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Pesticides containing glyphosate are herbicides broadly used both for domestic and professional purposes. Although its irritant property is low (1), there are surprising cases of important irritant contact dermatitis (ICD) (2), and there is a controversy about the substances and mechanisms responsible for such cases (3). We have recently seen a patient who suffered an ICD after accidental exposure to a glyphosate herbicide, which caused an erythema multiforme-like (EEM-like) eruption at distant sites.

### Case Story

A 37-year-old woman gardener with no history of atopic dermatitis, neither recent medications, viral infections or vaccination, had been fumigating during 3 consecutive days, 2 hr/day, with a glyphosate herbicide (Touchdown Premium<sup>®</sup>; Syngenta Agro S.A., Madrid, Spain). The pesticide contained 36% ammonium salt glyphosate and was routinely diluted at 1.6% in water for its use.

The backpack containing the pesticide broke, and impregnated the patient's clothes during these 3 days. She noticed redness on her arms at the end of the first day of working with the pesticide, which became eczematous the second day. 5 days later, erythemato-purpuric plaques appeared on the skin of the upper extremities as well as target-like lesions on the abdomen (Fig. 1), axillae and groin.

A biopsy of a target plaque of the abdomen showed a discrete spongiosis and exocytosis in the epidermis (Fig. 2), with lymphoid perivascular infiltrate in the papillary dermis and some scattered eosinophils. No epidermal basal changes were present.

The patient was treated with oral corticosteroids and antihistamines, and the lesions resolved in 2 weeks with post-inflammatory hyperpigmentation. She avoided further use of the herbicide, and no new lesions reappeared.

**Erythema multiforme-like eruption due to an irritant contact dermatitis from a glyphosate pesticide**

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Fig. 1. Target-like coalescing papules and urticarial lesions on the abdomen after the eczematous phase on both arms.

After recovery, patch tests performed with the Spanish Standard series (True Test<sup>®</sup> and Chemotechnique<sup>®</sup>) and the Pesticide series (Martí Tor<sup>®</sup>, Barcelona, Spain) were negative. The patch test with the glyphosate herbicide 1% aq. was also negative, both on previously uninvolved (back) and involved skin (abdomen). 3 months later, she was patch tested again with the Pesticide series, 1,2-benzisothiazolin-3-one, and the glyphosate herbicide 1%, 5%, and 10% aq., and all of them showed negative results.

### Discussion

In the above-mentioned case, there are two aspects which are worth commenting: first, the development of an EEM-like eruption following an ICD; and second, the exuberant contact reaction caused by an apparently mild skin irritant pesticide.

EEM-like eruption is a rare manifestation that occurs a few days after

an allergic contact dermatitis (ACD) from diverse substances (4). Lesions are papules and plaques with a target-like appearance that appear at acral sites and/or at distant sites of the ACD. Although some cases have histology mimicking a true EEM (5, 6), the predominant pathology is one of a spongiotic dermatitis (4, 7, 8), and the whole picture could be considered as an id reaction ('autosensitization').

It is surprising that ICD, and not it ACD, can proceed to an EEM-like reaction. In our patient, we expected delayed hypersensitivity as the cause of the dermatitis, but all the patch tests performed were negative. Interestingly, glyphosate herbicide was patch tested [following other reports (1, 9)] at a much higher concentrations (10% aq.) than the one used by the patient during the fumigation (1.6% aq.).

There are 2 other previously reported cases, although not patch

tested, where an ICD prompted an EEM-like eruption (10, 11). This shows that type IV sensitization is not a prerequisite for the development of this id reaction. ICD and ACD share chemokines and clinical manifestations, and an immunological-like response may occur in ICD (12). Perhaps the principal factor required to develop an EEM-like eruption is the massive skin absorption of the allergen/irritant, and there are other immunological mechanisms, like a type III sensitization (13), that could play a role.

There is some controversy about the chemical responsible for contact dermatitis from glyphosate herbicides in the few cases reported (14). One case was because of benzisothiazolinone (15), a biocide present in some of these preparations. Other authors suggest the participation of the surfactant added in some formulations (2), which is also suspected to cause systemic toxicity when the herbicide is ingested (3). Nevertheless, more evidence is needed, and it cannot be excluded that the glyphosate molecule, an organophosphate compound, could be the toxic chemical affecting the skin.

Glyphosate herbicides are as irritant as a commercial baby shampoo (1). Despite wide use of these pesticides, ICD is very rare. Other factors might exist for the ICD to develop, like sweat or wet conditions, which permit a greater percutaneous absorption of the compound (16). This was the case in our patient. Additionally, she delayed rinsing off the herbicide. That might explain the important ICD and the subsequent EEM-like eruption she developed.

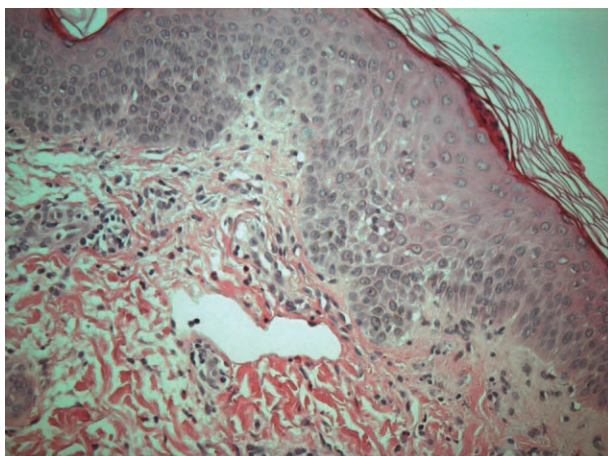


Fig. 2. Slight spongiosis and exocytosis from a target-like lesion of the abdomen (haematoxylin and eosin  $\times 200$ ).

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