

8. Riaz F, Rashid RM, Khachemoune A. Onychoheterotopia: pathogenesis, presentation, and management of ectopic nail. *J Am Acad Dermatol.* 2011;64:161–6, <http://dx.doi.org/10.1016/j.jaad.2009.11.018>.

L. Navarro Campoamor*

Servicio de Dermatología, Hospital Beata María Ana, Madrid, Spain

*Corresponding author.

E-mail address: lournacam@gmail.com

27 March 2019 9 April 2019

<https://doi.org/10.1016/j.adengl.2020.12.026>
1578-2190/ © 2020 AEDV. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Photoinduced Granuloma Annulare Confirmed by Experimental Exposure to UVA Light[☆]



Granuloma anular fotoinducido demostrado experimentalmente mediante fotoprovocación UVA

To the Editor:

A 59-year-old man with type 2 diabetes mellitus who had experienced myocardial infarction 2 years earlier was seen for asymptomatic, generalized, somewhat photodistributed skin lesions that had appeared 1 year earlier and had not responded to topical corticosteroids. The patient was a nonsmoker and was taking daily fenofibrate, aspirin, acenocoumarol, metformin, pantoprazole, folic acid, and bisoprolol. He ruled out any connection between the dermatosis and his work, as the lesions persisted after he left his job as a plasterer.

The dermatological examination revealed annular erythematous and violaceous papules with raised borders that clustered to form plaques on the back of the hands (Fig. 1A).

Smaller, isolated, light pink annular lesions (approximately 3–4 mm) were present on both arms (Fig. 1B).

A phototest was performed using different light sources. A reading was taken immediately to determine the minimum urticarial dose and again after 24 hours to determine the minimum erythematous dose. Photoprovocation and photopatch tests were also performed. The immediate phototest reading revealed a normal response to both ultraviolet (UV) A and UVB light. After 24 hours the values obtained for the minimum erythematous dose were as expected for the patient's phototype (31 mJ/cm²), and the response to UVA was normal. Double reading of photopatch tests (non-irradiated and UVA-irradiated [13.32 J/cm²] patches) after exposure to the standard battery, together with the drugs that the patient took habitually, revealed no reaction indicative of exogenous skin photosensitivity at either 24 or 48 hours after irradiation (Fig. 2A).

In a photoprovocation test, UVB irradiation of the back and shoulder had no effect, while UVA irradiation (24.42 J/cm²; Fig. 2B) resulted in the appearance of some micropapules and erythema after 48 hours. The lesions reappeared on the following days of the photoprovocation test, up until day 6 (cumulative dose, 97.71 J/cm²). Based on this



Figure 1 Clinical presentation of the patient. A, Brownish, arciform, erythematous plaques with a tendency to coalesce on the backs of the hands and the dorsal aspect of the forearms. The lesions were mildly infiltrated and lacked an appreciable epidermal component. B, The lesions extended to the volar aspect of the forearms, where they were milder and coalesced less.

[☆] Please cite this article as: Fonda-Pascual P, de Gálvez MV, Aguilera J, Herrera-Ceballos E. Granuloma anular fotoinducido demostrado experimentalmente mediante fotoprovocación UVA. *Actas Dermosifiliogr.* 2021;112:190–192.

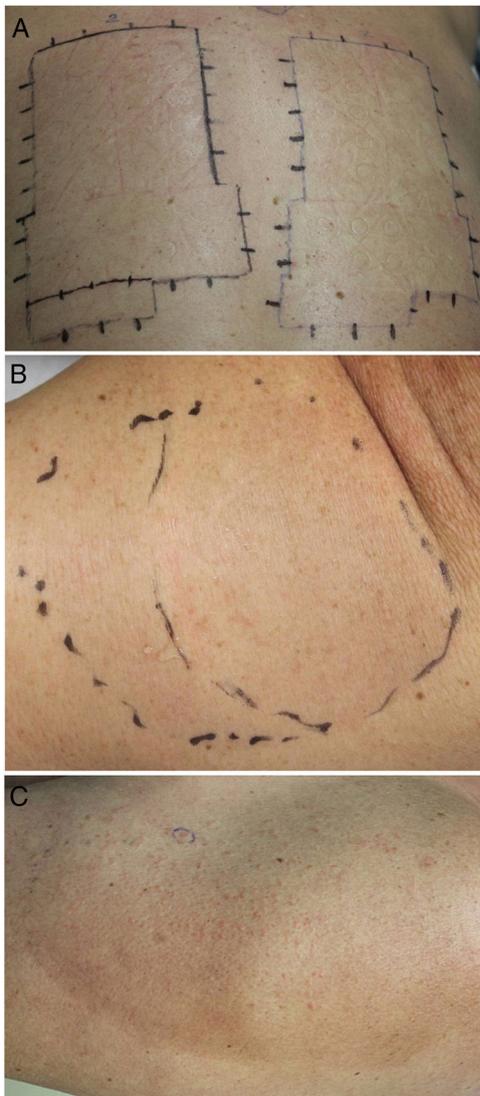


Figure 2 Photobiological study of the patient. A, Photopatch reading at 48 hours. The photopatches on the left were irradiated with UVA for 6 minutes using a Philips® HB 404 high pressure lamp (13.32 J/cm^2). The patches on the right were not irradiated. No contact or photo-contact reactions were observed for the standard battery or for the drugs that the patient had been prescribed. Results were also negative after 96 hours. B, Photoprovocation on day 1 of irradiation (7 min; 15.54 J/cm^2). The photoprovoked region consisted of an area directly irradiated with UVA (left) and an area covered with a water-filled Petri dish (right) to eliminate the infrared (IR) component. C, Photoprovocation at 144 hours. Isolated minute micropapules are evident on the left side of the irradiated area. Some of the lesions near the edge are larger. Milder lesions are also evident in the area protected from IR radiation.

finding, a skin biopsy of the newly formed lesions and the pre-existing papules was performed. Histology of the biopsies revealed numerous histiocytes and multinucleated giant cells distributed interstitially in the papillary and reticular dermis (Fig. 3A and B). No phagocytosis of elastic fibers was observed in interstitial macrophages (Fig. 3C). Based

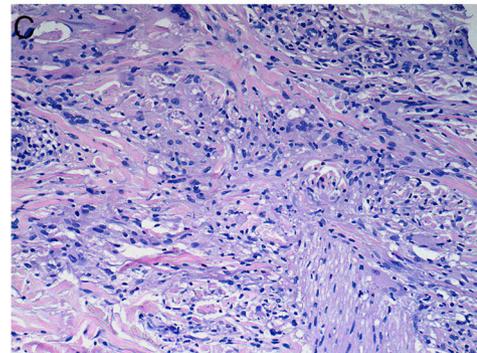
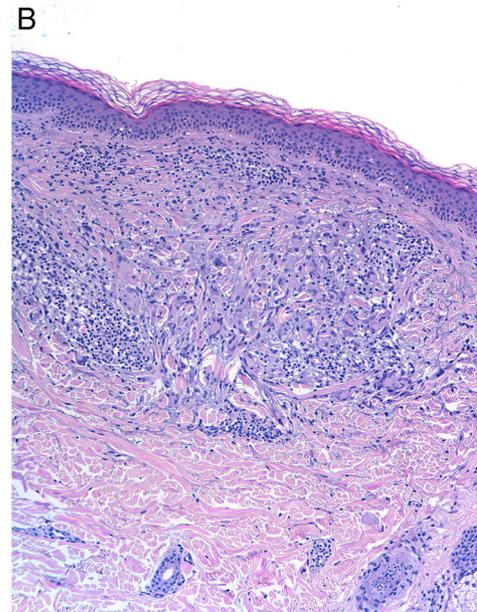
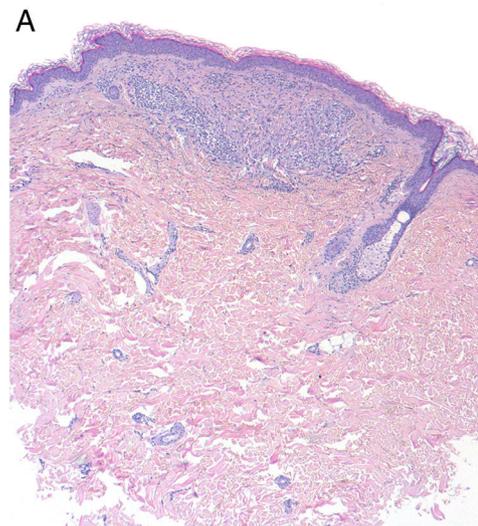


Figure 3 Histology of newly formed papules after photoprovocation. A, Well-circumscribed interstitial dermal infiltrate. At low magnification, neither granulomas nor epidermal involvement are observed (hematoxylin-eosin [HE] $\times 2$, original magnification $\times 20$). A higher magnification image reveals lymphohistiocytic infiltrate containing an important component of large cytoplasmic cells surrounding collagen bundles to

on the clinical and histopathologic findings, the patient was diagnosed with UVA-photoinduced granuloma annulare (GA).

GA is a benign and self-limiting inflammatory dermatosis of uncertain origin.^{1,2} It is characterized by the presence of dermal papules with no appreciable epidermal component and a tendency to coalesce to form mainly asymptomatic arcuate or annular plaques.^{1,3} The specific etiology of GA is unknown, although it has been linked to a multitude of comorbidities, including malignant neoplasms,³ viral infections, and drug treatment.² Although most resolve spontaneously, even after biopsy, some lesions can leave permanent scars.⁴

Disseminated GA has been more specifically related to systemic conditions such as diabetes mellitus^{1,5} and, in rare cases, sun exposure.⁶ Actinic granuloma, described by O'Brien, is characterized by the presence in photo-exposed areas of lesions that are suggestive of GA⁷ but exhibit degeneration of elastic fibers, which are phagocytosed by histiocytes present in the infiltrate (elastophagocytosis).⁸

There are few published cases of GA induced by light radiation.^{4,9,10} According to some studies, solar radiation is considered one of the potential causes of GA. Attempts have been made to reproduce GA lesions using ultraviolet light, without success.¹ We believe that this is the first reported case of photoinduced granuloma annulare in experimental conditions in the context of a photobiological study. There are some published descriptions of photoinduced GA in patients taking medication, such as paroxetine.¹⁰ However, in our patient the results of photopatch tests ruled out a pharmacological etiology. Despite the absence of medication, we believe that in our case a preformed antigen may have undergone a conformational change upon exposure to UVA, triggering GA-like granulomatous dermatitis.

Treatment of this entity is often unsatisfactory. Various treatment options have been used, including oral retinoids, antimalarials, and phototherapy.^{5,9} Our patient was recommended exhaustive topical photoprotection with a high sun protection index, including UVA and infrared photoprotection, as well as oral photoprotection. After 9 months of follow-up, the patient has not presented any new lesions and all existing lesions have stabilized.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

References

1. Studer EM, Calza AM, Saurat JH. Precipitating factors and associated diseases in 84 patients with granuloma annulare: a retrospective study. *Dermatology*. 1996;193:364–8.
2. Piette EW, Rosenbach M. Granuloma annulare: pathogenesis, disease associations and triggers, and therapeutic options. *J Am Acad Dermatol*. 2016;75:467–79.

3. Mangold AR, Cumsy HJL, Costello CM, Xie D, Buras MR, Nelson SA, et al. Clinical and histopathologic features of paraneoplastic granuloma annulare in association with solid organ malignancies: a case-control study. *J Am Acad Dermatol*. 2018;79, 913.e1–920.e1.
4. Gass JK, Todd PM, Rytina E. Generalized granuloma annulare in a photosensitive distribution resolving with scarring and milia formation. *Clin Exp Dermatol*. 2009;34:e53–5, <http://dx.doi.org/10.1111/j.1365-2230.2008.03183.x>.
5. Piette EW, Rosenbach M. Granuloma annulare: clinical and histologic variants, epidemiology, and genetics. *J Am Acad Dermatol*. 2016;75:457–65.
6. Cohen PR, Grossman ME, Silvers DN, DeLeo VA. Generalized granuloma annulare located on sun-exposed areas in a human immunodeficiency virus-seropositive man with ultraviolet B photosensitivity. *Arch Dermatol*. 1990;126:830–1.
7. Gutiérrez-González E, Pereiro M, Toribio J. Elastolytic actinic giant cell granuloma. *Dermatol Clin*. 2015;33:331–41.
8. Gutierrez-Gonzalez E, Gomez-Bernal S, Alvarez-Perez A, Sanchez-Aguilar D, Toribio J. Elastolytic giant cell granuloma: clinic-pathologic review of twenty cases. *Dermatol Online J*. 2013;19:20019.
9. Andreu-Barasoain M, Gómez de la Fuente E, Pinedo F, Gamo-Villegas R, Sánchez-Gilo A, López-Estebarez JL. Long lasting interstitial generalized granuloma annulare on sun-exposed areas. *Photodermatol Photoimmunol Photomed*. 2012;28:216–8.
10. Álvarez-Pérez A, Gómez-Bernal S, Gutiérrez-González E, Rodríguez-Granados MT, Toribio J. Granuloma annulare photoinduced by paroxetine. *Photodermatol Photoimmunol Photomed*. 2012;28:47–9.

P. Fonda-Pascual,^{a,b,*} M.V. de Gálvez,^c J. Aguilera,^c E. Herrera-Ceballos^{c,d}

^a *Servicio de Dermatología, Hospital Central de la Defensa, Madrid, Spain*

^b *Grupo de Dermatología Experimental y Biología Cutánea, Instituto Ramón y Cajal de Investigación Sanitaria (IRYCIS), Hospital Universitario Ramón y Cajal, Madrid, Spain*

^c *Unidad de Fotobiología Dermatológica y Oncología Cutánea, Departamento de Dermatología y Medicina, Universidad de Málaga, Málaga, Spain*

^d *Servicio de Dermatología, Hospital Universitario Virgen de la Victoria, Málaga, Spain*

* Corresponding author.

E-mail address: pfonpa1@mde.es (P. Fonda-Pascual).

4 April 2019 15 May 2019

<https://doi.org/10.1016/j.adengl.2020.12.021>
1578-2190/ © 2020 AEDV. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

create an interstitial granulomatous dermatitis pattern (HE ×10, original magnification ×100). C, High magnification image in which elastophagocytosis is not observed, ruling out a diagnosis of actinic granuloma (HE ×20, original magnification ×200).