

Original Article

Solar Urticaria and its Impact on our Environment

Angel San Miguel Rodríguez¹, Alicia Armentia Medina², Blanca Martín-Armentia², Sara Martín-Armentia³, Angel San Miguel Hernández^{4*}, Blanca Martín Armentia¹ and Alejandro Sanchez⁵

¹Research Service, Hospital Universitario Río Hortega, Valladolid, Spain

²Allergy Unit, Hospital Universitario Río Hortega, Valladolid, Profesor de la Universidad Internacional de la Rioja (UNIR), Spain

³Primare Care, Paediatrics Delicias, Valladolid, Spain

⁴Clinical Analysis Service, Hospital Universitario Río Hortega, Universidad Internacional de la Rioja (UNIR), Spain

⁵Servicio de Dermatología, Hospital Río Carrión, Palencia, Spain

Abstract

Urticaria is a very common pathology. In the database of 19,736 patients treated in the Allergy Unit of the Río Hortega University Hospital (HURH), this pathology affected 8% of the patients and was associated with physical agents in 26% and of them 12% were triggered for the Sun. Spain, as our geographical area has many hours of sun and solar urticaria is therefore frequent. Many times the etiology of urticaria is difficult to diagnose and, other times, behind solar urticaria there is a hidden sensitizing cofactor or photoallergen.

Thus, generally the treatment will depend on each case, but the use of sun creams with a high protection factor is important and also the use of appropriate clothing that prevents the filtration of the sun's rays.

Keywords: Allergy; Hipersensibility; Solar urticaria

Introduction

Solar Urticaria (SU) is an infrequent photodermatosis defined by erythema together with a welt in both photo-exposed and non-photo-exposed areas and with a short latency time from exposure to light [1,2]. Exposure can be to ultraviolet light (290-400 nm) or visible (400-700 nm), or rarely, infrared radiation greater than 700 nm. Perhaps it is a disease that has been underdiagnosed [3], since electromagnetic radiation can cause different skin conditions [4].

Sun allergy, as it is commonly known, refers to a small number of pathologies mediated by a hypersensitivity mechanism in which the

***Corresponding author:** Angel San Miguel Hernández, Clinical Analysis Service, Hospital Universitario Río Hortega, Universidad Internacional de la Rioja (UNIR), Spain, Tel: +34 620800117; Email: asanmi@saludcastillayleon.es

Citation: Rodríguez ASM, Medina AA, Martín-Armentia B, Martín-Armentia S, Hernández ASM, et al. (2021) Solar Urticaria and its Impact on our Environment. J Clin Dermatol Ther 7: 076.

Received: May 22, 2021; **Accepted:** May 26, 2021; **Published:** June 02, 2021

Copyright: © 2021 Rodríguez ASM, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

immune system intervenes, which includes solar urticaria. It would not be an allergy to the sun but rather allergic reactions that require exposure to light for their appearance [5].

Photoallergic dermatosis is characterized by the activation of immunological mechanisms, involving photosensitizers and photoallergens that can cause photosensitization in some people. Under the influence of light, photosensitizers are activated, followed by the fusion of skin proteins that convert them into complete antigens, and the consequent initiation of immunological mechanisms with the resulting pathological skin lesions. The most common photoallergens are: sulfonamide antibiotics, phenothiazines and halogenated salicylanilides [1,3,6].

Immunologically mediated photodermatoses represent a heterogeneous group of disorders, presenting with pathological reactions of the skin caused by optical radiation, particularly in the UVA wavelength region. The exact immune mechanism remains to be elucidated, however it is most likely autoimmune [6].

The onset of this pathology occurs between the second and fourth decade of life and is predominantly female [7].

Solar urticaria is a rare type of hives. It represents less than 0.5% of all cases of urticaria and 7% of all photodermatoses. The disease usually begins in young adulthood, with a mean age of 35 years, but cases of onset in neonates or the elderly have been reported. There is a predominance of the female gender, but there is no ethnic difference. In the largest series of patients, a history of atopy is seen in less than 30% of cases. The association of solar urticaria with other types of chronic urticaria can be observed in up to 16% of patients [8].

In addition, both genetics and environmental factors play a role in the development of photosensitivity [9].

Regarding their classification, the types of photodermatosis, which are immunologically mediated, are shown in Table 1 [4,6,10-19].

- **Solar urticaria (US):** Acute erythema and urticarial scarring after exposure to UVR (ultraviolet radiation). Itching, erythema, small papules and hives limited to the areas of exposure [4].
- **Polymorphic light eruption (PLE):** It is the most common idiopathic photodermatosis, affecting women in the first decades of life. The most important part of the treatment is to avoid sun exposure and to use sunscreen correctly [7].
- **Hydroavacciniforme**
- **Chronic actinic dermatitis (CAD)**
- **Actinic prurigo (PA)**
- **Drug- and chemical-induced photosensitivity**
- **Dermatoses exacerbated by photo**

Table 1: Classification of the types of immunologically mediated photodermatosis.

Photodermatitis and solar urticaria constitute approximately 10% of all photosensitivity diseases [5]; Furthermore, the acquired idiopathic photodermatoses are PLE, US, PA, CAD, Hidroa (Table 2) [7].

Acquired Idiopathic Photodermatoses

- Actinic prurigo
- Light polymorphous eruption
- Hydroavacciniforme
- Solar urticaria
- Chronic actinic dermatitis

Photosensitization by endogenous or exogenous chemicals

- Photoallergy
- Photosensitivity
- Porphyrias Defective DNA repair disorders
- Xeroderma pigmentosum
- Cockayne syndrome
- Bloom syndrome

Dermatitis exacerbated by UV radiation

- Vulgar acne
- Dermatomyositis
- Carcinoid syndrome
- Lique flat
- Rosacea
- Pellagra
- Disseminated superficial actinic porokeratosis
- Haley-Haley disease
- Flat warts
- Pityriasis alba
- Lupus erythematosus

Table 2: Classification of photodermatoses [7,20-25].

Incidence

In our database consisting of 19,736 patients treated in the Allergy Unit of the Rio Hortega University Hospital (HURH), this pathology affected 8% of the patients and was associated with physical agents in 26% and 12% of them they were triggered by the sun (Figure 1).

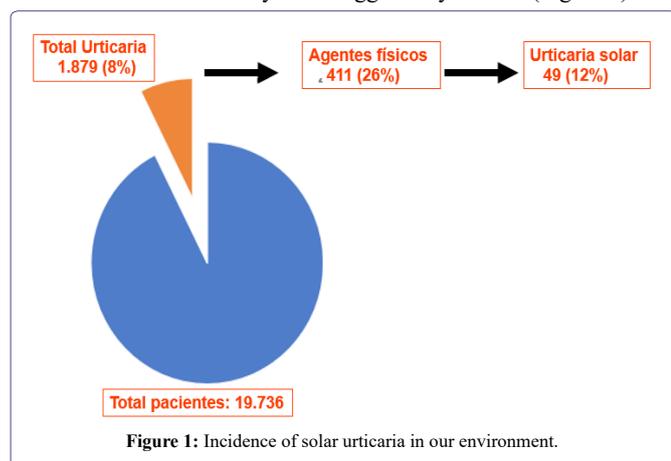


Figure 1: Incidence of solar urticaria in our environment.

US is a process that manifests with erythema and hives a few minutes after exposure to sunlight, usually after 10 minutes. And it is classified into six different types, according to the light wave that causes it.

The first symptom to appear is itching with the need to scratch, followed by erythema or redness of the skin and hives. These

reactions usually disappear after about three hours or so. But when exposure to the sun is very intense, symptoms can be exacerbated, leading to headache, hypotension and even bronchospasm.

It occurs due to a mechanism of immediate hypersensitivity to an unknown allergen produced by sunlight.

In addition, it should be known that, depending on the type of skin, one may have a greater predisposition to suffer from solar urticaria, so you will have to take stricter measures. The best ones are, avoid sun exposure during midday, have the first progressive sun exposures and preferably on the move, wear a head protector, use a sunscreen half an hour before sun exposure, reapply sunscreen every three or four hours, after getting out of the water, if you are taking any medication, you should consult with the specialist and also avoid perfumes before sun exposure.

US is an easy pathology to identify from the clinical history reported by patients; very rarely will we see these lesions in the office. They begin as itching, erythema, and hives appear in photo-exposed areas within 5-10 minutes (Figure 2). They are evanescent, disappearing normally, and if sun exposure is avoided in 1 or 2 hours, without scarring. The face and the back of the hands, due to being chronically exposed to the sun, are areas where the rash appears less frequently. The etiopathogenic mechanism is explained by a type 1 hypersensitivity reaction mediated by immunoglobulin E (Ig E), also involving photoinduced allergens [7,26-30].



Figure 2: Patient with solar urticaria.

Shortly after exposure to the sun, erythema, itching and hives (hives) appear in the area, which persist between a few minutes and a couple of hours, disappearing without leaving any injury. When the exposure is very intense and / or the affected area is very large, it can be accompanied by general symptoms such as headache, nausea, respiratory distress and hypotension, and may even cause loss of consciousness. For its prevention, it is recommended to avoid solar exposures as much as possible and the use of oral antihistamines for its treatment [5,31-36].

Pathophysiology

The pathophysiology of US is not fully understood. It is an immediate hypersensitivity reaction, which may be mediated by IgE, and occurs after exposure to the sun. Radiation can activate an endogenous substance called a chromophore that could be present in serum

and/or dermis, turning it into an immunologically active photoallergen. This later induces mast cell degranulation, resulting in urticarial lesions. The positive intradermal reaction after injection of the patient's irradiated serum is consistent with the hypothesis of a circulating chromophore [8]. Certain wavelengths of radiation (generally the long ones) can inhibit the immune reaction induced by other wavelengths (generally the short ones); This is called the double spectrum of action [8,37-41]. Occasionally, solar urticaria is triggered by an exogenous substance, such as some medications such as atorvastatin, chlorpromazine, tetracycline, or oral contraceptives [8].

Erythema and edematous papules occur within minutes after exposure to sunlight, in exposed and unexposed areas, such as areas covered with thin, white clothing that allow radiation to reach the underlying skin. Coated skin reacts more severely to the sun when exposed. The skin of the face and hands seems more tolerant to solar radiation. The rash is associated with an itching or burning sensation. Periorbital and / or mucosal angioedema may also be seen. Dermoglyphism may be noted in some patients.

Systemic symptoms such as nausea, wheezing, dyspnea, or syncope are not uncommon, especially if large areas of the skin are exposed to sunlight for a prolonged period. However, even if there are systemic symptoms, anaphylactic shock rarely occurs in solar urticaria. Skin symptoms resolve in 75% of cases within one hour after stopping sun exposure and more within 24 hours. In addition, the severity and duration of the symptoms is also related to the intensity of the light [8,42-44].

Solar angioedema is a rare photodermatosis, with only a little more than a dozen reported patients worldwide. Patients develop facial swelling, predominantly eyelids, lips and/or acral, hours after sun exposure, especially during vacations to tropical areas. Its management includes photoprotection and avoidance of the sun.

Preventive antihistamines have been tested with minimal effect. Short courses of oral corticosteroids may be necessary when these measures fail. Recognition of solar angioedema is important for dermatologists, allergists, emergency physicians, and primary care physicians, as this condition can significantly affect quality of life [11].

Regarding the differential diagnosis, it must be done with other urticarias of physical cause such as heat, cold and cholinergic urticarias; in addition to the polymorphous light eruption [7,8].

- Lupus erythematosus, drug-induced photosensitivity, and photographic contact dermatitis.
- Heat urticaria: manifested by hives located in areas of skin subjected to heating.
- Cold urticaria (a frigore): they can be generalized, after exposure to water or intense cold, or circumscribed to areas of skin that have come into contact with cold objects.
- Cholinergic urticaria: affects 0.2% of the population; It is manifested by small hives when sweating starts, stimulated by intense physical exercise, exposure to heat, taste stimuli, and emotional tension.
- Polymorphous light eruption (PLE): the elemental lesion is papule in PLE and wheal in solar urticaria.

Despite being a pathology, generally a benign condition, the impact on quality of life is considerable [28], which limits daily activities and seriously alters the quality of life of patients [12], which can become extremely disabling [16], mainly due to urticaria and pain [6,42,45]. In general, immunologically mediated photodermatoses form a significant group of skin conditions that can be extremely disabling for the patient and are difficult to diagnose and treat [6].

Currently, the canons of beauty and quality of life are linked to the hyperpigmentation provided by Ultraviolet Radiation (UVR). Thus, these pathologies are more frequent in the daily consultation [7].

SU is predominantly caused by visible radiation, longer and shorter UVA, penetrating window glass and where sunscreens are less effective. Photoprotective agents effective against this spectrum are needed [12].

Photodiagnostic procedures are mandatory for the exact determination of the action spectra and the degree of photosensitivity [6,37].

It is suspected during the anamnesis because transient urticarial lesions occur, which occur a few minutes after exposure to sunlight, while the physical examination is normal, in the absence of sun exposure. The symptoms and distribution of solar urticaria may mimic other acquired photodermatoses. However, solar urticaria may be associated with other photodermatoses, such as polymorphic light eruption and porphyria cutanea tarda [8,45].

The diagnosis of solar urticaria is confirmed by photographic tests with UVA, UVB, and visible light sources. Sometimes natural light is also used. The objective of photographic tests is to determine the spectrum of action, that is, the activation wavelengths and the minimum urticarial dose, that is, the minimum dose that induces a urticarial reaction. Determination of the spectrum of action is also important for subsequent management, so that patients take precautions to avoid activation wavelengths [8].

The light sources are placed at a distance of 10 to 15 cm from the back of the patient and different doses of radiation are administered. The clinical response is assessed every 10 minutes for one hour. Erythema and welt occur immediately after photographic tests and fade within minutes after radiation stops. However, in many cases, photographic tests with artificial light sources do not contribute, as it may not induce skin lesions, which can be activated only by natural exposure to sunlight.

In some cases, repeating the photographic tests can help to obtain positive results [8], therefore the diagnosis of the pathology involves great difficulty.

A histopathologic examination can be performed to rule out other photodermatoses. In solar urticaria, it shows typical characteristics of urticaria that are endothelial inflammation and infiltration of dermal neutrophils, monocytes and eosinophils [8,24,33].

The photopatch test may be beneficial in ruling out drug-induced photosensitivity or photographic contact dermatitis [8,18,36].

Table 3 shows other tests that can be included in the case of photosensitivity, when making the differential diagnosis of solar urticaria.

1. Complete blood analysis
2. Connective tissue antibodies including antinuclear antibodies (ANA), extractable nuclear antigens (ENA) if lupus erythematosus is suspected
3. Porphyrins in blood, urine and feces.
4. Liver function and iron tests in patients with suspected porphyria.
5. Skin biopsy for histopathology and direct immune fluorescence in primary and photo-exacerbated dermatosis
6. In suspected cases of xeroderma pigmentosum, measurement of post-UV cell survival and DNA repair capacity in fibroblast assays
7. The appearance of tiger hair on brittle hair polarized microscopy (dark and light areas) should lead to chromatography to determine amino acid content, showing a reduction of cysteine in trichothiodystrophy
8. Gene sequencing can confirm Bloom syndrome or Rothmund Thomson syndrome.

Table 3: Other tests that can be included in the case of photosensitivity, when making the differential diagnosis.

Treatment

The treatment of solar urticaria is considered very complex and difficult and is not entirely established. There are no guidelines for the treatment of solar urticaria [8]. This is mainly based on the avoidance of the triggering agent, such as solar radiation and the use of antihistamines in order to alleviate the symptoms.

In order to avoid the triggering agent, it is recommended to restrict ultraviolet radiation at the relevant wavelength, maintain a non-sensitive state with exposure to natural or artificial light [10], use of broad spectrum protectors, including appropriate clothing (dark clothing) [7,8].

SPF is a sun protection factor, defined as the dose of solar radiation necessary to induce noticeable erythema, Minimum Erythema Dose (MED) on skin treated with sunscreen of 2 mg/cm, divided by the MED on skin not treated. SPF primarily describes protection against UVB rays, as it reflects protection against the spectrum of action of erythema. Primary photodermatitis in polymorphic light eruption can be paradoxically effectively treated by graded and cautious exposure to ultraviolet radiation [9].

The use of non-sedating antihistamines such as fexofenadine and cetirizine are used to alleviate symptoms [10]. By analogy with the treatment of chronic idiopathic urticaria, single receptor antihistamine agents are widely used. They can induce relief in most cases, but generally in higher doses, two to four times higher than conventional ones.

Antihistamine receptor agents 1 appear to be more effective in late-onset urticaria, but have no effect on erythema in solar urticaria. Antihistamines and avoidance of the sun remain the main treatment for SU, but other treatments, such as omalizumab, are of possible interest in the treatment of refractory patients [7-9,13]. Omalizumab brought clinical benefits in approximately 80% of Solar Urticaria patients. Patients who do not improve the standard doses of omalizumab may benefit from higher monthly doses [14,20,21]. Omalizumab is a recombinant human anti-IgE monoclonal antibody approved for the treatment of chronic spontaneous urticaria and severe treatment of asthma [15,16,30,31,35]. Its approval for the treatment of inducible chronic urticaria is under discussion [16,17,43,42].

Since chronically exposed areas appear to be relatively tolerant to solar radiation [8], a phenomenon known as hardening [7], phototherapy (UVA, UVB, visible light) and Photochemotherapy (PUVA) have

been used to induce immune tolerance against UV radiation from the environment [6,8]. It appears that PUVA provides a more durable response than phototherapy alone [8].

This process should be based on the spectrum of action and the minimum urticaria dose [16]. Induction of light tolerance with UVB bands in solar urticaria is safe and effective in a high percentage of patients [15].

To help the hardening phenomenon, which this photodermatitis presents, oral antihistamines and beta-carotenes can be prescribed one month before sun exposure. Antimalarials and tolerance induction with psoralens plus UVA radiation (PUVA) have been used in adults. The evolution is that of idiopathic chronic urticaria [7].

In severe forms, immunomodulatory and immunosuppressive therapies should be considered [6]. A single course of IVIG appears insufficient to obtain significant long-term control of SU; Future evaluation of different IVIG administration schedules is warranted [16].

Intravenous immunoglobulins, plasma exchange (plasmapheresis) [8,10], cyclosporine, afamelanotide, and omalizumab have been used successfully in patients with refractory solar urticaria [8,30,31,43].

Photoprovocation for solar urticaria with determination of action spectra and MUD allows specifically designed treatment regimens consisting of combinations of antihistamines and leukotriene receptor antagonists [17]. Treatment with leukotriene receptor antagonists as monotherapy or in combination with antihistamines does not show any evidence in solar urticaria [18]. Oral steroids, leukotriene receptor antagonists, antimalarial drugs, prostaglandin inhibitors, and oral beta-carotene have shown little or no effect in the treatment of solar urticaria. Combination therapies are frequently necessary to achieve and maintain acceptable clinical relief [8].

Among the most studied herbal substances that have shown photoprotective activity are green tea extract, carotenoids and Polypodium Leucotomos (PLE) extract. They have been shown to increase the minimal dose of erythema and improve the signs of photodamage. PLE has been shown to be helpful in the holistic treatment of a number of conditions, including polymorphous light rash, solar urticaria, and melasma; It can also be used as an adjunct to UVB treatment of vitiligo and photodynamic therapy of actinic keratosis [19]. Antihistamine treatment was used in 2 patients [20]. And treatment with cyclosporine A in a resistant patient [21]. Table 4 summarizes the management of photosensitivity [9].

1. Avoid exposure to direct sunlight.
2. Stay indoors and away from windows, and seek shade when outdoors
3. Dress to cover clothing and wear a wide-brimmed hat when outdoors. Some garments are labeled with an ultraviolet protection factor (UPF). The best protection for clothing is obtained from thick, tightly woven, dry, dark-colored polyester, denim or wool.
4. Broad spectrum sunscreen SPF 50 or higher, which covers all exposed skin. The sunscreen must protect from UVB and UVA rays and be resistant to water. It should be applied generously and reapplied every two hours while outdoors.
5. Tanning products containing dihydroxyacetone provide poor photoprotection against UVA rays and, to a lesser extent, against UVB rays.

Table 4: Management of photosensitivity [9].

In a patient with photosensitivity, we must follow the following protocol, which is shown in Table 5 [7,9,29,28,35].

- **Clinical history:** personal and family history, usual and recent treatment, current disease (onset, evolution, previous history of photoexposure) and response to photoprotectors [7].
 - **Complementary tests:** hemogram, biochemistry, ANA, anti DNA, anti Ro and anti LA, porphyrins in urine, feces and blood.
 - **Physical exam:**
1. **Skin biopsy for histopathology and direct immune fluorescence** [7]. Histopathology to rule out other photodermatoses. In solar urticaria, it shows typical characteristics of urticaria that are endothelial inflammation and infiltration of dermal neutrophils, monocytes and eosinophils [8]
 2. **Photopatch.** It must be done in the hospital environment
 3. **Photographic tests:** The light sources are placed at a distance of 10 to 15 centimeters from the back of the patient and different doses of radiation are administered. The clinical response is assessed every 10 minutes for one hour. Erythema and welt occur immediately after photographic tests and fade within minutes after radiation stops. However, in many cases, photographic tests with artificial light sources do not contribute, as it may not induce skin lesions, which can be activated only by natural exposure to sunlight. In some cases, repeating the photographic tests can help to obtain positive results [8], therefore the diagnosis of the pathology involves great difficulty.

Table 5: Protocol to be followed in the study in patients with photosensitivity.

Conclusion

Therefore, in the case of solar urticaria, it is necessary to start with the need for an effective photoprotection and to carry out a good diagnosis of the hidden photoallergen.

In general, the treatment will depend on each case, but the use of sun creams with a high protection factor is very important, as well as the use of suitable clothing that prevents the filtering of the sun's rays. And the administration of medication for the most advanced cases must be stipulated by a specialist.

Conflict of interest

The authors declare no conflict of interest

References

1. Silpa-Archa N, Wongpraparut C, Leenutaphong V (2016) Analysis of solar urticaria in Thai patients. *Asian Pac J Allergy Immunol* 34: 146-152.
2. Pérez-Ferriols A, Barnadas M, Gardeazábal J, de Argila D, Carrascosa JM, et al. (2017) Solar urticaria: Epidemiology and clinical phenotypes in a Spanish series of 224 patients. *Actas Dermosifiliogr* 108: 132-139.
3. Pezzolo E, Peroni A, Gisoni P, Girolomoni G (2016) Heat urticaria: a revision of published cases with an update on classification and management. *Br J Dermatol* 175: 473-478.
4. Mihi LL, Bulat V, Situm M, Cavka V, Krolo I (2008) Allergic Hypersensitivity Skin Reactions Following Sun Exposure. *Coll Antropol* 2: 153-157.
5. Millard TP, Hawk JL (2002) Photosensitivity disorders: cause, effect and management. *Am J Clin Dermatol* 3: 239-246.
6. Gambichler T, Al-Muhammadi R, Boms S (2009) Immunologically mediated photodermatoses: diagnosis and treatment. *Am J Clin Dermatol* 10: 169-180.
7. Kowalczik L, Thiel W, Bielfeld C, Ziegler H, Eickenscheidt L (2017) Partial response of solar urticaria to omalizumab therapy. *Hautarzt* 68: 492-496.
8. Rodríguez P (2017) Omalizumab in the treatment of chronic Inducible Urticaria. *Actas Dermosifiliogr*. 108: 423-431.
9. Pérez-Plaza A, Concha-Garzón MJ, Solano-López G, de Argila D (2014) Fracaso de omalizumab en una urticaria solar grave inducida por ultravioleta. *Inmunología* 33: 147-148.
10. Calderón S, Alonso E (2019) Urticaria y Angioedema. *Protocolos. Asociación Española de Pediatría* 2: 149-160.
11. Eguino P, Laso O, Gardeazábal J, Díaz-Pérez JL (2005) Urticaria solar. Estudio de 20 casos. *Actas Dermosifiliogr* 96: 25-29.
12. Raigosa M, Toro Y, Sánchez J (2017) Urticaria solar. Reporte de un caso y revisión de la literatura. *Rev Alerg Méx* 64: 371-375.
13. Photiou L, Foley P, Ross G (2019) Solar urticaria - An Australian case series of 83 patients. *Australas J Dermatol* 60: 110-117.
14. Zuberbier T, Aberer W, Asero R, Bindslev-Jensen C, Brzoza Z, et al. (2014) The EAACI/GA(2) LEN/EDF/WAO guideline for the definition, classification, diagnosis, and management of urticaria: The 2013 revision and update. *Allergy* 69: 868-887.
15. Bernstein JA, Lang DM, Khan DA, Craig T, Dreyfus D, et al. (2014) The diagnosis and management of acute and chronic urticaria: 2014 update. *J Allergy Clin Immunol* 133: 1270-1277.
16. Trevisonno J, Balram B, Netchiporouk E, Ben-Shoshan M (2015) Physical urticaria: Review on classification, triggers and management with special focus on prevalence including a meta-analysis. *Postgrad Med* 127: 565-570.
17. Pérez-Ferriols A, Aguilera J, Aguilera P, De-Argila D, Barnadas MA, et al. (2014) Determination of minimal erythema dose and anomalous reactions to UVA radiation by skin phototype. *Actas Dermosifiliogr*. 105: 780-788.
18. Amaya D, Sánchez A, Sánchez J (2016) Inducible urticaria: Case series and literature review. *Biomedica* 36: 10-21.
19. Nitiyarom R, Wongpraparut C (2014) Hydroa vacciniforme and solar urticaria. *Dermatol Clin* 32: 345-353.
20. Webb LM, Mikita CP (2009) Solar urticaria. *Allergy Asthma Proc* 30: 563-565.
21. Baliu-Piqué C, Aguilera-Peiró P (2016) Three cases of solar urticaria successfully treated with omalizumab. *J Eur Acad Dermatol Venereol* 30: 704-706.
22. Magerl M, Altrichter S, Borzova E, Giménez-Arnau A, Grattan CE, et al. (2016) The definition, diagnostic testing, and management of chronic inducible urticarias. The EAACI/GA(2) LEN/EDF/UNEV consensus recommendations 2016 update and revision. *Allergy* 71: 780-802.
23. Komarow HD, Eisch AR, Young M, Nelson C, Metcalfe DD (2015) Omalizumab in the Treatment of Chronic Inducible Urticaria. *J Allergy Clin Immunol Pract* 3: 789-790.
24. Goetz S, Elsner P (2015) Solar Urticaria. *J Dtsch Dermatol Ges* 13: 1250-1253.
25. Adamski H, Viguiet M; pour la Société française de photodermatologie (SFPD) (2012) Solar Urticaria. *Ann Dermatol Venereol* 139: 324-328.
26. Sabbah F, Hodak E, Levi A (2016) Solar Urticaria. *Harefuah* 155: 604-607.
27. Harris BW, Badri T, Schlessinger J (2020) Solar Urticaria. *StatPearls Publishing*, PMID: 28723015.
28. Abajian M, Schoepke N, Altrichter S, Zuberbier T, Maurer M (2014) Physical urticarias and cholinergic urticaria. *Immunol Allergy Clin North Am* 34: 73-88.
29. Horio T (2003) Photodermatol Photoimmunol Photomed 19: 147-154.
30. Schauder S (2003) Solar urticaria. *Hautarzt* 54: 952-958.
31. Ramsay CA (1980) Solar urticaria. *Int J Dermatol* 19: 233-236.
32. Kieselova K, Santiago F, Henrique M (2019) Incapacitating solar urticaria: successful treatment with omalizumab. *An Bras Dermatol* 94: 331-333.
33. Schaffenburg WC, Guerrero KT, Marks SN (2019) Solar urticaria treated with omalizumab. *Cutis*. 104: 4-5.
34. Farr PM (2018) Erythropoietic protoporphyria and solar urticaria. *Br J Dermatol* 179: 542.

35. Uetsu N, Nomura Y, Matsuyama Y, Okamoto H (2020) Characteristics and clinical significance of augmentation spectra in solar urticaria. *J Dermatol* 47: 369-377.
36. Maurer M, Metz M, Brehler R, Hillen U, Jakob T, et al. (2018) Omalizumab treatment in patients with chronic inducible urticaria: A systematic review of published evidence. *J Allergy Clin Immunol* 141: 638-649.
37. Fityan A, McGibbon D, Fassihi H, Sarkany RS (2018) Paediatric solar urticaria: a case series. *Br J Dermatol* 178:1453-1454.
38. Milanesi N, Gola M, Francalanci S (2020) Evaluation of nine patients with solar urticaria during summer. *G Ital Dermatol Venereol* 155: 800-802.
39. Gaebelein-Wissing N, Ellenbogen E, Lehmann P (2020) Solar urticaria: Clinic, diagnostic, course and therapy management in 27 patients. *J Dtsch Dermatol Ges* 18: 1261-1268.
40. Farr PM (2000) Solar urticaria. *Br J Dermatol* 142: 4-5.
41. Oakley AM, Badri T, Harris BW (2021) Photosensitivity. Treasure Island (FL): StatPearls Publishing PMID: 28613726
42. Lehmann AR, McGibbon D, Stefanini M (2011) Xeroderma pigmentosum. *Orphanet J Rare Dis* 1: 70.
43. Wright E, Kurland E, Lim HW (2020) Solar urticaria caused by visible light in a 33-year-old male refractory to treatment with omalizumab. *Photodermatol Photoimmunol Photomed* 36: 316-317.
44. Morgado-Carrasco D, Fustà-Novell X, Podlipnik S, Combalia A, Aguilera P (2018) Clinical and photobiological response in eight patients with solar urticaria under treatment with omalizumab, and review of the literature. *Photodermatol Photoimmunol Photomed* 34: 194-199.
45. De Martinis M, Sirufo MM, Ginaldi L (2019) Solar Urticaria, a Disease with Many Dark Sides: Is Omalizumab the Right Therapeutic Response? Reflections from a Clinical Case Report. *Open Med (Wars)*. 14: 403-406.
46. Du-Thanh A, Debu A, Lalheve P, Guillot B, Dereure O, et al. (2013) Solar urticaria: a time-extended retrospective series of 61 patients and review of literature. *Eur J Dermatol* 23: 202-227.
47. Kogame T, Uetsu N, Nguyen CTH, Kawada A, Okamoto H (2017) Solar urticaria with an augmentation spectrum in a child. *J Dermatol* 44: 214-215.



- Advances In Industrial Biotechnology | ISSN: 2639-5665
- Advances In Microbiology Research | ISSN: 2689-694X
- Archives Of Surgery And Surgical Education | ISSN: 2689-3126
- Archives Of Urology
- Archives Of Zoological Studies | ISSN: 2640-7779
- Current Trends Medical And Biological Engineering
- International Journal Of Case Reports And Therapeutic Studies | ISSN: 2689-310X
- Journal Of Addiction & Addictive Disorders | ISSN: 2578-7276
- Journal Of Agronomy & Agricultural Science | ISSN: 2689-8292
- Journal Of AIDS Clinical Research & STDs | ISSN: 2572-7370
- Journal Of Alcoholism Drug Abuse & Substance Dependence | ISSN: 2572-9594
- Journal Of Allergy Disorders & Therapy | ISSN: 2470-749X
- Journal Of Alternative Complementary & Integrative Medicine | ISSN: 2470-7562
- Journal Of Alzheimers & Neurodegenerative Diseases | ISSN: 2572-9608
- Journal Of Anesthesia & Clinical Care | ISSN: 2378-8879
- Journal Of Angiology & Vascular Surgery | ISSN: 2572-7397
- Journal Of Animal Research & Veterinary Science | ISSN: 2639-3751
- Journal Of Aquaculture & Fisheries | ISSN: 2576-5523
- Journal Of Atmospheric & Earth Sciences | ISSN: 2689-8780
- Journal Of Biotech Research & Biochemistry
- Journal Of Brain & Neuroscience Research
- Journal Of Cancer Biology & Treatment | ISSN: 2470-7546
- Journal Of Cardiology Study & Research | ISSN: 2640-768X
- Journal Of Cell Biology & Cell Metabolism | ISSN: 2381-1943
- Journal Of Clinical Dermatology & Therapy | ISSN: 2378-8771
- Journal Of Clinical Immunology & Immunotherapy | ISSN: 2378-8844
- Journal Of Clinical Studies & Medical Case Reports | ISSN: 2378-8801
- Journal Of Community Medicine & Public Health Care | ISSN: 2381-1978
- Journal Of Cytology & Tissue Biology | ISSN: 2378-9107
- Journal Of Dairy Research & Technology | ISSN: 2688-9315
- Journal Of Dentistry Oral Health & Cosmesis | ISSN: 2473-6783
- Journal Of Diabetes & Metabolic Disorders | ISSN: 2381-201X
- Journal Of Emergency Medicine Trauma & Surgical Care | ISSN: 2378-8798
- Journal Of Environmental Science Current Research | ISSN: 2643-5020
- Journal Of Food Science & Nutrition | ISSN: 2470-1076
- Journal Of Forensic Legal & Investigative Sciences | ISSN: 2473-733X
- Journal Of Gastroenterology & Hepatology Research | ISSN: 2574-2566
- Journal Of Genetics & Genomic Sciences | ISSN: 2574-2485
- Journal Of Gerontology & Geriatric Medicine | ISSN: 2381-8662
- Journal Of Hematology Blood Transfusion & Disorders | ISSN: 2572-2999
- Journal Of Hospice & Palliative Medical Care
- Journal Of Human Endocrinology | ISSN: 2572-9640
- Journal Of Infectious & Non Infectious Diseases | ISSN: 2381-8654
- Journal Of Internal Medicine & Primary Healthcare | ISSN: 2574-2493
- Journal Of Light & Laser Current Trends
- Journal Of Medicine Study & Research | ISSN: 2639-5657
- Journal Of Modern Chemical Sciences
- Journal Of Nanotechnology Nanomedicine & Nanobiotechnology | ISSN: 2381-2044
- Journal Of Neonatology & Clinical Pediatrics | ISSN: 2378-878X
- Journal Of Nephrology & Renal Therapy | ISSN: 2473-7313
- Journal Of Non Invasive Vascular Investigation | ISSN: 2572-7400
- Journal Of Nuclear Medicine Radiology & Radiation Therapy | ISSN: 2572-7419
- Journal Of Obesity & Weight Loss | ISSN: 2473-7372
- Journal Of Ophthalmology & Clinical Research | ISSN: 2378-8887
- Journal Of Orthopedic Research & Physiotherapy | ISSN: 2381-2052
- Journal Of Otolaryngology Head & Neck Surgery | ISSN: 2573-010X
- Journal Of Pathology Clinical & Medical Research
- Journal Of Pharmacology Pharmaceuticals & Pharmacovigilance | ISSN: 2639-5649
- Journal Of Physical Medicine Rehabilitation & Disabilities | ISSN: 2381-8670
- Journal Of Plant Science Current Research | ISSN: 2639-3743
- Journal Of Practical & Professional Nursing | ISSN: 2639-5681
- Journal Of Protein Research & Bioinformatics
- Journal Of Psychiatry Depression & Anxiety | ISSN: 2573-0150
- Journal Of Pulmonary Medicine & Respiratory Research | ISSN: 2573-0177
- Journal Of Reproductive Medicine Gynaecology & Obstetrics | ISSN: 2574-2574
- Journal Of Stem Cells Research Development & Therapy | ISSN: 2381-2060
- Journal Of Surgery Current Trends & Innovations | ISSN: 2578-7284
- Journal Of Toxicology Current Research | ISSN: 2639-3735
- Journal Of Translational Science And Research
- Journal Of Vaccines Research & Vaccination | ISSN: 2573-0193
- Journal Of Virology & Antivirals
- Sports Medicine And Injury Care Journal | ISSN: 2689-8829
- Trends In Anatomy & Physiology | ISSN: 2640-7752

Submit Your Manuscript: <https://www.herallopenaccess.us/submit-manuscript>