

Clinical Manifestations of Paederus Dermatitis: A Retrospective Cohort Study in a Tropical Country

Sukhum Jiamton MD, PhD¹, Pichaya Limphoka MD¹, Ya-Nin Nokdhes MD¹, Yanisorn Nanchaipruek MD¹, Oraya Pochanapan MD¹

¹ Department of Dermatology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand

Background: Paederus dermatitis (PD), or dermatitis linearis, is a skin reaction to a chemical substance called pederin from *Paederus* spp.

Objective: To assess the clinical manifestations and seasonal variation of PD.

Materials and Methods: The present study was a retrospective medical chart review of patients over 18 years of age diagnosed with PD attended by the Dermatology Clinic of Siriraj Hospital between January 2012 and January 2016.

Results: Four hundred sixty-two patients with a median age of 35 years old were included in the present study. Most patients were female (77%). Lesions were found in exposed areas, especially extremities, and commonly manifested as erythematous patches and pustules in a linear arrangement or kissing lesions.

Conclusion: Skin lesions with erythematous patches and pustules in a linear arrangement or kissing lesions are crucial for the diagnosis of PD. The PD cases were higher after the rainy seasons and flood events. However, the number of patients was not related to the season.

Keywords: Paederus dermatitis, Clinical manifestations, Thailand

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Paederus dermatitis (PD), or dermatitis linearis, is a skin reaction to a chemical substance called pederin from the endolymph of *Paederus* beetles, which are classified as Staphyllinidae family and Paederinae subfamily⁽¹⁻⁴⁾. Pederin induces apoptosis of the basal and suprabasal layers of the dermis^(2,5-9). *Paederus* beetles can be found throughout the world, especially in tropical areas^(1-7,9-12). Seasonal variations play a key role in the beetle dispersal^(2,3,10). They are usually active during the rainy season and commonly live in moist habitats, such as crop fields and riverbanks^(1,2,6,9,11); therefore, the outbreaks of PD frequently occur after rainy seasons. PD produces symptoms within 24 to 48 hours after a

person comes into contact with pederin^(2,3,6,8). The suggested clinical manifestations of PD are kissing, linear, erythematous, swelling, or vesiculobullous pustules, which typically appear on the exposed areas of the body, including the face, neck, and extremities^(2-4,8-10,13). PD may resemble the symptoms and signs of other diseases, it may be misdiagnosed as herpes simplex, herpes zoster, or allergic contact dermatitis^(2,10,14). Common complications include postinflammatory hyperpigmentation and secondary bacterial infection^(2,3,13). PD is a self-limiting disease that takes about 20 to 35 days to heal^(2,4,5). The treatment is palliative^(1,2,14). Topical corticosteroids are useful for relieving pain and itching symptoms^(2,14).

The present study aimed to assess the clinical manifestations of PD among patients attending the skin clinic at Siriraj Hospital, and the influence of seasonal variations affecting the occurrence of PD.

Materials and Methods

The present study was a retrospective cohort study. The medical records of patients aged over 18 years old that attended the dermatology clinic at Siriraj Hospital between January 2012 and January 2016 and were diagnosed with PD (ICD-10 code L2481) by a dermatologist were reviewed. PD was diagnosed

Correspondence to:

Jiamton S.

Department of Dermatology, Faculty of Medicine Siriraj Hospital, Mahidol University, 2 Wanglang Road, Bangkoknoi, Bangkok 10700, Thailand.

Phone: +66-2-4197380; **Fax:** +66-2-4115031

Email: sukhum.jia@mahidol.ac.th

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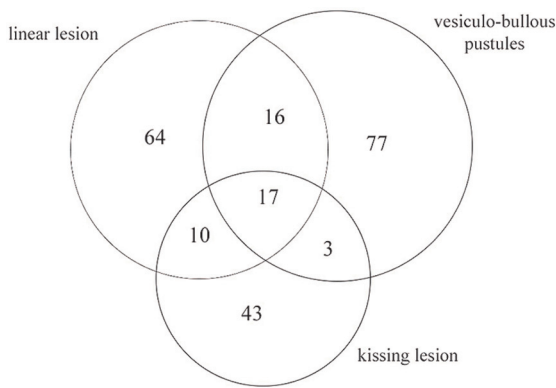


Figure 1. Number of patients who presented with kissing or linear lesions or vesiculobullous pustules.

when the patient presented with kissing, linear, erythematous, swelling, or vesiculobullous pustules lesions. The information of the patients' gender, medical underlying diseases, clinical manifestations, sites affected, treatment time, treatments, and any complications or misdiagnosis were obtained.

Statistical analysis

The data were described herein using descriptive statistics. All the statistical analyses were performed using PASW Statistics for Windows, version 18.0 (SPSS Inc., Chicago, IL, USA).

Ethics approval

The present study was approved by the Siriraj Institutional Review Board of the Faculty of Medicine Siriraj Hospital [approval number 501/2560(EC1)].

Results

Four hundred sixty-two patients with a median (interquartile range, IQR) age of 35 (25) years old were included in the present study, of whom 357 (77%) were female. The most frequent clinical manifestation was erythematous patches. Kissing, linear, and vesiculobullous pustules or lesions were also seen (Figure 1). Table 1 presents a summary of the demographic data of the patients. The sites affected were the patients' extremities in 187 cases (40.5%), face in 65 cases (14.1%), neck in 65 cases (14.1%), and trunk in 53 cases (11.5%). Surprisingly, some medical records had no report about the sites in 50 cases (1.8%). Overall, 449 (97.2%) patients were diagnosed with PD at the first visit to the dermatology clinic. At the first visit, most patients had no complications, while postinflammatory hyperpigmentation was found in 39 cases (8.4%) and

Table 1. Demographic data of the patients diagnosed with Paederus dermatitis who attended the skin clinic at Siriraj Hospital between January 2006 and January 2016 (n=462)

Characteristics	n (%)
Sex	
Female	357 (77.3)
Male	105 (22.7)
Age (years)	
Median (IQR)	35 (25, 50)
Range (min, max)	74 (18,9 2)
Site	
1 site	370 (80.2)
• Extremities	187 (40.5)
• Face	65 (14.1)
• Neck	65 (14.1)
• Trunk	53 (11.5)
2 sites	41 (8.9)
• Face and extremities	12 (2.6)
• Face and neck	11 (2.4)
• Extremities and trunk	10 (2.2)
• Extremities and neck	5 (1.1)
• Neck and trunk	3 (0.6)
3 sites	1 (0.2)
• Face, neck, and trunk	1 (0.2)
Complications	
No	416 (90)
Postinflammatory hyperpigmentation	39 (8.4)
Secondary infection	7 (1.5)
Previous treatments	
Topical steroid	8 (1.7)
Topical antibiotics	3 (0.6)
Oral acyclovir	7 (1.5)
Oral antihistamine	3 (0.6)
Topical steroid and antibiotics	6 (1.3)
Topical steroid and antihistamine	2 (0.4)
Acyclovir and topical antibiotic	1 (0.2)
Topical steroid, antibiotics, and oral antihistamine	2 (0.4)

IQR=interquartile range

seven cases (1.5%) had secondary infection. Overall, 420 (90.9%) patients had no treatment before they visited the present study clinic. Treatment with topical steroids, antibiotics, and antihistamine were common, as shown in Figure 2. The occurrence of PD increased each year during the period of October to December, except in 2012, when most cases in that year occurred from January to March. The outbreak of PD increased in 2016 (Figure 3).

Discussion

The most common clinical manifestation seen in

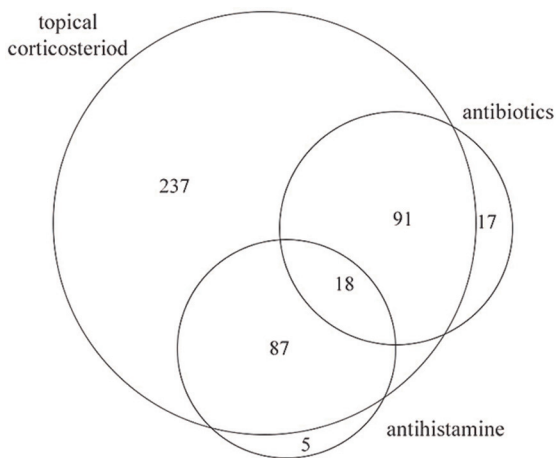


Figure 2. Number of patients treated with topical corticosteroids, antibiotics, or antihistamine.

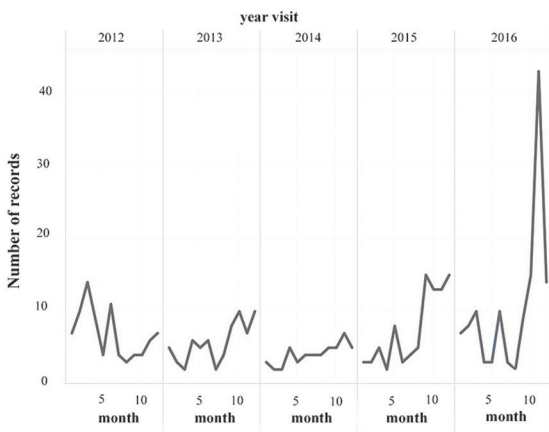


Figure 3. Occurrences of *Paederus* dermatitis from 2012 to 2016.

the present study was erythematous patches. From a literature review, the common manifestations of PD are kissing, linear, or vesiculobullous pustules^(2,3,8,12-14). The authors found kissing lesions in 73 cases (16.4%), linear lesions in 107 cases (24%), and vesiculobullous pustules in 113 cases (25.3%). Other skin lesions, such as erythematous plaques, patches, or papules, are non-specific for PD and may be presented with herpes simplex, herpes zoster, or allergic contact dermatitis, which can lead to physicians misdiagnosing^(2,10,14).

Several points may suggest a differential diagnosis of PD. This includes the characteristic signs, including kissing or linear lesions, or vesiculobullous pustules. The history of exposure to the *Paederus* insects is an important indicator in suggesting the disease⁽²⁾. A laboratory test may be useful if the history and physical examination were inconclusive. In addition, a Tzanck smear may be performed to rule out

herpes infection. Gram staining or bacterial culture may be done to differentiate PD from certain types of infection⁽²⁾. Patch tests can be used to distinguish from allergies while KOH preparation can rule out a fungal infection⁽³⁾. PD can be distinguished from other diseases by distribution, onset of skin lesions, and history of exposure. The clinical manifestation of PD usually appears within 48 hours after crushing of the insect on the skin and usually noticed on awakening in the morning because of the nocturnal nature of the insects^(2,3,6,8). The dermatomal distribution is unlikely, if any, but should be aware of herpes zoster infection. Moreover, atypical variant of PD presenting with generalized erythroderma and desquamation had been previously reported^(15,16). In the present study, complication was mild and found in only 10%. However, severe complications such as extensive scar, epiphora, keratoconjunctivitis, and temporal blindness have been reported^(17,18).

The season is also a clue in the diagnosis. Seasonal changes have substantial effects on the dispersal of *Paederus* spp. and an increase in the prevalence of PD^(1,2,8,9,11). Humid, hot, and wet weather prevents the beetles becoming dehydrated during their movement and helps them to be more widely dispersed over greater range⁽²⁾. Consequently, outbreaks of PD usually occur after the rainy season. Water events can also result in an increase in the number of the beetles. In Peru and Egypt, it was reported that cases of PD occurred after El Nino in 2002 and the Sinai floods in 2010⁽⁹⁾. The present study showed the outbreaks of PD commonly increased from October to December, or after the rainy season period. However, in 2012, the PD outbreak increased from January to March, because there was a major flood event in Thailand in 2011, and as a consequence, the occurrence of PD in early 2012 was greater than that in other years (Figure 3). Surprisingly, the incidence in 2016 was drastically high. It might be because of an outbreak in the last quarter of 2016.

Limitation

One limitation of the present study may be the possibility of overestimating of PD diagnosis. In general practice, physicians actually make a diagnosis of PD by the characteristic skin signs, however, the linear pattern of lesions together with kissing lesions are specific to PD, although the irritation from other chemicals present could resemble PD. Therefore, awareness of how to diagnose this condition and its clinical features will prevent misdiagnosis. In addition, there may be incomplete information in

the medical records due to the retrospective nature. Further prospective studies to provide the knowledge to the community to recognize *Paederus* beetle and to explore the factors associated with the outbreak of PD are highly recommended.

Conclusion

Common skin lesions and a history of exposure to the *Paederus* insects are key factors for the diagnosis of PD. Humid, hot, and wet weather also increase the number of *Paederus* insects, and hence the potential for PD. Laboratory investigation can be used to differentiate from other diseases, such as herpes infection.

What is already known on this topic?

PD is a skin reaction to a chemical substance called pederin from *Paederus* spp.

What this study adds?

Erythematous patches and pustules in a linear arrangement or kissing lesions are crucial for the diagnosis of PD. The occurrence of cases of PD was observed to be higher after rainy seasons and flood events. The present study will increase awareness to the healthcare workers.

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Conflicts of interest

The authors declare no conflict of interest.

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