Ocular manifestations in moderate-to-severe psoriasis in India: A prospective observational study

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Purpose: Ocular manifestations in psoriasis are due to direct eye involvement with psoriatic plaques or psoriasis-related, immune-mediated inflammatory processes. The commonly reported pathologies are blepharitis, conjunctivitis, keratitis, dry eyes, and uveitis. Limited data is available on the ocular findings in psoriasis patients in India. In this study, we evaluated various ocular changes associated with moderate-to-severe psoriasis.

Methods: In this prospective cohort study, treatment-naïve psoriasis patients with Psoriasis Area Severity Index (PASI) score of more than 10 were included. The Ocular Surface Disease Index (OSDI) score, Schirmer’s score, tear film breakup time (TBUT), corneal and conjunctival staining score, and meibomian gland dysfunction score were noted. All these parameters were re-evaluated at 8 weeks of follow-up after systemic treatment.

Results: Sixty-eight patients were enrolled in the study. The most common ocular pathologies observed in this study were tarsal hyperemia and anterior blepharitis in 26 (19.1%) and 44 (47.7%) eyes, respectively. Mild, moderate, and severe dry eyes were seen in 26 (19.1%), 14 (10.2%), and 38 (25.3%) eyes, respectively. Thirty-nine (57.3%) patients complained of significant difficulty watching television or digital screen. In 21 patients evaluated on follow-up at 8 weeks, cornea and conjunctiva’s ocular surface staining score increased and TBUT decreased significantly.

Conclusion: The most common ocular pathologies observed in this study were anterior blepharitis and moderate dry eye, which significantly affected most patients’ daily routines. Screening patients with greater severity of psoriasis would help in early management of such problems.

Key words: Dry Eyes, ocular manifestation, psoriasis, Schirmer’s, tear film breakup time

Psoriasis is an immune-mediated, chronic inflammatory disease that mainly affects the skin.[1] The lesions are usually erythematous plaques formed due to excessive proliferation of the underlying epidermis. The ocular disorders are often non-specific and asymptomatic, and are usually detected late with a risk of significant ocular morbidity. The incidence rate of ocular involvement varies from 10% to 58%, as reported by several studies.[2] The ocular features are either due to direct eye involvement with psoriatic plaques, psoriasis-related immune-mediated inflammatory processes, or complications of psoriasis treatments.[3] The ocular manifestations commonly reported are uveitis, dry eyes, blepharitis, conjunctivitis, keratitis, ultraviolet (UV)-associated cataracts, and retinal pathologies.[4] Blepharitis has been found to be the most prevalent ocular involvement in psoriasis patients.[5] Dry eye, conjunctivitis, hyperemic conjunctiva, cicatricial entropion, and ectropion due to chronic blepharitis have also been reported.[6] Bilateral cataracts unrelated to previous steroid use have also been reported.[6] Uveitis is more commonly reported in psoriatic arthritis.[7] The most common presentation is that of acute anterior uveitis.[8]

Limited data is available on the ocular findings in psoriasis patients in India. A study by Abbagni et al.[9] showed blepharitis and ocular surface involvement as the most frequent occurrence in Indian subjects. In this prospective observational study, we evaluated various ocular changes associated with psoriasis, their severity, and changes post systemic treatment in the eastern Indian population.

Methods

This is a prospective cohort study conducted at the outpatient ophthalmology department in a tertiary care center from September 2019 to May 2021. Institutional ethics committee approval was obtained. The study adhered to the tenets of the Declaration of Helsinki. Patients in the age group between 18 and 60 years with a confirmed diagnosis of psoriasis were included in this study. The other inclusion criteria were a Psoriasis Area and Severity Index (PASI) score of more than 10 and treatment-naïve status.[10–12] Patients with a history of ocular trauma or surgery, Steven–Johnson syndrome, doubtful clinical diagnosis, and those who did not give consent were excluded from the study. A total of 68 patients (136 eyes) were included in this study.

Informed written consent was obtained from all participants. Patients’ demographic profile, type of psoriasis, PASI score, and disease activity were noted. The patients were followed up at 4, 8, and 12 weeks. The patients were treated clinically and biologically as per the identical terms.

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duration of psoriasis, and treatment history were documented. They were given the Ocular Surface Disease Index (OSDI) questionnaire for filling up.[13,14] In case of difficulty, they were assisted by the medical staff. A comprehensive ocular examination was performed. Best-corrected visual acuity (BCVA) was charted using Snellen’s chart and converted to Logarithm of the Minimum Angle of Resolution (LogMAR) for statistical analysis. Intraocular pressure (IOP) was measured with a non-contact tonometer (NCT). The Schirmer test was conducted using Schirmer tear test strips, and the score at 5 min on the Schirmer test strip was noted. Tear film breakup time (TBUT) was evaluated on slit lamp, and an average of three consecutive measurements was documented. Fluorescein uptake on cornea and conjunctiva was assessed 3 min later, and the scores were obtained according to the National Eye Institute Workshop scoring system. The meibomian glands were evaluated under slit lamp in the lower lid, and the “abbreviated meibomian gland dysfunction grading system” was used for scoring the dysfunction.[15] This consisted of lid margin inflammation, orifices, and the nature of the secretions expressed from the glands. The central 10 glands of the lower lid were evaluated for plugging and any cicatricial changes. The volume, quality, and expressibility of meibum were analyzed and the final score was calculated. The patients were followed up 8 weeks after systemic treatment, and all the baseline parameters were recorded.

Statistical analysis

The data collected were tabulated in a master sheet in Microsoft Excel. Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) statistical software (IBM SPSS Statistics version 20).

All the categorical data were presented as a percentage. The Shapiro–Wilk test was used to determine the distribution of the continuous data. Mean and standard deviation were calculated in the data with normal distribution. Otherwise, the median and interquartile range (IQR) were calculated. The correlations between PASI score and the duration of psoriasis with the OSDI score, Schirmer’s score, and TBUT score were analyzed using Spearman’s rho coefficient (for continuous data) or Kendall’s tau-b (for ordinal data). Comparison of the data at baseline (T0) and at 8 weeks follow-up (T8) was done using the Wilcoxon signed-rank test (for nonparametric continuous data) and the McNemar’s test (for categorical data). The level of significance was determined at a P value <0.05.

Results

A total of 68 patients with moderate-to-severe psoriasis, involving a skin surface area of >10% and PASI score >10, were enrolled in the study. There were 14 females (20.6%) and 54 males (79.4%). The mean age of patients was 43.69 ± 1.55 years (range, 16–60 years). According to the modified Kuppuswamy scale, most patients belonged to the lower middle class (37, 54.4%). Most of the patients in our series had BCVA of 20/20 (range, 20/20–20/40). The median value of IOP was 15 mmHg with an IQR of 12.25–16.00. Plaque psoriasis was the most common presentation in this study (56, 82.4%). The demographic and baseline characteristics of the study population are shown in Table 1.

The most common ocular pathology observed in this study was tarsal hyperemia in 128 eyes (94.1%). Other findings were upper tarsal conjunctival papillae in 106 (77.9%) eyes, anterior blepharitis in 64 (47%) eyes, trichiasis in four (2.9%) eyes, and lagophthalmos in two (1.4%) eyes. Forty-seven (34.5%) eyes showed early nuclear opalescence, and four (2.9%) eyes were pseudoptikic. On retinal evaluation, two (1.4%) eyes had mild nonproliferative diabetic retinopathy, one eye (0.7%) had asteroid hyalosis, and one eye (0.7%) had branch retinal vein occlusion. Fig. 1 shows various ocular pathologies and the frequency of their occurrence in our study.

The dry eye diagnostic parameters according the Dry Eye Workshop (DEWS) II classification at baseline with a median value were OSDI score of 13.2 (IQR 4.12–32.56), Schirmer I test score was 22.5 mm (IQR 10–32), TBUT was 7.250 s (IQR 5–14), and meibomian gland dysfunction (MGD) score was 12.0 (IQR 8.0–16.75). The mean ocular surface staining scores of cornea and conjunctiva were 1.66 ± 2.4 and 1.24 ± 2.21, respectively. The correlation between PASI score and duration of psoriasis with ocular symptoms was not statistically significant [Table 2]. There was no significant correlation between visual acuity, conjunctival and corneal staining score, Schirmer test, and TBUT with OSDI score [Table 3]. The OSDI score classified 31 cases as asymptomatic. Mild dry eye was seen in 13 (19.1%) patients, moderate dry eye in seven (10.2%) cases, and severe dry eye in 17 (25%) cases. Thirty-nine (57.3%) patients complained of significant difficulty watching television or digital screen. Seven patients (10.2%) had a considerable problem driving at night.

Forty-two eyes were evaluated on follow-up at 8 weeks. The dry eye parameters at presentation (T0) and after treatment with immunosuppressants at 8 weeks follow-up (T8) were compared.
Details are provided in Table 4. We found a statistically significant reduction in PASI score. There was no significant change in the MGD and OSDI scores. The ocular surface staining score of cornea and conjunctiva showed a statistically significant increase following treatment after 8 weeks, while TBUT decreased significantly at T8. Other ocular signs such as anterior blepharitis, tarsal conjunctival hyperemia, and papillae did not show any significant decrease. Instead, bulbar congestion was increased after immunosuppressant therapy.

**Discussion**

In this study, we evaluated various ocular changes associated with psoriasis, their severity, and changes post systemic treatment in the eastern Indian population. The demographic features in our study were similar to previously reported findings. Psoriasis has a clear preponderance for the male gender. Most of the patients are in the fourth decade of their life. In an Indian study by Abbagani et al., the mean age of presentation was 46.18 ± 13.54 years, which is similar to that in our study group. The majority of subjects in their study were men, which is also similar to our finding. Another study by Chandran et al. on the Asian population showed the mean age to be 44 ± 12.1 years with male preponderance. Her et al. showed similar age and gender distribution in their study. Yang et al. showed a lower mean age of 29 years with male predominance. The studies on the Caucasian population by Demirci et al., Campanati et al., and Erbagci et al. also showed similar trends.

A higher prevalence of severe psoriasis was seen in lower education and income groups in our study. The study by Kimball et al. reported a positive association between poor psoriasis control and a lower education level. Eighteen cases (20.6%) were smokers in this study. Fotiadou et al. have shown an increased incidence of pustular psoriasis in smokers. Smoking increases the production of free radicals, which interferes with the signal pathways relevant to psoriasis. Nicotine also induces an increased secretion of several cytokines such as interleukin (IL)-12, IL-2, tumor necrosis factor (TNF), and granulocyte–monocyte colony-stimulating factor, which play a crucial role in the pathogenesis of psoriasis. We had two cases of pustular psoriasis, and both of them were smokers.

Various studies have given contradictory results regarding the Schirmer’s score in psoriasis patients. Campanati et al. showed a lower Schirmer’s score, whereas Demirci et al. found a comparable Schirmer’s score between the psoriasis patients and the control group. The studies by Zengin et al. and Her et al. also showed normal Schirmer values. In this study, the Schirmer’s score was within the normal range in 99 (72.7%) eyes. The postulated reason is that the Schirmer test primarily measures aqueous tear secretions. The lacrimal gland is unaffected in the psoriatic disease process, resulting in an average Schirmer value. Increased epithelial turnover, the central pathology in psoriasis, causes increased cell production and shedding that ultimately creates a mechanical blockage of the meibomian duct. This causes MGD, leading to drying and desiccation of the ocular surface, increased TBUT, and increased areas of conjunctival and corneal fluorescein stain uptake. In this study, the mean MGD score was raised in 67 (98.5%) subjects, TBUT was decreased in 83 (61%) eyes, and conjunctival and corneal staining scores had increased in 53 (38.9%) and 36 (26.4%) eyes, respectively. In all previous studies, TBUT, conjunctival, and corneal staining scores were unanimously deranged. The OSDI score that evaluates the symptoms of dry eye was high in this study, which is suggestive of the eyes’ symptomatic involvement. A high OSDI score (mild, moderate, and severe dry eye) was seen in 34 (50%) of our subjects. Severe dry eye was seen in 16 (23.5%) of our patients. Because of dry eye, 39 (57.3%) patients complained of...
Table 2: Correlation of ocular pathologies with PASI score and duration of psoriasis

| Parameters                     | PASI score  | Duration of psoriasis |
|-------------------------------|-------------|-----------------------|
|                               | Spearman    | P                      |
|                               | correlation |                       |
| TBUT                          | −0.106      | 0.391                 |
| Schirmer                      | −0.77       | 0.73                  |
| Meibomian gland dysfunction   | −0.044      | 0.719                 |
| Anterior blepharitis          | −0.11       | 0.36                  |
| Tarsal hyperemia              | 0.1         | 0.40                  |
| Tarsal conjunctival papillae  | 0.18        | 0.13                  |
| Bulbar congestion             | 0.19        | 0.10                  |

PASI=Psoriasis Area Severity Index, TBUT=tear film breakup time

Table 3: Correlation of dry eye parameters with the OSDI score

| Parameters                     | Spearman    | P     |
|-------------------------------|-------------|-------|
|                               | correlation |
| TBUT                          | 0.10        | 0.377 |
| Visual acuity                 | 0.02        | 0.9   |
| TBUT                          | 0.051       | 0.68  |
| Ocular surface staining score | −0.143      | 0.2   |
| Schirmer's test score         | 0.028       | 0.82  |

OSDI=Ocular Surface Disease Index, TBUT=tear film breakup time

Table 4: Comparison of dry eye parameters at baseline and at 8 weeks

| Parameters                     | T0 (baseline) Median (IQR) | T8 (after 8 weeks) Median (IQR) | P  |
|-------------------------------|-----------------------------|---------------------------------|----|
|                               | (n=136)                     | (n=42)                          |    |
| Meibomian gland dysfunction   | 12 (8.00-16.75)             | 15.0 (7.75-19.50)               | 0.19|
| OSID score                    | 13.20 (4.12-32.56)          | 12.50 (4.5-29.75)               | 0.445|
| Corneal staining score        | 0.0 (0.00-4.0)              | 1.50 (0.0-5.0)                  | 0.009|
| Conjunctival staining score   | 0.0 (0.0-1.75)              | 0.0 (0.0-6.0)                   | 0.004|
| TBUT                          | 7.25 (5.00-14.00)           | 6.0 (4.0-9.25)                  | 0.015|
| Schirmer’s score              | 22.50 (10-32)               | 25 (12.50-35.0)                 | 0.76|

IQR=interquartile range, OSID=Ocular Surface Disease Index, TBUT=tear film breakup time. P-value assessed using Wilcoxon signed-rank test

significant difficulty watching television or digital screen and seven patients (10.2%) had considerable problems driving at night. Previous studies have also shown higher OSDI scores in psoriasis patients compared to the control population. We also found endothelial guttae in two eyes. While no studies have reported any incidence of guttata in psoriasis patients, it might be an incidental finding in our study.

The eyelids are one of the primary sites of ocular involvement, given that psoriasis is principally an epithelial disease. Blepharitis occurs when there is lacrimal blockage due to unintentional forwarding movement of squama on the skin caused by rubbing or washing eyes. Chronic inflammation leads to cicatrical lid changes like ectropion, entropion, and trichiasis. Lid pathologies were predominant in our study subjects. We noticed lagophthalmos in four eyes, which occurred probably as a sequela to the cicatrical change in the conjunctiva.

None of our patients had any visual impairment. This correlates with the studies by Au et al. and Aragona et al., who reported minimum vision impairment in patients with psoriasis. Previous studies have not found any significant association between psoriasis and cataract. None of the patients in this study had any significant cataract.

Uveitis in psoriasis patients has been reported predominantly in the psoriasis vulgaris and psoriatic arthritis groups. The Indian studies conducted by Abbagani et al. did not find uveitis in any of the psoriasis patients. A similarly study by Shah et al. reported uveitis in only three of their patients. In our series, no evidence of uveitis was present in any case.

We analyzed the ocular pathologies for any change at 8 weeks of follow-up after systemic treatment. Most patients were treated with oral methotrexate (57, 83.8%). The remaining patients received oral cyclosporine (7, 10.3%), oral apremilast (2, 2.9%), and ointment cyclosporine (2, 2.9%). No studies have reported dry eye as a side effect of these medications. A statistically significant decrease in PASI score was observed. Still, no significant change in the OSDI score, MGĐ score, and anterior blepharitis was found. Also, the TBUT value decreased significantly. The results of our study indicated the worsening of ocular surface parameters with time. The dermatological treatment did not improve the ocular parameters. Most of the previous studies were cross sectional; hence, limited data is available on change in the ocular dry eye parameters with dermatological treatment. Although the study by Campanati et al. showed a positive impact on tear film functionality (increased Schirmer value and TBUT), there was no impact on pathologies like conjunctival hyperemia and telangiectasia after the immunosuppressive therapy of 12 weeks. Hence, prescribing lubricants for treatment and to avoid complications of dry eye symptoms will be effective in combination with systemic therapy.

**Conclusion**

This study describes the ocular involvement pattern in psoriasis in eastern India. The most common ocular pathologies observed in this study were anterior blepharitis and moderate dry eye, which significantly affected the daily routine of majority of the patients. Screening of patients with greater severity of psoriasis would help in early management of such problems. Further studies with a greater sample size and more geographic variation are required to understand the prevalence and multitude of ocular involvement in psoriasis. Longer follow-up is needed to ascertain the effect of systemic management on the ocular symptoms.

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**Conflicts of interest**

There are no conflicts of interest.
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