

Bullous Contact Dermatitis Caused by Self-Applied Crushed *Paederus fuscipes* for the Treatment of Vitiligo

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Paederus dermatitis is a linear, blistering contact dermatitis caused by pederin, a potent vesicant agent that is contained in insects belonging to the genus *Paederus*. This form of dermatitis usually occurs accidentally in those who have contact with this insect during the summer season. We report a peculiar case of a patient developing severe chemical burnlike lesions after application to her skin of many crushed *Paederus fuscipes* that she collected from the soil of a riverbank in the early spring for the treatment of her vitiligo.

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P*aederus* dermatitis is a self-healing bullous contact dermatitis characterized by erythematovesicular lesions of sudden onset on areas of the body exposed to the genus *Paederus*.¹ This insect neither bites nor stings, but when it accidentally comes into contact with human skin, it releases coelomic fluid from its tail. The fluid contains pederin, which causes burnlike erythema and blistering to the skin within 24 hours of contact.²⁻⁵ The acute vesicular lesions become crusted and scaly within a few days and heal completely in about 1 to 3 weeks, sometimes leaving a transient postinflammatory hyperpigmentation.^{1,6}

Accidental cases of *Paederus* dermatitis usually occur during the summer season; however, our case

was peculiar due to the patient developing dermatitis after contact with the insects in early spring.

Case Report

A 61-year-old woman visited the emergency department of our hospital with vesiculobullous eruptions on exposed areas of her body. She had vitiligo on her face, neck, and forearm. Treatment with topical steroid cream had been unsuccessful. Her neighbor advised her to try an alternative treatment consisting of an application of crushed red antlike insects to the affected area. The patient collected about 200 insects by digging them up from a riverbank on an early spring day. She crushed the insects, mixed them with an ointment (not methoxsalen), and applied them to her vitiliginous lesions. Three to 4 hours after the application, erythematous patches accompanied by a severe tingling sensation developed on the application sites. The patient's skin eruptions progressed into confluent vesiculobullous eruptions during the next 24 hours. On physical examination, we observed edema, ruptured blisters, exudating crusts, erosions, and ulcerations on the erythematous patches accompanied by severe burning pain on the face, neck, and forearm (Figure 1).

Results of a routine laboratory examination revealed leukocytosis with neutrophilia. A histopathologic examination of the vesicle on the patient's hand showed a subcorneal blister filled with neutrophils, severe spongiosis, upper dermal edema, dense perivascular mixed inflammatory cell infiltration, and the extravasation of red blood cells (Figure 2). We identified the red insect as *P fuscipes* Curtis, which has been the most frequently isolated species in Korea (Figure 3).

The patient's skin lesion was treated successfully with a systemic corticosteroid and antihistamine combined with a wet dressing and silver sulfadiazine cream, which left mild erythema and

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hyperpigmentation. The vitiligo lesion revealed no pigmentary change after 4 months.

Comment

Blister beetle dermatitis is a distinctive, seasonal vesiculobullous skin eruption that occurs after contact with 3 major families of beetles of the order Coleoptera. The Meloidae and Oedemeridae families produce injury to the skin by releasing the vesicating agent cantharidin, which is present in body fluid of the beetles. A third group of blister beetles belong to the family Staphylinidae, which contain a different vesicant known as pederin.⁷

Paederus dermatitis is a self-healing blistering skin disorder caused by a small insect belonging to the genus *Paederus*, family Staphylinidae, order Coleoptera, class Insecta.³⁻⁵ Species of *Paederus* are widely distributed throughout the world, especially in hot damp climates. More than 600 species of *Paederus* are known, of which *P alternans*, *P peregrinus*, *P goeldii*, *P crebrepunctatus*, *P colombinus*, *P brasiliensis*, *P sabaesus*, and *P fuscipes* are able to cause a bullous contact dermatitis in humans.¹⁻³ Although *Paederus* can fly, they prefer to run. They are nocturnal and powerfully attracted by light.² They do not bite or sting, nor do they produce a lesion just by running over the human skin; however, accidentally brushing against this insect or pressing or crushing one over the skin provokes the release of its coelomic fluid, which contains pederin, a potent vesicant agent.^{1-3,5,6}

Pederin is one of the most toxic animal products known. It is more toxic than cobra venom.⁸ Pederin causes an erythematovesicular acute bullous contact dermatitis within 12 to 24 hours after contact with the substance, giving a “whiplash” appearance when linear.¹ Pederin that was applied experimentally to human skin in a small dose (0.05 µg) caused slight erythema and transient postinflammatory pigmentation. At a high dose (1 µg), which is the average dose present in every *P fuscipes*, an acute inflammatory reaction with blisters and necrosis occurred.⁴ Pederin differs from cantharidin in its biologic, physical, and chemical properties. *Paederus* dermatitis is characterized by a more violent cutaneous reaction with prominent urtication and dermatitis prior to blistering.⁹

The *P fuscipes*, which are 6 to 8 mm in length, 1 mm in width, and 4 mg in weight, resemble an ant.^{4,6,8} The *P fuscipes* have a dark blue head, elytron, and lower abdomen, and a yellow-red thorax and upper abdomen (Figure 3). They are predators and scavengers that feed on debris and live on dead larvae of other insects. The natural habitat of *P fuscipes* is among decaying vegetable

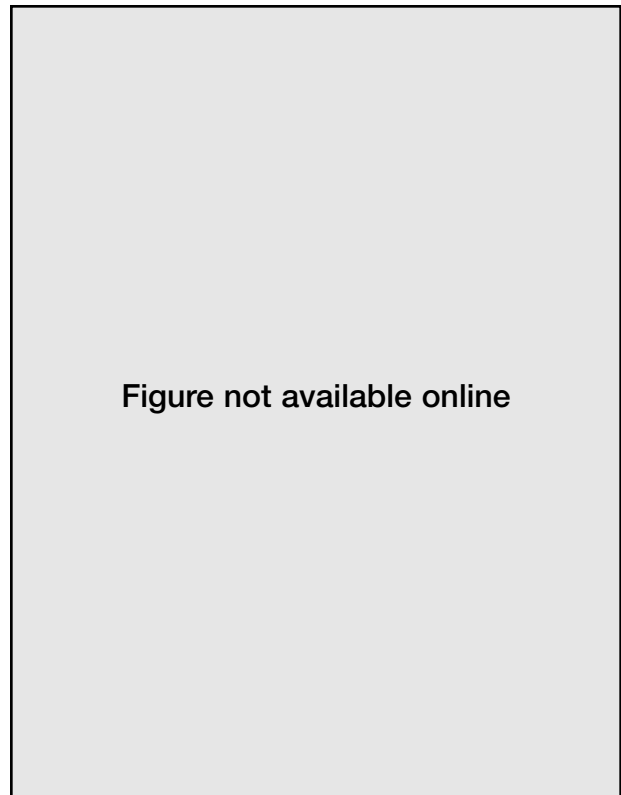


Figure 1. Ruptured blisters, exuding crusts, erosions, and ulcerations on the face and neck (A) and forearm (B).

matter and beneath stones, bark, or logs, preferably in sandy soil near water, such as on riverbanks.⁶ They hibernate as an imago, spawn in the spring, and become a new imago after a transformation period.² Only one generation of this insect is produced annually.⁴ The *P fuscipes* hide in their dwelling place during the day; on cloudy or rainy days, they come out on tree leaves or on the water surface, and in the warm seasons their activity increases.^{2,5} Both sexes contain pederin, which is evenly contained in the imago, spawning, and larva stages.^{3,8}

In general, clinical manifestation of *Paederus* dermatitis shows a series of progressive stages.^{1-3,5-8,10-12}

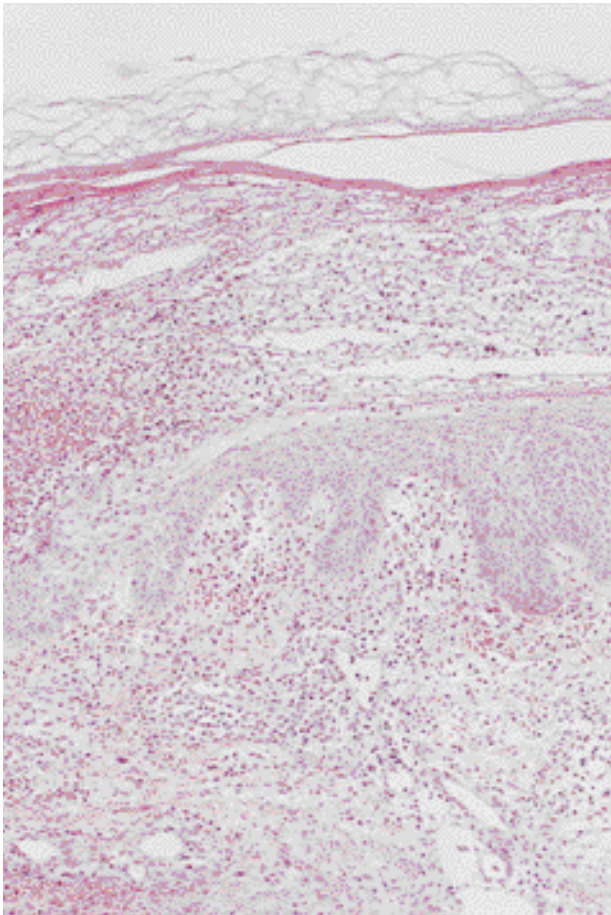


Figure 2. Subcorneal blister filled with neutrophils and red blood cells, reticular degeneration, and irregularly acanthotic epidermis. The dermis shows upper dermal edema and perivascular mixed cell infiltration and extravasation of red blood cells (H&E, original magnification $\times 40$).

Subsequent to contact with the insect, linear erythema and mild edema appear along with a tingling and itching sensation, and several hours later vesicles emerge. These vesicles continue to form for 3 to 4 days at which point they rupture and form erosions, ulcers, and crusts. Our patient also developed these same clinical symptoms and signs. After a period of 1 to 3 weeks, the vesicle is cured leaving transient hyperpigmentation.¹¹

Paederus dermatitis may be asymptomatic, though it often is accompanied by burning, pain, and pruritus. The systemic symptoms include general malaise, fever, headache, and arthralgia and may occur in the presence of widespread or large lesions or in the event of bacterial superinfection.^{2,5,6,10}

Paederus dermatitis must be distinguished clinically from herpes simplex, herpes zoster, bullous or allergic contact dermatitis, dermatitis artefacta, impetigo, and dermatitis herpetiformis.^{3,6,10}

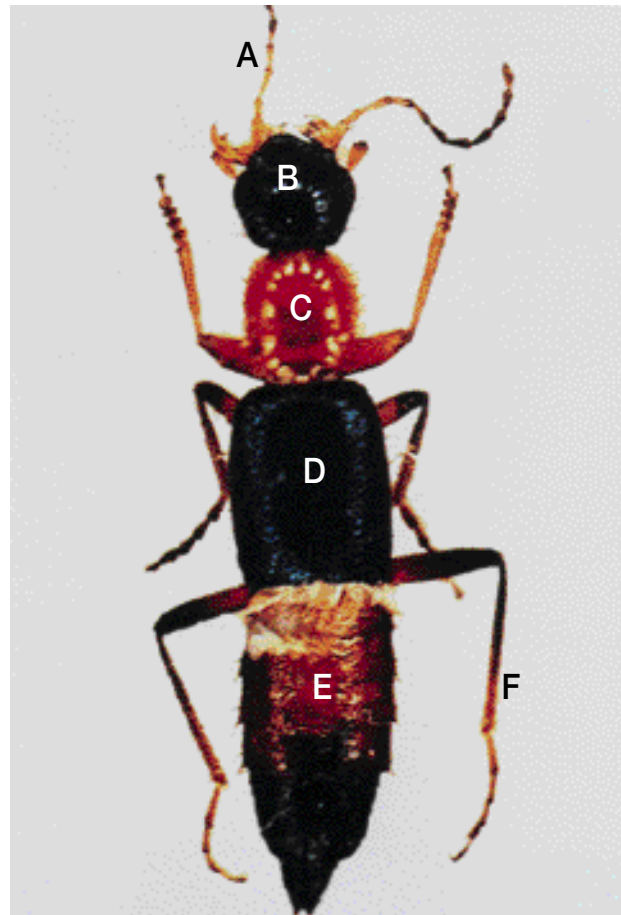


Figure 3. Dorsal aspect of adult *Paederus fuscipes* Curtis: antenna (A), head (B), thorax (C), elytron (D), abdomen (E), and leg (F).

Unlike previously reported cases, most of which occurred after accidental contact with this insect, it is quite peculiar that our patient applied crushed *P. fuscipes* to her skin for the treatment of her vitiligo. Our case, therefore, falls within the category of maltreated bullous contact dermatitis presenting with severe cutaneous and systemic manifestations. Although many patients have a postinflammatory hyperpigmentation at the site of the dermatitis for 6 to 8 months,⁸ to our knowledge, there is only one reported case of accidental repigmented vitiligo after beetle dermatitis.¹² The repigmentation of the vitiligo patch was either due to some specific effect of cantharidin or it was just a postinflammatory phenomenon.

Histopathologic findings of *Paederus* dermatitis are predominantly characterized by intracellular edema, ballooning, and reticular degeneration of the epidermis rather than by intercellular edema

and spongiosis, which characterize true allergic contact dermatitis.^{1,3-5} These histopathologic findings vary depending on the time elapsed before the biopsy is performed and the concentration of pederin per unit surface.^{1,4} We observed similar findings in our patient.

As a self-healing disease, *Paederus* dermatitis usually needs no treatment. A wet dressing, topical steroids, and oral antihistamines for pruritus may be useful.^{1,2} Systemic steroids are used in patients with severe dermatitis who require hospitalization, and topical or systemic antibiotics may be administered in the presence of bacterial infection.^{3,8,10} Povidone iodine is used as a disinfectant because it destroys pederin.⁵ Because our patient had severe cutaneous manifestations with systemic symptoms, she was hospitalized and treated with a systemic steroid and antihistamine combined with a wet compress and silver sulfadiazine cream for the chemical burnlike lesions. The skin lesions healed quickly leaving mild postinflammatory hyperpigmentation. There was no pigmentation in the vitiliginous lesions of our patient after 4 months.

A variety of blister beetles are present in North America. Although most American blister beetles produce less severe blistering, isolated cases of widespread severe blistering can occur. An outbreak of severe blistering caused by Staphylinid (rove) beetles was reported in a military unit in Arizona. Periods of heavy rain and flooding caused an increase in the population of rove beetles in the southwest.¹³ Ingestion of blister beetles in alfalfa can kill horses in the United States. Within hours, the horses develop signs of gastrointestinal tract distress that may be associated with nonspecific neurologic signs. Symptoms of shock predominate terminally, with death often occurring within hours.¹⁴

Most cases of *Paederus* dermatitis occur incidentally or sporadically in a linear fashion after contact with *P fuscipes*. Here, however, we report a case of unusual severe bullous contact dermatitis caused by

self-applied crushed *P fuscipes* for the purpose of treating vitiligo.

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