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RESEARCH ARTICLE

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Some Biochemical Features of the *Paedrus Fuscipes* and Medical Importance of its Irritant Exudates in Patients in Northern Iran

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ABSTRACT

Biochemical characteristics and pathogenic effects of Paederus Fuscipes Curtis are identified by morphological and biochemical markers in patients from northern IRAN. All inspection data from patients, skin lesions, sleep locations, beetle activity, and interviews with directors of the clinical laboratories are documented. The patients were infected by a plague of rove beetles, Paederus fuscipes. The arthropods do not bite or sting but accidental crushing of the beetle on the skin provokes the release of its coelomic fluid which contains paederin, a potent vesicant agent. With Paederus fuscipes, symptoms are mild, disappearing in a few days on develop lesions, which, become full developed with new peripheral vesicles. Biopsy of hand skin demonstrated epidermal atrophy, hyper vascularity and vasodilatation of dermal vessels, and degeneration of dermal connective tissue. The best approach of controlling the paederus infection is to avoid contacting the beetles. Paederus fuscipes needs little treatment. Topical steroids, with antibiotics, if necessary to prevent impetiginisation, may be useful in the acute phase.

Keywords: Paederus fuscipes; paederin; skin lesions

INTODUCTION

The genus Paederus including about 600 species [1], is found in all tropical and temperate climates. Nearly 30 species are capable of causing skin and eye disease called Paederus dermatitis [2]. Beetles belonging to the genus Paederus [3] causing an acute vesicating dermatitis have been reported from many parts of the world [4]. In Tanzania and Kenya the most common blister beetle is known as Nairobi Fly and is of the genus Paederus. Ocular symptoms are common, usually secondary to transfer by the fingers of the toxic chemical involved from elsewhere on the skin[5]. Mycalamides A and B originally isolated from a marine sponge, show close structural similarity to the insect toxin Pederin, and exhibit potent cytotoxicity and anti-tumor activity. Short-term exposure of squamous carcinoma cells to 18-O-methyl mycalamide B or Paederin caused an irreversible inhibition of cellular proliferation and induced cellular necrosis. In contrast, the anti-proliferative effects of the compounds on human fibroblasts were reversible and there was no evidence of necrosis[6]. Awareness of the clinical features of Paederus dermatitis will prevent misdiagnosis. The simple preventive measures suggested are based on the behavioral pattern of this nocturnal beetle [7,8]. Paederus dermatitis should be considered in the differential diagnosis of acute vesicular dermatitis [9]. Members of genus Paederus contain Paederin which in contact with human skin causes a necrotizing lesion and with the eye causes conjunctivitis [8,9]. The present investigation was aimed to fill the gap in the knowledge of Paederus

fuscipes, biochemical characteristics and the medical importance of Paederin, the toxic compound cause damage to skin.

MATREIALS AND METHODS

The present work was done in Mazandaran province (300 Km far from Tehran). This study was undertaken to identify the cause of the dermatitis. Patients, who developed an acute vesicating dermatitis were studied by questionnaire and by inspection of their skin. The data for skin lesions, sleeping locations of the patients, and beetle activity were extracted from the laboratory director's record book. The details of the skin lesions, the constitutional symptoms, the duration, and the months of occurrence were recorded. The patients were inspected to confirm the symptoms. Biochemistry laboratory directors documented the presence and type of skin lesions of all patients, determined the proximity of lights to sleeping areas, and detailed the arrival and activity of the beetles. The biochemical features, relationship to night and the month of occurrence were noted. Insects were caught at night on several occasions and identified. Fifty Paederus fuscipes were collected for identification. The morphological characteristics of the Paederus beetle was about 7-12 mm long with bright carrot-colored sections. The collection of the insect always corresponded to the appearance of the symptoms. The geographic distribution of the collected insects were within the radius of 200 Km.

RESULTS

The identified insect is Paederus fuscipes with their peak activity during summer. The Paederus beetle is 7-12 mm long with bright carrot-colored sections. These beetles live in damp, moist areas. Common habitats are stream banks and swamps. It is a scavenger, feeding on other insects and decaying animal and vegetables. It is attracted to lights. The beetle produces a toxic alkali substance, paederin, which is released by contact of a crushed beetle with the skin. The toxin may be deposited voluntarily by the beetle, as well . Skin damage takes several hours to occur and so is often not associated with the beetle. Paederus fuscipes is much widespread in Iran. Seasonal activities of Paederus fuscipes in Mazandaran commenced at the beginning of summer. Their flight during the night and their daily activities in other seasons is related to the moisture and temperature.

Paederus fuscipes have two larval stages. The larvae at 2nd-instar stage are predators of eggs or larvae of other insects and mites. The immobile prepupa resembles the larva but assumes C-shaped position. Pupation occurs in cell constructed beneath the soil surface. All immature stages of Paederus fuscipes are very sensitive to moisture and desiccate easily. Biochemical examination of patients revealed a localized circumscribed acute, eruption localized consisting primarily of vesicles and bullae containing a serous liquid over an erythematous. The overall arrangement resembled herpes zoster. The lesions, with a larger, bullous lesion at the base center and smaller lesions located at the periphery. Biopsy of hand skin demonstrating epidermal atrophy, hyper-vascularity and vasodilatation of dermal vessels, and degeneration of dermal connective tissue(fig 1). Routine blood tests, urine analysis were normal. All patients have been outdoors on nights within a few days prior to the onset of the lesions. The skin lesions were consistent with those described as Paederus dermatitis, a self-healing , irritant contact dermatitis caused by an insect belonging to the genus Paederus. The skin lesions progressed in a similar way to those described [5,10]. All patients reported painful, blistering, skin lesions. Some required hospitalization for treatment of an extensive exfoliating and ulcerating dermatitis. Biochemical appearance of the lesions corresponds in shape and dimensions to the area affected by the released substance. Due to the mechanism by which the lesion occurs, its morphology and location is different from case to case but resembles an accidental dropping of a caustic or hot liquid. The lesions become crusted and scaly within a few days and heal completely in two weeks, with a transient post inflammatory hyper-pigmented patch.

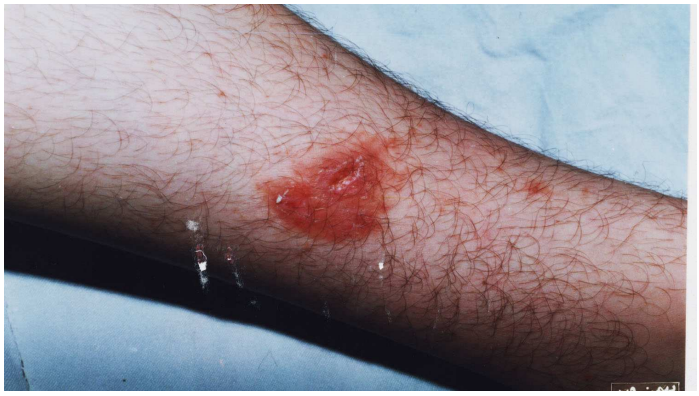

Fig.1.Degeneration of dermal connective tissue.

Fig.2.Paederus fuscipes

DISCUSSION

Paederus fuscipes are slim, they weigh ca. 5-8 mg (Fig.2). Several species of Paederus have been shown to cause the disease. In northern Iran, Paederus fuscipes has been the most frequently identified species which cause numerous cases of cutaneous lesions every year, mainly during summer. In northern Iran, Paederus fuscipes Curtis, is an active predator of several insect pests attacking on a wide variety of cultivated plants as rice and cotton. Pathological reports of skin biopsy reveal dilatation of skin vessels, hydropic degeneration of basal layer and dermal elastic and collagen fibers verifying the clinical diagnosis [11,12]. The vesicant Paederin is released from the hemolymph when the beetles are crushed. Within 10-15 h Paederin provokes acute dermatitis, which can be asymptomatic and accompanied by a mild itching-burning sensation. The Paederin also show some tumor cell toxicity, which indicates that this novel class of compounds should be subjected to preclinical evaluation. This is the report describing the pathogenicity of Paederus fuscipes Curtis in northern Iran. The best approach of controlling the paederus infection is to avoid contact. Paederus fuscipes is attracted to violet rays, destroyed by chemical or mechanical methods as a preventive approach.

CONCLUSION

As a self-healing disorder, Paederus dermatitis needs little treatment. Topical steroids, associated with antibiotics may be useful in the acute phase.

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REFERENCES

[1] J.H. Frank, K. Kanamitsu, *J.Med.Ent* **1987**,24 (3): 155-191.
[2] C. Gemetli, R. Grimalt, *Eur.J.Pediatrics* **1993**, 152 (1): 6-8.
[3] A. Rook, D.S. Wilkinson, F.T.G.E. Ebling, Textbook of Dermatology.London.: Blackwell scientific 1992: 1290-1291.
[4]R.K. Armstrong, J.L.Winfield ,*J. Med. Entomol*. **1968**,5: 362-364.
[5] TR Poole, *Eye* **1998**,12 : 883-885.
[6] A. Richter , P. Kocienski, P. Raubo, D.E. Davies, *Anticancer. Drug. Des*. **1997**,12: 217-227.
[7] S.N. Okiwelu , O.C. Umeozor, A.J. Akpan, *Ann. Trop. Med. Parasitol*.**1996**, 90(3): 345-346.
[8] T.A. Morsy , M.A. Arafa, T.A. Younis, I.A. Mahmud ,*J. Egypt. Soc. Parasitol*. **1996**,26(2): 337-351.
[9] R.E. Todd, S.L. Guthridge, B.L. Montgomery, *J. Aust.* **1996**,164 (4): 238-240.
[10] L.A. Banney, D.J. Wood, G.D. Francis, *Australasian Journal of Dermatology* **2000**,41(3): 162-167.
[11] D.M. Claborn, J. M. Polo, P.E. Olson, K.C. Earhart, S.S. Sherman, *Military Medicine*. **1999**,164(3): 209-213.
[12] S. D., Kamaladasa, W.D. Perera, L. Weeratunge, *Int. J. Dermatol*.**1997**,36(1): 34-36.