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Problems With Phototesting for the Diagnosis of Solar Urticaria

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To the Editor:

Solar urticaria is an uncommon idiopathic photodermatosis that presents as transient erythema and wheals in sun-exposed areas immediately following exposure to ultraviolet (UV) B (280–320 nm) or UV-A radiation (320–400 nm), or to visible light (400–600 nm).¹

The diagnosis of solar urticaria is seemingly simple and is based on the patient's clinical history and the results of phototesting. In daily clinical practice, however, there are some circumstances that can make diagnosis more difficult.

We present the case of a 43-year-old woman with no drug allergies or relevant medical or surgical history.



Figure 1.

She reported dermatological symptoms that had begun 14 months earlier. Her laboratory tests, which included biochemistry, blood count, C3-C4, immunoglobulin E, and antinuclear antibodies, were normal.

In her history taking she described episodes of transient pruritic rash that appeared when she was exposed to sunlight, either directly or through windows or curtains. She said that these episodes subsided in a matter of hours after she returned home and that the rash affected sun-exposed areas. As the symptoms were consistent with a diagnosis of solar urticaria, we told the patient to expose herself to natural sunlight for approximately 30 minutes. She subsequently returned to our clinic with pruritic wheals on areas that are not usually exposed to light—nape of the neck, retroauricular region, upper back, and area under her watch strap—and a very mild rash on the upper limbs. The face, back of the hands, and areas covered by clothing were not affected (Figure).

One week later we performed a phototest to confirm the diagnosis and to determine the spectrum of light responsible for the rash and the minimum urticarial dose. Various areas of the back were irradiated with the following light sources and doses:

1. UV-B source: UV-B 180 (Waldmann): 0.01 J/cm², 0.05 J/cm², 0.1 J/cm², and 0.15 J/cm².
2. UV-A source: PUVA 800 (Waldmann): 1 J/cm², 3 J/cm², 6 J/cm², and 10 J/cm².
3. Visible light source: slide projector: 10 and 15 minutes.

Table. Published Case Series^a

Study	No. of Patients	Negative Phototest	%
Beattie et al ⁸	83	3	3.6
Ryckaert and Roelandts ⁴	25	1	
Monfrecola et al ⁷	57	3	5.2
Uetsu et al ⁶	40	0	0
Eguino et al ¹	21	1	4.7
Chon and Khoo ⁹	19	1	5.3
Total		9	3.7

^a The number of patients included in the study and number and percentage of negative phototests are specified.

The results were negative for all the light sources used. The phototest was repeated 4 months later in 2 areas: the middle of the back and the medial surfaces of the upper limbs, again with negative results.

Phototesting to induce lesions with sources of artificial light is needed to confirm a diagnosis of solar urticaria; it also makes it possible to determine the degree of photosensitivity and the action spectrum for the lesions.

Lesions appear most frequently on exposure to UV-A and visible light (the 320-500 nm range is the spectrum most frequently involved), and more rarely on exposure to UV-B, and in some cases, to infrared radiation. In most cases, the rash is found to be caused by a combination of spectra.

It must be borne in mind that a negative result obtained from a single light source does not rule out a diagnosis of solar urticaria.³ However, case series have been published in the dermatology literature describing patients with solar urticaria and repeatedly negative results in phototests with various spectra of sunlight, as in our case (Table).^{1,2,4} The most likely explanation for these results is that such patients require radiation with the total solar spectrum, rather than with partial spectra, to induce lesions.

Another factor that may make it difficult to determine the action spectrum in solar urticaria in some cases is the possible interaction between various wavelengths.⁵ In some patients, a double action spectrum has been described: one that is responsible for the appearance of lesions and another that inhibits this response. Usually, longer wavelengths (500-600 nm) inhibit shorter ones (the reverse is also possible, although far less frequent)⁶; when the patient is exposed to wavelengths of the inhibition spectrum before, during, or after exposure

to those that cause solar urticaria, the result will be a less intense response or an absence of lesions altogether. In other, less frequent cases, there is an augmentation spectrum that intensifies the inflammatory reaction when exposure to that spectrum precedes exposure to the action spectrum.

The diagnosis of solar urticaria is based on the patient's clinical history and on the induction of lesions by phototesting. Diagnosis is usually simple, but there are circumstances that can affect phototest results. It is important to bear in mind that in some cases negative phototest results do not rule out solar urticaria and that there are cases in which lesions can only be reproduced by exposure to natural sunlight.

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Conflicts of Interest

The authors declare no conflicts of interest.

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