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Effect of Isotretinoin Treatment on Tear-Film Status and Ocular Surface Disease Index Score in Patients with Acne Vulgaris

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ABSTRACT

Purpose: To determine tear film stability, tear secretion, volume, and dry eye symptoms according to the duration of isotretinoin use in treating acne vulgaris.

Materials and Methods: In this cross-sectional comparison study, dry eye measurements were taken for 60 participants from patients who were diagnosed with acne vulgaris and were treated with isotretinoin from the dermatology clinic at Tishreen University Hospital-Lattakia during the period 2022-2023. The sample was examined before using isotretinoin, after a month and a half, and after three months. The sample underwent eye examinations that included the Schirmer 1 test, a tear film break-up time (BUT) examination using a slit lamp device, and Ocular Surface Disease Index (OSDI).

Results: We noticed an increase in the intensity of dry eye as the duration of use increased, with statistically significant differences regarding the mean values of the tear film breakdown time (BUT) test, as it became less with the increase in the duration of isotretinoin (p=0.0001). The OSDI also showed an increase in the intensity of dryness as the duration of isotretinoin use increased, with statistically significant differences (p=0.0001). The Schirmer1 decreased as the duration of isotretinoin increased, with statistically insignificant differences regarding the mean values of the Schirmer1 test, as it became less as the duration of isotretinoin increased (p=0.07).

Conclusion: The intensity of dry eye increases with the increasing duration of isotretinoin use in treating acne vulgaris in a statistically significant manner.

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Keywords: Dry Eye, Isotretinoin, Acne Vulgaris

Introduction

Many studies have proven that dry eye syndrome, like other chronic diseases, can reduce a patient's quality of life. Therefore, it is necessary to accurately diagnose and determine its pathophysiology. Both objective and subjective tests and investigations are necessary because signs and symptoms are often not associated with each other [1-3].

Acne Vulgaris is a chronic inflammatory skin disease that affects the sebaceous follicular unit. Clinically manifested with non-inflammatory lesions(Closed and open comedones) And/or papules, pustules, and sometimes nodules varies Depth and inflammation. The face, back, and chest are the most common areas of injury. In a way rare It affects the Buttocks. Mostly the disease specific For its own sake Clinically it may be Lead to sequelae long duration Such as pigmentation after inflammation and scarring Aladiya. Acne affects Different age groups, but it is more common in adults [4].

Isotretinoin derivative of vitamin A is used as a first-line treatment for severe inflammatory or nodular acne. It is the only treatment that can suppress acne for a long time. It is used to treat moderate or severe cases of acne and resistance to treatment topical or systemic. It is also the first plan of treatment for severe, widespread acne that affects the face and trunk [5].

It is currently considered the only treatment that affects the four mechanisms of acne, as it works to re-differentiate the sebaceous glands and reduce the secretion of sebum, which leads to a change in the structure of the skin flora, which reduces the colonization of the follicles by Propionibacterium, which carries several side effects, including dry eyes, which in turn causes discomfort in the young patient. Symptoms are more likely to occur in some groups of individuals who use isotretinoin for a long time and in high doses [5]. Some studies have predicted that the diagnosis of dry eye in people with used Isotretinoin was due to tear film disorder and Secretions of meibomian glands disorder.

So we conducted our study to try to Determine the association between the duration and dose of isotretinoin with symptoms and severity of dehydration that the patient complains of and

with objective tests that measure the stability and quantity of the tear film [5].

Results

Place and Time of Study

The research sample included 60 patients (120 eyes) of acne vulgaris patients attending the dermatology clinic at Tishreen University Hospital in Lattakia during the period 2022-2023 and treated with isotretinoin. Oral dosage 0.5 mg/kg.

Ethical Issue

Written informed consent was obtained from all participants in the research (the approved form at the Faculty of Human Medicine at Tishreen University). The research was also approved to be conducted by the Scientific Research Ethics Committee at the Faculty of Human Medicine at Tishreen University and by the Council of Tishreen University (Resolution No. 1271/ On 4/5/2022).

Inclusion Criteria

-Treated young acne vulgaris patients with isotretinoin Oral Without using tear supplements during the study period.

Exclusion Criteria

1. Patients previously diagnosed with dry eye syndrome.
2. Patients who have eye conditions that predispose to dry eye (Inflammation of the edges of the eyelids - irregularity of the surface of the cornea or conjunctiva....).
3. History of using medications that predispose to dry eyes (antihistamines, diuretics, and other retinoids...)
4. Systemic diseases (autoimmune, rheumatic, diabetes, high blood pressure, history of trigeminal nerve injury...)
5. Previous history of wearing contact lenses for a month at least.
6. Previous history of eye surgeries on the surface of the eyelid
7. History of eye trauma
8. History of irradiation to the head and neck
9. Pregnancy

Ocular examinations were performed starting treatment and repeated after a month and a half and three months after starting treatment:

Perform the Schirmer Test

Slit lamp examination of the anterior sections includes, in addition to the usual examination, a tear film breakdown time test BUT. Subject the participants to a questionnaire OSDI Translated into Arabic.

Study Design

Before-After study (prospective), The results are considered statistically significant withp-value<5%. Program accreditation IBM SPSS statistics (version 20) to calculate statistical coefficients and analyze the results.

The research sample included 60sick (120 eyes) acne vulgaris patients visiting the dermatology clinic at Tishreen University Hospital in Latakia during the period 2022-2023 and their therapists with isotretinoin oral dosage of 0.5 mg/kg.

The ages of the research sample patients ranged between 18 to 36 years, with an average of 23.62±4.9 years.

Table 1: Distribute a Sample 60 of Patients by Gender of Clinic Dermatology at Tishreen University Hospital in Latakia from 2022-2023

Sex	the number	The ratio
Male	22	36.7%
Females	38	63.3%
the total	60	100%

We Note from the Previous Table that 63.3% of the Studied Research Sample were Females and 36.7% Were Males with Sex Ratio (F: M)=1.7:1.

Table 2: Distribute a Sample 60 of Patients, According to Age Groups, Visiting the Clinic Dermatology at Tishreen University Hospital in Latakia from 2022-2023

Age groups (years)	the number	The ratio
25-18	43	71.7%
36-26	17	28.3%
the total	60	100%

We note from the Previous Table that 71.7% of the Studied Research Sample was Under the Age Group of Less than 25 Years.

Table 3: Average Values of OSDI Among Patients Attending the Clinic Dermatology at Tishreen University Hospital in Latakia During the Period 2022-2023

Tenses	Mean±SD	P-value
Before treatment	12.29±8.9	
after1.5 months	26.30±17.1	0.0001
after3 month	29.61±16.4	

We note from the previous table that there has been an increase in the average values of the OSDI across the time follow-up periods was 12.29±8.9, and after a month and a half, it was 26.30±17.1, with p-value=0.0001. At the end of the follow-up period, it reached 29.61±16.4, and comparing it with the values before treatment, there were statistically significant differences, p-value= 0.0001.

Table 4: Average Values of BUT Patients who Visit the Clinic Dermatology at Tishreen University Hospital in Latakia from 2022-2023

Tenses	O.D	OS
Before treatment	10.71±3.6	10.63±3.9
after1.5 months	8.92±4.3	9.18±3.7
after3 month	8.66±4.02	8.49±3.7
P-value	0.002	0.01

We note from the previous table that there is a decrease in the average values Over follow-up periods, whether in the right or left eye, as it was before starting treatment in the right eye10.71±3.6, and after a month and a half it was 8.92±4.3, and at the end of the follow-up period it reached 8.66±4.02. There are statistically significant differences-value=0.002, and in the left eye, the average value before starting treatment was 10.63±3.9, and after a month and a half, it was 9.18±3.7. At the end of the follow-up period, it reached:8.49±3.7, with statistically significant differences, p-value=0.01.

Table 5: Average Values of Schiermer for Patients Attending the Clinic Dermatology at Tishreen University Hospital in Latakia During the Period 2022-2023

tenses	O.D	OS
Before treatment	22.48±6.9	23.69±7.7
after1.5 months	21.38±5.9	22.29±6.1
after3 month	20.18±6.5	21.39±5.8
P-value	0.09	0.05

We note from the previous table that there is a decrease in the average values of Schiermer across follow-up periods, whether in the right or left eye, where it was 22.48±6.9 before starting treatment in the right eye, and after a month and a half, it was 21.38±6.7. At the end of the follow-up period, it reached:20.18±7.2 and without statistically significant differences p-value=0.09. In the left eye, the average value before starting treatment was 23.69±7.7 and after a month and a half, it was 22.29±6.1. At the end of the follow-up period, it reached 21.39±6.2 and without statistical differences p-value=0.05.

Table 6: Distribute a Sample 60 of Patients According to the OSDI Values Before Starting Treatment Visit the Clinic Dermatology at Tishreen University Hospital in Latakia During the Period 2022-2023

OSDI	the number	The ratio
Normal	49	81.7%
Mild	9	15%
Moderate	2	3.3%
Severe	0	0%

We note from the previous table, before starting treatment, that the values of...OSDI was 81.7% in the normal range, 15% mild dehydration, 3.3% moderate dehydration, and we did not notice any cases of severe dehydration.

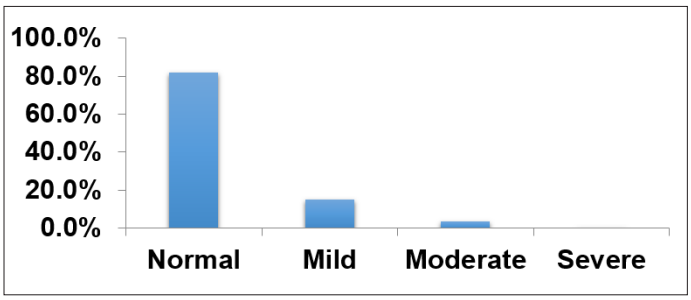

Figure 1: Distribute a Sample 60 Patients According to the OSDI Values before Starting Treatment Visit the Clinic Dermatology at Tishreen University Hospital in Latakia During the Period 2022-2023.

Table 7: Distribute a Sample 60 of Patients with OSDI Values after a Month and a Half of Treatment Visited the Clinic Dermatology at Tishreen University Hospital in Latakia During the Period 2022-2023

OSDI	the number	The ratio
Normal	15	25%
Mild	18	30%
Moderate	14	23.3%
Severe	13	21.7%

We note from the previous table that after a month and a half of starting treatment, the values of...Natural OSDI decreased from 81.7% to 25%, mild drought at 30%, moderate drought at 23.3%, and severe drought at 21.7%.

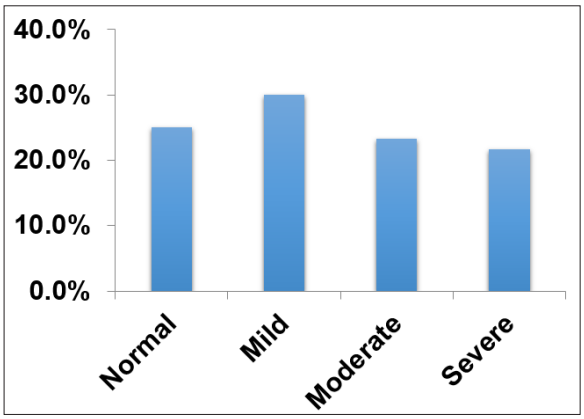

Figure 2: Distribute a sample 60 of Patients with OSDI Values after a Month and a Half of Treatment Visited the Clinic Dermatology at Tishreen University Hospital in Latakia During the Period 2022-2023

Table 8: Distribute a Sample 60 of Patients with OSDI Values after three Months of Treatment Visiting the Clinic Dermatology at Tishreen University Hospital in Latakia During the Period 2022-2023

OSDI	the number	The ratio
Normal	10	16.7%
Mild	11	18.3%
Moderate	16	26.7%
Severe	23	38.3%

We note from the previous table that after three months of treatment, the values of...Normal OSDI decreased to 16.7%, mild drought at 18.3%, moderate drought at 26.7%, and severe drought at 38.3%.

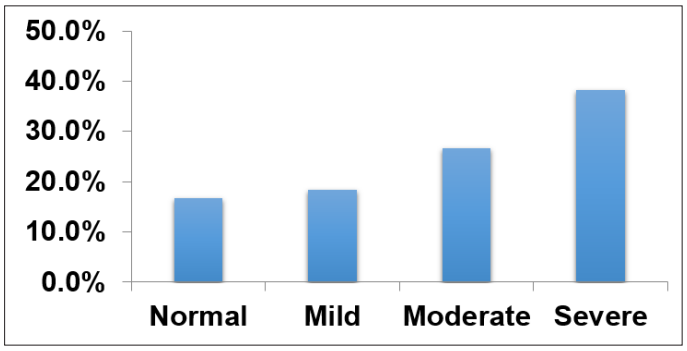

Figure 3: Distribute a Sample 60 Sick according to Values OSDI after three Months of Treatment Clinic Visitors Dermatology at Tishreen University Hospital in Latakia During the Period 2022-2023

Table 9: Distribute a Sample 60 of Patients according to OSDI Values During Follow-Up Periods Attended the Clinic Dermatology at Tishreen University Hospital in Latakia From 2022-2023

OSDI	Before treatment	after1.5 months	after3 month
Normal	49(81.7%)	15(25%)	10(16.7%)
Mild	9(15%)	18(30%)	11(18.3%)
Moderate	2(3.3%)	14(23.3%)	16(26.7%)
Severe	0(0%)	13(21.7%)	23(38.3%)

We note from the previous table and during the follow-up periods that the values of OSDI before treatment in 81.7% of the research sample were studied within the normal range and decreased after a month and a half of follow-up to 25% and reached 16.7% at the end of the follow-up period. Cases of severe dehydration appeared in 21.7% after a month and a half and rose to 38.3% at the end of the follow-up period.

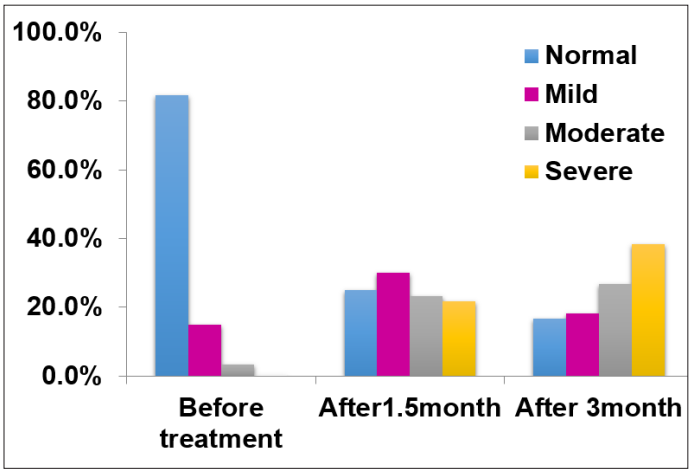

Figure 4: Distribute a Sample 60 of Patients According to OSDI Values and During the Follow-Up Periods Attend the Clinic Dermatology at Tishreen University Hospital in Latakia From 2022-2023

Discussion

In our study, we conducted subjective and objective dry eye tests for 60 participants from the dermatology clinic at Tishreen University Hospital between the years 2022-2023 who were diagnosed with acne vulgaris and treated with oral isotretinoin at a dose of 0.5 mg/kg. The research sample underwent dry eye tests before use and after one and a half months and three months. Months of use.

Including the Schirmer test 1, examination of tear film breakdown time using the slit lamp device, and pathology index surface of the eyeball.

We noticed that the severity of drought increased as the duration of drought increased are statistically significant differences regarding the mean values detect diseases of the surface of the eyelid OSDI across the follow-up periods as they were before starting treatment12.29±8.9After a month and a half26.30±17.1 with p-value=0.0001 At the end of the follow-up period, it reached:29.61±16.4When compared with the values before treatment, there were statistically significant differences-value=0.0001.

We also noticed lower mean values for the test BUT the longer the duration of use severity of the drought increased as the duration of drought increased are statistically significant differences, decreased values for but across follow-up periods, whether in the right or left eye, were 10.71±3.6 before starting treatment in the right eye, and after a month and a half it was 8.92±4.3, and at the end of the follow-up period it reached 8.66±4.02. There are statistically significant differences-value=0.002, and in the left eye, the average value before starting treatment was 10.63±3.9, and after a month and a half, it was 9.18±3.7. At the end of the follow-up period, it reached:8.49±3.7, with statistically significant differences, p-value=0.01.

We noticed a decrease in the average values of Schiermer across follow-up periods in both the right and left eye, where it was 22.48±6.9 before starting treatment in the right eye. After a month and a half21.38±6.7 At the end of the follow-up period, it reached:20.18±7.2 And without statistically significant differences-value=0.09, and in the left eye, the average value before starting treatment was 23.69±7.7. After a month and a half22.29±6.1, and at the end of the follow-up period it reached 21.39±6.2, without statistical differences, p-value=0.05.

These results are explained by the treatment of acne vulgaris with isotretinoin reduces goblet cells on the surface of the eye increases the thickening and keratinization of the gland ducts Meibomian, and reduces the size of Glandular vesicles Its fat content leads to to an increase in tear film evaporation and thus an increase in the severity of dehydration.

The results of our study were consistent with the values of the intraocular surface disease index and the time when the tear film broke TBUT with the study (Eyup Duzgun et al., Türkiye 2020) The time for both tests decreased between the study groups as a result of the increased duration of isotretinoin use [6].

The results of our study were consistent concerning the values of the intraocular surface disease index and the time when the tear film broke TBUT With the study (Zakrzewska et al., Poland 2023) The time for both tests decreased between the study groups depending on the increased duration of isotretinoin use [7]. It differed from our study in terms of Schirmer 1 values, as Schirmer 1 values were not affected after the use of isotretinoin in their study, while they decreased in our study, but in a statistically insignificant way.

The results of our study also agreed concerning the Schirmer 1 values and the time when the tear film broke TBUT With the study (Amit Amatya et al., Nepal 2015) The Schirmer 1 values decreased after using isotretinoin, but not statistically significant. Regarding the tear film crash time TBUT, the values decreased as the duration of isotretinoin use increased [8].

Conclusion

The severity of dry eyes increases with the duration of use of isotretinoin to treat acne vulgaris Importantly Statistically. This increase in dryness can be used as an indicator in the monitoring of people who use isotretinoin to treat acne vulgaris and those who suffer from dry eye symptoms. This increase also reflects the relationship of dry eye to the duration of use of isotretinoin to treat acne vulgaris.

Patient Consent

Written informed consent was obtained from the patient for participation publication of this paper and any accompanying images.

Funding and Competing Interests
The authors declare that there is no conflict of interest regarding the publication of this paper. This study received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Data Availability
The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Contributor
NA performs examinations, follows up, and writes the manuscript. MR direct supervision and reviewer. GK co-supervisor and reviewer. All authors read and approved the final manuscript.

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