

Erythema multiforme-like eruption following acute allergic contact dermatitis after exposure to the emulsified herbicide acetochlor

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doi:10.1111/cod.12225

Key words: erythema multiforme-like contact dermatitis; herbicide; acetochlor; emulsifier; calcium dodecylbenzene sulfonate; tristyrilphenol ethoxylates.

Case Report

A 35-year-old man presented with a 7-day history of an itchy eruption with target lesions on his forearms, hands, buttocks, and legs. Personal and family history were unremarkable. Less than one month before the onset of the rash, he had been exposed three times to an emulsified herbicide product containing acetochlor, owing to leakage from the container on his back. Although nothing happened after the first two incidents, 5 days after the third leakage a skin eruption appeared on his buttocks and on both legs, where the herbicide had leaked. The patient developed painful, red, swollen plaques with sharp borders and with small and large blisters. The lesions on the legs had a band-like pattern. Subsequently, oozing erosions developed. The patient was seen by a regional physician, who made a diagnosis of contact dermatitis, and immediately initiated therapy with systemic corticosteroids and antibiotics. Ten days later, the acute dermatitis had cleared, with mild scaling remaining. However, 2 days later, a second eruption with a lace-like pattern appeared, with target lesions just bordering the initial contact sites (Fig. 1) in addition to similar symmetrically distributed lesions on his forearms and hands, where there had been no previous contact with the herbicide emulsion (Fig. 1a). The second rash had resolved almost completely 12 days after the administration of systemic antihistamines and corticosteroids and the initiation of topical corticosteroid treatment.



Fig. 1. (a) Target lesions bordering the contact sites and on the forearms and hands. (b) Asterisks show the sites where the initial lesions were located.

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Funding source: This study is not supported by any funding.

Conflicts of interest: The authors have no conflict of interest to declare.

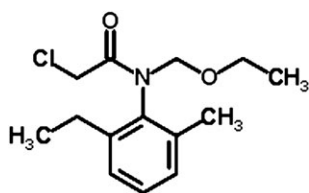
According to the manufacturer, the commercial herbicide contained 89% acetochlor (CAS no. 34256-82-1) and two additives: calcium dodecylbenzene sulfonate (emulsifier; CAS no. 26264-06-2) and tristyrilphenol ethoxylates (emulsifier; CAS no. 99734-09-5). No

Table 1. Results of patch testing

Chemical	Concentration and vehicle	Results			
		D2	D3	D4	D7
Acetochlor	0.01% acetone	++	++	+	+
Commercial product diluted with water to obtain the following acetochlor concentrations:	0.01%	++	++	+	+
	0.02%	++	++	++	+
	0.25%*	++	++	++	+
Calcium dodecylbenzene sulfonate	0.1% aq.	—	—	—	—
	0.5% aq.	IR	—	—	—
Tristyrylphenol ethoxylates	1% aq.	—	—	—	—
	2% aq.	IR	—	—	—
Acetone	Undiluted	—	—	—	—
Isopropanol	Undiluted	—	—	—	—

IR, irritant reaction.

*This is the concentration of the commercial product to which the patient had been exposed during his work.

**Fig. 2.** Structural formula of acetochlor.

further details on the composition were available. Four months later, the patient was patch tested with the commercial herbicide and its known ingredients. The chemicals applied in the patch tests included 0.01% acetochlor in acetone (Aladdin Reagent Database Inc., Shanghai, China), 89% emulsified acetochlor [Qingdao Jiner Agrochemicals (Group) R&D Co., Ltd, Qingdao, China], 68% calcium dodecylbenzene sulfonate in isopropanol and 99.5% tristyrylphenol ethoxylates (Shanghai Aoke Industrial Co., Ltd, Shanghai, China), 99.5% acetone (Luoyang Chemical Reagent Factory, Luoyang, China), and 99.9% isopropanol (Tianjin Kemiou Chemical Reagent Co., Ltd, Tianjin, China), which were diluted to the desired concentrations before testing if necessary. The aluminium chambers mounted on tapes were from Beijing Baiyi Yida Science and Technology Development Co., Ltd (Beijing, China). The results are shown in Table 1. Positive reactions were seen to the commercial product diluted with water to obtain 0.01%, 0.02% and 0.25% concentrations of acetochlor (the last of these being the concentration to which the patient had been exposed), and to acetochlor 0.01% in acetone. There were no positive reactions to the other

ingredients of the herbicide or the vehicle, acetone. Control tests in 10 volunteers were negative for 0.01% acetochlor in acetone.

Discussion

Acetochlor [CAS no. 34256-82-1; IUPAC name 2-chloro-N-(ethoxymethyl)-N-(2-ethyl-6-methylphenyl)acetamide] is a common, pre-emergence chloroacetanilide herbicide, which is widely used both in China and elsewhere for the control of most annual grasses and certain broadleaf weeds (1); its structural formula is shown in Fig. 2. Occupational contact dermatitis caused by the closely related herbicide alachlor has been observed (2), but allergic contact dermatitis caused by acetochlor has not previously been reported. Liu observed cases of contact dermatitis caused by another commercial acetochlor-containing product, but its ingredients were not disclosed, and patch tests were not performed (3).

Our patient had become sensitized to acetochlor by repeated occupational accidental contact with a commercial product containing this herbicide. A peculiar feature was the development of an erythema multiforme-like eruption at the borders of the previous contact sites and elsewhere on the body shortly after the acute allergic contact dermatitis had resolved with treatment.

Although the rash in the second episode might have been caused by the medications administered for the first rash, the location of the eruption surrounding the area of the initial lesions (Fig. 1b) is considered to indicate that the herbicide, rather than the medications, was the cause.

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