

Original Research Article

Clinico-etiological profile and antibiotic sensitivity pattern of chronic folliculitis: a common but less focussed disease of tropics

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ABSTRACT

Background: Chronic folliculitis (CF), a common disease of the tropics caused by *Staphylococcus aureus* (SA) is a less focussed therapeutic area.

Methods: We estimated the prevalence of CF, clinical types, seasonal variation through this prospective observational study and carried out routine laboratory investigations, gram stain, KOH mounting, Tzanck smear, and culture and sensitivity (C&S).

Results: Of 50 patients (prevalence 1.2%), 44 were men. Mean age was 36.5 years (range 18-55 years). Patients were from lower socioeconomic class (7%), comprised of unskilled (82%) workers, and presented with pustules (6%) and pruritis (18%). Dermatitis cruris pustulosa et atrophicans (78%) and folliculitis barbaetraumatica (6%), lesions on the lower limbs (74%), and beard area in men (18%), human immunodeficiency virus infection (8%) and diabetes mellitus (4%) were common observations. Shorter duration (6-8 months) was reported in more number of women (4/6,) while men (35/44) had a long-standing disease (8 months-2 years). Six had a duration of >2 years. Summer aggravated the symptoms (90%). Contact with soil, cow dung, intake of animal protein, excess alcohol, excessive sweating were the precipitating factors. Culture positive coagulase negative *Staphylococci* (98.0%) was the most common isolate. Organisms were sensitive to ceftriaxone (9%), cephalothin (7%) and resistant to penicillins (68%); there was no resistance against gatifloxacin, imipenam, vancomycin, and teicoplanin. Twenty seven patients had a complete cure.

Conclusions: CF is a recurrent condition with seasonal variation, predominantly involves legs, and affects adult labourers. Avoiding aggravating factors (trauma) is helpful in achieving the treatment goal and minimising recurrence. Prescription of Antibiotics should be considered after testing for C&S.

Keywords: Bacterial culture and sensitivity, Chronic folliculitis, Dermatitis cruris pustulosa et atrophicans, *Staphylococcus aureus*

INTRODUCTION

Chronic folliculitis (CF) is a superficial bacterial infection of hair follicles, is caused by gram positive and gram negative organisms and consistently shown to be due to *Staphylococcus aureus*.¹ It is considered as the disease of tropical countries and exact prevalence rates are unavailable for this extremely common condition; the

prevalence is reported to be 0.4-4.8% in Nigeria, 2.9% in Sri Lanka and Jayck reported a higher incidence (4.8%).²⁻⁷

Chronic folliculitis of legs (CFL) is a chronic and recurrent clinical problem. Overcrowding, malnutrition, unhygienic conditions and occupation like farming are predisposing factors, thus explaining that they are more

prone for minor injuries and abrasions of the skin, paving the way to the entry of the microorganisms.

Dermatitis cruris pustulosa et atrophicans (DCPA), a common condition of tropics, has unique distinguishing features (chronicity, seasonal variation, male preference, extremities, recurrence in crops, difficult to treat, resulting in atrophy and hair loss).^{4,8} Treating DCPA is a challenge due to treatment resistance and need of long follow-up.

It still remains a common dermatological entity in India, despite measures to improve hygiene. There is a paucity of Nation-wide data from India; a recent study (2009) reported the prevalence of CF from south Indian city Chennai as high as 3-4%.⁹ This condition was ignored for being a common clinical entity as indicated by the limited available data. With newer antibiotics, the prevalence and disease complications are expected to reduce, but the emergence of treatment resistant strain of bacteria has proved otherwise.

It primarily affects lower legs, preferentially young men of age group between 15-30 years of developing and underdeveloped countries especially in young Asian men.¹⁰ It has chronic course due to difficulty in achieving a long-lasting cure, which is frustrating for both physician and the patient.

Data on the bacteriology of pyodermas from several other regions are available but limited, and none is available from our region. Our study attempted to find out the existence of any differences in the causative agent for pyodermas and their susceptibility to anti-microbials.

METHODS

This observational prospective study on clinically diagnosed cases of CF affecting beard area, upper limbs, and lower limbs, was conducted by the outpatient department of Dermatology Venerology and Leprology of a tertiary care hospital (SVS Hospital, Mahabubnagar, Telangana state), India between December 2009 to October 2011. This study was reviewed by the Institutional Ethics Committee and patients were screened only after obtaining a written informed consent. Prevalence of chronic bacterial folliculitis, various clinical types and their seasonal variation, identification of the causative organism by culture and understanding their antibiotic sensitivity pattern were our study objectives.

We included patients with chronic folliculitis of ≥ 6 months, pus smear with pus cells and neutrophils, willing to take part and follow study procedures including pus culture and sensitivity. Those with acute folliculitis ≤ 6 months, on >20 mg/day of oral prednisolone and whose smear showed fungal elements and giant cells were excluded.

Information including age, sex, and occupation, medical history was taken with particular note to the onset, duration and evolution of symptoms, constitutional and systemic disturbances, pre-existing skin disease, predisposing factors, genetic, seasonal factors and details of topical and systemic medications. A detailed examination was carried out to find out the precise distribution and morphology of the lesions and to detect evidence for any pre-existing skin disorder or any associated dermatoses by the dermatologist.

Routine tests included complete blood picture, complete urine examination, random blood sugar, Blood urea, serum creatinine, and liver function tests. We tested the pus using gram staining for bacterial identification, KOH mounting for fungal elements, Tzanck smear for giant cells. Pus culture and sensitivity was done after stopping all topical and systemic medications for a week. Swab from the affected area was taken using aseptic precautions, culture and sensitivity was carried out using standard techniques (blood agar/MacConkey agar/nutrient agar).

Data captured on study proforma transferred to MS Excel (2007) and analysed using the statistical tools provided in the same. We expressed the results as mean, range percentages and using figures and tables as appropriate.

RESULTS

Of 4180 patients consulted the outpatient department, 50 (1.2%) had CF and were included; 44 (88%) of them were men and six (12%) were women with a ratio of 7.3:1.

Mean age of patients was 36.5 years and range of 18-55 years. Half of the study population were in 21-30 years and thirteen (26%) belonged to 11-20 years (Table 1).

Table 1: Age wise distribution.

Age (in years)	Number
0-10	0
11-20	13
21-30	25
31-40	8
41-50	3
51-60	1

Only four were aged >30 years, and only one was above 50 years, indicating it as the disease of the young active population.

Thirty five (70%) patients were from lower socioeconomic class, 14 (28%) from middle class and only one was from higher socioeconomic class. Our study population included predominantly unskilled (n=41, 82%) and semiskilled (n=4, 8%) workers; others included

students (2%), skilled professional (2%) and one home maker.

Main presenting complaints were pustules (68%) and pruritis (18%). Only men complained of pain (4%). Table 2 lists the symptoms.

Table 2: Clinical features.

Clinical feature	Males	Females	n (%)
Pustules	30	4	34 (68)
Pruritus	7	2	09 (18)
Pain	4	0	04 (8)
Shininess	1	0	01 (2)
Hyperpigmentation	1	0	01 (2)
Scaling	1	0	01 (2)
Total	44	6	100

Dermatitis cruris pustulosa et atrophicans was the most common (n=39, 78%) lesion (Table 3).

Table 3: Clinical diagnosis.

Clinical diagnosis	Male	Female
DCPA	34	5
Pseudofolliculitisbarbae	3	0
Folliculitis barbaetraumatic.	6	0
Disseminated and recurrent infundibulofolliculitis.	1	1

Lesions on the lower limbs were the most common (n=37, 74%, men- 34), followed by the beard area in men (n=9, 18%) and forearms (n=4, 8%, men- 3).

Human immunodeficiency virus (HIV) infection (n=4, 8%) and diabetes mellitus (n=2, 4%) were the common associated illnesses. Of two women who had coexisting illnesses, HIV and systemic lupus erythematosus (on systemic steroids) in one woman each, was reported. Among men, HIV (3%), diabetes mellitus (2%), ichthyosis vulgaris (2%) and hypertension (1%) were the associated illnesses.

Table 4: Multifactorial precipitating factors for chronic folliculitis.

Precipitation factors	Number	%
Soil, cow dung, animal protein, topical antibiotics.	3	6
Soil, cow dung, animal protein, alcohol.	4	8
Animal protein, alcohol, topical antibiotics.	3	6
Soil, cow dung, alcohol, topical antibiotics.	1	2
Soil, cow dung, alcohol.	1	2
Soil, cow dung, alcohol, topical antibiotics, Irritants.	1	2
Soil, cow dung, animal protein, alcohol, irritants.	5	10
Alcohol, animal protein, topical antibiotics, irritants.	1	2
Soil, cow dung, animal protein, alcohol, pumice stone.	1	2
Topical vegetable oil, alcohol, animal protein, irritants, ictyosis.	1	2
Topical vegetable oil, alcohol, animal protein, wax.	1	2
Topical vegetable oil, animal protein, wax.	1	2
Soil, cow dung, animal protein, alcohol, pumice stone, irritants.	1	2
Alcohol, topical vegetable oil, sweating, animal protein, irritants.	1	2
Vegetable oil, sweating, alcohol, topical antibiotics.	2	4
Soil, cow dung, sweating alcohol, pumice stone, irritants.	1	2
Soil, cow dung, vegetable oil, alcohol, sweating, irritants.	1	2
Soil, cow dung, wax.	1	2
Soil, cow dung, vegetable oil, animal protein, sweating, alcohol, irritants.	1	2
Soil, cow dung, vegetable oil, sweating.	5	10
Soil, cow dung, sweating, animal protein, irritants.	1	2
Soil, cow dung, wax, pumice stone.	1	2
Soil, cow dung, sweating, alcohol, irritants.	1	2
Soil, cow dung, sweating, animal protein, ictyosis	1	2
Soil, cow dung, sweating, animal protein, alcohol, irritants, fish	1	2
Soil, cow dung, animal protein, topical antibiotics.	1	2
Soil, cow dung, sweating, alcohol	1	2
Soil, cow dung, animal protein, irritants.	3	6
Soil, cow dung, sweating irritants.	1	2
Soil, cow dung, sweating, animal protein, alcohol.	1	2
Soil, cow dung, animal protein.	1	2
Soil, cow dung, vegetable oil, wax.	1	2

A shorter duration of disease, 6-8 months was noted in more number of women (4/6, 66.66%; men- 3). Men had longstanding disease ranging from 8 months-2 years (35/44, 79.55%; women- 2); 14 (31.82%) men had disease duration of 8 months-1 year, 21 (47.73%) had 1-2 year duration compared to one woman each in both groups. Six (13.64%) patients had a duration of >2 years.

Summer (n=45, 90%) aggravated the symptoms in both men (n=41, 93.18%) and women (n=4, 66.66%). Only five patients (10%) related the aggravation of symptoms to autumn.

Contact with soil, cow dung, intake of animal protein, excess of alcohol, excessive sweating were the precipitating factors. Table 4 lists the precipitating factors.

Of 50 patients, 49 (98%) were culture positive for coagulase negative *Staphylococci* while one had *Acinetobacter*.

Table 5: Sensitivity and drug resistance pattern shown by organisms.

Antibiotic	Sensitive	Resistant
Sparfloxacin	4	1
Levofloxacin	3	1
Ciprofloxacin	2	2
Gatifloxacin	2	-
Ceftriaxone	9	1
Cefuroxime	6	1
Ceftazidime	4	2
Cephalothin	7	1
Ampicillin	1	23
Amoxyclav	1	11
Imipenem	3	-
Vancomycin	2	-
Clindamycin	2	2
Erythromycin	1	2
Amikacin	1	3
Teicoplanin	2	-
Total	50	50

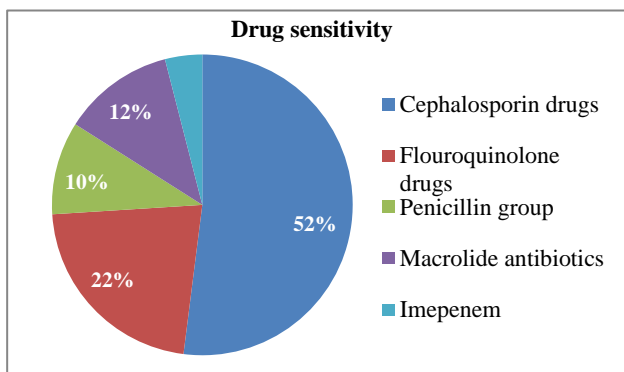


Figure 1: Antibiotic sensitivity of pus samples.

All pus samples were tested for drug sensitivity and were highly sensitive towards cephalosporin group of drugs (Figure 1). Organisms were sensitive to ceftriaxone (9%), cephalothin (7%) and cefuroxime (6%). Highest resistance was noted for penicillins (68%) followed by macrolides (14%), cephalosporins (10%), and flouroquinolones (8%); no resistance was noted towards gatifloxacin, imipenam, vancomycin and teicoplanin (Table 5).

Therapeutic outcome

Patients were treated for 2-4 weeks with the respective antibiotic (oral and topical) to which they were sensitive, and followed up for 3-6 months. Twenty seven had a complete cure while remaining had a recurrence.

Of those who were sensitive to flouroquinolones group of antibiotics (n=11), five patients (45.45%) had a complete cure for and six (54.54%) had a recurrence.

Of those who were sensitive to cephalosporin group of antibiotics (n=26), 18 (69.23%) were completely cured and eight (30.76%) had a recurrence.

Of those who were sensitive to penicillin group of antibiotics (n=5), a complete cure was reported in two patients (40%) and a recurrence in 3 (60%).

Of those who were sensitive to macrolide group of antibiotics (n=6), one (16.66%) patient was completely cured and recurred in five (83.34%); of those who were sensitive to teicoplanin antibiotic (n=2), complete cure and recurrence was reported in one patient each. Table 6 lists the response of patients to various antibiotics.

Table 6: Response to various medications.

Antibiotic	n	Complete cure	Recurrence
Sparfloxacin	4	3	1
Levofloxacin	3	1	2
Ciprofloxacin	2	1	1
Gatifloxacin	2	0	2
Ceftriaxone	9	6	3
Cefuroxime	6	4	2
Ceftazidime	4	3	1
Cephalothin	7	5	2
Ampicillin	1	0	1
Amoxyclav	1	0	1
Imipenem	3	2	1
Vancomycin	2	1	1
Clindamycin	2	0	2
Erythromycin	1	0	1
Amikacin	1	0	1
Teicoplanin	2	1	1
Total	50	27	23

DISCUSSION

Challenge in CF is treating the unresponsive and difficult to treat cases. Current focus of treatment is administration of antibiotics (systemic and topical) and avoidance of the precipitating factors. With emerging resistance to the most of available antibiotics, the search is on newer modalities of treatment; use of monochromatic excimer light (308 nm), bacterial polycomponent vaccine have shown encouraging results.^{8,11,12} These can be used as an adjuvant to the basic therapy in difficult to treat cases and the latter in correction of immunogenic parameters.

Chronic folliculitis is a disease of young adults, with male preponderance.^{10,13-16} Our report is in supportive of this with 88% male preponderance and being more frequent in 21-30 years (50%) age group; we noticed increased prevalence among the lower socioeconomic group (70%), unskilled workers (82%), actively involved in farming. Agriculturists who were active in farming were often affected as evident from previous studies and are considered due to unnoticed injuries causing a breach in the skin, contact with mud, chemicals and fertilizers.^{9,15,16}

Our report suggests that even after 3-5 decades, it has not changed. In the Nigerian study, none were aged >30 years but Indian studies have reported its development even in those older than 30 yrs (30%).¹⁰ In our study 24% patients were aged >30 yrs. These suggest an existence of variation among age distribution among Africans and Asians.

Dermatitis cruris pustulosa et atrophicans was the common condition (78%) in our study, followed by folliculitis barbae traumatica (12%), which is comparable with the studies by Desai et al (13%).¹⁴ We report pseudofolliculitis barbae (6%), disseminated and recurrent infundibulo-folliculitis (4%) as the next common clinical type of folliculitis in our study. Harman observed pseudofolliculitis barbae in 9% of study population.⁴

Pruritis is the main symptom as reported by the earlier studies bilaterally symmetrical lesions are the common presentations.^{9,10,13,16-18}

Our patients complained of pustules (68%) and pruritis (18%); surprisingly, only men complained of pain, not women. Pustules (84%), papules (78.7%) and alopecia (64%) apart from scaling, crusting, excoriation and atrophy were the common lesions reported by Kunjukunju et al.¹⁹ Lower legs, thighs and forearm are the common affected sites.¹⁶ We too noticed similar distribution with lower limbs being most affected (74.0%), followed by the beard area in men (9, 18%). HIV infection (4, 8.0%) and diabetes mellitus (2, 4.0%) were the common associated illnesses in our patients.

Chronicity is one of the characteristic features of this clinical condition. Kunjukunju et al report that 48% had the disease for 1-5 years and few patients had it for >10 years.¹⁹ We noted a shorter duration of disease in women. This could be due to women tending to notice skin conditions earlier due to cosmetic effect. We noted a longer duration of 1-2 years and >2 years in 22 (44%, one female) and six (12%) patients, respectively.

A relationship between CF and seasons is well documented; few report aggravation of *S. aureus* infection in summer while few in autumn and few during both.^{9,10,16,20-24} we observed exacerbation of lesion in summer. We report contact with soil, cow dung, intake of animal protein, excess of alcohol, excessive sweating as the precipitating factors, in line with earlier reports. Contrary to the general belief, studies have proved that oil application aggravates the condition.^{18,19}

Coagulase positive staphylococci are the main causative agents for chronic folliculitis.^{10,14,15,17,18,25} Presence of *Staphylococci* with plenty of pus cells (80%) on gram stain was the common observation.²⁶ presence of Phage group III was reported by Rama et al.¹⁶ In contrary, we report coagulase negative *Staphylococci* (98%) and our observations are similar to that of Tiwari et al (100%), Parikh et al (100%), Harman (85%).^{4,17,18} Kaimal et al observed that 56.75% were carriers of *S. aureus* indicating the significance of carrier state.²¹ *Acinetobacter* (2%) was isolated from pus culture from our patients, which is not documented in the literature.

Isolated organisms in our study were highly sensitive to cephalosporin group of drugs. Resistance was highest for penicillins (68%) and no resistance was shown towards gatifloxacin, imipenam, vancomycin and teicoplanin in our study. Resistance to penicillins were reported by Harman et al (75%) and Tiwari et al (87%).^{4,18}

Positive treatment response to ciprofloxacin was reported by Balachandran et al (91.30%), but there was no significant difference in the time taken for remission compared to placebo (Cipro Vs. placebo, 44.5 vs 40 days).¹⁵ Treatment options have evolved from Puvosal and cotrimoxazole to fluoroquinolones.²⁵ Prasad reported minocycline as a safe and effective drug in CFL.²⁷ In our study, complete cure (54.0%) was achieved using appropriate antibiotics determined by the culture sensitivity, with 69.23% of those who received cephalosporins completely cured; recurrence was higher among those who were treated with fluoroquinolones (54.54%) than with cephalosporins (30.76%).

Observations of our study are similar to that of earlier studies in terms of demography, site of lesion, causative organism and treatment outcome.^{5,16,19}

Follicular disease is known by various names is a common dermatological condition caused by *S. aureus* and *Streptococcus pyogenus*.^{4,8,10,14,16,19} Folliculitis of

face and beard area are common among men, must be distinguished from pseudofolliculitis and acne. With *S. aureus* as a well-established causative agent, treatment focuses on the effective antibacterial agents against this and to a lesser extent on *Streptococci*.^{28,29} Emergence of bacterial resistance against the available antibiotics is an important factor in deciding the antibiotic for treatment.

Infectious lesions need to be identified, differentiated and investigated to distinguish from the non-infectious aetiology. In difficult cases, histopathology is helpful, with few authors supporting cytology as the first to consider in the battery of investigations.^{30,31} Lesions on the face has to be differentiated from eosinophilic pustular folliculitis, common among East Asians and needs to further check the underlying immunological etiology.³²

Diabetes, immunodeficiency due to HIV, organ transplantation, or cancer, an underlying skin condition such as eczema, acne, chronic staph infection or another dermatitis, obesity, frequent shaving, are the risk factors to be evaluated.^{7,10,14,33} Traumatic folliculitis due to use of home epilating device has been reported and is a cause to be considered in evaluation.¹³ Dermatological manifestations are seen in certain malignancies, though rare, suggests underlying malignancy has to be suspected and investigated.^{34,35} Patrizi et al report Non-infectious folliculitis (eosinophilic folliculitis) as a manifestation of underlying leukemia and Rosenthal report it's association with HIV infection.^{36,37} Use of epidermal growth factor receptor inhibitors for various malignancies can result in folliculitis.^{38,39} There is a report that folliculitis can be a manifestation of chronic Steven-Johnson syndrome.⁴⁰

Rough scrubbing, ichthyosis and occupational exposure are considered contributing factors, hence, should be avoided. Patient counseling to adhere to treatment, avoiding precipitating factors is necessary for achieving complete cure and minimising recurrence.

CONCLUSION

Chronic bacterial folliculitis is a recurrent, perennial condition with seasonal variation, predominantly involving legs, affecting mostly the adult labourers belonging to lower socioeconomic class. Avoiding aggravating factors (trauma), application of vegetable oil and irritants will aid achieving the treatment goal and minimise recurrence. We recommend administering antibiotics after isolation of the causative organism and testing for antibacterial sensitivity to achieve complete clearance.

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