropyl methylcellulose-dextran-containing eyedrops in patients with dry eyes.

MATERIALS & METHODS

The present study consisted of 70 patients of dry eyes disease of both genders. All were informed regarding the study and their written consent was obtained.
Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 35 each. Group I were prescribed dextran 70, 1 mg/ml and hypromellose, 3 mg/ml hydroxypropyl methylcellulose (HPMC) and group II 0.3 g HPMC and 0.1 g of dextran 70, with 0.01% benzalkonium chloride (BAK). The Schirmer test, corneal and conjunctival staining, tear break up time (TBUT), and the Ocular Surface Disease Index (OSDI) questionnaire were all conducted at baseline and at 6 weeks. Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Drug	Hydroxypropyl methylcellulose	Benzalkonium chloride
M:F	15:20	21:14

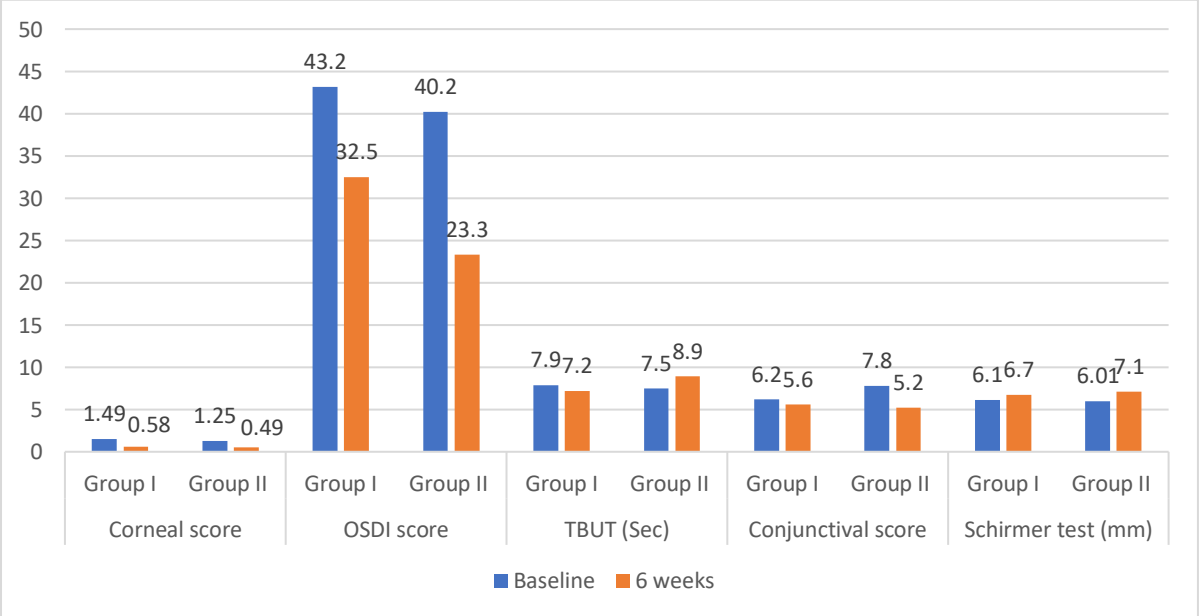
Table I shows that group I had 15 males and 20 females and group II had 21 males and 14 females.

Table II Comparison of parameters

Parameters	Groups	Baseline	6 weeks	P value
Corneal score	Group I	1.49	0.58	0.02
	Group II	1.25	0.49	
OSDI score	Group I	43.2	32.5	0.01
	Group II	40.2	23.3	
TBUT (Sec)	Group I	7.9	7.2	0.05
	Group II	7.5	8.9	
Conjunctival score	Group I	6.2	5.6	0.04
	Group II	7.8	5.2	
Schirmer test (mm)	Group I	6.1	6.7	0.86
	Group II	6.01	7.1	

Table II, graph I shows that mean corneal score at baseline was 1.49 and 1.25 and at 6 weeks was 0.58 and 0.49 in group I and II respectively. OSDI score at baseline was 43.2 and 40.2 and at 6 weeks was 32.5 and 23.3 in group I and II respectively. TBUT (sec) at baseline was 7.9 and7.5 and at 6 weeks was 7.2 and 8.9 in group I and II respectively.Conjunctival score at baseline was 6.2 and 7.8 and at 6 weeks was 5.6 and 5.2 in group I and II respectively. The mean schirmer test (mm) at baseline was 6.1 and 6.01 and at 6 weeks was 6.7 and 7.1 in group I and II respectively. The difference was significant (P< 0.05).

Graph I Comparison of parameters



DISCUSSION

Dry eye, a condition of the tear film brought on by insufficient or excessive tear evaporation, damages the interpalpebral ocular surface and is accompanied by a range of symptoms that indicate pain in the eyes.[8] The anterior lipid layer, middle aqueous layer, and innermost mucin layer comprise the precorneal tear film, which is a crucial part of the ocular surface.[9] The goblet cells of the conjunctiva, the lacrimal gland, and the meibomian glands, respectively, create these layers.[10] The tear film serves as a refractive element, lubricates the eye, keeps the ocular structures nourished and oxygenated, and aids in clearing debris from the ocular surface. Dry eye can be classified as either tear-deficient or tear-producing.[11]The present study compared preserved and preservative-free hydroxypropyl methylcellulose-dextran-containing eyedrops in patients with dry eyes.

We found that group I had 15 males and 20 females and group II had 21 males and 14 females.Shobha P et al[12] discovered that there were no statistically significant variations between the two groups' OSDI, TBUT, conjunctival and corneal staining, and Schirmer scores prior to the intervention. Participants in groups I and II had respective mean ages of 44.08 and 45.83 years. Conjunctival, corneal, and OSDI staining scores improved after 4 weeks compared to pre-intervention levels. However, there was no significant difference between the TBUT and Schirmer test scores.

We observed that mean corneal score at baseline was 1.49 and 1.25 and at 6 weeks was 0.58 and 0.49 in group I and II respectively. OSDI score at baseline was 43.2 and 40.2 and at 6weeks was 32.5 and 23.3 in group I and II respectively. TBUT (sec) at baseline was 7.9 and7.5 and at 6 weeks was 7.2 and 8.9 in group I and II respectively. Conjunctival score at baseline was 6.2 and 7.8 and at 6 weeks was 5.6 and 5.2 in group I and II respectively. The mean schirmer test (mm) at baseline was 6.1 and 6.01 and at 6 weeks was 6.7 and 7.1 in group I and II respectively. In their study, Ozdemir et al[13] discovered that diabetic patients had considerably lower TBUT and Schirmer's test values than controls. Abnormal fluorescein staining was more common in the diabetes group than in the control group ($P<0.001$). Proliferative diabetic retinopathy and worse metabolic glucose management were linked to abnormal tear function tests ($P<0.05$), but not the length of diabetes ($P>0.05$). Proliferative diabetic retinopathy and inadequate metabolic management were found to be significant risk factors for ocular surface diseases in individuals with type 2 diabetes.

CONCLUSION

Authors found that eyedrops containing dextran and hydroxypropyl methylcellulose were effective in lowering the symptoms of dry eyes condition, whether they were stored or not.

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