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Original Research Article

Tear film evaluation in patients with psoriasis

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Abstract

Introduction: Psoriasis is a long-lasting, inflammatory debilitating skin disorder with numerous extracutaneous symptoms. Ocular involvement can lead to symptoms of dryness, redness, and itching which can result in sight threatening corneal complications and lower overall quality of life. Without a focused eye examination these changes can be undiagnosed.
Aim and Objective: To study the tear film changes in patients with psoriasis.
Materials and Methods: This was a cross-sectional hospital-based study on 30 psoriasis patients. The patients were assessed using a questionnaire for ocular symptoms/signs. For tear film assessment Schirmer's test, staining cornea with fluorescein dye and the tear film breaks up time were done.
Results: Out of the 30 patients, psoriasis vulgaris, pustular psoriasis, Inverse psoriasis, and psoriatic arthritis were 40%, 20%, 37%, and 3% respectively. Only 18 were symptomatic. Redness was the most prominent symptom in 11 out of 30 (37%), followed by foreign body sensation 10 (33%) and blur vision in 8 (27%). 14 patients (47%) had conjunctivitis, 14 (47%) had posterior blepharitis and 9(30%) had episcleritis. Schirmer's test was normal in all patients, lower T.B.U.T value was present in 18 patients and 13 patients had abnormal corneal staining test.
Conclusions: In our study 18 patients were symptomatic. Lower TBUT values and abnormal corneal staining were suggestive of unstable tear film. Thus, a multidisciplinary approach and prompt treatment is necessary to reduce morbidity in psoriasis patients.

Keywords: Psoriasis, Tear film tests, Dry eye.

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1. Introduction

Psoriasis is an immune-mediated inflammatory dermatological disorder that is primarily identified by erythematous papules along with silver scales.[1] It impacts one to three percent of the overall population, affecting both sexes equally, with a peak incidence rate between the ages of fifteen and thirty. Psoriasis has a prevalence range of 0.44% to 2.8%.[2] For adults, it goes from 0.91% to 8.5%, while for kids, it's 0 to 2.1%. The susceptibility to psoriasis is significantly influenced by genetic factors.

Situated on chromosome 6p21, the psoriasis susceptibility (PSORS1) locus is thought to be the primary hereditary cause of the condition.

It results from the activation of the cellular immune system. Activated T cells penetrate the skin and secrete intricate cytokines and growth factors that stimulate keratinocytes, leading to hyperproliferation. It is a series of interconnected cellular alterations in the skin that include vascular hyperplasia, ectasia, the creation of an inflammatory infiltrate, and epidermal keratinocyte hyperplasia.

Although genetic predisposition is important, environmental and behavioural variables such as smoking, drinking, drug use, and infection frequently impact disease progression.

Compared to dizygotic twins, monozygotic twins are more likely to have concordant psoriasis.[3,4] The HLA has a

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distinctive relationship with various psoriasis forms. First-degree relatives of 40% of psoriasis patients are predisposed to the condition.[5]

Obesity, pregnancy, and winter season fluctuations are all known to make the condition worse. Blepharitis, conjunctivitis, episcleritis, dry eyes, and uveitis are merely a few of the countless eye complaints. Because of its modest appearance, ocular inflammation has long been recognized, but it has not been adequately researched or diagnosed. Recent advances in early ocular screening have made it possible to detect the eye manifestation in psoriatic individuals.[6,7]

According to numerous research, the incidence rate of ocular involvement ranges from 10% to 58%.[8] With a 64.5% prevalence, conjunctival involvement appears to be the most frequent finding.[9] The upper palpebral conjunctiva exhibits a "cobblestone" look due to conjunctival inflammation. Eyelid involvement can take many different forms, such as anterior blepharitis, hyperkeratotic plaques, and dysfunction of the meibomian glands, which results in posterior blepharitis.[10]

In chronic blepharitis, trichiasis, ectropion, and entropion are observed. Blepharitis that is left untreated can cause evaporative dry eye.[11]

Also reported is symblepharon. Corneal involvement might be brought on by blepharoconjunctivitis or extremely dry eyes. Patients with episcleritis present with sectorial or distributed congestion, as well as pain and wet eyes as signs of discomfort.[12]

Due to meibomian gland dysfunction which affects the lipid layer of tear film, thus psoriatic patients experience tear film instability. It is accompanied by an increase in ocular surface inflammation and tear film osmolarity (DEWS 2007).[2]

If neglected, keratoconjunctivitis can lead to a corneal condition that is sight-threatening.[13]

Dry eye symptoms are exacerbated by psoriasis medications including retinoid, PUVA therapy, and systemic medications like methotrexate.[14]

Compared to the other kinds of psoriasis, anterior uveitis has a stronger correlation with psoriatic arthropathy.[15]

The most effective way to stop the significant complications that could endanger your vision is by screening and prompt detection of such manifestations. Therefore, the purpose of this study was to determine the tear film dysfunctions in patients with psoriasis.[16]

2. Aim

The aim of the study was to analyse tear film changes in psoriasis patients.

3. Objectives

1. The patients were assessed using a questionnaire for ocular symptoms.
2. For tear film assessment Schirmer's test, staining cornea with fluorescein dye and tear film break up time were done.

4. Materials and Methods

The study was a rural hospital-based cross-sectional observational study conducted between November 2022 to May 2023 in the Department of Ophthalmology at Acharya Vinoba Bhave Rural Hospital attached to Jawaharlal Nehru Medical College, Sawangi (Meghe) Wardha, a constituent college of Datta Meghe Institute of Medical Sciences (DMIMS) (Deemed to be University), Sawangi, Wardha, Maharashtra, India. The study was approved by the Ethics and Research committees of DMIMS (IEC) and was carried out in accordance with the tenets of the Declaration of Helsinki.

Thirty patients who satisfied the inclusion and exclusion criteria were included in this research. We obtained informed consent from each individual.

4.1. Inclusion criteria

1. Psoriasis patient, asymptomatic or symptomatic.
2. Patients willing to provide informed consent.

4.2. Exclusion criteria

Patients with Pterygium, Corneal pathology, Postoperative cataract patient, Chemical injury, Diabetes, on topical medication like anti glaucoma drugs or lubricating eye drops, and patients not giving the consent for the study were excluded.

Sampling size calculation and statistic analysis sample size was calculated using the following formula;

$n = \frac{z\alpha/2.P(1-p)}{E^2}$ where, $z \alpha/2$

The level of significance at 5% i.e 95% of confidence interval = 1.96; P = incidence of psoriasis = 2% = 0.02; E = Error of margin = 5% = 0.05; 11

$$n = \frac{1.96^2 \times 0.02 \times (1-0.02)}{0.05^2}$$

$$= 30.11$$

n = 30 patients needed in the study. (18)

Descriptive and inferential statistics were used in the statistical analysis along with the chi-square test. The analysis made use of IBM Corp.'s SPSS Version 27.0, and the significance threshold was set at $p<0.05$.

4.3. Data collection, tools and process

Psoriasis patients were worked up in detail in the department of ophthalmology after meeting the inclusion & exclusion criteria as follows:

1. A thorough history of ocular symptoms was taken.
2. A standard general physical examination of the patients was performed.
3. Each patient got a thorough ocular examination, which included the following steps:

    a. External eye examination, which involves looking at the eyelids, conjunctiva, cornea, iris, pupil, and lens.
    b. Clear vision at a distance as well as up close.
    c. Slit-lamp examination: This allows you to see the eye's front segment.

The tests that follow were carried out as specified below.

Schirmer's test:

4.4. Patient preparation

1. Seated in a dimly lit room
2. Face straight

Eyes open and blinking normally
↓
Perform Schirmer's Test-1 (No Anaesthesia):

Use 35 x 5 mm Schirmer's tear test strip

Fold 5 mm from one end

Insert strip at junction of lateral 1/3 and medial 2/3 of lower palpebral conjunctiva
↓
Wait 5 Minutes
↓
Measure Wetting Length (mm):

Wetting ≥ 10 mm → Normal Tear Production

Wetting < 10 mm → Dry Eye Suspected (Positive Test)
↓
Instill Topical Anaesthetic (Proparacaine 0.5%)
↓
Perform Schirmer's Test-2 (With Anaesthesia):

Repeat the same procedure to assess basal secretion only
↓
Measure Wetting Length after 5 Minutes
↓
End

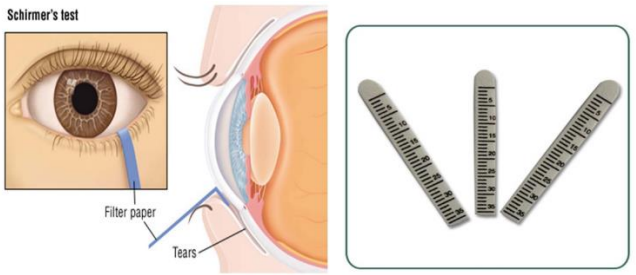

Figure 1: Image courtesy: internet

Tear film breakup time (TBUT):
Instill Fluorescein Dye into Conjunctival Sac
Avoid contact with cornea to prevent reflex tearing
↓
Examine Cornea Using Slit Lamp with Blue Filter
↓
Instruct Patient to Blink Once, Then Keep Eyes Open
↓
Start Stopwatch Immediately After Blink
↓
Observe Cornea for First Appearance of Random Dry Spots
↓
Record Time (in seconds) for Break-Up
↓
Repeat Test 3 Times
↓
Calculate Average TBUT
↓
Evaluate Result:

Average TBUT < 10 seconds → Dry Eye Suspected (Positive Test)

Average TBUT ≥ 10 seconds → Normal Tear Film Stability
↓
Note Any Corneal or Conjunctival Staining
↓
End

5. Results

Thirty patients of psoriasis were screened and tested to find out about the ocular symptoms and assess the changes of tear films in psoriasis patients. The mean age of these patients was 46.30 years, and they were between the ages of 30 and 70; the youngest being of 17 years age and eldest of 64 years age.

Psoriasis vulgaris, Inverse psoriasis, pustular psoriasis and psoriasis arthritis were all present in 40%, 37%, 20% and 3% respectively.(**Figure 2**) One patient in our study had joint involvement. Out of 30 cases only 18 were symptomatic.(**Figure 3**)

Redness was the most prominent symptom in 11 out of 30 psoriasis patients(37%), followed by foreign body sensation with a burning feeling in 10 individuals (33%) and blur vision in 8 patients (27%).(**Figure 4**)

Additionally, 14 participants (47%) had conjunctivitis, 14 subjects (47%) had posterior blepharitis and 9 participants (30%) had episcleritis.(**Figure 5**)

All 30 of the patients underwent tear film function tests. In all cases, the Schirmer's test 1 & 2 showed wetting of strip more than 5mm, suggestive of normal tear production.

Tear film breakup time was less than 10 sec 18 of the cases.(**Table 1**)

Of the 30 subjects examined, abnormal fluorescein corneal staining was seen in 13 of them.(**Table 2**)

Out of the entire study group, patients with pustular psoriasis (6 patients) and psoriasis vulgaris (12 patients) had the highest percentage of ocular symptoms with ocular surface problem.

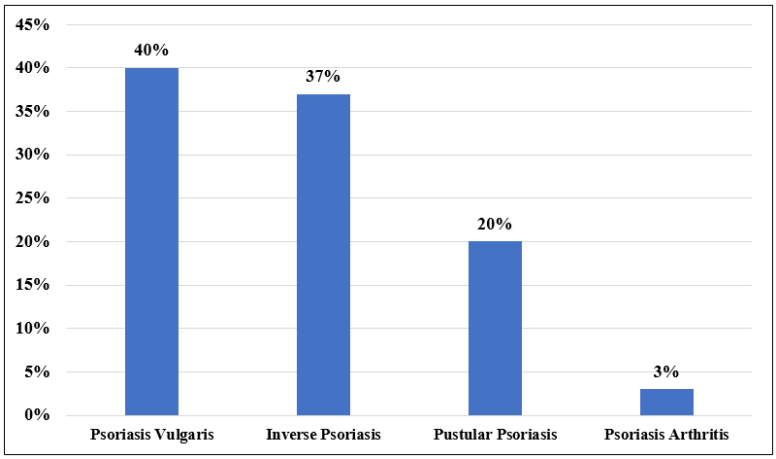

Figure 2: Distribution of patients into type of psoriasis seen

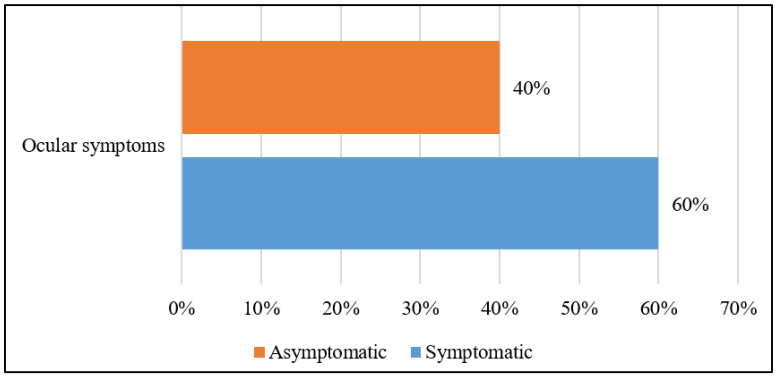

Figure 3: Percentage of patients asymptomatic (40%) and symptomatic (60%)

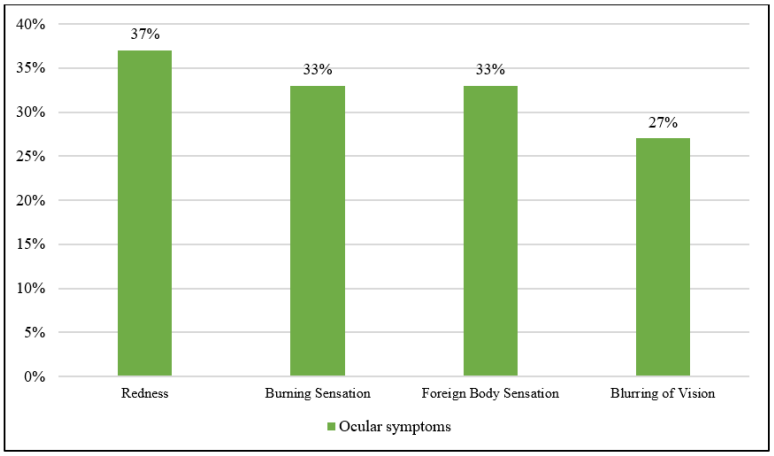

Figure 4: Ocular symptoms in patients with psoriasis

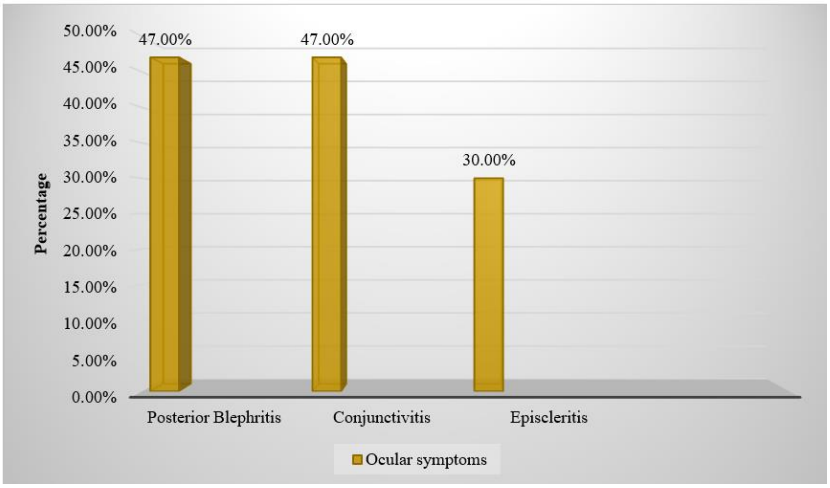

Figure 5: Percentages comparison of posterior blepharitis, conjunctivitis and episcleritis in patients

Table 1: Significance of tear flim breakup time test in patients with psoriasis

	Tear flim breakup time test		Chi square	p-value
	Positive	**Negative**		
Psoriasis vulgaris	12	0	**2.51**	**0.112**
Inverse psoriasis	0	11		
Pustular psoriasis	6	0		
Psoriasis arthritis	0	1		
Total	18	12		

Table 2: Significance of fluorescein corneal staining in patients with psoriasis

	Fluorescein corneal staining		Chi square	p-value
	Normal	**Abnormal**	**0.138**	**0.709**
Psoriasis vulgaris	3	9		
Inverse psoriasis	11	0		
Pustular psoriasis	2	4		
Psoriatic arthritis	1	0		
Total	17	13		

6. Discussion

Psoriasis is immune mediated chronic inflammatory skin disease due to excess proliferation of underlying epidermis forming erythematous plaques. Most of the time ocular manifestations are nonspecific and asymptomatic. Usually detected late after significant ocular morbidity. Ocular manifestations can be due to direct involvement by plaques, immune mediated mechanisms or related to its treatment.

Ocular manifestations in patients with psoriasis includes, blepharitis, conjunctivitis, episcleritis, ocular surface abnormalities and dry eyes. Blepharitis is most common occurrence.

In our study, 30 patients were examined over the course of six months at the Department of Ophthalmology at a rural hospital in central India. In our study, there were 4 (13.3%) patients under the age of 20, 14 (46.6%) patients between the ages of 21 and 40, 10 (33.33%) patients between the ages of 40 and 60, only 2 (6.6%) patients beyond 60. The average age of onset, according to Farber EM and Nall ML19, was 28 years old.[17] Our study maximum patients were between 20 to 40 years of age.

In our study, there were 63% were male patients and 37% were female patients. Our results were comparable to the study by Henseler J et al, which showed male preponderance. Also the study showed two peaks in disease occurrence, one early age (early 20s) and second after the age of 60 years.[18]

In our study only 18 patients were symptomatic. The significance of this study is underscored by the fact that these sight-threatening consequences were evident in symptomatic individuals who often came at a later stage, raising serious concerns and underscoring the need for patient screening.

Redness was the most prominent symptom in 11(37%) out of 30 cases followed by foreign body sensation with a burning feeling in 10 individuals (33%) and blur vision in 8 patients (27%).

On slit lamp examination, 14(47%) cases had conjunctivitis, 14 (47%) had posterior blepharitis and 9 participants (30%) had episcleritis. None of them had uveitis.

Posterior blepharitis was seen in 14 individuals, which is consistent with previous studies that have documented an elevated frequency of both anterior and posterior blepharitis among psoriasis patients.[19]

Limba FB et al discovered that 12.5% of psoriasis patients had conjunctivitis.[20] According to Ibrahim Erbagei et al., blepharoconjunctivitis affects 64.5% of the Turkish population.[23] JR Lambert also found conjunctivitis in 19.6% of the individuals.[19] Catsarou - Catsari A discovered blepharoconjunctivitis and keratoconjunctivitis sicca were the most prevalent ocular signs.[21]

Our study is consistent with findings from the above studies in which conjunctivitis and blepharitis is similar in occurrence.

Psoriasis patients have higher incidence of dry eye. J R Lambert et al. discovered that individuals with psoriasis had 2.7% dry eye.[19]

In our study, 60% of the patients had tear break up time less than 10 secs. And the Schirmer's test score was above 5 mm wetting in all 30 patients. Our finding is consistent with the study by Her Y et al. in 2013.[25] Wherein, tear film function and ocular surface changes was noted in 60 patients as a case control study and no significant change in the Schirmer's result, but they did notice a reduction in tear break up time and an alternation in conjunctival cytology with reduced goblet cells.

Similarly, research conducted by Ibrahim Erbagci et al. reported that there is increased frequency of reduced tear breakup time in patients with psoriasis.[23]

In our study, it showed that corneal fluorescein staining was positive in 13 (43%) patients which in similar to the results shown in Chowdhury et al study.[24] They found that fluorescein staining was positive in 8 eyes (5.7%) suggesting ocular surface damage.

Young Her et al in their study also showed that fluorescein staining test was significantly higher in the patients of psoriasis than in the controls.[25]

Thus our study findings are suggestive of ocular surface abnormalities leading to corneal staining and dry eyes. Also blepharitis with ocular surface irregularity leading to reduced tear film breakup time and thus unstable tear film and dry eye. However there was no abnormality in tear production as suggested by normal Schirmers test. If left untreated these ocular surface abnormalities can lead to sight threating complications in the form of corneal involvement.

All the symptomatic patients and ocular findings were treated accordingly and were asked for regular follow up.

Hence the need for ophthalmological evaluation at the time of diagnosis and during subsequent follow-ups should be made clear to the dermatological and medical coworkers who are frequently the first to interact with psoriasis patients emphasizing the role of interdisciplinary approach.

7. Limitations

1. Small sample size
2. Being cross sectional study, follow up of the patient could not be done.
3. The length of the disease and its ocular symptoms were not significantly correlated.

8. Conclusion

In our study majority of patients had psoriasis vulgaris. Blepharoconjunctivitis was the most prevalent manifestation. Reduced tear film breakup time and ocular surface staining was present with no abnormality in Schemer's test was noted in our study suggestive of tear film instability. Hence focused ophthalmic evaluation, is must in all cases of psoriasis is must for early diagnosis and management of eye illnesses.

9. Source of Funding

None.

10. Conflict of Interest

None.

11. Ethical Approval

Ethical No.: DMIMD(DU)/IEC/2022/418.

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