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Original Article

Descriptive study on the clinical profile and demography of patients with chronic folliculitis of leg attending a tertiary referral center

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ABSTRACT

Objectives: The objectives are as follows**:** (1) To document the clinical profile and demography of patients attending a tertiary referral institution with chronic folliculitis of leg and (2) to document the bacteriological profile of pustular lesions of chronic folliculitis.

Materials and Methods: After obtaining clearance from institutional research and ethics committees, consecutive patients who attended our tertiary care center with clinically diagnosed chronic folliculitis of the leg from December 1, 2016, to November 30, 2017, were included in this cross-sectional study. The data regarding patient characteristics and clinical profile of disease were collected using a preset pro forma. Pus culture and sensitivity study was carried out in all patients who had pustules at presentation. The association between duration of disease and extent of disease and duration of disease and clinical grading was evaluated by Pearson's Chi-square analysis.

Results: The study population comprised 39 (78%) males and 11 (22%) females with male to female ratio of 3.5:1. Study participants ranged in age from 16 to 67 years. In 15/24 (62.5%) patients who manifested pustules, pus culture isolated pathogenic bacteria, *Staphylococcus aureus,* sensitive to cloxacillin in 14 (58.3%) and methicillin-resistant *S. aureus* in one (4.2%).

Limitations: A study conducted in a tertiary referral center not reflecting the disease profile in the community was the major limitation.

Conclusion: *Staphylococcus aureus* sensitive to common antibiotics like cloxacillin being the most common pathogen isolated from pustular lesions signifies the need for more prospective studies with a large sample size to evaluate the role of environmental factors and individual's immune system in maintaining the inflammation in chronic folliculitis of the leg.

Keywords: Chronic folliculitis, Leg, *Staphylococcus aureus*

INTRODUCTION

Chronic superficial folliculitis is a distinctive type of superficial folliculitis that primarily affects the lower limbs. The disease has been described under various names.[1-6]

It is characterized by recurrent episodes of symmetrical itchy follicular pustules of both legs with cutaneous edema that results in alopecia, atrophy, and scarring.[6] This disease of tropical countries may either resolve spontaneously or may have a prolonged remitting and relapsing

course.[1] Trauma, seasonal variation, application of oil, contact with sea water, wet soil, and cow dung are cited as exacerbating or precipitating factors.[1,6,7]

Chronic folliculitis assumes significance for its recurring nature with no satisfactory treatment options available at present. Moreover, it is not an uncommon condition with 50–60 cases attending the outpatient clinic of our tertiary referral center annually. The current study aimed to document the clinical profile and demography of patients attending our institution with chronic folliculitis and to document the bacteriological profile of pustular lesions.

MATERIALS AND METHODS

All patients who attended the outpatient clinic of our tertiary referral center from December 2016 to November 2017 with the presence of symmetrical pruritic follicular pustules of legs or those who presented with a history of symmetrical pruritic follicular pustules of legs that progressed to loss of affected hairs were included in this cross-sectional study.

Patients who developed permanent hair loss of legs without preceding follicular pustules and patients who developed follicular pustules and permanent loss of hair of other body sites without leg involvement were excluded from the study.

Clearance was obtained from the Institutional Ethics Committee. Written informed consent was received from individual patient.

Using preset proforma details of patient characteristics, duration of illness, precipitating factors, and associated systemic features were collected.

Body sites affected and types of skin lesions observed were carefully noted. Patients were clinically graded by the modified grading system of Sugathan *et al.* proposed by Kaimal *et al.*[8]

- Grade 1: Predominant lesions are follicular pustules with or without surrounding erythema. Erythematous papules may be seen. No alopecia or atrophy
- Grade 2: Predominant lesions are follicular pustules. Papules may be seen in lesser numbers. Alopecia and wiry roughness detected to some degree, atrophy may be present
- Grade 3: Predominant lesions are papules, with a few scattered pustules at periphery — marked alopecia and atrophy
- Grade 4: No pustules with a few papules at the periphery and with complete alopecia and marked atrophy.

Complete hemogram, erythrocyte sedimentation rate, random blood sugar estimation, liver, and renal function tests and serology for human immunodeficiency virus (HIV) infection were performed in all. Specimen for pus culture (carried out on blood agar) was collected using a sterile swab from patients with a pustular lesion after cleaning the area with normal saline and rupturing the pustule using a sterile needle.

Data were entered into Microsoft Excel and analyzed with SPSS version 18. The association between duration of disease and extent of disease and duration of disease and clinical grading was evaluated by Pearson's Chi-square analysis.

RESULTS

The study population comprised 39 (78%) males and 11 (22%) females with male to female ratio of 3.5:1. The study participants ranged in age from 16 to 67 years (Mean age 38.2 years, standard deviation of 12.9).

Maximum number of patients were in the age group of 31–45 years (22 [44%]), followed by 16–30 (13 [26%]), 46–60 (11 [22%]), and more than 60 years (4 [8%]).

The majority of males were manual laborers (22/39 [56.4%]) with 15 farmers (38.5%) and seven (17.9%) construction workers. Eight of the total 11 females were housewives (8/11 [72.7%]). Others included drivers (6 [12% of total]), clerical workers (3 [6% of total]), students (4 [8% of total]), salesmen (2 [4% of total]), engineer (1 [2% of total]), and fisherman (1 [2% of total]).

All manual laborers gave a history of contact with soil and dust and experienced exacerbation during work and relief while on leave.

Duration of illness at the time of recruitment to the study varied from 6 months to 25 years in the study group (mean – 5.8 years, standard deviation – 4.9 years).

Most of the affected (21 [42%]) had disease duration of 1–5 years [Table 1].

The disease started as pruritic papules in 8 (16%), papules and follicular pustules simultaneously in 38 (76%), and as follicular pustules alone in 4 (8%). The leg was the initial site of involvement in all patients. In 38 (76%) cases, the disease started on one leg and then extended to the other within 2–24 months. Twelve (24%) patients had simultaneous involvement of both legs.

Pruritus was the universal symptom recorded. During exacerbations in initial stages, 12 patients (24%) had pain,

Table 1: Duration of chronic folliculitis in study participants.

Duration of disease	Number of patients
<1 year	4
1–5 years	21
6–10 years	14
11–15 years	7
>15 years	4
Total	50

three (6%) had low-grade fever, and one (2%) had bilateral, painful inguinal lymphadenopathy.

The majority of patients (30 [60%]) could not identify any precipitating factors. Precipitating factors recorded were climatic changes and exposure to dust and cement [Table 2].

Six patients each (12% each) used to apply oil over the body before or after the bath. Eleven patients used coconut oil and one gingelly oil. Six of the 12 used to apply oil over trunk and limbs and six over limbs alone. In all, the lesions were limited to lower limbs.

Among the seven patients who used scrubs for bathing, five used conventional coconut husk scrubs and others plastic scrubs. Although the entire body was scrubbed using these, lesions were confined to lower limbs in all.

All patients used a bathing bar of various brands and reported no exacerbation with a change of brands.

Eighteen (36%) patients were smokers and 8 (16%) gave a history of occasional alcohol intake. Exacerbation of disease had no association with smoking or alcohol intake. No other substance abuse was documented in the study group.

Forty-four (88%) patients had no other skin diseases whereas three each (6%) had psoriasis and contact dermatitis, respectively.

Among the three patients who also suffered from psoriasis vulgaris, the onset of folliculitis succeeded the subsidence of psoriasis in two and preceded psoriasis by 4 years in the third.

Three patients had coexisting contact dermatitis. They attributed allergy to black rubber footwear, laundry detergent powder, and cement, respectively, which were not proven by patch testing.

Table 2: Factors precipitating chronic folliculitis among study participants.

Precipitating factors	Number of patients	Percentage
No precipitating factors	30	60.00
Summer	8	16.00
Winter	2	4.00
Exposure to dust	7	14.00
Exposure to cement	5	10.00

None of the patients had a history of similar illness in any of the family members.

Anterior and lateral aspects of legs were the predominantly involved sites in 41 (82%) patients [Figure 1a-c]. Two (4%) had involvement of posterior aspect alone. Entire leg was affected in the remaining seven patients (14%).

Other sites involved were thighs (16 [32%]), forearm (6 [12%]), chest [Figure 2], beard area, pubic region, and dorsum of foot (1 each [2% each]).

In all 16 (32%) patients with thigh involvement, lesions spared the posterior aspect. None of those with thigh lesions had it in contiguity with leg lesions, and an area of normal skin was well evident in all, between the involved areas of thighs and legs.

The interval between the onset of leg and thigh involvement ranged from 6 months to 3 years.

The single patient who had lesions over the dorsum of foot had terminal hairs at the site.

Involvement of body sites other than legs was observed in none of those with disease duration <1 year [Table 3], while involvement of areas other than legs was a universal finding when duration of disease exceeded 15 years. A statistically significant relationship between involvement of body sites other than legs and duration of disease was noted ($P = 0.008$).

All patients had well-defined plaques with follicular pustules and/or papules. Eleven patients (22%) had scattered pustules in the surrounding skin.

Majority of patients manifested Grade 2 disease (23 [46%]) [Figure 1a] followed by Grade 3 (20 [40%]) [Figure 1b] and Grade 4 (7 [14%]) [Figure 1c] types. None of them manifested Grade 1 clinical type.

As disease duration increased, clinical grading of lesions also increased which was statistically significant [$P < 0.001$, Table 4].

Complete hemogram, random blood sugar, and renal and liver function tests were within normal limits in all study participants. Screening for HIV infection was negative in all.

Figure 1: (a) Papules and pustules in Grade 2 chronic folliculitis of leg. (b) Alopecia and follicular papules in Grade 3 chronic folliculitis of leg. (c) Marked atrophy and a few papules in Grade 4 chronic folliculitis of leg.

Pus culture and sensitivity study was limited to those with pustules and was done in 24 patients (48%). 14/24 (58.3%) yielded *Staphylococcus aureus* and normal skin flora was isolated from the rest (9/24 [37.5%]). Pus culture in one patient (4.2%) isolated methicillin-resistant *S. aureus* (MRSA).

All *S. aureus* isolates were sensitive to cloxacillin, cefazolin, vancomycin, and linezolid. 11/14 (78.6%) were sensitive to cotrimoxazole, 7/14 (50%) to erythromycin, 10/14 (71.4%) to amikacin, and five (35.7%) to gentamicin. All strains were resistant to penicillin.

The lone MRSA isolate was sensitive to vancomycin and linezolid.

Figure 2: Grade 3 chronic folliculitis involving chest showing papules and marked alopecia.

DISCUSSION

The male to female ratio of 3.5:1, observed by us, was comparable to one recent study.[9] Many studies have recorded greater predilection for male sex while Harman documented equal sex distribution.[1,6,10,11]

The common age of onset of disease in the current study (31–45 years) was slightly higher than the observations of previous authors who recorded 16–30 years as the age of disease onset in majority.[1,6,9]

Our finding of manual labor being the occupation of the majority with most of them being engaged in agricultural work was consistent with the findings of Prasad *et al.*[10] They suggested minor trauma and frequent exposure to allergens to play a precipitating role.[10]

Only one of the patients being fishermen by profession was contradictory to the previous observation of fishermen being at higher risk for the disease and the suggestion that frequent contact with seawater increases the risk for chronic folliculitis.[12]

Pruritus identified as the universal symptom in this study was discordant to certain other studies that documented variable pruritus in patients.[1,13] Some patients complaining of pain over lesions during exacerbations of illness were as reported earlier.[10]

Systemic features were conspicuous by their absence in the study which was concordant to literature, though higher frequency of regional lymphadenopathy was reported in some studies (17–20% in contrast to the 2% in the current study).[1,9]

Table 3: Relationship between duration of illness and involvement of other body areas.

Duration in years*	Body areas affected in the study group					
	Legs alone (%)	Other body areas affected (%)				
		Thighs	Forearm	beard	Pubic region	Foot
<1 (4)	4 (100)	0	0	0	0	0
1–5 (21)	17 (81)	4 (19)	1 (4.7)	1 (4.7)	0	0
6–10 (14)	11 (78.6)	3 (21.4)	1 (7.1)	0	0	1 (7.1)
11–15 (7)	1 (14.3)	5 (71.4)	3 (42.9)	0	1 (14.3)	0
>15 (4)	0	4 (100)	1 (25)	0	0	0
Total	33 (66)	16 (32)	6 (12)	1 (2)	1 (2)	1 (2)

*Number in bracket shows the total number of patients in each category

Table 4: Relationship between duration of illness and grade of lesion.

Duration in years	Grade 1	Grade 2	Grade 3 (%)	Grade 4 (%)	Total (%)
<1	0	4 (100)	0	0	4 (100)
1–5	0	15 (71.4)	5 (23.8)	1 (4.8)	21 (100)
6–10	0	2 (14.3)	12 (85.7)	0	14 (100)
>11	0	2 (18.2)	3 (27.3)	6 (54.5)	11 (100)
Total	0	23	20	7	50

Our observation of leg being the initial site of involvement in all patients was in agreement with the previous studies.[1,6,14] Average duration of involvement of other leg varying from 2 months to 2 years as noted by us was as reported earlier.[1]

Our finding of disease duration ranging from 6 months to 25 years was concordant to certain previous studies.[1,14] However, Tiwari *et al*. documented shorter disease duration ranging from 8 weeks to 2 years in a study of 15 patients.[11]

Seasonal exacerbation, especially during summer as observed by us, was previously documented.[1,8,15] Exposure to cement as exacerbating factor as observed by us was not documented in the previous studies,[1,6,14] whether aggrevation following exposure to cement is only an exaggerated response of diseased skin to potential allergen needs further analysis.[1,10,16]

Oil application was documented as aggravating factor in one previous study, but later Sugathan *et al*. refuted the same, citing that even when coconut oil was applied all over the body, the disease process was limited to legs which were consistent with later studies including ours.[1,6,16]

Similarly, preferential involvement of lower limbs in those who used scrubs all over the body was against a primary role for a scrub bath in disease causation.

Our observation of a lack of association between chronic folliculitis and consumption of alcohol was contrary to the previous studies.[1,8,16]

One previous study documented vitiligo (2%), Hansen's disease (4%), and psoriasis (2%) as coexisting diseases in chronic folliculitis.[2,6,10] To determine whether psoriasis and contact dermatitis as observed by us have any common pathological mechanism with chronic folliculitis or their association was mere coincidence, further studies incorporating histopathology analysis and patch testing are required. Allergic contact dermatitis to topical antibacterial agents has been postulated as perpetuating factor for folliculitis.[16]

A family history of chronic folliculitis was not noted in any of the affected while the previous studies give conflicting reports on this.[1,9,11] Our observation of the anterior and lateral aspect of the leg being the most common site of folliculitis was comparable to literature.[1,6,14] Two (4%) patients manifesting lesions limited to posterior aspect of leg as noted by us, was contradictory to the finding of Tiwari *et al.* who reported sparing of upper and posterior aspect of leg in chronic folliculitis.[11]

The involvement of axilla and face were not seen in the current study contrary to certain studies.[1,14] None of the studies including ours observed involvement of body areas bearing only vellus hairs.[1,6,7,14]

Our observation of disease process leaving skip areas between affected regions of leg and thighs is suggestive of the disease having more complex pathogenesis than an infective process.

All patients manifesting well-defined plaque as noted by us was consistent with previous reports, though lesions lacking well-defined borders were also reported.[1,6] None of the current study participants manifested milia-like pustules or scaling as described by some.[4,5,10,11,14]

Absence of Grade 1 lesions in the study group, when considered along with the statistical significance observed between the grade of lesions and duration of illness could be attributed to the fact that most of the cases seen in a tertiary referral center are those which are referred to from peripheral centers. Hence, there will be a considerable time delay between the onset of illness and presentation at a referral center. This was further supported by the finding of a minimum disease duration of 6 months noted in the study group.

Leukocytosis and anemia documented in some patients in different studies were not observed in any of our patients.[1,14]

Normal blood sugar and renal and liver function tests and HIV-negative status observed in all patients by us were comparable to existing literature.[1,5,7,14]

The pattern described in this study of *S. aureus* being isolated in 50% of those with pustular lesions was concordant to the previous studies.[6,8,11,14-16]

Staphylococci showing penicillin resistance as noted by us was consistent with the literature [Table 5].[1,6]

Table 5: Comparison of pus culture and sensitivity in different studies with the present study.

Study	Organism (%)	Penicillin	Ampicillin	Erythromycin	Cotrimoxazole	Amikacin
Harman	*S. aureus* (71.43)	50% resistant	_	_	_	_
Tiwari *et al.*	*S. aureus* (100)	86.67% resistant	Sensitive	Sensitive	Sensitive	Sensitive
Parikh *et al.*	*S. aureus* (100)	100% resistant	_	Sensitive	Sensitive	_
Kaimal *et al.*	*S. aureus* (87.18) MRSA (5.4) *E. coli* (2.7)	84.61% resistant	_	Sensitive (66.67%)	_	Sensitive (2.56%)
Pasha and Gunda	*S. aureus* (98)	68% resistant	Sensitive (2.04%)	Sensitive (2.04%)	Sensitive	Sensitive
Present study	*S. aureus* (58.33) MRSA (4.17)	100% resistance	_	Sensitive (50%)	Sensitive (78.57%)	Sensitive (71.42%)

MRSA: Methicillin-resistant *S. aureus*, *S. aureus*: *Staphylococcus aureus*

Pseudomonas and *Klebsiella*, the other pathogens isolated in previous studies, were not reported in the current study.[10]

Although resistant to penicillin, 50% of those manifesting pustular lesions in the study had an infection with a common pathogen that was sensitive to commonly prescribed antibiotics. This indicates the need to evaluate the immunological aspects that result in chronicity and recalcitrance associated with chronic folliculitis.

Limitations

A study conducted in a tertiary referral center not reflecting the disease profile in the community was the major limitation.

CONCLUSION

Staphylococcus aureus sensitive to common antibiotics like cloxacillin being the most common pathogen isolated from pustular lesions signifies the need for more prospective studies with a large sample size to evaluate the role of environmental factors and individual's immune system in maintaining the inflammation.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

Dr. Sarita Sasidharanpillai and Dr. Kidangazhiathmana Ajithkumar are on the editorial board of the Journal.

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