

Contact anaphylaxis caused by Basic Blue 99 in hair dye

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Hair dyes can cause generalized reactions, for example contact urticaria syndrome, rhinoconjunctivitis, bronchial asthma, and even anaphylaxis (1). *p*-Phenylenediamine (PPD) is the most well-known sensitizer among hair dye ingredients (1), and is usually included in the baseline series, although it does not cover other sensitizing agents such as disperse dyes (2). We present a case of contact anaphylaxis following application of Basic Blue 99 (BB99) in a hair dye.

Case Report

A 56-year-old woman was referred to our dermatology department for identification of the cause of recent anaphylaxis. The patient had a history of asthma. She had recently replaced her brown semi-permanent, non-oxidative hair dye product with a deeper-coloured shade. She applied it on her head for the first time, and then showered; 10 min later, she had generalized wheals, nausea, dyspnoea, and impaired consciousness. She visited the nearest hospital, where she was given systemic corticosteroid treatment. A prick test with the hair dye containing BB99 showed a positive reaction (wheal 9 mm × 6 mm, erythema 30 mm × 25 mm)

(Fig. 1a), whereas neither the previous hair dye (wheal 5 mm × 4 mm, erythema 5 mm × 4 mm) nor saline (wheal 5 mm × 5 mm, erythema 4 mm × 4 mm) caused a positive reaction. Because the only difference in ingredients between the two hair dyes was the presence of BB99, and a prick test with PPD gave a negative result, we performed another prick test with BB99 0.1% aq. A positive result (wheal 10 mm × 5 mm, erythema 36 mm × 10 mm) was seen, with pseudopod development (Fig. 1b). BB99 0.01% aq. and BB99 0.001% aq. resulted in a slight reaction (wheal 2 mm × 2 mm, erythema 10 mm × 6 mm) and a negative result (no wheal, erythema 4 mm × 4 mm), respectively.

Discussion

BB99 (CAS no. 68123-13-7, 'arianor steel blue') is used as a direct hair dye and in rinse-off products such as shampoo. Because of its cationic nature, it has high affinity for hair, but low affinity for skin. Thus, it has little irritating properties and toxicity, and a prick test with BB99 1% aq. was reported to give negative results in 25 healthy controls (3). According to the Scientific Committee on Consumer Safety of the European Commission, BB99

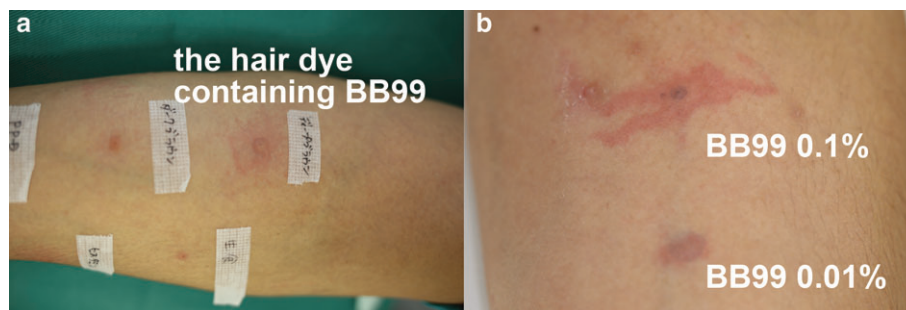


Fig. 1. (a) Prick test with the hair dye containing Basic Blue 99 (BB99). (b) Prick test with BB99 0.1% and 0.01%.

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is a mixture of 23–32 substances, and its components vary between batches (4). Contact dermatitis and contact urticaria have been previously reported in the literature (Table S1). Anaphylaxis [contact urticaria syndrome stage IV according to Krogh and Maibach (5)] caused by BB99 has not been reported. In previous reports, prick testing with BB99 was performed at a concentration of 1% aq. We performed a prick test with BB99 0.1% aq. to avoid contact anaphylaxis. Indeed, in our case, 0.1% aq. was strong enough to result in pseudopod development, and even 0.01% aq. caused a small wheal. As skin patch tests with BB99 have been performed at concentrations of 0.1% and 1% aq. (4), 1% BB99 might be too high a concentration for use in a prick test.

In conclusion, patients with anaphylaxis after hair dye use may be sensitized not only to PPD (2), but possibly also to BB99.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Table S1. Review of publications concerning allergic reactions to Basic Blue 99.

Appendix S1. Allergic reactions to basic blue 99.