

Multiple positive allergic reactions from patch testing to *p*-phenylenediamine and azo dyes. Is this a frequent risk and can it be reduced?

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Cross-reactivity between *p*-phenylenediamine (PPD) and azo dyes is well recognized. (1) We studied the

Table 1. Azo dyes in textile series

1	Disperse orange 3
2	Disperse yellow 3
3	Disperse red 1
4	Disperse red 17
5	Disperse blue 124
6	Disperse blue 85
7	Disperse orange 1
8	Disperse orange 13
9	Disperse brown 1
10	Basic red
11	Disperse blue 106

Table 2. Concomitant reactions to PPD and/or azo dyes: The first line shows the number of PPD positive patients and the concomitant number of positive reactions to azo dyes. The second line illustrates the number of PPD negative patients allergic to at least 1 azo dye and their concomitant number of azo dye positive reactions

	Number of azo dyes reacted to							
	0	1	2	3	4	5	6	7
Number of PPD positive patients	43	20	7	1	7	3	3	2
Number of PPD negative patients allergic to at least 1 azo dye		26	18	7	3	1	1	1

PPD, *p*-phenylenediamine.

frequency of concomitant positive allergic reactions between PPD and azo dyes. We also investigated the possibility of reducing the number of azo dyes in our textile series without running the risk of missing allergy. This investigation was prompted by a patient showing multiple extremely strong patch test reactions to PPD and multiple azo dyes inducing a very severe generalized skin eruption over the back.

The electronic records of 10 904 patients patch tested were evaluated. 1311 was tested simultaneously with PPD (1% PPD base in white soft paraffin) and a series of textile dyes. Our textile patch test series includes 17 textile dyes of which 11 are azo dyes, 5 anthraquinone dyes, and 1 is a nitro dye (Table 1). Readings were taken at 2 D and 4 D.

Of the 1311 patients tested to both PPD and our textile series, 86 were allergic to PPD with 43 being allergic to just PPD and 43 to both PPD and at least 1 azo dye. 57 were allergic to at least 1 azo dye but PPD negative. The concomitant sensitivity numbers are identified in Table 2. Patients with allergy to PPD commonly also reacted to Disperse Orange 3 (81%), Disperse Red 1 (29%), Disperse Yellow 3 (26%), Disperse Blue 106 (24%), and Disperse Blue 124 (24%). This is similar to previously published data. Goon et al. reported simultaneous patch test reactions to PPD and to Disperse Orange 3 in 46.1% and to Disperse Yellow 3 in 21.9% of their patients (2).

Analysis of concomitant reactions failed to identify any particular dye that will always co-react with at least 1 other azo dye. The number of patients with a minimum of 3 strong reactions from PPD and/or azo dyes was 36/1311 tested (2.7%). Of these 36, 23 (64%) were PPD positive and 13 (36%) were PPD negative. 22 of 43 patients testing positive to PPD and

at least 1 azo dye had a documented history of hair dye or temporary tattoo allergy. However, documentation was not available in all cases not allowing further evaluation.

Multiple (>3) positive allergic reactions are a risk, albeit small, in patients tested to PPD and our azo dyes, amounting in this study to 2.7% of the patients tested to PPD and our textile series. However, we were unable to rationalize our textile azo dye series without risking missing a potentially relevant allergen.

Patients investigated with a series of textile azo dyes should be warned of the risk, although low, of multiple positive reactions, particularly if there is a previous history of hair dye or temporary tattoo allergy. In such cases, consideration for testing for textile allergy at a separate time from standard series patch testing can be given.

References

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