Contact Dermatitis

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Photo-Aggravated Allergic Contact Dermatitis due to Hydroxyacetophenone Present in a Sunscreen: A Case Report

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1 | Case Report

We report the case of a 59-year-old man who presented with relapsing erythematous and itchy rashes on his face and neck over several months. The condition showed only partial improvement with topical corticosteroids. A skin biopsy revealed spongiotic dermatitis with apoptotic bodies. Upon reviewing the patient's medical history, daily application of a sunscreen (Fusion Water Magic SPF 50, Isdin, Barcelona, Spain) was identified. The patient acknowledged a possible causal relationship, noting that the itching often began after applying the cream (Figure 1). He was otherwise healthy, with no history of atopic dermatitis and no current medications.

In our department, the patient was studied with patch test and photo-patch test (UVA 5 J/m^2) of the European baseline series and sunscreen series (Chemotechnique Diagnostics, Vellinge, Sweden and AllergEaze, SmartPractice, Calgary, Canada on Finn Chamber Aqua, Smart Practice, with Scanpor tape, Norgesplaster, Vennesla, Norway) as well as patch test and photo-patch test of the suspected cream 'as is' and a photo-test to establish the minimal erythematous dose (solar simulator). All the tests were negative or normal, except the cream 'as is' that revealed a 1+ reaction on D4 both in the patch and photo-patch tests (Figure 2). With these results, the manufacturer was contacted to provide the sunscreen components prepared according to de Groot [1] (or, if not available, in the concentration of the formula). In a second study, the patient was patch and photo-patch tested with the supplied products (specified in Table S1). The results revealed a weak positive (1+) reaction with a mild palpable erythema for hydroxyacetophenone on D4 and D7 and a stronger (2+) infiltrated reaction when irradiated on D4 (D2 after irradiation) and D7 (D5 after irradiation) (Figure 2). Seven controls were patch tested with hydroxyacetophenone with negative results. After this finding, the patient was patch tested with resacetophenone with a negative result, and no previous reactions to other acetophenone-containing substances could be detected.

2 | Discussion

This case is the first report of allergic contact dermatitis due to hydroxyacetophenone (CAS n°: 99-93-4) in a sunscreen and the third due to its presence in a cosmetic [2, 3]. Allergic contact dermatitis due to acetophenone compounds (acetophenone azine [4, 5], resacetophenone [6, 7], hydroxyacetophenone [2, 3], among others) is increasingly described in the literature. These compounds are particularly used for their preservative/antioxidant properties. Hydroxyacetophenone is a natural extract in

FIGURE 1 | Clinical picture of the reaction with erythema and crusting on the neck. The background of the picture has been modified due to the presence of patient' belongings.

plants which may be found in cosmetics and pharmaceuticals [2]. Allergic contact dermatitis cases have been described for a face cream and an anti-wrinkle serum [2, 3].

Furthermore, this case represents the first description of some photo aggravation potential of this chemical in clinical practice. The potential of photo-sensitisation has been rarely evaluated for acetophenone-related compounds, except for 4-methoxyacetophenone which was considered a probable non-sensitiser in *in chemico* skin photosensitisation assays [8]. This case highlights the possibility of additional photoaggravation in acetophenone compounds. The addition of these compounds in sunscreens may increase the frequency of these reactions.

In conclusion, this contact point presents a case of photoaggravated allergic contact dermatitis due to hydroxyacetophenone present in a sunscreen and expands the spectrum of sources and clinical manifestations of acetophenone compounds.

Author Contributions

David Pesqué: conceptualization, formal analysis, writing – original draft, investigation, methodology. **Emilio Berná-Rico:** writing – review and editing, methodology, validation. **Gabija Rudzikaitė:** methodology, writing – review and editing, validation. **Ramon M. Pujol:** methodology, validation, writing – review and editing. **Fernando Gallardo:** methodology, writing – review and editing, validation. **Ana M. Giménez-Arnau:** conceptualization, methodology, supervision, writing – review and editing, validation.

Consent

The patient has given written consent to publish his case details and pictures.

Conflicts of Interest

Outside the submitted work, Ana M. Giménez-Arnau has been a medical advisor for Uriach Pharma/Neucor, Genentech, Novartis, FAES, GSK, Sanofi–Regeneron, Amgen, Thermo Fisher Scientific, Almirall, Celldex and Leo-Pharma. She has received research grants from Uriach Pharma, Novartis and Instituto Carlos III-FEDER. She has participated in educational activities for Uriach Pharma, Novartis, Genentech, Menarini, Leo-Pharma, GSK, MSD, Almirall, Sanofi, Avène. David Pesqué has received research funding from LEO Foundation. All other authors declare no conflicts of interest.

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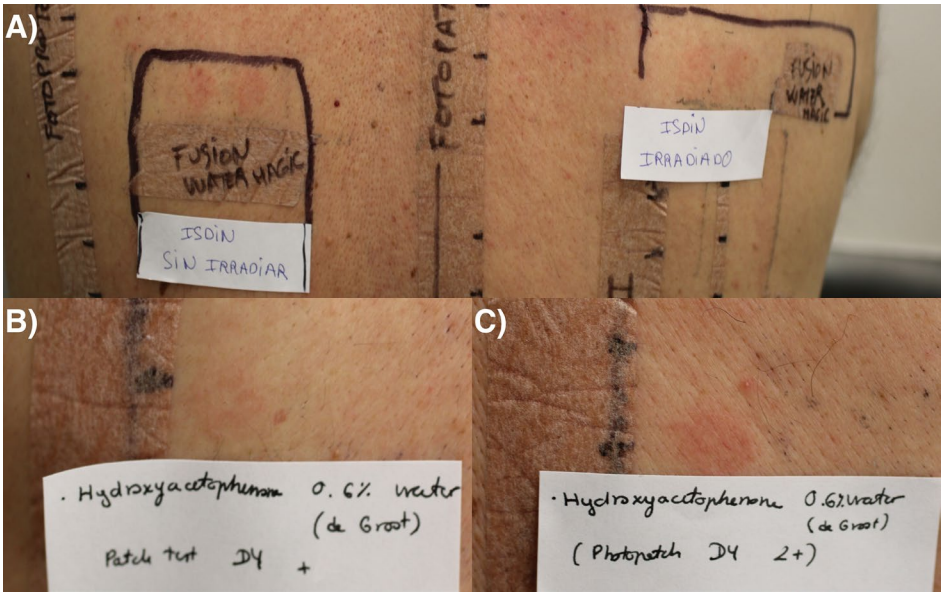

FIGURE 2 | (A) Patch test results to the sunscreen 'as is'; (B) patch test reaction on D4 and (C) photopatch test reaction on D4.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.