PAEDERUS DERMATITIS: A CLINICAL, EPIDEMIOLOGICAL AND THERAPEUTIC STUDY OF 417 CASESK. V. T. Gopal¹**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: INTRODUCTION: Paederus dermatitis is an acute irritant contact dermatitis caused by accidental crushing of an insect belonging to the genus Paederus. We came across an epidemic cluster of paederus dermatitis cases in our campus which prompted us to undertake this study to know its clinical manifestations, epidemiology and the most effective topical therapy. **METHODS:** The study included all clinically diagnosed cases of paederus dermatitis who were subjected to a thorough history and dermatological examination. Comparative assessment of efficacy of three commonly advised topical treatments was done by dividing patients into 3 age and sex matched groups: Group A (topical steroid), Group B (topical antibiotic) and Group C (topical steroid and antibiotic combination). All patients were followed up after 7 days, 15 days and 1 month. Polythene bags were used to collect insect specimens and species identification was done. **RESULTS:** Students residing in various hostels accounted for 251 cases (60.19%) whereas inhabitants of villages accounted for 101 cases (24.22%). Majority of the cases occurred during the summer months of April (90 cases), May (131 cases) and June (72 cases). Moist surroundings, dense vegetations and paddy or sugarcane fields were noticed close to the residences of affected patients. Head and neck were the most commonly affected site (38.60%) followed by the upper extremity (24.40%). Group C patients who used a combination of topical steroid and antibiotic healed fastest with a mean duration of 8.4 days whereas Group A patients and Group B patients had a mean healing time of 12.9 days and 14.7 days respectively. Paederus extraneus and Paederus melampus were identified as the commonest species in this locality. **CONCLUSION:** We observed that topical steroid and antibiotic combination is more effective than topical steroid and topical antibiotic alone. Prevention of human-insect contact acts as a hindrance for the development of Paederus dermatitis which can be achieved by increased public awareness.

KEYWORDS: Paederus dermatitis, clinical study, epidemiology.

INTRODUCTION: Paederus dermatitis is an acute irritant contact dermatitis presenting with erythematous and bullous lesions over exposed areas of the body, caused by accidental crushing of an insect belonging to the genus Paederus (Rove beetle – family Staphyllinidae) which releases the coelomic fluid containing potent vesicant – paederin.¹⁻³

Outbreaks of paederus dermatitis have been reported from many countries worldwide, mainly in the tropical regions including India.⁴⁻⁸

We came across an epidemic cluster of paederus dermatitis cases, on a daily basis over many months, mainly affecting the students residing in our medical college campus and villagers of adjacent localities.

Since no previous studies on paederus dermatitis have been conducted in Andhra Pradesh, we undertook this study to know the spectrum of clinical manifestations and the various

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epidemiological factors associated with paederus dermatitis in north coastal Andhra Pradesh. Our study also compared the efficacy of the commonly used topical medications in this condition.

MATERIALS AND METHODS: This study was conducted at the department of Dermatology of a suburban medical college hospital between January 2010 and December 2010. The study was approved by the Institutional ethics committee. The study included all cases of paederus dermatitis attending to the Dermatology outpatient department (OPD) during the 12 months period in whom the diagnosis was established clinically with detailed history and dermatological examination.

Prefilled proforma were used to note down the patients' history including age, sex, occupation, residence, family history and past history of similar skin eruptions, time at which the eruptions were first noticed and their duration, light source at residence (whether fluorescent or incandescent) and details of vegetation, plants and agricultural crops in their surrounding areas.

Thorough dermatological examination was done in all cases to determine the parts of the body affected, various primary and secondary skin lesions, number of skin lesions, patterns of skin lesions and eye and mucosal involvement. Presence of systemic features such as fever, constitutional symptoms and lymphadenopathy were noted.

All routine basic investigations like complete hemogram and serum biochemistry profile were carried out in cases with extensive skin lesions. Histopathological examination was done using 5mm punch biopsy specimens in selective cases who presented with characteristic morphological types of skin lesions.

Comparative assessment of efficacy of three commonly advised topical treatments was done by dividing patients into 3 age and sex matched groups of 139 cases each: Group A patients were advised to use topical steroid alone twice daily (mometasone furoate), Group B patients used topical antibiotic alone (fusidic acid) and Group C patients used topical steroid and antibiotic combination (mometasone furoate plus fusidic acid).

Anti-histamines and analgesics were given in addition to topical therapy as per the patients symptoms. All patients were followed up after 7 days, 15 days and 1month to note the response to treatment and residual changes such as pigmentary alterations and scarring. Patients were asked to look for insects on window screens, bed sheets and below fluorescent lights. Polythene bags were used to collect specimens from hostels, residential schools and houses near to dense vegetations and paddy fields. Expert consultation was sought from Department of Entomology, Andhra University, Visakhapatnam regarding entomological assessment and species identification.

RESULTS: Out of the 417 paederus dermatitis cases, 218 were males and 199 were females. The age of the patients varied from 7-69 years, the mean age being 20.6 years (SD = 7.28 yrs.). Two hundred and fifty six cases (61.39 %) were from the age range of 15 -25 years followed by 65 (15.58%) cases in the 25-35 years range. Medical and paramedical students residing in various hostels within the medical campus were predominantly affected accounting for 251 cases (60.19%) whereas inhabitants of villages accounted for 101 cases (24.22%).

Rest of the cases lived in urban areas. Concurrent occurrence of similar eruptions in other residents of hostel or household was reported in 110 cases (26.37%). Majority of the cases occurred during the summer months of April (90 cases – 21.58%), May (131 cases – 31.41%) and June (72 cases – 17.26%) whereas only 15 cases (3.59%) were seen in the 3 winter months of November,

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December and January. Out of the total of 417 cases, 297 cases (71.22%) first noticed the eruptions on their skin in the morning whereas 33 cases (7.91%) and 77 cases (18.46%) noticed the eruptions in the afternoon and night respectively.

The time interval between the observation of the eruptions and presentation at the OPD ranged from 1 hour to 6 days with a mean duration of 18 hours (SD = 22hrs). Fluorescent lights were used at night by 73% of the affected patients whereas incandescent light was used in 27% of the patients. Moist surroundings and dense vegetations were noticed close to the hostels where the affected students resided whereas almost all the patients residing in rural areas lived close to paddy or sugarcane fields.

Head and neck were the most commonly affected site seen in 161 cases (38.60%) followed by the upper extremity in 102 cases (24.40%) (Figure 1), trunk in 83 cases (19.90%), lower extremities in 63 cases (15.10%) and groin in 8 cases (1.91%). A periorbital predilection was present in 70 percent of the facial lesions (Figure 2). We came across many morphological types of skin lesions (Table 1) and observed various signs and symptoms (Table 2). In all the cases, the skin lesions began as a linear or irregular area of erythema associated with variable degree of itching and burning.

In most cases, within a day vesicles and bullae appeared over the erythematous area, ruptured within a few days forming erosions or crusting or developing secondary infection. A single skin lesion was observed in 148 cases (35.49%), two skin lesions were seen in 99 cases (23.74%) and more than two lesions were seen in 170 cases (40.76%). Pattern of distribution of skin lesions was linear in 192 cases (46.04%) (Figure 3), geographic in 108 (25.89%), herpetiform in 70 (16.78%) and annular in 57 cases (13.66%). Involvement of mucous membranes was commonly observed manifesting as keratoconjunctivitis (40 cases) whereas balanoposthitis was uncommon (3 cases).

Complete hemogram and serum biochemistry profile were within normal limits in all cases and histopathological examination revealed intraepidermal vesicle formation, areas of confluent necrosis and reticular degeneration in the epidermis with mononuclear perivascular infiltrate and edema in the upper dermis.

Comparative assessment of efficacy of various treatment modalities showed that patients of Group C who used a combination of topical steroid and antibiotic healed fastest with a mean duration of 8.4 days (SD = 1.7 days) whereas Group A patients who used topical steroid alone had a mean healing time of 12.9 days (SD = 2.1 days) and Group B patients who used topical antibiotic alone had a mean healing time of 14.7 days (SD = 2.4 days).

Post inflammatory hyperpigmentation was observed in majority of cases (69%) (Figure 4), a few lesions healed with hypopigmentation (6%) and scarring was not observed in any patient. A single species was not consistently identified from the specimen of insects collected. However, in majority of the samples, *Paederus extraneus* and *Paederus melampus* were identified as the commonest species in this locality.

DISCUSSION: *Paederus* beetles belong to family Staphyllinidae, order Coleoptae, class Insecta and consists of over 600 species which are distributed worldwide and have been associated with outbreaks of dermatitis in various countries including Australia, Malaysia, Iran, Nigeria, Brazil and India.^{4,6,7,9-11} *Paederus* are nocturnal and attracted by incandescent and fluorescent lights and dermatitis occurs as a result of inadvertent contact of humans with hemolymph of the beetle containing potent vesicant paederin which acts by blocking mitosis and releasing epidermal

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proteases.^{1,9,12} In our study, the incidence of paederus dermatitis was highest in the summer months of April, May and June and lowest in the winter months. Similar observations were reported by Padhi et al, Gnanaraj et al and Handa et al.¹³⁻¹⁵

In contrast, the incidence of cases is reported to be greater during the last quarter of the year in South America and in the month of September in Iran and Guinea which could be explained by variations in habitat specificity and rainfall pattern.^{1, 5, 9}

As in previous studies, majority of affected patients in our study were students residing in hostels and villagers who lived close to moist areas, dense vegetations and agricultural farms which are the natural habitat of these insects.^{8, 10, 14}

Exposed body parts such as head, neck and upper extremities were the most commonly affected sites in our study which was in concordance with previous studies from India, Sierra Leone and Sri Lanka.^{16- 18} The characteristic clinical picture shows linear erythematous and edematous plaques with central vesiculation.

A striking feature is the presence of "kissing lesions" that occur on adjacent surfaces such as the flexor aspects of knee or elbow. Usually, the skin lesions appear after 24 to 48h of contact, undergo crusting within a few days and heal in 10-12 days. Complications include cervical lymphadenopathy, post inflammatory hyperpigmentation, extensive exfoliating and ulcerating dermatitis requiring hospitalization and ocular involvement.^{2, 12, 13}

Ocular involvement occurs secondary to transfer of the toxic chemical from elsewhere on the skin by fingers and presents with unilateral periorbital dermatitis or keratoconjunctivitis (Nairobi eye).¹⁹ We observed kissing skin lesions in 11.03 % patients, post inflammatory hyperpigmentation in 67.14% patients and ocular involvement in 9.59% patients.

Clinical appearance of paederus dermatitis mimics many dermatoses including herpes simplex, herpes zoster, liquid burns, acute allergic or irritant contact dermatitis and phytophotodermatitis.^{1, 3, 12}

A thorough history, characteristic clinical presentation and epidemiological features such as seasonal incidence, occurrence of similar cases in a given area and identification of the insect always helps in correct diagnosis. Review of literature shows that the species commonly causing paederus dermatitis are *Paederus melampus* in India, *Paederus irritans* in Peru, *Paederus brasiliensis* in Brazil, *Paederus sabaeus* in Sierra Leone and *Paederus fusipes* in China.^{1, 5, 11, 17, 20}

In our study, *Paederus extraneus* and *Paederus melampus* were identified as the commonest species in north coastal Andhra Pradesh whereas due to the difference in the habitat of the beetles, *Mylabris phalerata* and *Mylabris pustulata* were identified in a study from the western part of neighboring state of Orissa.¹³

Treatment of paederus dermatitis initially involves removing the irritant by washing the area with soap and water followed by the application of topical agents.^{2, 4}

We observed that topical steroid and antibiotic combination is more effective than topical steroid and topical antibiotic alone. The better response to topical steroid and antibiotic combination in our patients suggests a concurrent bacterial infection as most of the *Paederus* spp. harbor symbiotic gram-negative bacteria that contaminate the area when the beetle is crushed against the skin.

Similar observations were recorded in a comparative study in Sierra Leone where healing time was statistically faster in patients who were given oral ciprofloxacin in addition to a topical

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steroid compared to topical steroid alone.¹⁷ However, systemic antibiotics were not used in any of our patients.

Prevention of human-insect contact is the cornerstone of preventing paederin-based trauma. Learning to recognize *Paederus* beetles and avoiding handling or crushing these insects will help decrease these eruptions.

Both doors and windows should be screened and closed to reduce the entry of beetles into buildings. A net or mesh can be tied under the lights to prevent the beetle from dropping onto humans. Since beetles are attracted to light, these should be switched off near areas where people sleep and excess vegetations around the residences should be cleared. Spraying appropriate pesticides particularly in the breeding season are often helpful.^{1, 13, 14}

To conclude, *Paederus* dermatitis is a common condition which can be prevented by increased public awareness. We conducted a series of awareness campaigns in and around our medical campus stressing on the simple preventive measures discussed above, leading to significant reduction in the incidence of *paederus* dermatitis. General physicians in the endemic areas should also be enlightened of this condition and its management.

CONCLUSION: We observed that topical steroid and antibiotic combination is more effective than topical steroid and topical antibiotic alone in the treatment of *paederus* dermatitis. Prevention of human-insect contact acts as a hindrance for the development of *Paederus* dermatitis which can be achieved by increased public awareness.

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Morphology of lesions	No. of cases	Percentage (%) n = 417
Macule	41	9.83
Papulovesicles	254	60.91
Urticarial plaque	137	32.85
bulla	91	21.82
Pustule	71	17.02
Erosion	44	10.55
Excoriation	08	1.91
Crusting	273	65.46

TABLE 1: MORPHOLOGY OF OBSERVED SKIN LESIONS

Signs and Symptoms	No. of cases	Percentage (%) n = 417
severe pain and burning	291	69.78
Erythema and swelling	212	50.83
pruritus	96	23.02
Kissing lesions	46	11.03
Eye involvement	40	9.59
Fever/constitutional symptoms	11	2.63
Regional lymphadenopathy	23	5.51
Post inflammatory hyperpigmentation	280	67.14

TABLE 2: OBSERVED SIGNS AND SYMPTOMS

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Figure 1: Discrete papulovesicular lesions with central crusting at places over lateral aspect of arm.

Figure 1

Figure 2: Erythema, papulovesicular lesions and crusting over periorbital area including both eyelids.

Figure 2

Figure 3: Linear crusted lesion with marginal vesiculation and surrounding multiple discrete pustules.

Figure 3

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Figure 4: Linear post inflammatory hyperpigmentaion over side of neck six weeks after presentation.

Figure 4

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