

Occupational airborne allergic contact dermatitis from potassium metabisulfite

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Sulfites are heterogeneous compounds that are widely used in occupational and non-occupational fields as preservatives and antioxidants in foods, beverages, drugs, and cosmetics, as fixatives in the photographic industry, and as acidifying agents in tanning of leather (1–5). They mainly cause immunoglobulin E-mediated disorders (6), but contact dermatitis from sodium metabisulfite is reported (7).

Case Report

A 37-year-old non-atopic male agricultural worker presented with a 5-year history of itchy erythema, swelling and scaling of his face, including the eyelids, and more severe on the forehead and malar areas. An itchy erythematopapular scaly dermatitis was also present on the extensor part of the forearms. His condition had seasonal relapses, occurring after the grape harvest and persisting through the period of grape fermentation in the wine cellar. During these periods, the patient added potassium metabisulfite to the must to prevent yeast and bacteria proliferation and wine oxidation. When away from work, the dermatitis spontaneously healed in 10 days, and there were no relapses when he was assigned to other duties in the same vineyard.

Patch testing with SIDAPA (Società Italiana di Dermatologia Allergologica, Professionale e Ambientale) baseline series, agriculture series, potassium metabisulfite, sodium metabisulfite, and sodium sulfite (the latter three all at 1% in pet.) was performed 2 months after the resolution of the skin lesions (Table 1). The allergens (FIRMA Diagent, Florence, Italy)

Table 1. Patch, prick, and intradermal test results

	(%)	D2	D4
Patch test			
SIDAPA baseline series		—	—
Agricultural series		—	—
Potassium metabisulfite	1*	++	++
Sodium metabisulfite	1*	++	++
Sodium sulfite	1*	—	—
	(%)	D0	D2
Prick test			
Potassium metabisulfite	1**	—	++
Sodium metabisulfite	1**	—	++
Sodium sulfite	1**	—	—
Intradermal test			
Potassium metabisulfite	0.1**	—	++
Sodium metabisulfite	0.1**	—	++
Sodium sulfite	0.1**	—	—

SIDAPA, Società Italiana di Dermatologia Allergologica, Professionale e Ambientale.

*In pet.

**In sterile saline solution.

were tested on the upper back with Haye's Test Chambers® (Haye's Service B.V., Alphen aan den Rijn, the Netherlands) on Soffix® tape (Artsana, Grandate, Italy) and removed after 2 days. The readings (D2 and D4) were performed according to International Contact Dermatitis Research Group criteria. Positive reactions to potassium metabisulfite and sodium metabisulfite were observed (Table 1). To investigate a possible concomitant immunoglobulin E-mediated allergy, prick (1% in saline) and intradermal tests (0.1% in saline) with sulfites were carried out on the volar aspect of the forearm with readings at 20 min (D0) and 2 D (D2). Positive delayed eczematous reactions to prick and intradermal tests with potassium metabisulfite and sodium metabisulfite were observed (Table 1). Skin tests (patch, prick, and intradermal tests) with sulfites in 10 healthy volunteers were negative.

The patient did not report any problems after ingestion of food and drink containing sulfites.

Discussion

Contact allergy to sulfites is mainly caused by non-occupational exposure to sodium metabisulfite ('E' number for foods – E223). In a recent review of sodium metabisulfite sensitivity in 1751 patch tested patients, the allergy to this chemical was identified in 71 (4.1%). However, 38 (53.5%) positive reactions were not relevant. The most common cause of

allergy was topical medicaments, but occupational exposure was considered a source of sensitization in seven (9.8%) patients (8).

Contact sensitivity to potassium metabisulfite (E222), an antifermmentative used in breweries and wineries, has been rarely reported. One case of occupational allergic contact dermatitis of the hands was reported by Nater (9) 40 years ago. In our patient, an airborne exposure, never reported in relation to sulfite sensitivity, is supported by involvement of the upper eyelids, the triangle of skin behind the ears, and the uncovered part of his forearms. The absence of lesions on the hands is explained by the use of vinyl gloves at work.

The positive delayed reactions to skin tests with sodium metabisulfite were not a relevant cross-reaction as the patient had tolerated the use of local anaesthetic solutions containing sodium metabisulfite (added to prevent oxidation of adrenaline).

In a large series of patch tests with sodium metabisulfite carried out in 2894 consecutive eczematous patients by Vena et al. (10), all patients positive to this chemical (50, 1.7%) were sensitized to potassium metabisulfite, while only two (4%) of these were also positive to sodium sulfite. Metabisulfite is rapidly converted to bisulfite in an aqueous solution, but the latter is converted to sulfite only under appropriate conditions, such as acid pH, temperature, and ionic strength. This explains the negative reactions to skin tests with sodium sulfite in our patient.

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Key words: allergic contact dermatitis; cutaneous lymphoid hyperplasias; *N*-isopropyl-*N'*-phenyl-phenylenediamine; pseudolymphoma; T cells.

Lymphomatoid contact dermatitis is a chronic and persistent allergic contact dermatitis histologically similar to mycosis fungoides and is included in the cutaneous lymphoid hyperplasias. We report a 58-year-old male car production line worker with lymphomatoid contact dermatitis due to *N*-isopropyl-*N'*-phenyl-phenylenediamine (IPPD) present in his rubber gloves. Lymphomatoid contact dermatitis histology was observed in the IPPD patch test site. After avoiding contact with the causal agent, his skin lesions resolved with no recurrence after 2 years of follow-up.

Case Report

A 58-year-old car production line worker with localized plaque-type psoriasis on his knees presented with a 6-month history of itchy lesions on his forearms that had worsened with use of calcipotriol and anthralin derivatives. A less symptomatic lesion had been present on the right side of his neck for 1 month. On the distal third of the flexor and extensor surface of both forearms, symmetrical, well-defined plaques with erythema, desquamation, marked lichenification, and fissuring were present (Fig. 1). A well-defined erythematous plaque on the right side and the 'V' of his neck extended to his ear (Fig. 2).

Skin biopsies of the right forearm and neck lesions showed identical his-

tological findings. A lymphoid infiltrate with marked epidermotropism could be seen in the dermis with very discrete spongiotic microvesiculation (Fig. 3). The cells of the infiltrate had large, hyperchromatic, convoluted nuclei. Immunohistochemical stainings with CD45R0 (Fig. 4) and CD20, pan T-cell and B-cell markers respectively, showed the band-like infiltrate to be comprised of T lymphocytes (CD3, CD4, CD8, CD30, and CD1a were positive), with only CD4 cells in the epidermis and a large predominance of CD4 in the dermis.

A polymerase chain reaction for clonal T-cell rearrangement was performed, but no clonality was established. Plaque-stage mycosis fungoides was suggested histologically, but due to the lack of clinicohistological concordance, the histology was reviewed. The spongiotic microvesiculation (Fig. 3, asterisk) was considered minor compared with that expected with acute eczema, and a spongiotic variant of mycosis fungoides was considered, which in the majority of cases can be histopathologically indistinguishable from true mycosis fungoides.

Review of the patient's history showed that he used cotton gloves at work which came up to his wrists and over these, another pair of black rubber gloves, which reached the line where the skin lesions ended. During the previous month, his work had involved testing some items in vehicles during which the right side of his neck, face, and outer ear had come into contact with the rubber of the pedal cables. With this information, which suggested a possible lymphomatoid

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