

T Cell Mediated Delayed Anaphylaxis after Eyelash Tinting associated with a Positive Patch Test to 4-Paraphenylenediamine

Stembridge N^{1*}
Nasser S²
Todd P¹

¹Department of Dermatology, Addenbrooke's Hospital, Cambridge, United Kingdom

²Department of Allergy, Addenbrooke's Hospital, Cambridge, United Kingdom

Introduction

PPD (4-paraphenylenediamine) is a common allergen contained in many products including; permanent oxidative hair dyes, henna tattoos, eyelash tints, dark cosmetics, printing inks, x ray fluids, lithography, photographic film developers, leather processing, black rubber and shoe, clothing and fur dyes. Sensitisation to this allergen can occur at any time during life and reactions can range from an eczematous rash to rarer reactions including; contact urticaria, rhinitis, occupational asthma and systemic reactions including angioedema and anaphylaxis [1-3].

Keywords

4-Paraphenylenediamine [PPD]; Patch test; Delayed hypersensitivity; Anaphylaxis.

Case Report

A 48 year old lady had an eyelash tint performed for the second time at a local beauty salon. The first time was six weeks earlier and she had noted itchy eyes after the treatment. She had previously dyed her hair twice a year with a semi-permanent hair dye with no reaction. She had never had a henna tattoo. She had her eyelash tint in the morning and 7 hours later she noted itchy eyelids and the following morning periorbital swelling was noted that spread to her mouth and lips. 48 hours after the treatment she became breathless, dizzy, nauseated and dyspnoeic and was transferred by ambulance to the emergency department.

On arrival, she was found to be hypotensive with features of anaphylactic shock including wheeze and pallor. She was treated with oxygen, intravenous hydrocortisone, salbutamol nebulisers and intramuscular adrenaline and made a rapid recovery. She was admitted for observation and had no rebound reaction. By day three she had scalp soreness with crusting and scaling.

In view of the rapid onset of systemic symptoms she was reviewed by the allergy department who found she was dermographic with positive skin prick tests to dust mite, grass pollen and cat with negative skin prick reactions to PPD, PTD, ONPPD (2-nitro-4-phenylenediamine), bee and wasp venom. Her low blood pressure and systemic symptoms at the time of her presentation were fully consistent with a delayed T cell mediated anaphylactic reaction to PPD. Her negative skin prick test to PPD confirmed that she did not have IgE-mediated allergy. The allergist referred her for patch testing to consider a delayed hypersensitivity reaction to PPD. PPD was diluted to a standard concentration of 0.01% in Petroleum gel for patch testing. At her first patch test read at 48 hours later a strongly positive 2+ reaction to PPD was found with the same appearance seen at the final patch test read at 96 hours. An identical reaction to Nickel Sulphate was found at both patch tests reads.

Discussion

PPD is a well-known cause of delayed hypersensitivity in hairdressers and consumers [1]. Rarely, type 1 hypersensitivity reactions including contact urticaria and anaphylaxis can occur after exposure to hair dyes and one patient who developed anaphylaxis after having her hair dyed was reported to have a positive skin prick test to PPD confirming her reaction was IgE mediated [1]. Anaphylaxis, urticaria and angioedema have been reported after henna tattoos [2-4]. A 48 year old lady had a henna-based eyelash tint at a salon a day later developed oedema of her forehead, cheeks and eyes with eosinophils in her tear fluid reported as T cell mediated contact blepharconjunctivitis with a positive patch test to PPD and negative skin prick test [5].

Anaphylaxis is most often IgE-mediated in response to drugs, occupational substances and substances causing contact urticaria but the same or similar presentation may be seen more rarely due to a T cell mediated mechanism [6]. It is important to advise patients to avoid further use of products containing PDD to avoid further anaphylactic reactions. Death has been reported in a case of anaphylaxis secondary to PPD in hair dye [7].

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*Corresponding author:

Stembridge N,
Department of Dermatology
Addenbrooke's Hospital, Cambridge
United Kingdom
E-mail: natasha24@doctors.org.uk

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Anaphylaxis due to PPD contained in hair dye is reported, but to our knowledge this is the first case of T cell mediated anaphylaxis occurring after PPD exposure and specifically after eyelash tinting. Patch testing to PPD was helpful in this case to confirm her delayed hypersensitivity with negative skin prick testing ruling out an IgE-mediated anaphylactic reaction.

Conclusion

The case demonstrates the need for caution when patients are considering undergoing salon treatments including eyelash tinting and avoiding re-exposure to a further treatment after signs of sensitisation are noted.

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