Irritant Dermatitis to Staphylinid Beetle in Indian Troops in Congo

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Abstract

Background: Contact dermatitis to Staphylinid beetle is a well known entity worldwide. *Paederus sabaeus* (Econda) species of this insect was responsible for a widespread occurrence of this dermatitis in United Nations (UN) troops posted in Congo. This study was undertaken to observe the various aspects of this unique dermatitis in the mission area.

Methods: All clinically diagnosed cases of contact dermatitis to Econda occurring in Indian troops posted to UN mission in Congo during the study period were included. Their epidemiological and clinical characteristics with treatment options were studied in detail.

Result: A wide range of dermatological manifestations were seen in the subjects under study. Few of the manifestations observed in the study have not been reported earlier in literature. Most of the reactions occurred on the exposed areas. Treatment options were guided by the site and the severity of the reaction.

Conclusion: Contact dermatitis to Staphylinid beetle can mimic various other dermatoses and has to be considered in the differential diagnosis in all dermatological consultations during the peak season in the Congo mission area. The insect was found to have certain definite behavioural patterns, the knowledge of which would help in preventing this dermatosis.

MJAFI 2010; 66 : 121-124

Key Words : Contact dermatitis; Beetle; Staphylinid

Introduction

Contact dermatitis to insects is frequently seen in clinical practice. Econda (*Paederus sabaeus*) is a Staphylinid beetle which is found in many tropical and subtropical habitats. The beetle does not bite or sting, but when crushed against the skin, releases a potent toxin known as pederin from its hemolymph that results in itching, burning, erythema and oozing in the area of contact. This dermatosis is more frequent on the uncovered parts of the body. In recent years, *Paederus* beetles have been associated with outbreaks of dermatitis in various countries of Africa, Asia and South America. Similar epidemics have also been reported in various parts of India [1,2]. The objective of this study was to note the clinical patterns of dermatitis to Staphylinid beetle, the best treatment options and to recommend suitable preventive measures.

Material and Methods

A total of 154 clinically diagnosed cases of Staphylinid beetle dermatitis presenting to the dermatology outpatient department (OPD) in the United Nations (UN) mission area in Congo during the period of September 2007 to March 2008 were included in this prospective study. The patients included military personnel of Indian origin only and were all males

with age ranging from 22 to 36 years.

A detailed history including personal and family history of skin diseases, atopy or allergies was sought and a thorough dermatological and systemic clinical examination was carried out. The patients were examined twice weekly while on treatment and thereafter followed up weekly for two months. Initial treatment of the patients included washing the lesions with clean water and cold compresses. All cases except patients having scrotal edema and periorbital involvement were treated with a standard protocol of topical betamethasone cream application at night with either mupirocin or silver sulphadiazine cream in the morning along with oral antihistaminics for seven days. Patients having facial or genital involvement were prescribed a milder steroid desonide lotion. Patients with scrotal edema and periorbital involvement were given prednisolone 20 mg daily in addition for the first three days of treatment.

Results

The peak time of presentation of the dermatitis was from mid October to mid December in 121 (78.57%) cases. None of the patients included in the study had any previous history of atopy, allergies or other skin diseases. Almost all the patients noticed the lesions when they woke up early morning. All cases had one symptom in common i.e. burning sensation over the lesions.

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The skin lesions were mainly on the exposed parts in 110 (71.43%) cases of which 42 (27%) cases were on forearms. However the covered areas were not totally spared (Fig. 1). Of these, 73 (47.4%) patients had more than one lesion.

Clinically, the most common presentation consisted of vesicles in a linear arrangement with a surrounding erythematous halo (Fig. 1a). Surprisingly the characteristic kissing lesions were seen in only two cases. Vesicles were seen in 78 (50.65%) patients and pustules in three (2%) cases. A variety of other cutaneous lesions were also seen: two cases had severe edema of scrotum followed by desquamation (Fig. 1b) and four cases had periorbital involvement. There were three other interesting presentations: nummular eczema and erythema multiforme (Fig. 1c) in one case each and four cases resembled lichen simplex chronicus (Fig. 1d). There were no systemic complications in any patient.

Investigations showed eosinophilia in 59.8% patients. Skin biopsy showed epidermal vesiculation and necrosis while the dermis was filled with lymphocytic infiltrate admixed with a few eosinophils in the typical cases (Fig. 2a). There was dermal edema in the case involving scrotum and perivascular infiltration of lymphocytes and basal cell changes in the erythema multiforme case (Fig. 2b).

While silver sulphadiazine was well tolerated by all the patients, 20% of the patients, including all cases with periorbital involvement, did not tolerate mupirocin well. The patient with scrotal edema responded well to oral steroids. It was seen that all the cases with typical presentation of linear vesicular lesions regressed in seven days. Scrotal edema regressed in ten days but scaling persisted for 15 days. Similarly scaling over periorbital region lasted longer (14-21 days). Residual hyperpigmentation persisted upto four weeks except over periorbital regions where it lasted upto eight weeks.

An interesting observation made was that the beetles were attracted not only to light, but also to orange coloured flowers present in the nearby garden.

Fig. 1 : a) Characteristic linear lesions, b) Scrotal lesions with cellulitis, c) Erythema multiforme like lesions and d) Lichen simplex chronicus like lesions.

Discussion

Econda (Paederus sabaeus) is a Staphylinid beetle belonging to the order Coleoptera, family Polyphaga and genus *Paederus*. The genus *Paederus* has almost 600 species which are responsible for dermatitis worldwide [3,4]. *Paederus sabaeus* (Fig. 3) was the specific species causing the irritant dermatitis in our study. Members of this species breed in wet rotting leaves and soil and their population increases rapidly at the end of the rainy season (November and December) in Congo. The beetle is drawn to light fixtures and candles at night [5]. The reason for attraction of *Paederus* to orange flowers as seen in our study was probably due to the colour [6]. Not only is this behaviour true for the Staphylinid beetle, but also for other blistering beetles like the *meloidaea* family, which in turn also helps in the pollination of the flowers, thus serving an important botanical function [7,8]. The orange flowering plants mentioned in the study were identified as *Rhododendron keysii* which belongs to the *rhododendron* species.

Disruption of tonofilaments within the desmosomes leads to acantholysis and intraepidermal blister formation giving the clinical picture. Acantholysis is probably caused by the release of epidermal proteases [9]. The morphology and location of the dermatitis varies with

Fig. 2 : Histopathology of the skin lesions a) Classical vesicular lesions and b) Lesion resembling erythema multiforme.

Fig. 3 : *Paederus sabaeus* (Econda).

the type of pathological reaction.

Eighty percent of the cases reported to have noticed the lesions on waking up in the morning substantiating the nocturnal habits of the insect. This was in corroboration with a study in Sri Lanka where it was found that people on night shifts were the most affected [10].

In most patients, the skin lesions were located on the exposed parts of the body which was corroborated in our study too. Cases of periorbital dermatitis have been reported earlier from Tanzania [11] and from a study in South India [12,13]. Ocular involvement in the form of unilateral periorbital dermatitis or keratoconjunctivitis is popularly known as the “Nairobi eye”. We had four such patients who presented with periorbital involvement.

The clinical picture is very characteristic when the lesions are linear or “kissing lesions” on both sides of the folded part of an articular joint. Clinically lesions similar to herpes zoster, bullous impetigo, urticaria and phytophotodermatitis have been reported [14]. In our study lesions resembling nummular eczema, erythema multiforme and lichen simplex chronicus were also observed. These resemblances have not been reported earlier in literature.

The case resembling nummular eczema had initially burning sensation over the legs followed by development of oozy crusted well defined round plaques over both legs. The patient with lesions resembling erythema multiforme had initially papulo-vesicles on both legs associated with burning sensation followed by the development of surrounding pale edema and erythematous halo. All the lichen simplex-like cases were located on the neck and had a longer history of lesions before presenting to the medical authorities. Histopathology in all the above cases confirmed features of insect bite reaction and patient responded to the standard treatment prescribed in the study.

Both the cases with scrotal edema had overlying vesicular lesions and complained of severe burning sensation. The edema regressed with severe desquamation which lasted upto ten days. Such desquamation has been described earlier in a report from Northern Iran [15].

A combination of steroid with antibiotic application along with oral antihistaminics was found to be an effective means of treatment in 146 cases (94%). The three periorbital cases which had received mupirocin complained of increased burning sensation, erythema and mild swelling over the lesions. They were switched over to silver sulphadiazine and the lesions improved. It was also found that of the overall 82 cases which received mupirocin, 16 (20%) cases complained of

increase in burning sensation and erythema over the lesions and took an average of 11 days for regression. None of the cases allocated to the silver sulphadiazine group had similar complaints. The average duration of lesions was found to be seven days. Mupirocin was not well tolerated probably because of the percutaneous absorption of its vehicle polyethylene glycol, the same reason for which it is rarely being used in burns patients too.

Oral steroids led to early recovery in all cases with periorbital and scrotal involvement. The comparison in these cases was made with experiences of preceding years and by consultation with other dermatologists coexisting in the locality. It was found that treatment with oral antibiotics alone did not seem to benefit the patients contrary to reports from a study carried out in Sierra Leone. Early attention to the skin lesions and topical antibiotic application negates the need for oral antibiotics. Healing required seven to ten days, if there is no further contact as corroborated from a study in Guinea [16]. The scrotal and periorbital cases persisted longer due to a more severe reaction because of increased sensitivity of the skin in these sites.

Recommendations for prevention of Staphylinid beetle dermatitis and its complications [10,15] :

1. Minimise the use of fluorescent lights.
2. Meshes to be placed around lights at night so that the insects do not fall on troops.
3. People staying in lighted areas at night e.g. on night duty, be well protected by personal clothing, mosquito nets and repellants.
4. Clothes and shoes to be checked before use in the morning and similarly bedding, at night before sleep.
5. Regular insecticide spraying of the camp. Fogging with 1% Deltamethrin is the preferred mode to cover wide areas.
6. Handling or crushing the insects against the skin should be avoided. Following contact with the beetle, the affected area must be placed under running water to wash off the toxin. Periorbital area, when involved must be handled with care and wet compress is the ideal initial treatment.
7. Soap water wash reduces the chances of infection while cold compress can be used to reduce discomfort.
8. Dermatological consultation should be taken if lesions do not resolve or in cases of periorbital or scrotal involvement.

Conclusion

Staphylinid beetle dermatitis is quite common in Congo

and hence awareness of the condition and its clinical features is of paramount importance. Many variations occur in its presentation and this condition will have to be kept as differential diagnosis in all dermatological consultations especially during the rainy season. The characteristic linear appearance of the lesions, their predilection for exposed areas and finally the epidemiological features (occurrence of similar cases in a given area, the seasonal incidence and identification of the insect) should enable the clinician to arrive at the correct diagnosis. Simple preventive measures based on the behavioural pattern of this nocturnal beetle can help reduce the incidence of this dermatitis.

Conflicts of Interest

None identified

Intellectual Contribution of Authors

Study Concept : Lt Col B Vasudevan, Col DC Joshi

Drafting & Manuscript Revision : Lt Col B Vasudevan, Col DC Joshi

Statistical Analysis : Lt Col B Vasudevan

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