



## Scholars Research Library

Archives of Applied Science Research, 2010, 2 (1) 187-190  
(<http://scholarsresearchlibrary.com/archive.html>)



ISSN 0975-508X  
CODEN (USA) AASRC9

### Allergic Ectopic Contact Dermatitis with Henna Tattoos

Divya T. Raj, Prabhu N.,\*Yamuna Gowri K, Vidhya N and Jasmine MK

Postgraduate and Research Department of Microbiology, Dr. N. G. P College, Kovai Medical Center and Hospital, Coimbatore, India

---

#### Abstract

The erythematic and edematous allergic reactions to pure henna are rare. But nowadays the allergic reaction to black henna containing para-phenylenediamine (PPD) has become most often. PPD causes majority of allergic reactions when applied over skin for tattooing. Here in this article, three such cases are described. The contact dermatitis in three adolescents is due to the presence of PPD which was then confirmed by patch test. Thus it is concluded that the application of PPD must be avoided in tattoos.

**Key words:** Black henna, PPD, contact dermatitis, allergic reactions, tattoos.

---

#### Introduction

Henna has been used to paint the skin for adornment and for religious reasons for about 9000 years in over 60 countries. Henna is the Arabic name for the plant whose botanical name is *Lowsomnia unermis* or *Lowsomnia alba* (Family Lythraceae). The plant is indigenous to North Africa, Middle East, India. The active ingredient is Lawsone (2- hydroxyl 1, 4 naphthoquinone). Natural henna imparts a brownish orange colour to the skin when applied. A variety of oils, powders, and dyes are often added to henna to obtain various colours. Pure henna is a safe product and reported allergic reactions are rare [1]. Tattoo is made by inserting ink into the layers of the skin to change the pigments.

Nowadays the use of henna tattoos has become more popular beyond its traditional values, especially among teenagers [2]. In 1990's henna artists in Africa, India, Arabia, Peninsula and the West began to experiment with PPD based black hair dye, applying it as a thick paste as they would apply henna, in an effort to find something that quickly make jet black temporary body art.

The combination of henna and PPD is known as black henna. It is often applied by street artisans at travelling carnivals and fairs [3]. PPD is a less toxic diamine used as a component of synthetic polymers, aramid fibers, cosmetic dyes, latex chemicals, textile dyes and pigments. Black henna ink commonly induces hypersensitivity reactions. Majority of the contact dermatitis reported with tattoos was due to the application of PPD in the henna [4]. Henna boosted with PPD can cause lifelong injuries. In this article we discuss the allergic contact dermatitis in three adolescents due to tattoos made of black henna.

### Case study

#### Case-1

An 18 year old boy was admitted to our clinic for allergic reaction on his left arm. The erythematous and edematous reactions were developed after the application of black henna containing PPD. The patient applied black henna for temporary tattooing. After two days, an acute allergic contact dermatitis was developed at the tattooed site. Within the borders of the tattooed site demarcated, indurated, erythematous, pappulo vesicular eruption followed by pain, edema, erythema and pruritis were reported. The past medical history of the patient was clear. Methylprednisolone 0.1% cream and oral hydroxyzine 100mg/day were administrated. The lesions were healed completely after three weeks of therapy. The patient was patch tested with European standard series after the complete recovery. The patch test results were evaluated after 48, 72 and 96 hours. The results showed positive reaction to PPD and negative reaction to pure henna.

**Figure 1: Demarcated, indurated, erythematous and pappulo vesicular eruption**



#### Case-2

A 16 year old girl was referred to our clinic for the erythematous and edematous allergic reaction at the tattooed site. The patient developed acute contact dermatitis 48 hours after tattooing. The tattoo had been stained with black henna which contained PPD. Edema, erythema and vesiculation were observed at the tattooed site. The patient was administrated with topical steroids and oral certirizine for two weeks. The lesions were resolved completely. The patient was recommended for the patch test and the results showed positive reaction to PPD where as it showed negative reaction to pure henna.

**Figure 2: Edema, erythema and vesiculation****Case-3**

A 20 year old boy with itchy pruritic rash was admitted to our clinic. The allergic reaction was developed three days after tattooing. He applied black henna with PPD for tattooing. The patient did not have any chronological medical condition. The area was swollen, red and itchy. Minivesicles were noted without weeping. The treatment was carried out for two weeks. Topical steroids were administrated. Itching and swelling subsided gradually where hypo pigmentation was seen for many months. The patch test was refused by the patient.

**Figure 3: Swollen, red and itchy****Discussion**

Henna tattooing plays an effective role in the day-to-day life of teenagers. It has become popular beyond the traditional values. Though pure henna is a safe product, the addition of components like PPD and P- toulidenediamine may lead to the allergic reaction of contact dermatitis [5]. The type of hypersensitivity reaction of allergic contact dermatitis developed in at least 7-10 days after new antigen is introduced [6]. However an acute life threatening type I reaction has also been described [7]. In the first case, allergic reaction developed two days after tattooing. The person had been sensitized to the PPD and developed contact dermatitis in a short period. PPD in a high concentration is the reason for the very short sensitization [8]. In the second case, the symptoms of contact dermatitis were observed and confirmed by patch test.

In the most reported cases, the allergic reaction developed in a couple of days and in some cases adverse skin reactions developed in some weeks following the application [1]. In the third case, the contact dermatitis observed at the tattooed site may be due to the PPD and it was not

confirmed since the patient refused the patch test. Erythema, swelling blisters weepy dermatitis, edematous dermatitis, erythema multiform, lichenoid dermatitis, pruritic dermatitis and papular dermatitis are the few common clinical symptoms of allergic reaction to black henna.

PPD is a potent T- cell stimulator [9]. The concentration and the duration of direct exposure play the key role for the PPD potency as an allergen. PPD is not permitted to be used as a skin product at any concentration [10]. The recommended concentration of PPD in patch test is 1%, whereas the concentration of this toxic substance in skin paintings is over five times greater [11].

From this study, it is confirmed that the application of PPD is the main cause for the allergic contact dermatitis at the tattooed site. So we recommend the public not to apply PPD on the skin for tattooing. Most countries have no regulation about the application of PPD on the skin for tattooing [12]. So the use of PPD in tattooing should be discouraged especially in children [13]. The clinicians and the public must be informed about the risks of the PPD containing black henna and the health department of the state must take care to prevent the usage of PPD as an additive in henna.

## References

- [1] I. Neri, E.Guareschi, F.Savoia, A.Patrizi. *Pediatr Dermatol.* **2001**; 19(6):503-505.
- [2] PK. Nigam, AK. Saxena. *Contact Derm* **1988**; 18:55-56.
- [3] L.Borrego, B.Hernandez-Machin, O.Gonzalez, B.Hernandez. *Contact Dermatitis.* **2005**; 52(5):288-289.
- [4] GG.Lestringant, A.Bener, PM. Frossard. *Br J Dermatol.* **1999**; 141:598-600.
- [5] WH.Chung, CM.Wang, HS.Hong. *Int J Dermatol.* **2001**; 40:754-756.
- [6] R .Rietschel, J. Fowler Jr. Fisher's. *Contact Dermatitis.* **1995**. 1-10.
- [7] M. Onder. *J Cosmetic Dermat.* **2004**; 2(3-4):126-130.
- [8] S. Devos, P.Vander Valk. *Contact Derm.* **2001**; 44: 273-275.
- [9] S. Sieben, Y.Kawakubo, B.Sachs, T.Al Masaoudi, HF.Merk, B.Blomeke. *Int Arch Allergy Immunol* **2001**; 124(1-3): 356-358.
- [10] <http://www.cfsan.fda.gov/~dms/cos-tatt.html>.
- [11] MD.Ronni Wolf, MD.Danny Wolf, Hagit Matz. *Dermatology Online Journal* **2003**; 9(1):3.
- [12] J.Matulish, J.Sullivan. *Contact Dermatitis.* **2005**; 53(1):33-36.
- [13] Nevin Uzuner, Duygu Olmez, Arzu Babayigit, Ozlem Vayvada. *Ind Pediatrics.* **2009**; 46:423-424.