

BLISTER BEETLE DERMATOSIS. A REPORT OF 43 CASES IN A MILITARY UNIT IN ERITREA

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ABSTRACT

Objective: To present our experience of an outbreak of blister beetle dermatosis in a military unit.

Methods: An outbreak of a blistering disease was reported in a Jordanian military unit participating in the United Nations mission in Eritrea. The unit was stationed in the Gash – Barka Eritrean province at the western border of the country.

Blister beetles of the genus *Pederus* were collected at the site. Local clinicians were familiar with such outbreaks in rainy seasons, but it had not been previously reported in the area. Our study documents the distribution of the lesions, their natural history, healing stages and effective treatment.

Results: In a unit of 461 personnel, 43 presented with dermatological complaints including one with symptoms and signs of “Nairobi eye” only. Follow-up period was 1 to 7 weeks until complete healing was noted. All patients were males in the second and third decades of age. Thirty-one patients (72%) presented with one lesion, 9 (21%) with two, and 3 (7%) with three lesions. In 31 patients (72%) the area was less than 5 cm square. Out of these, 25 (81%) had complete healing by one week from the time of injury. Residual skin hyperpigmentation is a known complication, which can take up several months to resolve.

Conclusion: It is important for our military troops coming into afflicted areas to be aware of this type of dermatitis as a cause of skin blisters.

Key words: Blister, Beetles, Pederin, Outbreak, Eritrea, Military.

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Introduction

Blister beetles and plants may produce chemical dermatitis that presents as blistering lesions. These lesions result from the direct skin contact of coelomic fluid or plant toxin or from a phytotoxic reaction associated with the chemical blistering on the skin.

Pederus dermatitis is one type of the lesions. It is a specific form of acute irritant contact dermatitis caused by pederin, a secretion of insects of the genus *Pederus*. The disease is characterised by vesicles, bullae and sometimes small pustules, on an erythematous base with sudden onset of a stinging, burning sensation. The dermatitis is most frequently seen in regions with a hot, tropical climate. We present 43 cases in a military unit stationed at the Eritrean/ Ethiopian border in the Gash-

Barka province.

Methods

All studied patients were seen firsthand within 48 hours of injury and were followed until complete healing was achieved. The follow up period was 25 to 39 days with a mean of 30.6 days. All patients were fit, healthy, young military personnel and with no previous relevant medical history. The age range was from 21 to 40 years with a mean of 29.7 years. The characteristics of the lesions noted included the site, size, number and healing stage. A detailed history of symptoms and primary action taken by patients was also noted. All patients were asked if they noticed the offending insect. The natural history of the injury was related to the treatment given. All

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members of the contingent were advised to apply copious amounts of water to the affected area once injured. Treatment included local antiseptic applications and cold compresses in addition to soap and water washes.

The causative genus of beetle was identified by local entomologists.

Results

Out of 461 personnel, 43 presented with a total of 58 lesions of multiple skin blisters during the months of July and August. One case of "Nairobi eye" was also seen. All patients were males in the second and third decades of age. Thirty one (72%) patients presented with one lesion, nine (21%) with two lesions and three (7%) with three lesions. All injuries were of exposed body areas in the distribution shown in Table I. The affected surface area was variable ranging from 1 to 40 cm². In 31 patients (72%) the area was less than 5 cm square. Out of these, 25 (81%) had complete healing by one week from the time of injury.

Table I. Distribution of lesions*.

Site	Face	Neck	Torso	Upper limb	Lower limb	Eye
Number of patients	5	23	9	7	7	1
Number of lesions	6	27	9	8	7	1

* Some patients may have lesions in more than one area.

All patients complained of a burning type sensation when first affected. In 14 cases, itching in the affected body area was also a feature. The first clinical sign noticed in all patients was localised erythema. Multiple skin blisters were evident within 48 hours of the complaint in all patients. Only 15 patients (35%) saw the offending insect. Complete healing of the lesions was achieved by 1 week in 21 cases (49%), by 2 weeks in 15 cases (35%), and by 3 weeks in 7 cases (16%). Twenty three patients used immediate wash of the injured region with water. Out of these, 15 patients (65%) had complete healing by one week. Residual skin hyperpigmentation or darkening of the affected area was evident after 7 weeks in 20 (47%) patients. Healing in the one case of "Nairobi eye" was complete by 2 weeks post injury with no complications. Treatment given included washing with soap and water, cold compresses, and local antiseptic application. The eye was the only affected site in this one case.

Discussion

Aristotle described beetles as insects that have wing cases and thus named them Coleoptera, from the Greek koleon, "sheath", and pteron, "wing".

Beetles, the largest group of insects, representing a fifth of all living organisms and a fourth of animals, epitomize diversity. Their diversity, which eloquently

extends beyond the physical, encompassing strategies of behavior, defense, reproduction, and adaptation, has been appreciated since the time of the Pharaohs.

Of the 250,000 species of beetles, some are injurious to humans. The most common beetle injury is not from a bite or sting but from the formation of blisters.

Blister beetles are slender insects 12 to 19 mm long. They have prominent heads and may be black, gray with black spots, or black and yellow striped^(1,2).

These insects have seven instars and over winter as mature larvae in the soil. After pupation in the spring, adults begin to emerge in early summer and by midsummer reach their peak population. During summer months blister beetles feed on plant foliage or flowers. Eggs are laid in the soil in groups of 50 to 300 eggs. Ten to 21 days later larvae emerge from these eggs and search for their preferred food, grasshopper or bee eggs. As larvae molt and grow their activity decreases. When they reach the fifth instars they move into the soil, molt again, and remain over winter in the soil as sixth instars^(1,3,4).

Blister beetle dermatosis is a distinctive vesicubullous eruption that occurs after contact with three major groups of beetles (Order: Coleoptera). It is caused by a vesicant chemical substance contained in the body fluids of the beetles.

The smallest and least known family is the Oedemeridae. The best-known family is the Meloididae with numerous species worldwide causing blistering. The vesicant chemical in both Oedemeridae and Meloididae is cantharidin^(5,6). The best known of these is *Lypta vesicatoria*, the Spanish fly. This beetle fills its breathing tube with air and closes its breathing pores to elevate body pressure. This forces the toxin cantharidin out through its leg joints. On human skin, cantharidin forms blisters within hours. Some of the blistering may evolve to ulceration and secondary infection. Clues to this cause of blistering are the presence of multiple blisters in the same stage of development and the lack of an accompanying rash. Sometimes the blisters form a line, reflecting the path of the beetle as it crossed the skin. When ingested, cantharidin causes nausea and abdominal pain. Cantharidin has been prepared commercially and used as a diuretic, aphrodisiac, and rubefacient^(3,6,7).

The third group of blister beetles includes species of the genus *Pederus* (Family: Staphylinidae) (Fig. 1). The clinicopathologic picture differs because this genus contains a different vesicant agent, pederin⁽⁵⁾.

Pederin causes a spectrum of histopathologic changes ranging from acute epidermal necrosis and blistering in acute stages, to marked acanthosis with mitotic figures in late stages. *Pederus* dermatitis is an entomological model of irritant contact dermatitis, having histopathologic features of intra-epidermal and sub-epidermal blistering, epidermal necrosis and acantholysis. The latter is probably caused by the release of epidermal proteases^(8,9).

Clinically, this is a peculiar contact dermatitis characterized by erythemato-bullous lesions of sudden

onset on exposed areas of the body. The disease is provoked by an insect belonging to the genus *Pederus*. This beetle, known in East Africa as Nairobi Fly, does not bite or sting, but accidental brushing against or crushing the beetle over the skin provokes the release of its coelomic fluid, which contains pederin, a potent vesicant agent. Due to the pathogenic mechanism, the morphology and location of the dermatitis change from case to case. The lesion usually resembles the accidental dropping of a caustic or hot liquid ⁽⁸⁾. These lesions generally do not expand or migrate after presentation ^(1,2). The uncommon association of acute dermatitis with minimal or no complaint, which would be noteworthy in the case of chemical or thermal burns, facilitates diagnosis, which is corroborated by the season and by the case history ⁽⁷⁾.

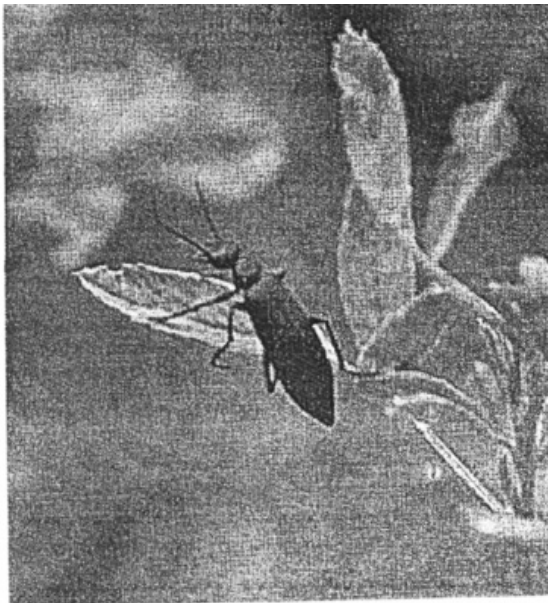


Fig. 1. Blister beetle (genus *Pederus*).

If the beetle is crushed in a skin fold, such as the popliteal fossa, mirror image lesions are seen on both sides of the fold. Lesions generally stop itching by the fifth day and desquamates over the following week. Residual hyper pigmentation may remain for months ^(1,10).

In our series, four stages of the condition were identified: blistering over an erythematous base, desquamation and ulceration, ulcer healing, and residual skin changes. The healing time ranged from one to three weeks depending on the severity of the injury and the primary action taken. It was noticeable that patients who used immediate washing of the area with soap and water had less severe injuries probably due to toxin dilution.

“Nairobi eye” is the name given to the condition when *Pederus* causes ocular symptoms. Periorbital dermatitis and keratoconjunctivitis are usually secondary to transfer by the finger of the toxic chemical involved from elsewhere on the skin ⁽²⁾.

Treatment of these beetle-related skin injuries is soap and water and wet compresses. Occasionally, topical or systemic corticosteroids are used ^(11,12).

Elimination of the offending agent and protection from further exposure are important in both diagnosis and management. Managing blister beetles is difficult. Several insecticides are registered for blister beetle control. Strip-spraying field edges may be the best approach when blister beetles are observed in adjacent areas ⁽⁴⁾.

Conclusion

This is the first report of an outbreak in Eritrea. The injury was caused by the powerful pederin toxin in the beetle’s hemolymph coming into contact with the skin. It was noted that speedy recovery was dependant on the severity of the injury. Immediate dilution of the toxin by pouring water on the affected region further improved recovery rate. We recommend conservative management with water and soap washes, cold compresses and local antiseptic applications. It is important for troops coming into afflicted areas to be aware of this type of dermatitis as a cause of skin blisters.

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