

Primary sensitization to toluene-2,5-diamine giving rise to early positive patch reaction to *p*-phenylenediamine and late to toluene-2,5-diamine

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Allergic reactions following the use of permanent hair dyes are well known and well described for both hairdressers and their clients. *P*-phenylenediamine (PPD) and toluene-2,5-diamine (PTD) are the two most widely used active constituents of permanent hair dyes (1). Both are extreme sensitizers (2). It has been shown, both in animal and patients studies, that there is a significant cross/co-reactivity between PPD and PTD, as well as for many other hair dye constituents (3, 4).

Case Report

A 54-year-old woman had her hair dyed in a hairdressing salon with four

different tones of Wella hair dyes, and in the following week, she developed erythema, oedema, and scaling of the face, neck, and arms. On previous occasions, she had had her hair dyed with three of the same tones of dark dye, without any indication of allergic reactions, but during this recent hair colouring, a fourth dye with a darker tone was also used. She had never been patch tested before and was not known to have been sensitized to other hair dyes. She had no relevant history otherwise.

Standard patch tests and standard prick tests, including latex, were performed. She was patch tested to the European baseline test series (Almirall Hermal GmbH, Reinbek, Germany) using 8 mm Finn Chambers® (Epitest Ltd Oy, Tuusula, Finland) on Scanpor® tape (Norgesplaster A/S, Venne, Norway) including 1% PPD (free base) and PTD (free base) in pet. Reactions were read according to the scale of the International Contact Dermatitis Research Group, defining a positive reaction as homogeneous infiltration and erythema (6).

Tests results showed a +? to PPD on D3, + on D4, and a ++ on D7. She had a + reaction to PTD only on D7 (Fig 1). No other reactions were observed.

Ingredient listings of all four of her hair dyes were examined. None of the dyes contained PPD, but all of them contained toluene-2,5-diamine sulfate, among many other ingredients.

Discussion

This case illustrates two interesting points. From her history, this patient has not been exposed to PPD but only to PTD. However, the patch test showed an early positive reaction to PPD and a positive reaction to PTD occurring on D7. The reaction pattern observed in this case may be explained by the frequent cross-reactivity between PPD and PTD. However, it is noteworthy that it was only because of the D7 reading, which is not standard in many clinics, that the positive reaction to PTD was observed. Therefore, we concur that a D3 reading is insufficient to detect all hair dye-sensitized patients. A later reading (D5/D7) is recommended in the literature based on the studies that found later readings more reliable than early readings (7). One patch

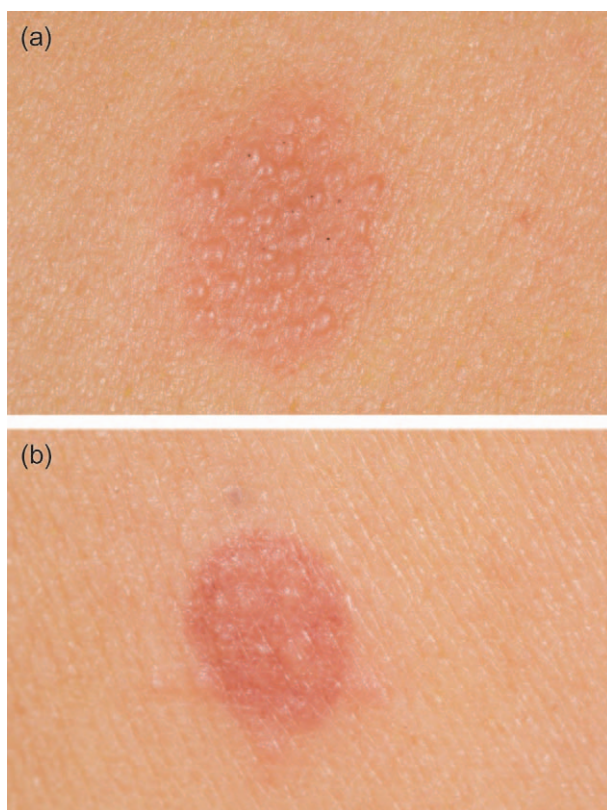


Fig. 1. (a) Patch test reaction to *p*-phenylenediamine. (b) Patch test reaction to toluene-2,5-diamine.

test population study showed that only a lone D2 reading shows 3.6% prevalence of PPD allergy compared with 4.8% if a D4 reading is included (8).

We query whether a 1% dilution of PTD is high enough. It would be desirable to investigate higher dilutions to determine if more sensitized patients would be detected.

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