

CLINICO EPIDEMIOLOGICAL STUDY OF PITTED KERATOLYSIS

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Abstract

Background: Pitted keratolysis is a common dermatological condition. However, very few studies are available on the clinical characteristics and epidemiological features of this disorder from India and abroad. **Materials and Methods:** Fifty patients from rural area of Kolar at Sri R.L.J.H. and S.N.R. Hospital, presenting with clinically distinctive lesions of pitted keratolysis were included in the study. Cases were interviewed with particular emphasis on triggering factors and findings were recorded. Investigations like Gram's stain, culture studies, Wood's ultraviolet light examination, histopathology etc, was done in selected cases to ascertain the clinical diagnosis. **Results:** Age of the patients varied from 20 to 40 years in 52% with male preponderance in 82% of cases. Duration of the disease varied from 15 days to five years, most of the patients were bare-footed farmers (62% of cases). Hyperhidrosis and pruritus were most frequently observed symptoms in 70% and 60% of patients. Most of the patients presented with the characteristic pits which varied from 1 to 50 in number in 56 % of cases, located predominantly on the pressure bearing areas in 92% of cases and depth of the pits varied from 1 to 2 mm in 60% of cases. Associated skin conditions recorded in present study were fissuring of soles in 38%, psoriasis 10%, dermatophyte infections in 6%, planter warts 6% and Corynebacterial triad and corn in 2% of patients each. **Discussion:** Affection of bare-footed individuals, male preponderance, presence of hyperhidrosis and occurrence of lesions over pressure bearing areas of soles, observed in the present study were consistent with earlier studies on the subject. However, pruritus as commonest presenting symptom reported by 60% patients in the present study, has not been documented in the previous studies. **Conclusion:** Pitted keratolysis is fairly common in bare footed male farmers of rural India. The condition is predominantly seen over the pressure bearing areas of sole and hyperhidrosis is common precipitating factor. Pruritus, a common presenting symptom observed in this study has not been reported earlier.

Key Words: *Corynebacterium species, dermatophilus congolensis, diptheroids, micrococcus sedentarius, pitted keratolysis, topical antibiotic therapy*

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Introduction

Pitted keratolysis is a descriptive title for a common superficial infection of the skin,¹ manifesting as hyperhidrosis, bromhidrosis,² sliminess and malodour. It is clinically characterized by conspicuous, discrete, shallow, circular, punched out small pits or craters, present over soles of the feet. The feet are typically malodorous providing distinctive pungent cue to the correct diagnosis.³

Sites of involvement are pressure-bearing areas such as ventral aspects of the toe, ball of the foot and the heel^{1,2,4} and rarely over the palm.^{1,5,6}

The cause is usually attributed to a member of *Corynebacterium species*,¹ *Micrococcus sedentarius*⁷ and *Dermatophilus congolensis*.^{8,9} All share a common feature,

which enables them to open small tunnels in the stratum corneum.¹⁰

It is more common among bare-footed people living in tropical regions but has also been seen in temperate zones,^{2,11} associated with hyperhidrosis, bromhidrosis, repeated trauma to the soles due to lack of footwear.

It presents no diagnostic difficulties because of its distinctive clinical appearance and odor³ and can be confirmed by biopsy. It may undergo spontaneous remissions or exacerbations and it may last for many years if not treated. In general, the condition is worse in warm weather and when the feet are damp. Effective long term treatment and prevention requires removal of the predisposing conditions that promote bacterial growth.³

There is a paucity of medical literature on clinico-epidemiological aspects of pitted keratolysis from India and abroad.^{12,13}

Materials and Methods

The patients were selected from the outpatient departments of Dermatology of Sri. R. L. Jalappa hospital, Tamaka and

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SNR hospital, Kolar for a period of one year (July 2003-June 2004).

All cases of pitted keratolysis, clinically fulfilling the inclusion criteria were included in the study. Patients were interviewed with particular emphasis on triggering factors and findings recorded in the proforma made for the study. Investigations like Gram's stain, culture studies, Wood's ultraviolet light examination, histopathology etc, carried out in selected cases to ascertain the clinical diagnosis.

Inclusion criteria

Patients of pitted keratolysis with a distinct clinical appearance and odor.

Exclusion criteria

Other conditions producing similar lesions like, tinea pedis, plantar warts, erythrasma, basal cell nevus syndrome, punctate keratoderma, punctate porokeratosis and rarely, arsenic keratosis, tungiasis, yaws and keratolysis exfoliativa by clinical presentation and relevant investigations.

Results

A total number of 50 pitted keratolysis cases were included in this study, which comprised of 41 (82%) male patients and 9 (18%) female patients. The youngest patient was 12 years and the oldest was 70 years old. The maximum number of patients in this study were between 21-30 (32%) years of age, bare-footed farmers / laborers commonly affected (62% of cases). Other occupations observed with pitted keratolysis patients were students (16%), patients with prolonged occlusive footwear (10%) and housewives (6%).

Hyperhidrosis and Pruritus were the most frequently observed symptoms in 70% and 60% of patients, respectively. Sliminess of the skin was a complaint in 54% of patients. Malodour was present in 36% of the patients. Pain and burning sensation were reported by 26% and 8% of the patients, respectively. Involvement of only soles was seen in 94% of cases, the remaining 6% showed involvement of both palms and soles. Majority of the patients had exacerbation of the disease in winter (42%) and summer (30%) respectively. Exacerbation during rainy season, was observed in 20%, however 8% of patients showed no seasonal influence in their progression of disease. Pressure - bearing areas were the commonest site of involvement detected in 46 (92%) cases.

The number of pits varied from 1 to 50 in majority (56%) of patients in this study, followed by 50-100 in (28%) of cases. Most (48%) of cases pits size varied from 0.5 to 1 mm. Pits size of less than 0.5 mm was observed in (26%) of cases and the remaining (26%) had pits size of more than 1 mm. Depth of the pits was 1-2 mm in 60% of cases. Whereas depth was more than 2 mm in 24% and less than 1 mm in 16% of cases in the present study.

Margins of pits were ill-defined in 92%, whereas well-defined margins were detected in 8% of cases. Pits were discrete in 72% and coalesced in 34% of the patients. Hyperhidrosis (78%) and Malodour (48%) were the most commonly associated features observed in this study. Associated hyperkeratosis and tenderness was detected in 36% and 24% of patients respectively, whereas scaling and erythema was seen in 12% and 4% of cases respectively (Table 1).

Culture of organisms was attempted in one case in the present study and the tissue scraping was inoculated into both McConkey media and blood agar. In McConkey's media, no growth was seen. However, in one plate of blood agar heavy growth of small, smooth, nonhemolytic white convex colonies was seen and the smear was suggestive of gram positive cocci in small groups and clusters. Another plate showed heavy growth of flat, nonhemolytic, irregular edged colonies and the smear showed gram positive cocci in tetrads, suggestive of heavy growth of *Staphylococcus aureus* and *Micrococcus* species. Histopathological evaluation was done in three cases the findings include hyperkeratosis, hypergranulosis, with acanthosis. The horny layer showed multiple punched out defects, the base of these pits showed many colonies of cocci. The superficial dermis was normal.

The fissuring of soles was the commonest association detected in 38% of patients, followed by psoriasis observed in 10% of cases. Dermatophyte infection was evident in 6% of patients. Associated plantar warts and corn was observed in 6% and 2% of cases respectively. Pitted keratolysis, erythrasma and trichomycosis (corynebacterial triad) were seen in one patient in the present study.

Table 1: Characteristic of pits

Characteristic of pits	No. of patients	Percentage
Site		
Pressure bearing areas	46	92
Non pressure bearing areas	2	4
Frictional areas	2	4
Number		
1-50	28	56
50-100	14	28
More than 100	8	16
Size		
<0.5	13	26
0.5-1 mm	24	48
> 1 mm	13	26
Depth		
< 1 mm	8	16
1 - 2 mm	30	60
>2 mm	12	24

Discussion

Majority of the patients belonged to the age group of 10-40 years, which corroborates with the findings of Narayani *et al.*¹⁴ The males outnumbered females by a ratio of 4.6:1 in this study, which is consistent with the finding of Takama *et al.*² Barefooted laborers constituted the majority of patients (62%) in our study which is similar to the observation of previous study.¹⁴ Pitted keratolysis was evident in 10% of the patients with history of prolonged usage of occlusive foot wear in the present study. In a study on industrial workers, pitted keratolysis was especially prevalent (1.5% of 4325 patients) in those wearing rubber shoes, probably due to retention of sweat.¹⁵

The duration of pitted keratolysis ranged from 15 days to five years with average being 10.98 months in our study. The duration varied from one day to five years and one months to 10 years in previous studies.^{2,14}

In our study, soles alone were affected in 94% of cases, whereas involvement of both soles and palms was observed in 6% of patients. In this study pressure bearing areas were the commonest sites affected in 92% of cases followed by nonpressure bearing areas (4%) and friction areas (4%). However involvement of pressure bearing areas in 92.5%, frictional areas in 32% and non-pressure bearing areas in (13.2%) of cases has been reported in an earlier study.²

Hyperhidrosis was the commonest symptom reported by 70% of cases in the present study, which is consistent with the findings of Gill and Buckels.¹⁶ However hyperhidrosis was evident in 96.2% of cases in one study and in only 20% of cases in another study.^{2,14}

Mild pruritus was reported in 60% of patients in our study, however, pruritus was observed in only 7.5% of patients in the previous study.² Pruritus has not been documented as a significant symptom of pitted keratolysis in other studies on the subject.¹⁷

Sliminess was seen in 54% of cases in the present study, which is not a wide disparity with earlier observation on the subject. Malodor and Burning of soles was reported in 36% and 8% respectively in the present study. Which is similar to the observation of earlier study.²

Pitted keratolysis has been reported as a painless condition by many previous studies.^{13,16,18,19} However in the present study, 26% of patients complained of pain while walking. Number of pits varied from 1 to 50 in majority (56%) of the patients, followed by 50-100 in 28% of cases. More than 100 pits were seen in 16% of the cases. However the number of pits varying from five to more than hundred has been reported in previous study.¹⁶

In our study, majority of the case that is 48% had pits size varying from 0.5 to 1 mm.

However large pits size varying from 2 mm to 4 mm in one study and the size of more than 7 mm was recorded by another study.^{16,18} Depth of the pits was 1-2 mm in majority (60%) of cases, which is consistent with earlier observation on the subject.¹⁶ Other morphological features of pits observed in the present study, which has not been documented in previous studies on the subject include margin of the pits and whether the pits were discrete or coalesced.

Associated dermatological conditions observed in the present study included psoriasis (10%), dermatophyte infections (6%) and plantar warts (6%), which corroborates the findings of earlier studies.

Corynebacterial triad was observed in one case in the present study. The coexistence of these three Corynebacterial diseases has been documented in the literature.²⁰

Other associated conditions were fissuring of soles in 38% and corn in 2% of the patients, which has not been documented in other studies on the subject.

Conclusion

Pitted keratolysis is fairly common in bare-footed male farmers of rural India. The condition is predominantly seen over the pressure bearing areas of sole and hyperhidrosis is common precipitating factor. Pruritus, a common presenting symptom and involvement of both palms and soles observed in few cases in the present study, has not been reported earlier.

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