

## CLINICO-PATHOLOGICAL CORRELATION OF ACQUIRED PALMOPLANTAR HYPERKERATOTIC DISORDERS

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### ABSTRACT

#### BACKGROUND

Acquired hyperkeratotic disorders of the palms and soles constitute a large majority of outdoor visits in Dermatology practice. Even though they can easily be identified from their morphological appearance, treating them properly needs accurate clinical diagnosis corroborated by histopathological examination.

The objectives of the present study were to find out the clinical features of patients presenting with acquired hyperkeratosis over palms and soles and to correlate the findings with that of histopathological examination.

#### MATERIALS AND METHODS

It was a hospital based study where 100 patients presenting with acquired hyperkeratosis over palms and soles were included. Clinical examination was done followed by biopsy in all cases.

#### RESULTS

Male agricultural workers in their 4<sup>th</sup> and 5<sup>th</sup> decade were the most common group of patients. Eczema comprised the maximum number of cases (45%), followed by psoriasis (37%). Hyperkeratosis, parakeratosis, and acanthosis were present in all cases of psoriasis while Munro's microabscess, pustule of Kogoj and suprapapillary thinning were found specific in 13%, 13% and 64.8% case of psoriasis respectively. Hyperkeratosis and acanthosis were seen in all cases of eczema whereas elongation of rete ridges and spongiosis were seen in 93.3% and 84.4% of cases respectively. The clinical findings matched with the histopathological findings in 75.6 % cases of psoriasis and 73.6% cases of eczema whereas the concordance was 100% in warts and callosity.

#### CONCLUSION

Hyperkeratotic lesions of palm and sole often present with typical clinical features and in cases in which they are absent, skin biopsy and special tests has to be done to aid diagnosis.

#### KEYWORDS

Palmoplantar Hyperkeratosis, Psoriasis, Eczema, Histopathology.

**HOW TO CITE THIS ARTICLE:** Dash M, Sahu MK, Padhi T. Clinico-pathological correlation of acquired palmoplantar hyperkeratotic disorders. J. Evid. Based Med. Healthc. 2018; 5(25), 1942-1947. DOI: 10.18410/jebmh/2018/404

#### BACKGROUND

Acquired hyperkeratotic disorders of the palms and soles constitute a large majority of outdoor visits in Dermatology practice. Even though they can easily be identified from their morphological appearance, treating them properly need accurate clinical diagnosis corroborated by histopathological examination. Several dermatoses such as psoriasis, eczema, dermatophytic infections and viral infections may present as hyperkeratotic lesions on the palms and soles. They are often recalcitrant in nature and pose a significant impact on

their physical and psychological health and also affect their occupation. Moreover, hyperkeratotic lesions on the palms and soles are difficult to diagnose based exclusively on their clinical features. Some of them, particularly psoriasis and eczema mimic each other very closely even though they have different treatment modalities. Both palmoplantar psoriasis and eczematous dermatitis of this skin area share similar clinical and even some of the histological features. In the absence of a proper diagnosis, they are often treated empirically using a host of topical and systemic medications.

Psoriasiform dermatitis is a broad group with individual conditions such as psoriasis, eczema, contact dermatitis, lichenified form of neurodermatitis and even superficial fungal infections. Occasionally seborrheic dermatitis and pityriasis rubra pilaris may be included under this group.<sup>1,2</sup>

Histopathologically, there exist differentiating features for psoriasis and psoriasis form dermatitis. The former includes hyperkeratosis, enlargement of dermal vasculature and Munro's and Kogoj's abscess whereas presence of

*Financial or Other, Competing Interest: None.*

*Submission 26-05-2018, Peer Review 29-05-2018,*

*Acceptance 05-06-2018, Published 18-06-2018.*

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*DOI: 10.18410/jebmh/2018/404*



spongiosis and absence of micro abscess favour the latter group.<sup>3,4</sup> In spite of this, the histopathological diagnosis is not always straightforward as superficial fungal infection that frequently present over the palms and soles can have micro-abscesses<sup>2</sup> and the biopsy findings are not uniformly found in either of the group i.e. psoriasis and psoriasis form dermatitis.

In all dermatological condition that present in a variety of morphological patterns, clinical diagnosis should always be corroborated by a matching histopathological one and the concordance rate for diagnosis of diseases like leprosy and basal cell carcinoma are well known.<sup>5,6,7,8</sup> Palmoplantar hyperkeratotic disorders, although being one of the most frequently encountered dermatological entity, lack such studies.

### Aim and Objectives

To Study the clinical features of patients presenting with acquired hyperkeratosis over palms and soles and to correlate the findings with that of histopathological examination and thereby finding a concordance between the two.

### MATERIALS AND METHODS

It was a single centre hospital based prospective observational study conducted in a tertiary care hospital between November 2015 and October 2017. 100 patients presenting with acquired hyperkeratosis over palms and soles in our OPD were included in the study. Patients having congenital hyperkeratosis over palms and soles, those with age less than 11 years of age, coagulation disorders and immunosuppressed individuals were excluded from the study. Demographic details such as name, age, sex, occupation, socio economic status were recorded.

All of them were subjected to a thorough clinical examination and the following were noted: number of lesions, duration of lesion, size, margin, erythema, scaling, fissuring, association with itching, symmetry, nail involvement, co-morbidity and seasonal variation.

The diagnostic and laboratory work up included complete blood count, KOH mount with lactophenol cotton blue stain, culture of the skin scrapping for fungal elements in Sabouraud dextrose agar media and biopsy. Consent was obtained from parents of children before doing biopsy. An active lesion was chosen for biopsy. The area was sterilised, Lignocaine was infiltrated and a disposable 4 mm punch was used to obtain a tissue sample for biopsy. The following histopathological features were noted-

1. Parakeratosis
2. Hyperkeratosis
3. Acanthosis
4. Neutrophilic micro abscess
5. Rete ridges
6. Supra papillary thinning
7. Type of cellular exocytosis
8. Type of cellular infiltration of dermis
9. Vacuolations
10. Fungal elements

All clinical features were correlated with histopathological features and clinical diagnosis were compared with the histopathological outcome.

### RESULTS

Age Group	Male	Female	Rural	Urban	Total
11-20 yrs.	5	3	6	2	8
21- 30	9	6	5	10	15
31 - 40	14	13	14	13	27
41 – 50	12	11	16	7	23
51 – 60	10	6	8	8	16
61-70	8	3	9	2	11
<b>Total</b>	<b>58</b>	<b>42</b>	<b>58</b>	<b>42</b>	<b>100</b>

**Table 1. Age, Sex and Rural-Urban Distribution of Cases**

Maximum number of cases were seen in the age group of 31-40 years of age followed by 41-50 year age group. Males outnumbered females in all age groups. Maximum number of males were in 31-40 age group (14/58) followed by 41-50 age group.

58% cases were from rural areas while 42% were from urban areas. There was a preponderance of referral from urban areas in age group of 21 – 40 years.

Sl. No.	Socio-economic Status	No. of Patients	Percentage
1	Lower	15	15
2	Upper Lower	19	19
3	Lower middle	29	29
4	Upper middle	24	24
5	Upper	13	13

**Table 2. Socio Economics Status<sup>9</sup>**

Majority of patients 29(29%) belonged to lower middle socio-economic group. 24(24%) patients had upper middle category.

Occupation	Number	%
Housewife	17	17
Student	11	11
Farmer	28	28
Labourer	19	19
Office employee	16	16
Driver	2	2
Teacher	4	4
Businessman	3	3

**Table 3. Occupation Wise Distribution**

Occupation wise farmer comprised the maximum number of cases (28%), followed by labourer (19%), and housewives (17%).

Disease	Frequency	%
Psoriasis	37	37
Eczema	45	45
Tinea	13	13
Wart	3	3
Callosities	2	2
<b>Total</b>	<b>100</b>	<b>100</b>

**Table 4. Clinical Spectrum of Disease**

Table 4 shows patients of dermatological conditions detected in this study. Eczema comprised the maximum number of cases (45%), followed by psoriasis (37%) and Tinea infections (13%) while callosities constituted the least number of cases (2%).

Sites	Psoriasis	Eczema	Tinea	Wart	Callosities	Total
Unilateral Palm	0	0	4	1	0	5
Bilateral Palms	16	17	1	0	0	34
Unilateral Sole	1	0	8	2	1	12
Bilateral Sole	8	15	0	0	1	24
Both Palm & Sole	12	13	0	0	0	25

**Table 5. Site of Involvement**

Table 5 shows the sites of involvement of different clinical patterns in this study population. Bilateral palm were involved in maximum number of cases (34/100).

Clinical Finding	Psoriasis n=37	Eczema n=45	Tinea n=13	Wart n=3	Callosity n=2
Itching	12 (32%)	36 (80%)	11 (85%)	1 (33%)	1 (50%)
Pain	25 (68%)	14 (31%)	0	3 (100%)	2 (100%)
Erythema	21 (57%)	10 (22%)	0	0	0
Scaling	29 (78%)	18 (40%)	13 (100%)	0	0
Fissuring	18 (49%)	25 (55%)	4 (31%)	1 (33%)	1 (50%)
Well Defined Margin	21 (57%)	4 (88%)	0	3 (100%)	2 (100%)

**Table 6. Clinical Findings**

Table 6 showing the predominant clinical finding of different diseases in the present study. Psoriasis had predominant finding of scaling (29/37), similarly itching was predominant in eczema (36/45) and scaling was predominant 13/13 followed by itching, 11/13 in cases of tinea.

Nail Involvement	Disease					Total
	Psoriasis	Eczema	Tinea	Wart	Callosity	
Pitting	12	2	0	0	0	14
Dystrophy	7	6	2	0	0	15
Nail Fold Inflammation	1	12	1	0	0	14
Longitudinal Striation	3	7	3	0	1	14
Normal	11	18	3	3	1	36
Subungual Keratosis	3	0	4	0	0	7
<b>Total</b>	<b>37</b>	<b>45</b>	<b>13</b>	<b>3</b>	<b>2</b>	<b>100</b>

**Table 7. Spectrum of Nail Involvement**

Table 7 showing the incidence and type of nail involvement in different diseases in the study. Nail involvement was seen in 64/100 (64%) of cases. most common abnormality seen in cases of psoriasis was pitting of nails followed by dystrophic changes while nail fold inflammation was most commonly seen in cases of eczema.

Histopathology	Psoriasis	Eczema	Tinea Manuum /pedis	Wart	Callosities
Hyperkeratosis	37 (100%)	45 (100%)	13 (100%)	3 (100%)	2 (100%)
Parakeratosis	37 (100%)	33 (73.3%)	4 (30.4%)	3 (100%)	2 (100%)
Acanthosis	37 (100%)	45 (100%)	13 (100%)	3 (100%)	0
Spongiosis	21 (56%)	38 (84.4%)	6 (46.1%)	0	0
Munro's microabscess	5 (13%)	0	0	0	0
Pustule of Kogoj	5 (13%)	0	0	0	0
Suprapapillary thinning	24 (64.8%)	0	0	0	0
Elongation of rete ridges	37 (100%)	42 (93.3%)	11 (84.6)	3 (100%)	0
<b>Type of exocytosis</b>					
Neutrophil	11 (29.7%)	0	0	0	0
Lymphocyte	0	39 (86.6%)	0	1 (33.3%)	0
Monocyte	16 (43.24%)	4 (8.8%)	0	0	0
<b>Type of infiltrate in Dermis</b>					
Neutrophil	0	0	0	0	0
Lymphocytes	6 (16.2%)	39 (86.6%)	12 (92.3%)	1 (33.3%)	0
Monocyte	29 (78.3%)	4 (8.8%)	0	0	0
Koilocytes	0	0	0	3 (100%)	0
Vacuolation	0	0	0	3 (100%)	0
Fungal elements	0	0	0	0	0

**Table 8. Histopathological Findings**

Table 8 shows that Hyperkeratosis, parakeratosis, and acanthosis present in all cases while Munro's microabscess, pustule of Kogoj, suprapapillary thinning found specific in case of psoriasis whereas spongiosis and lymphocytic infiltration of dermis seen in eczema.

Diseases	Clinical	Histopathology	Percentage
Psoriasis	37	28	75.6
Eczema	45	38	73.6
Tinea	13	0	0
Wart	3	3	100
Callosities	2	2	100
Nonspecific	0	29	29
Total	100	100	100

**Table 9. Clinical and Histopathological Correlation**

Table 9 shows the clinical and histopathological correlation between the different clinical patterns in the present study. While 71 cases diagnosed clinically had histological correlation, 29 cases had nonspecific correlation.

## DISCUSSION

The present study included one hundred patients which comprised of clinical patterns of psoriasis, hyperkeratotic eczema, tinea, warts, callosities.

In the present study the age of the patients ranged from 13 years-70 years, the mean age being 41.2 years.

This is in concordance with the result by Sandeep et al (mean age of 43.72 years).<sup>10</sup> But differs from that reported by Murthy et al which showed a mean age of 31.7 years.<sup>11</sup> This can be attributed to the inclusion of inherited cases by them. The average age for psoriasis in the present study was 38.7 years which is concordant with earlier studies of Murthy et al (average age of 34.5 years)<sup>11</sup> but differs slightly from Chopra et al (average age of 27 years).<sup>12</sup>

The average age for eczema in the present study was 43.26 years and was concordant with the study by Chopra et al (average age of 42.30 years).<sup>12</sup>

Majority numbers of patients (27/100) belonged to the age group of 31-40 years (27.0%) followed by the age group of 41-50 years (23.0%).

This can be attributed to the fact that these age groups belong to the working class of our society who indulge in various outdoor activities with predisposition to trauma thus resulting in hyperkeratotic lesions.

This result differs slightly from the studies done by Sandeep et al<sup>10</sup> and Murthy et al<sup>11</sup> which showed highest incidence in the age group of 41-50 years. But differs greatly from the study by Mahajan et al.<sup>13</sup> The highest incidence in the age group of 11-20 years by Mahajan et al might be due to inclusion of inherited cases by them.

In the present study there is a male predominance which comprised of 58.00% (58/100). This result was similar to other studies of Sandeep et al<sup>10</sup> (54%) and Mahajan et al<sup>13</sup> (64.63%). Similarly the study by Murthy et al also showed a male predominance of (62.35%) and male to female ratio was 1.3:1.<sup>11</sup>

The male predominance in psoriasis (22/37) in the present study is in concordance with Chopra et al<sup>12</sup> and can be attributed to their occupation and daily activities, thus pointing towards the role of Koebner's phenomenon in the causation of palmoplantar psoriasis.

In our study males outnumbered females in case of eczema. This can be attributed to fact that males in this part of country mostly work as farmer and labourer.

In our present study majority of the patients were from rural areas which comprised of 58 cases (58%) out of 100 cases. 78% of the Indian population stays in the rural areas and our result reflects the increase in referrals from rural areas and the growing concern of specialist care in a tertiary care hospital. This result was in concordance with that of Murthy et al where 48/85 was from rural areas.<sup>11</sup>

Occupation wise farmer comprised the maximum numbers of cases 28/100 (28%), followed by labourer (19%) and house wife 17(17%). This result was discordant with the results of Mahajan et al<sup>13</sup> where the manual labourers including farmers contributed to the maximum number of cases (48.16%), followed by students (31.15%), followed by housewives. But the study by Samanta et al showed highest incidence among students.<sup>14</sup>

This can be attributed to the fact that activities like manual labour and farming etc., all predispose to trauma which is known to aggravate keratoderma.

In the present study out of 100 cases, majority cases were eczema which was consistent with the earlier studies by Agrawal et al<sup>15</sup> and Chopra et al<sup>12</sup> which showed eczema to be the most common cause. Studies of keratoderma by Mahajan et al<sup>13</sup> and Murthy et al<sup>11</sup> where psoriasis was the most common among the acquired causes of palmoplantar keratoderma. Out of a total of 37 cases of clinically diagnosed psoriasis, 28 had typical histopathological findings (other were 6 (eczema) 3 (non-specific), Similarly out of 45 cases of eczema diagnosed clinically 38 cases correlated histopathologically (other were 3 (psoriasis), 4 (non-specific). All the 13 cases of clinically suspected fungal infection were nonspecific. Out of a total of 100 cases 29 cases had nonspecific histological correlation with their clinical diagnosis.

Other clinical patterns found in our study were wart (3/100) callosities (2/100).

In histopathology, hyperkeratosis, parakeratosis, acanthosis and elongation of rete ridges were found in all cases of psoriasis and spongiosis in 56% of cases. Munro's microabscess and Pustule of Kogoj found in 13% of cases. Suprapapillary thinning in 24/37 cases. Mixed cellular exocytosis was found in 43.24% cases and mixed cellular infiltrate in dermis in 78.3%.

In Eczema Hyperkeratosis, acanthosis in 100% of cases while spongiosis in 46.1% of cases. Elongation of rete ridges found in 93.3% of cases. Lymphocytic exocytosis and dermal infiltrate were found in 86.6% cases.

In Tinea Hyperkeratosis and acanthosis was present in 100% of cases and lymphocytic infiltration was seen in 92.3% of cases.

In histopathology Munro's microabscess, pustule of Kogoj and suprapapillary thinning favours the diagnosis of Psoriasis which were absent in case of hyperkeratotic eczema and tinea cases. Whereas Spongiosis, lymphocytic exocytosis and dermal infiltrate favours the diagnosis of hyperkeratotic eczema.

Involvement of both the palms were seen in majority of cases (34/100) followed by both the sole (25%), followed by both palm and sole involvement. Bilateral symmetry was seen in 90% of cases.

Similar results were seen in the study by Sandeep et al<sup>10</sup> which showed bilateral symmetry in 91% of cases, but involvement of both palm and sole was seen in majority of cases (60%) in their study followed by only sole involvement in 25% cases.

Palmoplantar psoriasis in our study was bilaterally symmetrical in 97.2% cases whereas eczema was bilaterally symmetrical in 100% cases. This result was concordant with the result of Chopra et al<sup>12</sup> which showed all the cases of psoriasis and eczema to be bilaterally symmetrical.

In psoriasis majority of cases had bilateral palm involvement (16/37), which is discordant with the study by Khandpur et al<sup>16</sup> where both palm and sole involvement was seen in majority cases (48.7%). In the present study unilateral involvement was seen in case of fungal infection (12/13) which was similar to that seen by Chopra et al.<sup>12</sup>

In the present study itching was the predominant symptom in majority of cases (60%) followed by pain, seen in 44.00% of cases. This result was similar with the results of the study by Sandeep et al<sup>10</sup> where itching was the predominant symptom, followed by pain and fissuring (seen in 75% cases). Similarly the study by Murthy et al showed that itching was the most common presenting feature seen (seen in 43/85 patients).<sup>11</sup>

In the present study itching was the most common symptom in patients with fungal infection, seen in 84.61% cases, which is concordant with the study by Chopra et al where 90.47% of patients with fungal infection complained of itching.<sup>12</sup> In cases of eczema itching was seen in 80% of cases which is dissimilar to the study by Chopra et al where 45.45% of cases of eczema complained of itching.<sup>12</sup> Plantar and palmar psoriasis in our study had itching in 18.9% of cases whereas in the study by Khandpur et al 9% of cases complained of itching.<sup>16</sup>

Thus the results of our study was consistent with the results of study by Aggrawal et al where itching was seen in 93.33% of cases of fungal infection, 85.42% of cases of eczema, and 29.73% of cases of psoriasis.<sup>15</sup>

Pain in our study seen in 44% of cases and seen most commonly in cases of plantar and palmar psoriasis (67.56%), followed by callosities where 1 out of 3 cases complained of pain. Both the cases of palmoplantar psoriasis by Khandpur et al 80/154 (51%) of cases complained of pain.

The most common finding of clinical examination in our study was scaling (60%) fissuring in 44% cases, erythema (31%), followed by well-defined margin in 30% of cases. Scaling was seen in all cases of fungal infection whereas it

was the most common finding in psoriasis (78.3%). The other clinical findings of erythema and well defined margin were more common in psoriasis, being 55.55% in each case. Fissuring was most common in case of eczema. Erythema and well defined margin were absent in all cases of fungal infection.

Nail involvement is often seen associated with palmoplantar keratoderma. In the present study nail involvement was seen in 60/100 (60%) of cases. This finding was consistent with the findings by Mahajan et al<sup>13</sup> and Murthy et al.<sup>11</sup> according to Murthy et al nail involvement in 45.88% cases while Mahajan et al showed nail involvement was seen in 52% of cases and majority showed transverse ridging in contrast to our study where longitudinal striations are the most common findings.

The plantar and palmar psoriasis cases in our study where associated with nail changes in 62.16% of cases (26/37), with pitting being the most common finding, followed by nail dystrophy (7/37). This result was concordant with the study by Agarawal et al<sup>15</sup> which showed nail involvement in 40.54% of cases of psoriasis and dissimilar to the studies by Murthy et al<sup>11</sup> and Chopra et al<sup>12</sup> which shows nail changes in palmoplantar psoriasis to be 80.8% and 23.43% respectively. In a study of 154 cases of palmoplantar psoriasis by Khandpur et al<sup>16</sup> found that nail involvement was seen in 64 (41%) cases with coarse pitting being most common finding (30 cases), followed by subungual hyperkeratosis (24 cases), followed by longitudinal ridges (13 cases)

The nail changes in cases of eczema in our study was found to be 60%, with nailfold inflammation being the most common association, seen in 26.6% cases. This result was dissimilar with earlier studies by Agarawal et al<sup>15</sup> and Chopra et al<sup>12</sup> which showed nail involvement in 75% cases and 6.36% cases respectively.

Predominance of keratoderma in middle aged working class males suggests the cumulative insults of constant exposure to trauma, allergen and irritants. Since manual work and trauma predispose to keratoderma, a change of job can be advised where ever possible.

## CONCLUSION

Hyperkeratotic lesions of palm and sole often present with typical clinical features and in cases in which they are absent, skin biopsy and special tests has to be done to aid diagnosis. Thus, a clinicopathological correlation must be the ideal approach of all dermatologists for appropriate diagnosis of cases of palmoplantar keratoderma.

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