

Paederus Dermatitis Featuring Chronic Contact Dermatitis

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Paederus dermatitis is a distinct variant of acute irritant contact dermatitis caused by mucocutaneous contact with the specific toxin of an insect belonging to the genus *Paederus*. It is characterized by the sudden onset of erythema and vesiculobullous lesions on exposed skin, with special predilection for the periorbital region. *Paederus* species have been mostly identified in Africa, Asia, Australia, and Central/South America. We report a 51-year-old woman who experienced 4 recurrences of periorbital erythema and edema in the previous year. No consistent etiology could be established at the beginning. Only after taking a detailed medical history was it discovered that 1 year before our examination, the patient had traveled to Kenya, where she had experienced contact with the insect. This fact led us to the diagnosis of *Paederus* dermatitis. After appropriate treatment, a complete regression was observed over a 3-week period.

Paederus dermatitis, also known as a “blister beetle dermatitis,”^{1–3} “night burn,”^{4–6} “rove beetle dermatitis,”^{2,7} “whiplash dermatitis,”⁸ and “dermatitis linearis”^{1,9–11} is a distinct variant of acute irritant dermatitis caused by mucocutaneous contact with the toxin of an insect belonging to the genus *Paederus*.^{1,12} It is a common dermatosis in hot and humid climates, especially after the rainy season, although it may sometimes be observed in moderate climates as well.^{1,4,6,9} *Paederus* dermatitis or dermatitis linearis (because the lesions are commonly arranged in linear form due to the accidental brushing and/or crushing of the beetle against the skin) clinically presents with erythema and edema at the site of mucocutaneous contact with the toxin of the insect, usually within 24 hours after the insect bite. A sensation of burning, stinging, or itching may be present, often preceding the skin lesions.^{4,9,13} In the next stage, vesicles, bullae, and sometimes pustules develop on the erythematous base, followed by desquamation.⁷ Skin lesions are usually confined to the exposed skin, most frequently involving the face, neck, and upper extremities.^{4,8,9,13} In the flexural region, kissing lesions may also appear.^{1,5,7,13,14} Regarding the face involvement, significant periorbital predilection has been observed.^{4,6,13} Skin lesions heal within a few weeks,

depending on the initial clinical manifestation, usually with postinflammatory dyschromia (hypopigmentation or hyperpigmentation) and without scarring.^{6,13} The condition is self-limiting.

Because of the irritant character of the dermatitis caused by *Paederus* species, it is important to be aware of the wide variety of possible clinical manifestations determined by the properties of the toxic chemical (pH, physical state, concentration, molecule size, amount, polarization, ionization, solubility), characteristics of exposure (amount, concentration, duration and type of contact, simultaneous exposure to other irritants), environmental factors (body region and temperature, mechanical factors such as pressure, friction or abrasion), and endogenous individual host factors (genetic predisposition to irritant susceptibility, skin permeability, atopic dermatitis, sensitivity to ultraviolet light, etc).^{6,15}

The eyes may be involved either by transfer of toxic chemical from the hands after contact with the chemical excreted by the beetle or as the primary site of involvement. In the latter case, unilateral periorbital dermatitis or toxic conjunctivitis is usually seen, and this condition is known as “Nairobi eye.”^{1,3,4,6,8}

Histopathologic findings may include parakeratosis, subcorneal bullae, spongiosis, and basal cell hydropic degeneration in the epidermis, with dermal infiltrate consisting predominantly of lymphocytes and, to a lesser extent, of eosinophils.⁵ Nevertheless, a variety of changes could be seen on histopathology, ranging from epidermal necrosis and blistering in early stages to marked acanthosis with mitotic figures in the later stages.^{4,12}

Diagnosis of *Paederus* dermatitis is based primarily on clinical appearance, predilection for exposed areas, presence of kissing lesions, patient history, and benign and self-limiting course of disease.^{1,14} Negative cultures for bacteria and fungi, negative Tzanck smear for herpetic cells, and negative results of direct immunofluorescence (IgM, IgG, IgA, and C3) may also point the

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medical practitioner toward the right direction.^{1,2,12} The special diagnostic challenge of *Paederus* dermatitis is its dependence upon the physician's awareness of its existence and its manifestation(s).

Most often, thermal or chemical burns, acute allergic or irritant contact dermatitis, phytophotodermatitis, herpes zoster, herpes simplex, bullous impetigo, and dermatitis artefacta might be included in the differential diagnosis of *Paederus* dermatitis.^{1,4,12}

The most frequent complications after *Paederus* dermatitis are postinflammatory hyperpigmentation, sometimes of several months' duration, as well as secondary infections.^{1,6,13}

The treatment of *Paederus* dermatitis consists of removing the irritant, immediately washing the area contaminated with the beetle's excretion with water and soap, and applying wet compresses. Topical, or in more severe cases, systemic corticosteroids and antibiotics could also be administered.^{1,6,8}

Besides the standard preventive measures, perhaps the best way to prevent *Paederus* dermatitis is education to improve the level of awareness, especially among people travelling to or staying in areas where these insects are abundant.^{1,4,9,16}

ENTOMOLOGIC OBSERVATIONS

Paederus genus belongs to the family Staphyllinidae (rove beetles), order Coleoptera (beetles), class insecta (insects), and phylum Arthropoda (arthropods).^{1,10} More than 600 species of *Paederus* species have been identified on all continents except Antarctica.^{1,2,4,11,17} Their size varies from 7 to 15 mm in length and 0.5 to 1 mm in width.^{1,4,10,11} They can be identified by the following characteristic appearance: body color is alternating black-red-black-red-black, corresponding to head-pronotum-elytra-anterior abdomen-posterior abdomen¹¹ (Fig. 1). *Paederus* species live in moist habitats, appearing usually after the rainy season, most often appearing during spring and summer, depending on the local climate conditions.^{1,6,9}

The beetles do not attack humans directly; they neither bite nor sting.^{1,8,12} Instead, the harm is self-inflicted by humans after contact with this insect when crushing the beetle against the skin.^{10,11,17} It usually happens when adult beetles are attracted by artificial light sources, mostly fluorescent or incandescent light,

and land on human beings present in proximity to the light.^{1,10,11} Typically, a hand is used to crush the beetle and its exudate (pederin) is smeared in a linear arrangement, which makes the term *dermatitis linearis* perhaps the most appropriate.^{10,11} The exudate (toxin) may be spread to distant sites (eyes, genitalia, etc.) by the contaminated human hand.^{10,11} In severe cases, the toxin may cause systemic symptoms such as fever, neuralgia, arthralgia, and vomiting.¹⁰ Secondary infections, rhinitis, and tympanitis have been reported, whereas perhaps the most serious are ocular manifestations, which include conjunctivitis, exfoliation of the cornea, and iritis, some of which may cause temporary blindness.¹⁰

Paederus species contain toxic chemicals which are the cause of the irritant dermatitis on contact with skin. Three toxins have been identified: pederin, which is excreted by several of the *Paederus* species, pseudopederin excreted by *Paederus fuscipes*, and pederone, which is excreted by *Paederus fuscipes* and *Paederus columbinus*.¹⁰ Pederin is an amide with 2 tetrahydropyran rings: pederamide and pedaldehyde.¹⁰ The toxin penetrates the intact human skin, and the symptoms develop within 24 hours.^{9,10} The exact mechanism of its effects on the human skin has not been explained yet, but it is believed that pederin inhibits DNA and protein synthesis to block mitosis and releases epidermal proteases, which cause acantholysis and blister formation.^{1,2,18}

CASE REPORT

A 51-year-old woman was examined in our general dermatologic outpatient clinic a few days after the appearance of unilateral periorbital edema. The patient claimed that she had experienced 4 recurrences of periorbital edema during the previous 10 months. The patient denied any systemic symptoms. Only after taking a detailed and thorough medical history was it discovered that 1 year before our examination the patient had traveled to Kenya where she had experienced contact with the insect. Skin lesions, consequent to the contact with the insect, had presented with the sudden appearance of periorbital erythema and edema, accompanied by itching and stinging sensation and vesicle and crust formation (Fig. 2). The patient had been then treated with oral and topical steroids, systemic antihistamines, and systemic potassium-magnesium-aspartate. After the treatment, gradual regression of skin lesions with residual hyperpigmentation had been observed within a 6-week period; however, the periorbital edema recurred. The patient's personal medical history was unremarkable and she was taking no medications before the insect bite. Complete blood count, sedimentation rate, C-reactive protein, liver function tests, renal function tests, and urinalysis were within normal ranges. Fungal culture and Tzanck smear were negative. Microbiological culture was negative, but only sparse material was available for culture. Our treatment included systemic therapy with broad-spectrum antibiotic (ciprofloxacin-chloride 500 mg twice a day for 21 days) and topical therapy with wet compresses, emollient cream, and sunscreen for residual



Figure 1. *Paederus* species.



Figure 2. Typical skin appearance after contact with *Paederus* species.

hyperpigmentation. Complete regression of skin lesions was observed after 3 weeks. No recurrences have occurred during the 1.5 years of follow-up.

DISCUSSION

A wide variety of clinical manifestations, sometimes even very bizarre and unusual, can be observed because of irritant contact dermatitis. Special attention should be given to obtaining a very detailed patient history, including personal, occupational, travel, and epidemiologic data. In the case of our patient, the diagnosis of the *Paederus* dermatitis was only first suspected after the detailed history of her travel in the context of the clinical appearance of skin lesions. Recurrences of periorbital edema may be explained by secondary bacterial superinfection, which has been well described in the literature as a common complication of *Paederus* dermatitis, usually due to endosymbiotic Gram-negative bacteria *Pseudomonas* species.^{1,6} It is likely that the acute phase of *Paederus* dermatitis can be successfully cured with steroids and antihistamines. Our rationale for the administration of oral antibiotics was the fact that secondary bacterial infection has also been described as a contributing factor in *Paederus* dermatitis.^{1,6,14} The negative result of the bacterial culture did not exclude the diagnosis of *Paederus* dermatitis in our patient, and the successful outcome of therapy (systemic antibiotic and steroid-free topical treatment) confirmed the presumed diagnosis.

Our case demonstrates that, although *Paederus* dermatitis is usually a self-limited condition, it can also present as chronic recurrent dermatitis. Although the patient acquired the disease in Kenya, where it is a common dermatosis, with this case report we would like to emphasize the necessity of including even this generally benign condition into the differential diagnosis, especially when etiopathogenetic clues to diseases common in this part of world fail to explain the patient's symptoms. To the best of

our knowledge, this is the first reported case of *Paederus* dermatitis in our country (Croatia).

CONCLUSIONS

We believe that it is quite important to get the detailed patient history with special attention to the epidemiologic, travel, and occupational history. In the context of the global village, the distance between "common" and "exotic" diseases should perhaps only exist hypothetically. Because there seem to be almost no limits to human migration, a greater responsibility for awareness rests on health care providers to accept and address these global changes. We believe that this might be very important to prevent clinical misdiagnosis and therapeutic failures.

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