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ORIGINAL ARTICLE

Para-phenylenediamine allergic contact dermatitis due to henna tattoos in a child and adolescent population☆

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Patch test;
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Abstract
Introduction: Henna tattoos are a very common practice in the adolescent population. Henna is very often admixed with para-phenylenediamine (PPDA) to improve the appearance of the tattoo. PPDA is a potent allergen, and is a frequent cause of allergic contact dermatitis (ACD).
Material and method: A study was conducted on the results of 726 consecutive children who had been patch tested in the University General Hospital Consortium of Valencia between 1980 and 2015.
Results: Almost half (49.7%; (361 cases) of the children had one or more positive patch test findings, with 4.7% (34) being allergic to PPDA. Mean age of patients allergic to PPDA was 12.4 years, and 44.2% were male. There were 2 cases (5.9%) of atopic dermatitis. Of the positive reactions, 73.5% were considered to be current clinically relevant. The sensitisation origin was a Henna tattoo in 50% of cases.
Conclusion: PPDA sensitisation is relatively common in the child and adolescent population. The most frequent origin is the performing of Henna tattoos adulterated with PPDA. Adolescents are at the higher risk of developing ACD due to Henna tattoos. Henna tattooing should be strongly discouraged in children.

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PALABRAS CLAVE
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Dermatitis alérgica de contacto a parafenilendiamina por tatuajes con henna en población pediátrica

Resumen
Introducción: Los tatuajes con henna son una práctica común en la población adolescente. En la mayoría de las ocasiones, la henna se mezcla con parafenilendiamina (PPDA) para mejorar las características del tatuaje. La PPDA es un potente alérgeno que causa con frecuencia dermatitis alérgica de contacto.
Material y método: Se recogió a 726 niños parcheados en la Unidad de Alergia del Hospital General Universitario de Valencia entre 1980 y 2015, identificándose los casos y revisando los resultados de las pruebas, así como datos clínicos y epidemiológicos.
Resultados: Trescientos sesenta y un niños (49,7%) demostraron sensibilización a al menos un alérgeno y 34 fueron alérgicos a la PPDA (4,68%). La edad media de los pacientes alérgicos a PPDA fue de 12,4 años. El 44,2% de los niños alérgicos eran varones. Dos pacientes (5,9%) presentaron antecedentes personales de atopia. El 73,5% de reacciones positivas a PPDA se consideraron de relevancia presente. El origen de la sensibilización fue la realización de un tatuaje con henna en el 50% de los pacientes.
Conclusión: La sensibilización a PPDA es relativamente frecuente en la población pediátrica. El origen más frecuente es la realización de tatuajes con henna adulterada. Los adolescentes son la población con mayor riesgo de presentar este tipo de reacciones. Se debe desaconsejar activamente la práctica de tatuajes con henna negra en la población pediátrica.

Introduction

Henna is a pigment extracted from the *Lawsonia inermis* plant. Because of its ochre hue, it has been used for centuries in different cultures to dye skin, nails or hair.[1] It has a low reactogenicity and reports of cases of allergic contact dermatitis caused by henna are extremely rare.[2,3]

In recent years, temporary tattoos with henna have become very popular among children and adolescents. However, the brownish hue, low contrast and short duration of staining make the results obtained with the pigment unsatisfactory. As a result, para-phenylenediamine (PPD) is commonly added to the henna mixture to speed up drying, improve contrast and darken the hue, so that designs look more like permanent tattoos. The resulting product from this mixture is known as black henna.[4–6]

Para-phenylenediamine is a disperse dye with a deep black hue. Its oxidised form is innocuous, but in everyday use it is never fully oxidised. Under these circumstances, it is a potent contact allergen, included in the ''Top 5'' list of strong sensitisers of the Food and Drug Administration.[6]

At present, the use of PPD in topical products is banned in the European Union (with the exception of PPD in hair dyes at a concentration of 6%).[7] In spite of this, there are still frequent cases of allergic contact dermatitis produced by tattoos made with henna adulterated with PPD.

The most frequent presentation of sensitisation to PPD is contact allergic dermatitis (CAD),[8–10] usually manifesting with erythema, vesicles and blisters at the site of henna application (Fig. 1). In some cases, it can lead to very severe or even fatal systemic allergic reactions.[11–13]

Many cases of sensitisation to PPD have been reported[2,9,10,14,15]; however, it would be useful to conduct a cross-sectional study to determine the prevalence of sensitisation to PPD in the paediatric population, and to establish its association with black henna tattoos.

Materials and methods

The aim of this study was to determine the prevalence of sensitisation to PPD in the population of paediatric patients referred to a skin allergy clinic, its epidemiological characteristics, and its association with black henna tattoos.

Figure 1 Allergic contact dermatitis caused by PPD from a black henna tattoo in an adolescent aged 16 years. The patient developed a vesicular rash with scab formation delineating the application of henna for the tattoo.