Occupational contact dermatitis in hairdressers

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Abstract

Hairdressers frequently have irritant and/or allergic contact dermatitis on the hands. They work under excessively wet conditions and repeatedly use shampoos, rinses, hair dyes, and permanent wave solutions containing irritating substances and/or allergens. Here, we describe (i) the background of occupational contact dermatitis among hairdressers and hairdressing apprentices, (ii) occupational contact dermatitis and the main allergens, and (iii) strategies for preventing occupational contact dermatitis.

Key words: occupational contact dermatitis, allergic contact dermatitis, irritant contact dermatitis, hand eczema, hairdressers, hairdressing apprentices

Introduction

Hand eczema as occupational irritant and/or allergic contact dermatitis on the hands is one of the most problematic skin diseases in hairdressers and hairdressing apprentices. We summarize the current situation and future strategy for reducing the affected frequency and improving the severity.

Background of occupational contact dermatitis among hairdressers and hairdressing apprentices

Occupational allergic and/or irritant contact dermatitis frequently occurs in hairdressers and hairdressing apprentices. Repeated exposures to various products for hair dressing frequently damage their hands and induce eczema. Repeated occurrences of irritation and allergic reaction may provoke sequential allergic sensitization and severe chronic eczema with spreading eczematous eruptions. This review is focused on general allergens and strategies of prevention for reducing contact dermatitis in hairdressers and hairdressing apprentices.

Bregnhøj et al. showed that hairdressing apprentices at the beginning of training had less eczema on the hands than a matched control group from the general population. Their results indicated that, with regard to skin diseases, hairdressing apprentices were healthier than the control group from the general population. Previously, Nyren et al. reported that atopic dermatitis in childhood did not influence the choice of career, but had a significant influence on job changes later in life, when severe eczema developed at work. Hairdressers and hairdressing apprentices, both with and without atopic dermatitis, also changed to other jobs due to the development of severe eczema. Uter et al. showed an obvious increase in skin changes and hand eczema of hairdressing apprentices during their three-year period of vocational training. Uter et al. stated that constitutional risk factors were difficult to evaluate because of the selective dropout of atopic participants. The development of hand eczema in hairdressers and hairdressing apprentices must be very seriously considered, because survivors have a distinctly lower risk profile. Hand eczema, however, is considerably under-reported as an occupational disease because of misperceptions among hairdressers and the lack of reporting from doctors.
Occupational contact dermatitis and main allergens

Occupational contact dermatitis in hairdressers includes irritant and allergic contact dermatitis. Irritant contact dermatitis may precede the development of allergic contact dermatitis. The concomitant presence of irritant and allergic contact dermatitis is not uncommon. Hand eczema by irritant substances develops more easily on atopic individuals. Hairdressers and physicians must understand the characteristics of irritant and allergic substances that can cause occupational contact dermatitis.

O’Connell et al. summarized the results of patch tests on 729 hairdressers. The most frequent positive allergens from the European baseline series in 729 hairdressers were nickel sulfate (32.1%), para-phenylenediamine (PPD) (19.0%), cobalt chloride (7.5%), fragrance mix I (6.6%), and formaldehyde (4.6%). The most frequent positive allergens from the hairdressing series in 538 hairdressers were glyceryl monothioglycolate (21.4%), ammonium persulfate (10.6%), toluene-2,5-diamine (4.5%), and ammonium thioglycolate (3.9%). These results were similar to those of previous studies. A study by Lind showed that the constituents of hair dyes most likely to cause sensitization were aromatic amines, such as PPD, toluene-2,5-diamine and toluene-2,5-diamine sulfate (para-toluenediamine sulfate).

Valsk et al. compared the results of patch testing and frequency of occupational allergic contact dermatitis in 300 hairdressers who had attended their department between 1994 and 2003 with the results of a previous study of 379 hairdressers who had attended their department between 1980 and 1993. They found a significant increase in the frequency of positive patch-test responses (78.3% vs. 58.8%) and occupational allergic contact dermatitis (58% vs. 48.8%). Statistic analysis was performed with Student’s t-test and values of p < 0.05 were considered significant. They observed a significant increase in sensitization to most allergens, including PPD (54% vs. 45.9%, p < 0.05), para-aminobenzene (40.7% vs. 31.9%, p < 0.05), ammonium thioglycolate (12.3% vs. 2.7%, p < 0.05), ammonium persulfate (14.3% vs. 7.9%, p < 0.05), toluene-2,5-diamine sulfate (15.3% vs. 6.8%, p < 0.05), para-aminodiphenylamine (7.7% vs. 2.9%, p < 0.05), o-nitro-4-phenylenediamine (7.3% vs. 2.1%, p < 0.05), and aminophenols (9% vs. 0%, p < 0.05). The main problematic allergens for hair dressers are described below.

(1) Para-phenylenediamine

PPD in hair dyes helps create long-lasting natural color. Hairdressers are clearly more sensitized to PPD than other groups. The frequency of positive patch test reactions to PPD in non-hairdressers is approximately 5% in Europe and North America.

PPD is used in permanent hair dye products, dyes for fabrics, dark makeup, printing and photocopying inks, rubber products, and other products. Malvestio et al. showed that PPD sensitization is significantly associated with hairdressing and beauty occupations in the sexes, professional drivers, barmaids, and cleaners in the female group, and bakers, waiters, household workers, and printers in the male group.

Hairdressers mainly present with eczema on the hands and forearms. Customers mainly present with eczema on the scalp and edema of the face, especially on the upper eyelids. Erythema multiforme can develop from PPD exposure. Allergic contact dermatitis from a permanent eyelash dye containing PPD occurs on the eyelids to which it is applied. Hairdressers can be sensitized to PPD from private use of PPD-containing products.

(2) Toluene-2,5-diamine and toluene-2,5-diamine sulfate

Toluene-2,5-diamine and toluene-2,5-diamine sulfate are used as colorants in permanent hair dyes and tints. Currently, toluene-2,5-diamine sulfate is used more often than toluene-2,5-diamine. Allergic sensitization to toluene-2,5-diamine and toluene-2,5-diamine sulfate has been increasing in recent years. Hairdressers can develop occupational contact dermatitis from toluene-2,5-diamine and toluene-2,5-diamine sulfate.

Scheman et al. showed that all patients with a positive allergic reaction to PPD and negative reaction to toluene-2,5-diamine sulfate can use a toluene-2,5-diamine sulfate dye. Individuals with positive allergic sensitization only to PPD can use hair dye products containing toluene-2,5-diamine sulfate. Hairdressers must carefully handle toluene-2,5-diamine and toluene-2,5-diamine sulfate to prevent sensitization to these substances.

(3) Glycerol monothioglycolate

Glycerol monothioglycolate is used as a wav-
ing agent in acidic permanent-wave products. It is retained in the hair for up to three months.\textsuperscript{10} Allergic sensitization to glyceryl monothioglycolate is one of the most prevalent sensitizations found among hairdressers.\textsuperscript{23-25} Recently, cases with a positive reaction to glyceryl monothioglycolate have fallen in number due to the increasing use of ammonium thiocyanate.\textsuperscript{10,14,25}

\textbf{(4) Ammonium persulfate}

Ammonium persulfate is an inorganic salt used as an oxidizing agent in hair bleaches and hair-coloring preparations.\textsuperscript{26} It can cause immediate and delayed allergic reactions in sensitized persons, both customers and hairdressers.\textsuperscript{27} Aalto-Korte and Mäkinen-Kiljunen identified specific binding of immunoglobulin E to ammonium persulfate in patients having immediate persulfate hypersensitivity.\textsuperscript{28}

\textbf{(5) Ammonium thoglycolate}

Ammonium thoglycolate is used in basic permanent-wave solutions and causes contact dermatitis. Occupational contact dermatitis has been reported.\textsuperscript{29}

\textbf{(6) Para-aminoazobenzene}

Para-aminoazobenzene is used in semi-permanent hair dyes. Seidenari et al. showed that 75% hairdressers with allergy to para-aminoazobenzene were also sensitized to PPD.\textsuperscript{30}

\textbf{Strategies for preventing occupational contact dermatitis}

Three strategies are mainly used for preventing occupational contact dermatitis. The first strategy is to eliminate dangerous, highly sensitizing substances from products and their replacement with substances having lower or no sensitization. For example, ammonium thiocyanate is a replacement for highly sensitizing glyceryl monothioglycolate.\textsuperscript{10,14,25}

The second strategy is protection from sensitizers. Hairdressers must avoid contact with such substances at work and at home. Sensitization to methylchloroisothiazolinone/methylisothiazolinone, fragrances, and methylidibromo glutaronitile may develop by not wearing gloves while shampooing clients. Hairdressers should avoid using latex gloves as they may induce an immediate type I allergy, including anaphylaxis.

The third strategy is information and support for hairdressers. Hairdressing organizations and occupational health websites provide good practical advice on self-management.\textsuperscript{31} Hairdressers should familiarize themselves with this advice as well as information of their rights and their employer’s duties concerning occupational allergies.\textsuperscript{31}

\textbf{Conclusion}

For several decades, extensive efforts have focused on reducing occupational contact dermatitis among hairdressers. However, many hairdressers still suffer from eczema. We must continue striving to reduce eczema among hairdressers by providing hairdressers with products and protectors with low or no sensitizing as well as information and support.

\textbf{References}

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