An outbreak of Paederus dermatitis in Thai Military Personnel

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An outbreak of Paederus dermatitis in Thai military personnel in 2007 was reported. Approximately ninety-one percent of military personnel who worked in a battalion located in Bangkok experienced Paederus dermatitis in April-May 2007. The most common clinical manifestations were blisters and erythematous rash. The most affected areas were head, neck, back and groin. "Kissing lesions" were seen in 17.3% of cases and 23.5% had multiple lesions. Compared with other reports, we found a high incidence of lesions in unexposed body parts. This disease should be recognized as a differential diagnosis especially in tropical countries. Awareness of the condition and its clinical features will aid early diagnosis and prompt treatment.

Keywords: *Paederus, Paederus dermatitis, Blistering dermatitis, Contact dermatitis, Military personnel, Thailand*

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Paederus dermatitis is an acute irritant contact dermatitis caused by beetles of the genus Paederus. These insects release their irritant coelomic fluid containing either cantheridin or pederin when they are provoked. Blister beetles are in order Coleoptera, which compose of three major families: Meloidae, Oedemeridae, and Staphylinidae, respectively[1-3]. The vesicant chemical in both family Meloidae and Oedemeridae is cantheridin while family Staphylinidae contains pederin[1,4]. The distribution of *Paederus* is worldwide, but more common in tropical and subtropical areas which more than 600 species of *Paederus* are known[1,3]. Common species of *Paederus* which have been reported to cause contact dermatitis were *P. sabaeus*, *P. fuscipes*, and *P. eximius*[4]. Pederin can produce more severe clinical manifestations which are blisters or pustules resembling burn lesion arising from intensely inflamed skin, whereas, cantharidin dermatitis is characterized by non-inflammatory vesicles and bullae[4,5].

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Paederus dermatitis was reported from various areas of the world[4]. Several outbreaks were documented in different groups such as home residents in Uganda, Northern Iran, and Australia, hospital staffs in Sri Lanka and soldiers who deployed near agricultural land in India[2,6-9]. Among these, a major outbreak of 2,000 cases of acute contact dermatitis associated with *P. fuscipes* was reported from Okinawa, Japan in 1961[10]. In Thailand, sporadic cases of contact dermatitis caused by these insects in general medical practice have been found throughout the year. In the present study, 226 cases of Paederus dermatitis were reported in military personnel of a battalion located in Bangkok, Thailand in April-May 2007.

Material and Method

The present study was conducted in the military personnel from the Supreme command Signal Battalion. The cases were diagnosed by clinical signs of dermatitis: vesicles, blisters or erythematous rash or blisters at various parts of the body during April-May 2007. All doubtful cases were excluded. A history was taken using self-administrated, standardized questionnaires, which comprised of age, sex, military ranking, personal hygiene and daily activities. The signs and symptoms of skin lesions were self-recorded in

body diagram chart in detail including lesion characteristics, duration, numbers and site of affected body area. Physical examination was performed in all cases by general physicians under supervision of a dermatologist and the diagnosis made by clinical history collaboration with signs and symptoms. The authors also explored the environment including place of residence, training area and surrounding landscape. Descriptive analysis was used for statistical analysis; data were reported in number of cases and percentages. The present study was approved by the Ethical Committee of the Medical Department of the Royal Thai Army.

Results

Two hundred and forty-nine military personnel were interviewed and examined, of which 226 cases met the case definition. Thus, the incidence of Paederus dermatitis was 90.8%. All subjects were male with mean age of 21.61 (+2.5) years old. The majority graduated from junior high school level and did not smoke. Military characteristic data are shown in Table 1; 242 soldiers (91.3%) ranked as private of which 200 were new recruits and other privates were assistant training officers. Clinical symptoms included: 88 cases (38.9%) complained of pruritus or itching and 54 (23.9%) had burning sensation. Table 2 shows clinical signs of cases. Most of the cases presented with blistering lesions followed by erythematous rash, 39 (17.3%) demonstrated "kissing lesions" (Fig. 1). The most affected parts were head & neck areas followed by back and groin. Fifty-three (23.5%) had multiple lesions on their bodies.

Regarding the personal hygiene history, 94.3% of military personnel repeatedly used their uniforms because of continuous rain and humidity, which affected the drying of clothes. All new recruits took a bath together in the main bathroom twice a day using their personal soap (98.8%). The environmental investigation showed a large grass field used for new recruits training, main barracks and section for bathing. There were large trees, bushes and a pond covered the area within 500 meters around the main barracks. All new recruits resided in the 1st and 2nd main barracks with anti-mosquito wire net installation. The inside chambers had good ventilation. It was noticeable that some insects were attracted by fluorescent lamps and could sneak into the resident area in the evening. Weather condition was rainy and humid since it had been raining continuously 1-2 weeks before the investigation. Approximately one-fifth of the military personnel reported that black and red beetles disturbed them. The highest peaks of cases were observed during the 3rd and 4th week of May. Of 111 affected cases, 80 (72.1%) were new recruits and 31 (27.9%) were training staffs.

Discussion

In the present study, Paederus dermatitis was reported in the military personnel of the Supreme Command Signal Battalion. About 50% of military personnel manifested with clinical signs and symptoms of dermatitis. Most lesions were blisters and erythematous rash. "Kissing lesions" were a classic sign of contact dermatitis caused by the spread of pederin to adjacent skin commonly found in flexor area. (Fig. 1)[1]. Other lesions are characterized by intense inflamed skin comprised of erythematous rash or blisters resembling burn lesion. Associated lesions may be bullae or pustules. The clinical manifestations may range from mild to severe forms due to lesion types, affected area, associated symptoms and complications. The skin lesions were usually present on exposed area of the body such as head, neck, back and groin (Fig. 2).

Table 1. Demographic data of the 249 enrolled military personnel

	No. of population	No. of case	Prevalence (%)
Total military personnel	249	226	90.8
Classified by ranking			
Private	242	221	91.3
Lance corporal	5	4	80.0
Sergeant	2	1	50.0
Classified by duty			
Newly recruited private	200	186	93.0
Private assigned as training assistant	42	35	83.3
Training officer	7	5	71.4

Table 2. Clinical signs of the 226 Paederus dermatitis cases

	No.	%
Lesion characteristic		
Blisters	77	34.1
Erythematous rash	76	33.6
Pustules	47	20.8
Kissing lesion	39	17.3
Affected body area		
Head & neck	69	30.5
Back	61	27.0
Groin	60	26.5
Leg & foot	53	23.5
Arm & hand	45	19.9
Chest & abdomen	27	11.9

* Lesion characteristics and affected body are reported inde pendently, cases could be manifested with multiple lesions or body areas

Fig. 1 Kissing lesion commonly found in the flexor area.

Fig. 2 Burn-like lesion in the unexposed body part.

The diagnosis should be differentiated from all other acute allergic or irritant contact dermatitis and other diseases which produce similar lesion such as thermal burn or liquid burn, herpes simplex infection, herpes zoster, bullous impetigo and dermatitis herpetiformis[1,4,11]. Taking good history collaboration with clinical manifestations was useful to make accurate diagnoses leading to appropriate management and potential prevention.

In the present study, the most affected parts were the head and neck, back and groin area. Lesions at groin area were not commonly reported in other reports[1,12]. Among these military personnel, lesions in uncommon parts might result from transferring the toxic substance to any parts of body with fingers or toxin, which remained in unwashed clothes. Since new recruits had to perform most activities together, it might be difficult to maintain personal hygiene without coming into contact with others. Twenty-three percent of the cases had multiple lesions on their bodies.

Paederus or "rove beetle" look like ants or some other familiar insects. The head is black while the thorax and abdomen are colored russet[1,9]. Their size, one and half times that of mosquitoes, range from 10-15 mm long and 0.5 mm wide. Adults live in moist habitats and are active in daylight, though flights seem to be largely restricted to night. *Paederus* usually appears in the evening and gathers around the light[4,9,11]. From the environmental exploration, the surrounded landscapes were composed of grass and small bush. Lights were turn on inside the barracks during the night. The beetles could be attracted by the light and followed into the sleep area. Even with insect screening such as mosquito wire net fixed in windows, the insects could sneak into sleep chambers due to their tiny size. *Paederus* do not bite or sting[1,5,6]. Because of their habits, skin lesions occurred through human response by trying to kill or dislodge the insect physically while running over skin. This action provoked the release of pederin. Even if the insects were removed, the toxic pederin was still deposited on the skin.

Paederus dermatitis usually needs no specific treatment. The disease is self-healing. However, appropriate supportive treatment will improve quality of life and prevent undesired complications. A wet dressing could be applied to the lesions and topical steroids could reduce the inflammation[3,4]. Oral antihistamines for pruritus may be useful. In severe cases such as extensive dermatitis, hospitalization and systemic steroids are required. Antibiotics may be used in topical or oral forms for secondary bacterial infection

depending on severity. Without any complications, the skin lesions healed within 1 to 3 weeks and resulted in post-inflammatory hyperpigmentation which may need 6-8 months for full recovery of normal skin pigmentation[4]. Most of cases leave no scar unless the pathology extends into deeper layer of dermis. All cases in this military unit received supportive treatment including oral antihistamine and topical steroids.

Some conditions, for instance military unit setting, improper hygiene, rainy and humid climate and fluorescent light sources suitably to stimulating insects, might promote the occurrence of the disease. As a self-healing disease, Paederus dermatitis is not considered a harmful disease with high morbidity or mortality, but the illness may affect the quality of life and reduce overall productive performance. Practical and useful potential prevention can be proposed to the public as follows: avoid crushing beetles or any insects on the skin, fix doors or windows with insect-proof mesh, use personal bed net to prevent insect threat, arrange the appropriate usage of fluorescent light. These methods could be performed in any household, not only for *Paederus*, but also versatile for other insect threats even the hazardous kind such as mosquitoes. These methods are also applicable for military units.

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Potential conflicts of interest

None.

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การระบาดของผิวหนังอักเสบจากแมลงก้นกระดกในทหารไทย

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การระบาดของผิวหนังอักเสบจากแมลงก้นกระดกถูกรายงานในทหารไทยในปี พ.ศ. 2550 ประมาณ 91% ของทหารที่ปฏิบัติหน้าที่ในกองพันหนึ่งในกรุงเทพเป็นผิวหนังอักเสบจากแมลงก้นกระดกในช่วง เดือนเมษายน ถึง เดือนพฤษภาคม พ.ศ. 2550 อาการที่พบได้บ่อยที่สุดคือ ตุ่มน้ำและผื่นแดงที่ผิวหนังบริเวณของร่างกายที่พบผิวหนังอักเสบได้บ่อยที่สุดคือ หัว คอ หลัง และขาหนีบ "Kissing lesions" พบได้ 17.3% มีประมาณ 23.5% ที่พบผิวหนังอักเสบได้หลายจุดเมื่อเปรียบเทียบกับรายงานอื่น ๆ ผู้นิพนธ์พบผู้ป่วยที่มีผิวหนังอักเสบบริเวณร่างกายส่วนใต้ร่มผ้าในอัตราที่สูงโรคนี้ควรจะนำไปใช้วิเคราะห์แยกโรคโดยเฉพาะอย่างยิ่งในประเทศที่อยู่ในเขตร้อน การตระหนักถึงโรคและอาการของโรคนี้จะนำมาสู่การวินิจฉัยและการรักษาได้อย่างรวดเร็ว