

## Original Article

**Comparison of Therapeutic and Anti-Inflammatory Properties of Triamcinolone with Placebo (Vitamin A) in Treatment of Paederus Associated Dermatitis**

Seyed Hasan Nikookar<sup>1</sup> Ahmad Ali Enayati<sup>2</sup> Seyed Farzad Motevalli-Haghi<sup>2</sup> Behzad Parsi<sup>3</sup>  
\*Mahmoud Fazeli-Dinan<sup>2</sup>

1- PhD Student, Department of Medical Entomology and Vector Control, Health Sciences Research Center, Mazandaran University of Medical Sciences, Sari, Mazandaran, Iran

2- Department of Medical Entomology and Vector Control, Health Sciences Research Center, School of Health, Mazandaran University of Medical Science, Sari, Iran

3- Department of Physiology and Pharmacology, School of Medicine, Mazandaran University of Medical Sciences, Sari, Iran

\*[m.fazeli@mazums.ac.ir](mailto:m.fazeli@mazums.ac.ir)  
(Corresponding Author)

(Received: 18 May 2014; Revised: 14 Jun 2014; Accepted: 18 Sep 2014)

**Abstract**

**Background and purpose:** Paederus associated dermatitis has always been considered as a health problem in the northern of Iran. Since until now, the traditional method and some corticosteroids have been used in the treatment of Paederus dermatitis (PD) and no comprehensive studies have been carried out on the new method of treatment. Therefore, this study was aimed to compare the anti-inflammatory effects of triamcinolone with placebo in treatment of PD.

**Materials and Methods:** This randomized double-blind clinical trial was performed during 6 months period in the clinics of Sari and Neka, Iran. Experimental group received triamcinolone and control group received placebo. The therapeutic effects of topically applied triamcinolone in 15 dermatitis patients and 15 control subjects were compared. The study subjects were visited in three separate times in the 1<sup>st</sup>, 7<sup>th</sup> and 14<sup>th</sup> day of the treatment. The data were collected in the questionnaire and compared in both groups by introducing the data into SPSS 11 software and analyzed by means of  $\chi^2$  test.

**Results:** A total of 15 patients, 10 and 5 cases were undertaken for treatment in the Sari and Neka Townships, respectively. 40% and 50% of the patients from Sari and Neka Townships had lesion size 6-10 cm<sup>2</sup>, respectively. In this study, 90% and 100% of the patients from Sari and Neka had complete recovery 7 days after treatment, respectively. Statistical analysis indicated a significant difference between the case and control groups ( $P < 0.05$ ).

**Conclusion:** Insignificant difference was observed for treatment between the patients from the two Townships under study.

[Nikookar SH, Enayati AA, Motevalli-Haghi SF, Parsi B, \*Fazeli-Dinan M. Comparison of Therapeutic and Anti-Inflammatory Properties of Triamcinolone with Placebo (Vitamin A) in Treatment of Paederus Associated Dermatitis. *IJHS* 2014; 2(3): 1-7] <http://jhs.mazums.ac.ir>

**Key words:** Anti-Inflammatory, Paederus Dermatitis, Triamcinolone

## 1. Introduction

The staphylinidae family with more than 30,000 species is the largest family of beetles. *Paederus* which belong to this family comprises 600 species of them and among these species 30 species cause skin and ocular lesion and dermatitis (1). *Paederus* beetles neither bite nor sting, but when crushed against the skin or the eye, they cause irritation and blistering that usually be called *Paederus* dermatitis (PD). PD is a peculiar type of irritant contact dermatitis caused by contact with the vesicant chemical pederin contained in the body fluids of *Paederus*. Pederin is the effective substance released after the insect has been crushed (2, 3). The epidemy of linear dermatitis has been reported in Malaysia (4), Iran (2), Iraq (5), India (6), Turkey (7), Sri Lanka (3), Japan (8) and Sierra Leone (9) and also have widespread in the west and east of Africa (10). Although this family has been known as a beneficial agent in nature and can reduce the number of harmful plant pests such as bugs in fields (11) but science the problem of dermatitis is a common problem that can be seen worldwide, consequently this insect is considered a medically important species. Population of staphylinid family increases at the end of the rainy season and after El-Nino phenomena and declines in the dry season (12). Adult beetles of this family often fly away from their natural breeding grounds and are attracted by the lighting of human habitations and people often crush these beetles against their skin so that its hemolymph is released. This fluid (called pederin) contains a unique toxic amide (13) that is one of the most toxic animal products known and even said that it is more toxic than cobra venom that affects the health of people and causes itching lesions (9). This kind of dermatitis appears only several hours after topical contact with the substance, giving a “whiplash” appearance when linear (14). Although the pederin concentration and exposure time of insect

contact are important for the severity of the dermatitis, but the role of region's temperature and humidity and also place of the body that is contact with the insect should not be ignored in severity of the lesion (15). Usually such dermatitis that caused by pederin is linear (16). The linear dermatitis is mainly due to the contact of the insect, and its stimulation on the skin (2, 17). All types of linear dermatitis such as, vesicle, pustule, erythema or pigmentation, discharged vesicular lesions, multifocal red papules along with burns, and itching are observed (18).

Topical glucocorticosteroids are the most widely used products in dermatology because of their favorable effects on inhibition of immune responses and cellular proliferation associated with cutaneous inflammatory diseases (19, 20). Triamcinolone acetonide is a synthetic glucocorticoid corticosteroid with marked anti-inflammatory action. In prior study given by Nikookar et al. (21), showed that triamcinolone has notable potential on the treatment of linear dermatitis caused by *Paederus* in the Guinea pig as animal model experiment model (21) and consequently in according to this considering the data and with given to the importance of this disease and potential of PD infection in northern coast linear and also in some southern regions of the Iran, it is necessary to perform appropriate studies by treatment of anti-inflammatory compounds such as Triamcinolone for rapid improvement of this disease on human patient. Thus, the present study was performed to evaluate the topical effects of triamcinolone and its anti-inflammatory and therapy effects in the human patients in a clinical trial model.

## 2. Materials and Methods

This randomized double-blind clinical trial (21-23) was conducted during 6 months period in Boali hospital and Toba clinic of Sari, Iran, and dispensary number-1, Vali e

Asr dispensary, Khatam al Anbia and Nimeh Shaban of Neka, Iran. The inclusion criteria for enrolling the patients in our study was PD that it was confirmed based on the clinical manifestation and physical comparison of the onset of lesion in <72 h, no previous treatment and the age of patient above 10 years. The exclusion criteria were the pregnancy, breast feeding and the children lower than 10-year-old. Of the total 15 patients, 10 and 5 cases were undertaken for treatment in the Sari and Neka Townships respectively. In this study, 50% and 60% of the study subjects orderly were the age group of 10-25 years and 26-45 years from the Sari and Neka Townships respectively. 50% of the patients from Sari Township were married and 80% from Neka Township unmarried. All patients were literate, and majorly of them were college students. About 50% and 60% of the patients at the Sari and Neka Townships had acute dermatitis respectively. Also in 35.2% of the patients at Sari Township and 33.3% from Neka Township, the lesion was observed on trunk and neck, respectively.

In the study period, the therapeutic effects of surface applied triamcinolone were compared in patient with PD. After describing the aim of the study, written consent was obtained from the patients. Then the study subjects were divided randomly into two groups: the first group underwent topical triamcinolone treatment twice a day, and the second group underwent treatment with placebo (22). The patients were recommended to use the medicine regularly and not to use any other drug during the study period. All the study subjects were checked up and interviewed thrice (the 1<sup>st</sup>, 7<sup>th</sup> and 14<sup>th</sup> day of therapy), and the obtained data were recorded in the questionnaire.

Base on other studies, the subjects with vesicular lesions, discharge and pustule with burning and itching and also a multifocal lesion more than 5cm<sup>2</sup> diameters were considered severe (acute dermatitis) (21-23).

The subjects with red and erythematic papule and papules with burning, itching and multifocal lesions up to 5 cm<sup>2</sup> were considered as moderate (the sub-acute dermatitis). The subjects with a single lesion <5 cm<sup>2</sup> diameter without pain along with erythematic and scaled were considered mild. It should be noted that the patients in their 2<sup>nd</sup> and 3<sup>rd</sup> visits were placed in one of the 4 categories as follow (21, 22):

- 1- The complete recovery of the disease: all of the symptoms disappeared, the vesicle and pustule healed and only the lesion site remained as erythema or pigmentation.
- 2- The partial recovery of the disease: the symptom subsided, and vesicles and pustules reduced in number and size.
- 3- No change of the disease: no recovery observed in the disease.
- 4- Severity of the disease: the symptoms, the size of the vesicles and pustules intensified and new lesion appeared.

The obtained data were analyzed using SPSS for Windows (version 11, SPSS Inc., Chicago, IL, USA) statistics and the  $\chi^2$  test. The level of  $P < 0.05$  was considered as a significant difference

### 3. Results

Table 1 shows the number of the patients and the age distribution and social status of study subjects in the Sari and Neka Townships. Half of the patients at Sari Township were in the age group of 10-25 years, and married, but majority of patient from Neka Township were in the age group of 26-45 years that were unmarried. All of the cases were literate and majority of them from Neka Township were college students. Furthermore, 40% and 60% of patients at Sari and Neka Township were Self-employed, respectively. In this study, 50% of the cases at Sari Township were male and other 50% were female, while at Neka Township 100% of patients were male.

**Table 1.** The gender and age distribution and the social features of the PD days

Feature	Sari	Neka	Total
Age in year	Number (%)	Number (%)	Number (%)
10-25	5 (50)	2 (40)	7 (66.66)
26-45	4 (40)	3 (60)	7 (46.66)
46>	1 (10)	0 (0)	1 (6.66)
Married	5 (50)	1 (20)	6 (40.00)
Single	5 (50)	4 (80)	9 (60.00)
Illiterate	0 (0)	0 (0)	0 (0)
Literate	10 (100)	5 (100)	15 (100)
Employed	1 (10)	0 (0)	1 (6.66)
Business	2 (20)	2 (40)	4 (26.66)
Housewife	3 (30)	0 (0)	3 (20.00)
etc.	4 (40)	3 (60)	7 (46.66)
Male	5 (50)	5 (100)	10 (66.66)
Female	5 (50)	0 (0)	5 (33.33)

PD: Paederus dermatitis

**Table 2.** Study of the disease signs, the cause, lesion, site history of disease, treatment period and wound size in the PD patients

Feature	Sari	Neka	Total
Signs and symptoms	Number (%)	Number (%)	Number (%)
Acute	5 (50)	3 (60)	8 (53.33)
Subacute	5 (50)	2 (40)	7 (46.66)
etc.	0 (0)	0 (0)	0 (0)
Cause Paederus	10 (100)	5 (100)	15 (100)
etc.	0 (0)	0 (0)	0 (0)
Lesion site			
Head and face	3 (17.64)	2 (33.33)	5 (21.73)
Neck	5 (29.44)	2 (33.33)	7 (30.43)
Hand	2 (11.76)	1 (16.66)	3 (13.04)
Trunk	6 (35.22)	0 (0)	6 (26.08)
Foot	1 (5.88)	1 (16.66)	2 (8.69)
History of Paederus lesion			
Yes	1 (10)	1 (20)	2 (13.33)
No	9 (90)	4 (80)	13 (86.66)
Treatment period in day (case)			
1	0 (0)	0 (0)	0 (0)
7	9 (90)	5 (100)	14 (93.33)
14	1 (10)	0 (0)	1 (6.66)
Observation in day (control)			
1	0 (0)	0 (0)	0 (0)
7	0 (0)	0 (0)	0 (0)
14	2 (25)	0 (0)	2 (13.33)
14>	6 (75)	7 (100)	13 (86.66)
Lesion size in cm <sup>2</sup>			
5< or 5>	4 (26.66)	1 (16.66)	5 (23.80)
6-10	6 (40)	3 (50)	9 (42.85)
11-15	1 (6.66)	2 (33.33)	3 (14.28)
16-20	1 (6.66)	0 (0)	1 (4.76)
21>	3 (20)	0 (0)	3 (14.28)

PD: Paederus dermatitis

Table 2 shows that 40% of patients at Sari Township had lesion size between 6 and 10 cm<sup>2</sup>, while half of the patients at Neka Township had

this condition. Ninety percent of the study subjects at Sari Township and 100% at Neka Township were treated completely after 7 days.



**Table 3.** Therapeutic response of the patient to the triamcinolone in compared with control

Days after treatment	Sari			Neka		
	Triamcinolone	Placebo	P-value	Triamcinolone	Placebo	P-value
	Number (%)	Number (%)		Number (%)	Number (%)	
1	0 (0)	0 (0)	Ns	0 (0)	0 (0)	Ns
7	9 (90)	0 (0)	P < 0.05	5 (100)	0 (0)	P < 0.05
14	10 (100)	6 (75)	P < 0.05	5 (100)	0 (0)	P < 0.05

The  $\chi^2$  test indicated that there is significant difference between case and control (placebo) in 7<sup>st</sup> and 14<sup>th</sup> days of the treatment in Sari and Neka (Table 3).

Figure 1 shows the complication due to contact with *Paederus* in a 10-year-old girl who presented with various acute pustular lesions and number of large bolus lesions at the center of pustule. Size of the lesion was 10 cm × 15 cm. The subject had no history of disease. She did not mention any history of drug usage, and even no history of disease among their family members. The patient was from a farmer family and living near to their rice field.

**Figure 1.** Lesion from contact with *Paederus*

#### 4. Discussion

The studies show that statins and corticosteroids have the anti-inflammatory and anti-leukocyte aggregation (24). In our study, significant difference in treatment was observed in the 7<sup>th</sup> and 14<sup>th</sup> days after

treatment. A similar study during 2 months period by single blind clinical trial method was performed in 77 patients at Behshahr Township (Iran) that was compared the effects of 4 drugs, the triamcinolone cloacarbane soap (TCC), betamethazone lotion, fluocinolone cream and placebo capsule. The rate of healing by using of fluocinolone group and betametazone Lotion was 100% while TCC and placebo showed 58.8% and 33.3% healing, respectively. In their study, significant difference was observed between the placebo and test groups (22). Also, Nikookar et al. compared therapeutic effects of Atorvastatin with placebo in the treatment of dermatitis due to *Paederus* beetles by randomized double-blind clinical trial methods. They showed the rate of recovery in the 7<sup>th</sup> and 14<sup>th</sup> days of treatment in compared with the control group (placebo) was 93.33% and 100% respectively and there was a significant difference in recovery rate between experimental and placebo groups (23).

Also in our study, the  $\chi^2$  test showed significant difference of the lesion site among the patients of the two townships (P < 0.05). Like the previous studies, lesions appeared more on the head, neck and face of the patients at the Neka Township while at Sari Township more on the trunk. Noteworthy, 50% of the Sari Township patients were female, and they generally used comfort cloths at home, hence more exposed to the *Paederus*. Therefore the lesions appeared more on the trunk. On the other hand, all of the Neka Township patients were male and generally out of the house and the uncovered body sites were more at risk of contact with

*Paederus*. For this reason, the lesions appeared more on the face, head and neck.

In this study, the dermatitis recovery showed significant difference between the case and control groups on the 7<sup>th</sup> day after treatment ( $P < 0.05$ ). It should be noted that there are not any study on the use of Triamcinolone on the human model yet and on this basis it seems that this evaluation performed for the first time. In the other significant difference was observed on the day 7<sup>th</sup> after treatment between the case and control group, which agrees with our findings (23). The best way of the prevention is to increase the public awareness and prevention of contact with the insect. In addition, procedures such as checking the cloths for insect before going to night bed rest, and avoiding crushing the lesion site are very effective. In our study, all of the patients under study recovered from the lesion till the day 14<sup>th</sup> of treatment with Triamcinolone, while in the control group, only less than half of them partially recovered. This drug could be used as a drug of choice in treatment of PD. Therefore, an execution in order to prevent the occurrence of dermatitis in the region under study is necessary.

### Acknowledgement

This project enjoyed the financial support of the Mazandaran University of Medical Sciences (with the code number of 88-143). Hereby we the authors would like to thank Seyedsomaieh Nikookar, Arezo Mohammadi, Marzieh Kyani Nasab and Davood Nikzad, for their cooperation and guidance and specially thank to Dr. Mitra Mahmoodi for preparation of drugs and placebo and kindly thanks to Dr. Zohreh Hajheidari for diagnosing the *Paederus dermatitis*.

### References

1. Schofield S. The tale of the *Paederus* beetle [Online]. [cited 2005 Mar 23]; Available from: URL:[http://www.forces.gc.ca/health/information/health\\_Promotion/Engraph/Beetlejuice\\_e.asp](http://www.forces.gc.ca/health/information/health_Promotion/Engraph/Beetlejuice_e.asp)
2. Zargari O, Kimyai-Asadi A, Fathalikhani F, Panahi M. *Paederus dermatitis* in northern Iran: a report of 156 cases. *Int J Dermatol* 2003; 42(8): 608-12.
3. Kamaladasa SD, Perera WD, Weeratunge L. An outbreak of *paederus dermatitis* in a suburban hospital in Sri Lanka. *Int J Dermatol* 1997; 36(1): 34-6.
4. Rahmah E, Norjaiza MJ. An outbreak of *Paederus dermatitis* in a primary school, Terengganu, Malaysia. *Malays J Pathol* 2008; 30(1): 53-6.
5. Al-Dhalimi MA. *Paederus dermatitis* in Najaf province of Iraq. *Saudi Med J* 2008; 29(10): 1490-3.
6. Gnanaraj P, Venugopal V, Mozhi MK, Pandurangan CN. An outbreak of *Paederus dermatitis* in a suburban hospital in South India: a report of 123 cases and review of literature. *J Am Acad Dermatol* 2007; 57(2): 297-300.
7. Sendur N, Savk E, Karaman G. *Paederus dermatitis*: a report of 46 cases in Aydin, Turkey. *Dermatology* 1999; 199(4): 353-5.
8. Armstrong RK, Winfield JL. *Paederus fuscipes dermatitis*; an epidemic on Okinawa. *Am J Trop Med Hyg* 1969; 18(1): 147-50.
9. Qadir SN, Raza N, Rahman SB. *Paederus dermatitis* in Sierra Leone. *Dermatol Online J* 2006; 12(7): 9.
10. Fox R. *Paederus* (Nairobi fly) vesicular dermatitis in Tanzania. *Trop Doct* 1993; 23(1): 17-9.
11. Morsy TA, Arafa MA, Younis TA, Mahmoud IA. Studies on *Paederus alfieri* Koch (Coleoptera: Staphylinidae) with special reference to the medical importance. *J Egypt Soc Parasitol* 1996; 26(2): 337-51.
12. Alva-Davalos V, Laguna-Torres VA, Huaman A, Olivos R, Chavez M, Garcia C, et al. Epidemic dermatitis by *Paederus irritans* in Piura, Peru at 1999, related to El Nino phenomenon. *Rev Soc Bras Med Trop* 2002; 35(1): 23-8.
13. Pavan M, Bo G. Pederin, toxic principle obtained in the crystalline state from the beetle *Paederus fuscipes* Curt. *Physiol Comp Oecol* 1953; 3: 307-12.

14. Kellner R, Dettner K. Differential efficacy of toxic pederin in deterring potential arthropod predators of *Paederus* (Coleoptera: Staphylinidae) offspring. *Oecologia* 1996; 107(3): 293-300.
15. Wilkinson SM, Beck MH. Contact dermatitis: Irritant. In: Tony B, Breathnach S, Cox N, Griffiths C, editors. *Textbook of dermatology*. Oxford, UK: Blackwell Science Ltd; 2004.
16. You DO, Kang JD, Youn NH, Park SD. Bullous contact dermatitis caused by self-applied crushed *Paederus fuscipes* for the treatment of vitiligo. *Cutis* 2003; 72(5): 385-8.
17. Kakakhel K. Acute erosive dermatosis of summer? *Paederus dermatitis*. *J Pakistan Assoc Dermatol* 2000; 10(1): 6-8.
18. Uslular C, Kavukcu H, Alptekin D, Acar MA, Denli YG, Memisioglu HR, et al. An epidemicity of *Paederus* species in Cukurova region. *Cutis* 2002; 69(4): 277-9.
19. Schimmer BP, Parker K. Adrenocorticotrophic hormone; adrenocortical steroids and their synthetic analogs; inhibitors of adrenocortical steroid biosynthesis. In: Hardman JG, Limbird L, Gilman AG, editors. *Goodman and Gilman's the pharmacological basis of therapeutics*. 12<sup>th</sup> ed. New York, NY: McGraw-Hill Professional; 2001. p. 1619-78.
20. Wyatt EL, Sutter SH, Drake LA. Dermatological pharmacology. In: Hardman JG, Limbird L, Gilman AG, editors. *Goodman and Gilman's the pharmacological basis of therapeutics*. 12<sup>th</sup> ed. New York, NY: McGraw-Hill Professional; 2001. p. 1795-818.
21. Nikookar SH, Moosa-Kazemi SH, Hajheidari Z, Davari B. Comparison of therapeutic and anti-inflammatory effects of topical triamcinolon with placebo in the treatment of *paederus dermatitis* in guinea pig. *Sci J Kurdistan Univ Med Sci* 2010; 15(4):10-8. [In Persian]
22. Davoudi SM, Rostami P, Emadi SN, Sadr B, Khabiri E. Comparison of the efficacy of fluocinolone cream, triclocarban soap and betamethasone lotion with placebo in the treatment of *Paederus dermatitis*. *Iran J Dermatol* 2006; 9(37): 217-20.
23. Nikookar SH, Mousa-Kazemi SH, Haj Haidari Z, Davari B. Comparison of atorvastatin with placebo in the treatment of *Paederus dermatitis*. *Sci J Kurdistan Univ Med Sci* 2010; 15(1): 53-62. [In Persian]
24. Andalib S, Ziaei M, Maleki N, Maljaei H, Hamzei H, Garjani A. Comparison of anti-inflammatory and anti-leukocyte accumulation effects of Statins. *Pharmaceutical Sciences* 2007; 2: 7-14.