

York, USA) and normal saline were used as positive and negative controls, respectively. The patient showed positive reactions to glove extract (glove extract=5.25 mm, histamine=3 mm, NSS=0 mm).

A wear or use test was carried out with fingers cut from the suspected gloves and applied to a dampened finger of the patient (1-3). There was no reaction at 30 min. When the 1-finger test result was negative, the entire glove was donned for 30 min. The patient showed urticarial eruptions on the hand.

A double use test was performed by putting latex gloves over polyethylene gloves on a dampened hand for 30 min. There was no reaction, implying a practical solution.

The patient was patch tested using the European standard series. She had a positive patch test result to nickel, which probably related to jewelry.

Discussion

Natural rubber latex (NRL) protein sensitivity is a crucial and frequent problem, especially in healthcare workers (4). If there is a risk of anaphylaxis, a RAST may be performed before skin testing (4). Resuscitation equipment that contains no NRL compounds should always be available in the event of anaphylaxis. In this report, the allergy was proven by prick and use tests. Vinyl gloves are safe for individuals sensitive to rubber,

but such gloves may fatigue easily, developing cracks or holes that may admit the AIDS virus. When greater protection against contagious agents is required, latex gloves are preferable (1). Double gloves may be used. Non-rubber gloves are not available in Thailand (except thin polyethylene gloves). Because our patient showed no reaction on the double use test, we suggested that she use double gloves. She has used them for 5 months without any problems. Therefore, double use tests may be performed as a guideline for patients, though, since patients with contact urticaria from rubber gloves may develop conjunctivitis, asthma and even anaphylaxis, such a strategy cannot be recommended universally, and requires careful monitoring if employed.

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Allergic contact dermatitis from 2,7-dihydroxynaphthalene in hair dye

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Key words: hair dye; permanent dye; scalp dermatitis; 2,7-dihydroxynaphthalene; naphthalenes; allergic contact dermatitis; cosmetics; hairdressers' clients. © Munksgaard, 1997.

Case Report

A 46-year-old female shop cashier developed an exceptionally severe skin eruption on her scalp, face, upper chest and upper extremities. She needed oral corticosteroids and a 1-month sick leave. The cause remained unknown. Her skin eruption relapsed 2 months later, after her hair had been dyed, and she was referred to a

dermatologist for patch testing. The TRUE Test™ (Pharmacia) standard series was negative. We then obtained from the manufacturer 22 constituents of the hair dye, and further patch testing was performed. 2,7-dihy-

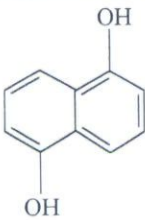
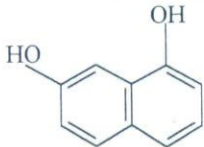
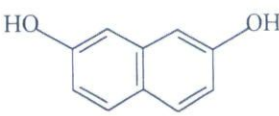
Table 1. Primary intermediates of hair dyes based on diamines or aminophenols

(a) <i>diamines</i>
2,5-diaminotoluene
2-chloro-p-phenylenediamine
N,N-bis(2-hydroxyethyl)-p-phenylenediamine
(b) <i>aminophenols</i>
n-methyl-p-aminophenol

Table 2. Couplers used in hair dyes

resorcinol
chlororesorcinol
2-methylresorcinol
naphthol
1,5-dihydroxynaphthalene
1,7-dihydroxynaphthalene
2,7-dihydroxynaphthalene
m-aminophenol
4-methyl-5-aminophenol
o-aminophenol
m-phenylenediamine
4-methyl-5-(2-hydroxyethyl)aminophenol

Table 3. Characteristics of some naphthalenes

Naphthalene structure	1,5-dihydroxynaphthalene	1,7-dihydroxynaphthalene	2,7-dihydroxynaphthalene
			
elemental formula	C ₁₀ H ₈ O ₂	C ₁₀ H ₈ O ₂	C ₁₀ H ₈ O ₂
molecular weight	160.18	160.18	160.18
CAS name	1,5-naphthalene-diol	1,7-naphthalene-diol	2,7-naphthalene-diol
CAS no.	83-56-7	575-38-2	582-17-2

droxynaphthalene 0.1% aq. elicited a +++ reaction, whereas the other constituents were negative. A use test on the lower arm with the hair dye also provoked a reaction. 20 control persons were patch tested with 2,7-dihydroxynaphthalene 0.1% aq.: 19 were negative, but 1 without any history of hair dye dermatitis had a ++ reaction.

Discussion

There are 5 main types of hair colours (1, 2), namely (a) restorers, e.g., lead acetate, (b) vegetable, e.g., henna (3), (c) temporary, based on large molecular weight acidic textile dyes (1), (d) semi-permanent, e.g., aminonitrophenols, and (e) oxidation or permanent (2). This last group is the most important, and also the most sensitizing (4). 2,7-dihydroxynaphthalene, the sensitizer in this case, is used as a coupler in permanent hair dyes (2).

p-phenylenediamine is the most common cause of allergic contact dermatitis (ACD) from permanent hair dyes (2). Of the primary intermediates (Table 1), p-aminophenol (5) and N-phenyl-p-phenylenediamine (5, 6) have caused sensitization. Resorcinol as a dye coupler (Table 2) has caused ACD (5, 7), but 2,7-dihydroxynaphthalene (C.I. 76645, synonyms: naphthalene-diol-2,7; naphthalene-2,7-diol) or the other naphthalenes used in hair dyes seem not to have caused al-

lergic reactions. Animal studies have indicated that 1,5-, 1,7- and 2,7-dihydroxynaphthalenes (Table 3) have no sensitization potential (8), but animal studies cannot be directly extrapolated to humans.

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