

## *Paederus* Dermatitis in Two Moroccan Soldiers During a Medical Mission in Guinea Bissau

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### Introduction

*Paederus* dermatitis is a vesicant and erythematous dermatosis caused by exposure to pederin, which is a toxic substance contained in the haemolymph of an insect of the genus *Paederus*. The cutaneous involvement takes place during the crushing of this insect on the skin [1]. It is a condition that is more common in tropical areas to be evoked in travelers during stays or after returning from these areas. The circumstances of appearance of lesions, their clinical appearance and especially the identification of the insect makes it possible to make the diagnosis and subsequently to ensure the proper management of this dermatitis. This also makes it possible to avoid additional examinations, especially since the means of investigation are sometimes limited on site. At the end of May 2015, corresponding to the beginning of the wet season, a Moroccan field medical and surgical hospital was set up in the city of Bissau in Guinea for a humanitarian mission. During the three-month period of this campaign, two cases among a hundred staff contracted dermatitis in *Paederus*.

### Observation 1

AE male, a 31-year-old nursing assistant with no notable pathological history who presented for three days a red plate on the neck with tingling sensation. The patient reported the notion of crushing, by reflex of an insect that he felt on the site of affection. The incident took place at night, under a projector when he was helping out with housework. Dermatological examination showed the presence of an extensive lesion, vesiculo-erythematous (Figure 1).



**Figure 1:** Plate érythémato-ve siculeuse at the neck in connection with the pédèrose.

The patient was put under the association chlorphenoxamine (SYSTRAL<sup>®</sup>) and trolamine (Biafine<sup>®</sup>), after a week of treatment, the lesions became scabby (Figure 2). The evolution was marked two weeks later by the disappearance of the lesions without leaving a scar (Figure 3).



**Figure 2:** Appearance of a crusted lesion after one week of treatment.



**Figure 3:** disappearance of the lesion without scar after 15 days of treatment.

#### Observation 2

EE male, 44-year-old gynecologist, with no notable pathological history. The history of the disease dates back four days ago to the burning sensation in the neck during sleep. The patient did not report any notion of crushing an insect on the skin. On dermatological examination, the lesions were erythematous with some vesicles (Figure 4). The site of the disease and the clinical appearance of the lesions were in favor of *Paederus* dermatitis. Moreover, a significant outbreak of the insect in question was observed during this period of the wet season.



**Figure 4:** erythematous plaque with excoriations at the neck related to the pédérose.

The treatment was based on trolamine (Biafine®) in two applications per day poorly monitored. After one week of treatment, the lesions became crusted (Figure 5). The evolution was marked by the disappearance of the lesions a week later with persistent scars (Figure 6).



**Figure 5:** Appearance of crusted lesions after one week of treatment.



**Figure 6:** Attenuation of the lesion with persistent scarring after 2 weeks of treatment.

#### Discussion

*Paederus* dermatitis is a vesicant contact dermatitis known for several centuries. It has been reported in Chinese medicine since the eighth century of the Christian era, however it has been recognized in Western medicine in the last hundred years [2]. This dermatological condition is more common in the tropics, but it also affects some countries with a temperate climate [3]. It has been reported in the Democratic Republic of Congo, Congo Brazzaville, Uganda, Malawi, Namibia, Guinea Conakry, Nigeria, Tanzania, India, Sri Lanka, Malaysia, Brazil, Turkey, Iran, Italy, Egypt and Australia [1,2,4,5]. In the medical literature, there are several reports of epidemics of this dermatitis, sometimes even in hospitals, as is the case in Sri Lanka where this dermatosis has been reported in medical staff (especially night teams) and

some patients. who were staying in the open rooms of an urban hospital [6]. Similarly, three cases were reported among health professionals during a humanitarian medical mission aboard a boat on the Amazon River in Brazil [7]. Series of cases have also been reported among soldiers on mission in sub-Saharan Africa among them, the one described in the Democratic Republic of Congo where 154 cases were observed among UN soldiers on peacekeeping mission [8].

Several factors contribute to this condition among which, the behavior of these insects that require wet soils for their normal life cycle, so their population increases rapidly during the rainy season. Moreover, our two cases were observed during the wet season. These insects are also attracted by fluorescent lighting; our first case illustrates the risk incurred near these light sources. Ignorance of the insect by the population and therefore lack of knowledge of how to respond to exposure to this arthropod favor the incidence of this dermatitis [9]. This is actually a passive venomous insect belonging to the family of *Staphylinidae* and order of Coleoptera [1].

This family contains 3847 genera including *Paederus*, which contains more than 622 known species [10,11]. It has an elongated shape, narrow and flattened dorsoventrally. It is 10 to 15 mm long and has a segmented thorax and abdomen [1]. These red-orange colored abdominal segments are soft and the insect frequently straighten them in “Scorpion tail”. The head, part of the thorax and the posterior extremity are black (Figure 7). The insect has small folded wings, but you rarely see it [12].



**Figure 7:** *Staphylinid* Coleoptera of the genus *Paederus*.

Crushed on the skin, most often accidentally, *Paederus* releases an irritating toxin contained in its coelomic fluid called pederine which is more potent than cobra venom [13-15]. This toxin is polypeptide in nature ( $C_{25}H_{45}O_9N$ ) is apparently used by the genus *Paederus* as a chemical defense against predators [16]. It has been shown that this substance is not produced by these insects themselves. Indeed, its manufacture is largely limited to about

90% of females at the expense of the existence in endosymbiosis of a non-cultivable bacterium of the genus *Pseudomonas*, closely related to *Pseudomonas aeruginosa* [16-21].

This toxin blocks cell division by inhibiting the synthesis of proteins and DNA without affecting that of RNA [17]. The cells of the upper epidermis show mitotic aspects and apoptotic changes, such as chromatin condensation and DNA fragmentation. This leads to an intra epidermal and blistering sub-épidermique and an epidermal necrosis and acantholysis which is probably caused by the epidermal protease output [1,22,23]. The lesions usually sit in the exposed parts of the body [24-26]. Ocular and genital involvement is relatively common, due to the transfer of the toxic chemical to the skin by the fingers [17].

In 24 hours' s after exposure to homosexual rine, there appear erythematous and edematous with a sensation of burning, usually linear donnan boost appearance [27,28].

The shape and size of these lesions correspond to the surface affected by this toxin [12]. “Mirrored” lesions can be seen at flexion areas such as the elbow crease and adjacent thigh areas due to contact between infected and healthy regions. In the beginning the lesions are vesicular, usually turning into pustules to finally cover with a dry crust after 10 to 15 days [29]. Post-inflammatory hyperpigmentation may persist for months [25]. In extreme cases, *Paederus* dermatitis can cause neuralgia, arthralgia, fever and vomiting [17,30]. These symptoms may be mistaken for herpes lesions, shingles, periorbital cellulitis, photophyodermatoses, eczema and other vesicant insect dermatoses, such as cantharidin dermatitis. [12,2], but in the case of *Paederus* dermatitis, the association of a cluster of arguments that are the epidemiological characteristics of the region, the presence of other similar cases, the seasonal incidence, the Identification of *Paederus*, the time of appearance of lesions, their type and the preferential localization on exposed parts guide the diagnostic of this disease [2,25,31].

If the insect is crushed on the skin, it is recommended to immediately wash the area affected by the soap and water to remove the toxin, especially as the severity of the symptomatology depends on the concentration of this toxin as well as the duration of its contact with the skin [9]. It is also recommended to apply cold wetted compresses as well as silver sulfadiazine ointment (Flammazine®) [32-34]. Antibiotic therapy may be considered in case of superinfection [33]. The use of topical corticosteroids in *Paederus* dermatitis appears to be controversial. Indeed, some authors strongly recommend their application [3,33], while a study has shown that these steroids delay healing, giving them a palliative rather than a curative effect [29]. Regarding our first patient, he was treated by applying chlorphenoxamine (SYSTRAL®) is an antihistamine in combination with the trolamine (Biafine®), which is an emulsifier and it also has an analgesic effect. This treatment

was effective when the scars disappeared after the first two weeks. However, the second patient who used only trolamine (Biafine®) with poor compliance had persistent scarring.

In order to protect against *Paederus* dermatitis in endemic areas, preventive measures are necessary. One must first learn to identify the *Paederus* to avoid crushing it on the skin [14]. As these insects are attracted to fluorescent lights, the use of these light sources must be limited [35]. It is also recommended to check the presence of the insect on the walls or false ceiling before going to bed. The use of mosquito nets or insecticides to fight malaria seems to be also useful for protection against *Paederus*. Even dead, these insects must be handled with care in view of the persistence of the pederine in their coelomic cavity [25].

## Conclusion

*Paederus* dermatitis is an unusual form of contact dermatitis caused by pederin, a secretion of insects belonging to the genus *Paederus*. These insects are present throughout the world although their concentration is higher in the tropical and subtropical zones. Preventive measures to repel insects remain vital, together with curative methods (for example, immediate cleaning of the skin in contact with the irritating substance).

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