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Original Research Article

Clinicomorphological patterns in an outbreak of paederus dermatitis in patients attending rural tertiary care hospital

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ABSTRACT

Background: Paederus dermatitis (PD) is an acute irritant contact dermatitis caused by beetles belonging to the genus '*Paederus'*. The study aims to describe the clinical and morphological patterns and epidemiology of PD.
Methods: A descriptive study was done on 80 patients with PD attending DVL OPD in a tertiary care hospital for 6 months i.e.; from March to August 2023. A detailed clinical history was taken and local and systemic examinations were done.
Results: The mean age of the patients was 24.8 years. The percentage of females affected was 61.25% and males was 38.75%. Peak cases were noted during May (32.5%) followed by August (17.5%). Out of 80 patients, 61 had erythematous plaques (76.25%) along with other types of lesions (mixed lesions), 8 had post-inflammatory hyperpigmentation (10%), 5 had bullae (6.25%), 6 had erosions alone (7.5%). Out of 61 patients with erythematous plaques, 16 had vesicles and 15 had pustules. Common sites involved were face and neck (42.5%), trunk (35%), and upper extremity (30%), 51.2% of patients were sleeping with windows open, 73.7 % of patients complained of itching, 80% of patients were residing in areas with nearby vegetations. 60% of the patients affected were students residing at college hostels in rural areas with surrounding vegetation.
Conclusions: PD can present in various forms and should be promptly differentiated from other conditions. Proper education of the general population and awareness about the paederus beetles should be given.

Keywords: PD, Rove beetles, Irritant contact dermatitis

INTRODUCTION

Paederus dermatitis (PD) also known as dermatitis linearis or blister beetle dermatitis, is an irritant contact dermatitis caused by the vesicant pederin found in the coelomic fluids of beetles. The condition is characterized by erythematous plaques with vesicles, bullae, or crusts, and it occurs when the skin comes into contact with the vesicant through accidental brushing or crushing of the beetle, not by bite or sting.[1]

These beetles belong to the order *Coleoptera*, family *Staphylinidae* (rove beetles), *Oedeneridae*, *Meloidae* (blister beetles) and genus *Paederus*. *Staphylinidae* contain pederin toxin (amide) whereas other families contain cantharidin toxin (bicyclic terpenoid). The toxin is not manufactured by the beetle themselves but by the endosymbiont bacteria, probably *Pseudomonas*.[2]

These insects exhibit phototaxis to fluorescent light, preferably to long-wavelength white light. They live in moist habitats.[3] They are 7-10 nm long and 0.5 to 1 mm wide. The thorax and abdomen of the insect are dark orange in colour while the head, front wings (elytra) and the tip of their abdomen are coloured black (Figure 1). When viewed under higher magnification, the front wings have blue/ green iridescence.

PD has many different local names including whiplash dermatitis, spider lick dermatitis and Nairobi fly dermatitis. In East Africa, Conjunctivitis due to contact of pederin to the eye was described as Nairobi eye.[4,5] Pederin on the skin from initial beetle contact can spread to other areas, often resulting in kissing or mirror-image lesions, especially in skin areas that come in contact (i.e., elbow flexure).[6] Additionally, touching the initial lesions can lead to the spread of pederin to other parts of the body.

The genus paederus contains more than 600 species and is distributed in almost all continents.[7] At least 20 of the more than 600 species of paederus beetles are associated with PD. In India, the commonest species is paederus melampus. In the Bible's book of Exodus, it was described that paederus beetles might be responsible for some of the ten plagues in Egypt.[8]

The study aims to describe the clinical and morphological patterns and epidemiology of PD.

METHODS

A descriptive study was done in dermatology OPD at Viswabharathi medical college and hospital, Kurnool, Andhra Pradesh for 6 months i.e; from March to August 2023, 80 patients attending the dermatology OPD with clinical features of PD i.e., erythematous plaques, vesicles, pustules, bullae, crusts along with post inflammatory hyperpigmentation on any part of the body with or without itching, burning sensation, pain and edema, during this study period were included. Patients with history of insect bite, with known history of contact with insects other than paederus beetles, lesions with doubtful diagnosis and lesions with known cause like contact dermatitis, atopic dermatitis, fungal and viral infections were excluded from study. From all the study participants informed verbal and written consents were obtained. Detailed clinical history and socio-demographic history was taken and local and systemic examinations were done. Ethical committee approval was taken for study. Data was collected from all the patients and statistical analysis was done using the Chi-square test.

RESULTS

Among 80 patients with PD, 49 were females (61.25%) and 31 were males (38.75%). The mean age of patients with PD was 24.8 years. The age of the youngest patient affected with PD was 16 months while the oldest was 70 years. The peak cases were noted during the month of May (32.5%) followed by August (17.5%) (Figure 2). All these patients belong to rural areas.

Risk factors leading to the onset of PD include vegetations near residence (80%), sleeping with windows open (51.25%), sleeping on floor (40%), history of contact with insects (31.2 %) (Table 1).

The onset of lesions was mostly in mornings after waking up from sleep (86.2%), followed by night (10%) and afternoon (3.75%). Most of the patients were presented with clinical features like itching (73.7%), burning sensation (60%), redness (86.2%), swelling (46.2%), tenderness (88.7%) (Table 2). Most common site affected in PD was face and neck (42.5%) with involvement of periorbital area (13.7%), followed by trunk (35%), upper limbs (30%) and lower limbs (11.2%) (Table 3).

Most of patients with PD presented with mixed lesions rather than single type of lesion. Out of 80 patients, 61 had mixed lesions (76.25%) i.e; erythematous plaques along with other type of lesions (Figure 3), 8 had post inflammatory hyperpigmentation (10%), 5 had bullae (6.25%) (Figure 4), 6 had erosions alone (7.5%). Out of 61 patients with erythematous plaques, 16 had vesicles alone, 9 had vesicles with crusts, 3 had crusts alone, 15 had pustules alone, 5 had pustules with crusts, 8 had papules alone, 4 had erosions alone, 2 had crusts with erosions (Figure 5).

Clinical patterns noted in PD bizarre lesions (47.5%), linear pattern (33.75%) (Figure 6), annular lesions (11.25%), kissing/ mirror lesions (7.5%) (Figure 7 and 8).

Figure 1: Paederus (rove) beetle found in the premises of the hospital.

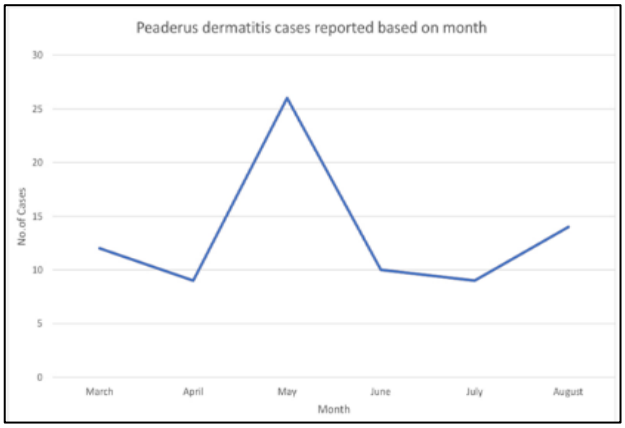

Figure 2: Distribution of patients according to the month of presentation with PD, (n=80).

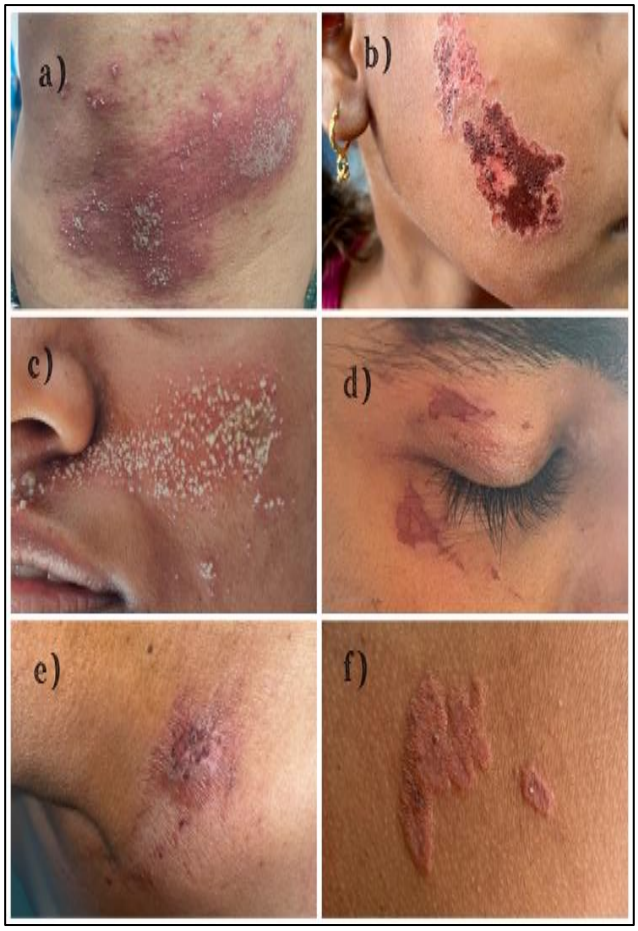

Figure 3: (A-F): Morphological forms in PD-erythematovesicles (herpetiform), crusts with erosions, pustules, erosions, crusts and erythematous plaque.

Figure 4: (A and B): Bullous lesions: initial presentation and after 10 days presented with healing ulcers.

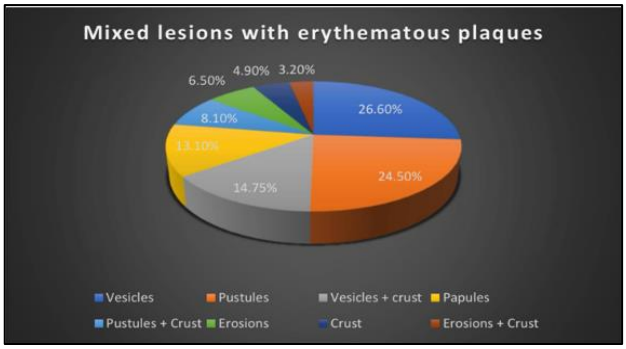

Figure 5: Distribution of different types of mixed lesions with erythematous plaques, (n=61).

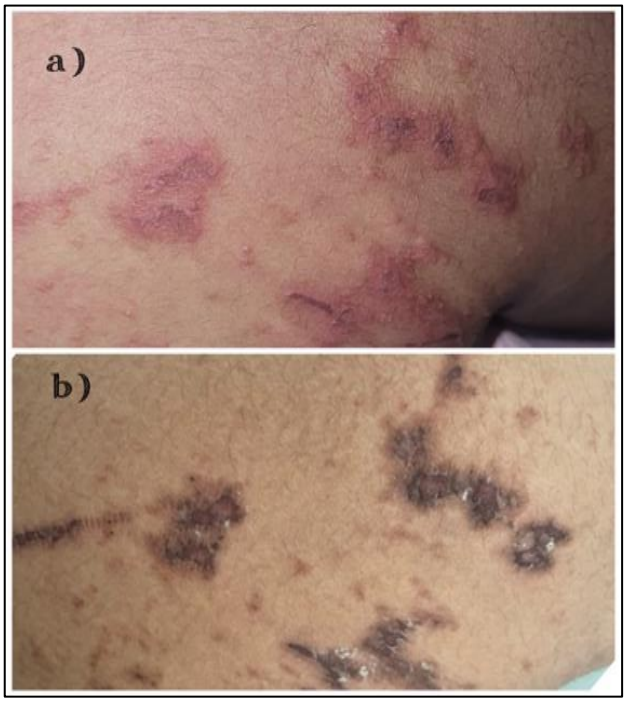

Figure 6: (A and B): Linear eythematous plaques-initial lesions and after few days presented with healing lesions.

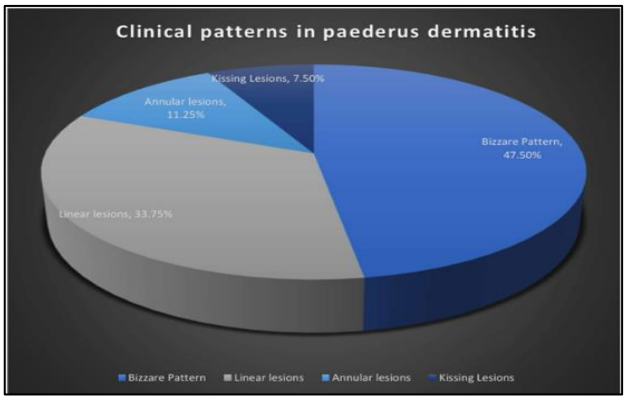

Figure 7: Distribution of different types of clinical patterns in PD, (n=80).

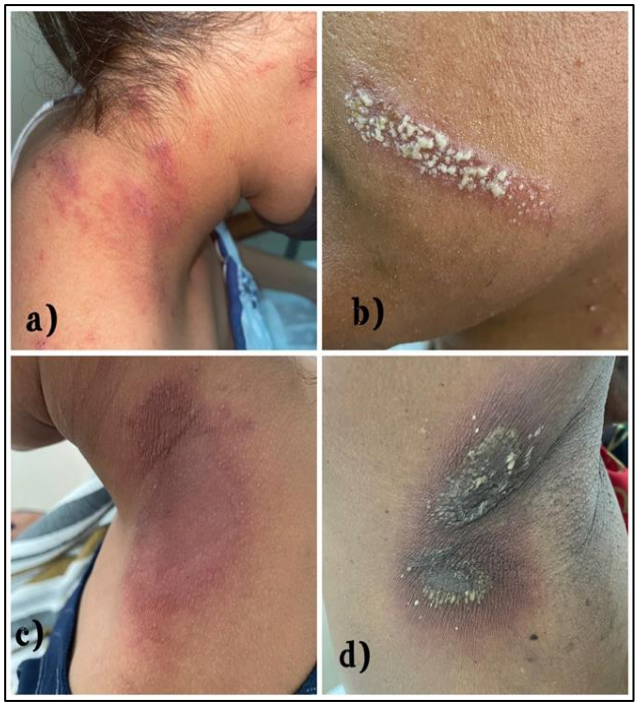

Figure 8: (a-d): Clinical patterns in PD-Bizarre pattern, linear lesion, annular lesions and kissing lesions.

Table 1: Risk factors for PD, (n=80).

Risk factors	N	Percentage (%)
Vegetations in the nearby areas	64	80
Sleeping with windows open	41	51.2
Sleeping on floor	32	40
History of contact with insect	25	31.2
Sleeping with lights on	23	28.7
Past history of similar lesions	10	12.5

Table 2: Symptoms of patients presenting with PD.

Symptoms	N	Percentage (%)
Itching	59	73.7
Burning sensation	48	60
Redness	69	86.2
Swelling	37	46.2
Tenderness	71	88.7

Table 3: Sites involved in PD, (n=80).

Sites	N	Percentage (%)
Head and neck	34	42.5
Trunk	28	35
Upper limbs	24	30
Lower limbs	9	11.2
Periorbital area	11	13.7

DISCUSSION

The current study was done in a rural tertiary care hospital with nearby vegetations and humid climate.

Paederus beetles are attracted to vegetations during the day and move to households at night due to the phototaxis, potentially causing the increased PD cases in the early mornings. The presence of students in campus hostels could indeed have contributed to the increased exposure.

In a study done by Padhi et al male preponderance was seen but, in our study, and in a study done by Kumaraguru et al female pre-ponderance was seen.[9,10]

In the present study, the average age of patients with PD is 24.8 years. The distribution includes 61.25% females and 38.75% males. Out of 80 patients, 80% patients reported presence of vegetations in the nearby areas, 51.25% patients were sleeping with windows open and 40% patients were sleeping on floor. In a study done in Trichy with 117 cases, the mean age was 24.54±11.8 years, females (51%), 85% patients reported vegetations in the surrounding areas, 71% were sleeping with open windows, 45.2% were sleeping on floor.[10]

The 31.2% patients had history of contact with insects while in a study done in Egypt only 14% gave history. Most of the patients noticed lesions in the early morning after waking up. Similar findings were seen in studies done in Malaysia and in India.[10-12]

Head and neck was the most common site reported in our study followed by trunk, upper extremity, similar to other studies.[13-16] Periorbital dermatitis was seen in 13.7% patients, similar to a study done by the Srihari et al, while in a study done by the Gnanaraj et al it was only 4.9%.[11,17]

Itching, pain, burning sensation were the most common symptoms in our study similar to other studies.[9,10,13] Most common clinical pattern noted was bizarre pattern followed by linear, annular and kissing lesions. In the study conducted by Padhi et al linear pattern was most common. In our study kissing lesions were present in 7.5% patients whereas in other studies 1.6% and 40.2% were noted.[10,14]

Most common morphology seen in the current study was erythematous plaques (76.2%) followed by vesicles, pustules, crusts similar to other studies.[10] According to Padhi et al study, papules were the most common morphology observed.[9]

The differential diagnosis of PD includes irritant contact dermatitis, allergic contact dermatitis, herpes zoster, herpes simplex, bullous impetigo, phytophotodermatitis, liquid burns, millipede dermatitis etc.[18,19]

Limitations

Species identification was not done and histopathology was not done.

CONCLUSION

We undertook this study to provide a comprehensive overview of PD shedding light on its clinical patterns, epidemiology, and associated risk factors. By examining a cohort of patients with PD, the study reveals noteworthy trends, including a higher prevalence among females in rural areas and correlations with environmental factors like proximity to vegetations and sleeping habits. The study underscores the diverse clinical manifestations of PD, and highlights the importance of accurate diagnosis amidst a spectrum of differential diagnosis. Through elucidating the various clinical patterns and morphologies observed in pederus dermatitis lesions, the study enhances our diagnostic understanding and aids in effective management strategies. Overall, this study contributes to the growing body of knowledge on PD, emphasising the need for heightened awareness, implementing effective preventive measures, and fostering interdisciplinary collaboration to improve patient care and outcomes in regions affected by paederus infestations.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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