

Contact Urticaria from Curcumin

Melinda Liddle, Christopher Hull, Clive Liu, and Douglas Powell

Turmeric, a spice derived from the rhizome of the plant *Curcuma longa*, contains the chemical curcumin, which is responsible for turmeric's taste, color, and biologic properties. Curcumin is used as a spice in foods, as a treatment in traditional medicine, as a dye for fur, and as a component in nutritional supplements. A few cases of allergic contact dermatitis from curcumin have been reported. We report two cases of contact urticaria from curcumin. These cases are mediated by two different mechanisms of contact urticaria: nonimmunologic and immunologic (immunoglobulin-E mediated).

TURMERIC is a spice derived from the dried rhizome of the plant *Curcuma longa*, which is cultivated in India and Southeast Asia. As a spice, it gives a food such as curry its strong flavor and color. Turmeric has been purported to treat many medical conditions ranging from liver and stomach ailments to dyspepsia, diarrhea, and many inflammatory conditions.¹ It has also been used to dye furs.²

Curcumin is the component of turmeric that gives the spice its unique taste and yellow color² and is thought to be responsible for turmeric's biologic activities.³ Rare cases of allergic contact dermatitis from curcumin have been reported among workers who dye animal furs,⁴ in a worker at a pasta factory,⁵ in an Indian spice miller,⁶ and from use of the Chinese herbal cream Chuu-ou-kou.⁷ In one patient's case, curcumin was noted to co-react during patch testing with ginger, cinnamic aldehyde, and cinnamic alcohol—spices with chemical structures similar to that of curcumin.⁷ Curcumin apparently is becoming more popular as people in Western countries use more alternative and herbal products.

Whereas the aforementioned cases were cases of contact dermatitis, no cases of contact urticaria from curcumin have been reported previously, to our knowledge. Two categories of contact urticaria have been noted: (1) immunologic, which is immunoglobulin-E (IgE) mediated, and (2) nonimmunologic, which is likely mediated by other inflammatory mediators, such as histamine, prostaglandins, leukotrienes, and substance

P.⁸ The immunologic variant, as do other IgE-mediated responses, typically causes systemic symptoms and extends beyond the area of contact (eg, reaction to latex). The nonimmunologic variant typically does not cause extracutaneous reactions and stays confined to the area of contact. This nonimmunologic type may develop into chronic dermatitis.⁹

We report two cases of contact urticaria from curcumin. The first case demonstrates the nonimmunologic form of contact urticaria whereas the second case apparently represents an immunologic (IgE-mediated) response.

Case 1

A 44-year-old woman was referred to the University of Utah contact dermatology clinic for evaluation of a recent pruritic eruption on the face and exposed areas of the arms. She had no history of atopic disease or known contact sensitivities. She was employed for many years at a company that produced various nutritional supplements. Her responsibilities included mixing a variety of ingredients before their placement into capsules. The patient's symptoms began after the institution of modifications in the production protocol, which included the addition of curcumin. Symptoms of severe pruritus started approximately 30 minutes after exposure to the powder, persisted during work hours, and diminished when away from work. She denied experiencing any pulmonary or gastrointestinal symptoms.

Clinical examination revealed numerous erythematous scaling patches and lichenified plaques on the eyelids, face, neck, distal arms, and hand, with minimal involvement of the lower legs. There was relative sparing of unexposed skin. Low-potency topical steroids were of little benefit.

From the Department of Dermatology, University of Utah School of Medicine, Salt Lake City, UT.

Address reprint requests to Douglas Powell, MD, Department of Dermatology, University of Utah, 4B454 SOM, 30 North 1900 East, Salt Lake City, UT 84132; E-mail: powell@derm.med.utah.edu

DOI 10.2310/6620.2006.06004

Results of open testing performed with curcumin as supplied by the nutritional manufacturing company were negative. Patch testing was performed with all of the spices used in the nutritional supplements, including curcumin “as is,”⁶ and with the North American Contact Dermatitis Group screening tray. There was a + reaction to gold sodium thiosulfate 0.5% in petrolatum, which was felt not to be relevant. The patient reported a sensation of itchiness under the patch where the curcumin was applied, but the reaction was negative at the 48-hour reading.

Subsequently, prick testing was performed with curcumin in a fashion previously described.⁸ Appropriate positive and negative controls were used. The curcumin site developed a large pruritic 2.5 cm red patch 30 to 40 minutes after application.

The patient was diagnosed with nonimmunologic contact urticaria from curcumin. Her employment duties were modified so that she could avoid the powder, and her symptoms improved, but she could never avoid the powder completely and thus continued to have mild reactions.

Case 2

Fifteen “normal control” subjects with no prior history of contact urticaria or curcumin sensitivity were prick-tested with the same material and in the same fashion as the patient in Case Report 1. They were asked specifically about food allergies, but they denied having any significant allergies.

One of the 15 subjects, a 20-year-old woman, reported noticing a small wheal some time after leaving the clinic; however, she was not available for evaluation of the lesion. She was subsequently retested in the same fashion; this time, she developed a large area (> 2 cm) of redness within minutes and intense pruritus that progressed up her arm and became generalized. The pruritus and urticarial lesions responded to intramuscular diphenhydramine. Upon questioning, she recalled that she had noticed laryngeal itching while eating sushi with ginger, occasional pruritus of the hands when cooking with “spices,” and the need for an inhaler whenever she had eaten hot tamales when she was a child.

Conclusion

Contact urticaria from spices is relatively common.^{10,11} The immunologic variant is IgE mediated and is treated with avoidance and antihistamines. The mechanism of the nonimmunologic variant is not well understood; this

variant can sometimes present as a combined eczematous and urticarial reaction.¹² Causative agents usually produce an initial wheal and flare reaction followed by eczematous changes after repeated exposure. In these cases, the eczematous response can mask the urticarial component of the disease.

History is critical in evaluating these patients, and possible co- or cross-reactions with other spices should be considered. Open testing is the safest method for detecting contact urticaria, but the chemical may need to be applied to previously affected skin. Closed-chamber testing can be done if reaction to an open test is negative. If the results of the above methods are negative, then scratch, prick, or intradermal testing can be used.⁸

Curcumin, which is used widely in traditional medicine, is also becoming more used in Western society in products such as nutritional supplements. A few cases of allergic contact dermatitis (type IV hypersensitivity) have been reported. We report two cases of contact urticaria from curcumin that were apparently produced by two completely different mechanisms, one immunologic and the other nonimmunologic. With the increasing use of this spice, we anticipate a rise in the cases of allergy to curcumin.

References

1. PDR for herbal medicines. 2nd ed. Montvale (NJ): Medical Economics Co.; 2000. p. 773–5.
2. Mitchell J, Rook A. Botanical dermatology. Vancouver: Greengrass; 1979. p. 724–5.
3. Araujo CAC, Leon LL. Biologic activities of *Curcumin longa* L. Mem Inst Oswaldo Cruz 2001;96:732–8.
4. Swartz L, Tulipan L, Birmingham DJ. Occupational diseases of the skin. Philadelphia: Lea & Febiger; 1957. p. 472.
5. Kiec-Swierczynska M, Krecisz B. Occupational allergic contact dermatitis due to curcumin food colour in a pasta factory worker. Contact Dermatitis 1998;39:30–1.
6. Goh CL, Ng SK. Allergic contact dermatitis to *Curcuma longa* (turmeric). Contact Dermatitis 1987;17:186.
7. Hata M, Sasaki E, Ota M, et al. Allergic contact dermatitis from curcumin (turmeric). Contact Dermatitis 1997;36:107–8.
8. Marks J, Elsner P, DeLeo V. Contact & occupational dermatology. 3rd ed. St Louis: Mosby; 2002. p. 389–94.
9. Lahti A. Nonimmunologic contact urticaria. In: Amin S, Lahti A, Maibach H, editors. Contact urticaria syndrome. New York: CRC Press; 1997. p. 5–6.
10. Rycroft RJG, Menne T, Frosch PJ, editors. Textbook of contact dermatitis. Berlin: Springer-Verlag; 1995. p. 314–400.
11. Cronin E. Dermatitis of the hands in caterers. Contact Dermatitis 1987;17:265–9.
12. Rietschel R, Fowler J. Fisher's contact dermatitis. 5th ed. Philadelphia: Lippincott Williams & Wilkins; 2001. p. 599.