



Successful Treatment of Solar Urticaria Triggered by Visible Light Using Blemish Balm Cream

Matsuda A, Tsuchihashi H, Yoshihara N and Ikeda S*

Department of Dermatology, Juntendo University School of Medicine, Japan

Abstract

Solar urticaria is a rare disease that causes swelling triggered by Ultraviolet Irradiation (UVA and/or UVB) and/or visible light, and is also considered a type of physical urticaria. After a few minutes of sun exposure, an itchy or burning rash appears, which usually disappears after 1 h to 2 h. There is no specific treatment; only symptomatic treatments such as antihistamines, sun avoidance, and sunscreens are provided.

We describe the case of a 30-year-old Chinese man who began to develop urticaria while playing soccer outside. After approximately 20 min of sun exposure, itching was observed and erythema and wheals appeared on the sun-exposed skin area. He was treated with antihistamines and sunscreen, with no relief. Physical shading with clothing is effective; however, physical shading of the face and other parts of the body during sports and other activities is often difficult. Therefore, we focused on exploring whether application of blemish balm cream, defined in this paper as a sunscreen cream containing foundation. An irradiation test was performed and the area where Blemish Balm cream was applied was irradiated with visible light, but no rash occurred. This case showed that Blemish Balm cream on patients could prevent wheals, by physically shaded visible light as the active wavelength.

Keywords: Solar urticaria; Blemish Balm cream; Visible light; Wheal

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*Correspondence:

Shigaku Ikeda, Department of Dermatology, Juntendo University School of Medicine, 2-1-1 Hongo, Bunkyo-ku, Tokyo 113-8421, Japan, Tel: +81-3-5802-1226; Fax: +81-3-3813-9443;

E-mail: ikeda@juntendo.ac.jp

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Introduction

Solar urticaria is a rare disease that causes swelling triggered by Ultraviolet Radiation (UVA and/or UVB) and/or visible light, and is also considered a type of physical urticaria [1]. There is no specific treatment; only symptomatic management such as antihistamines, sun avoidance, and sunscreen are provided. In Asia, visible light is often reported to be the wavelength of action [2] and cannot be blocked by sunscreen. Physical shading with clothing is effective; however, physical shading of the face and other parts of the body during sports and other activities is often difficult. We encountered a patient with solar urticaria caused by visible light, who did not respond to sunscreens or antihistamines, and who was a soccer player. We focused on exploring whether application of Blemish Balm (BB) cream, defined in this paper as a sunscreen cream containing foundation. BB cream on patients could prevent wheals, by physically shaded visible light as the active wavelength.

Case Presentation

A 30-year-old Chinese man presented with a one-month history of erythema and wheal that developed within 20 min of sun exposure and resolved spontaneously within a few hours.

Figure 1 taken by the patient himself showed erythema with itching and burning sensation, that appeared on the face, and a swelling on the back of his neck after walking for about 20 min. This condition strongly affected the quality of his personal life. Blood samples ruled out porphyria.

To search for the wavelengths of action, provocation and action spectrum tests of visible light, UVA, and broadband UVB were performed (Figure 2).

Visible light irradiation tests were conducted using a projector (300W) as the light source at a distance of 15 cm, which induced wheals 11 min after irradiation. UVA (PL-S9W/10/2P) and broadband UVB (PL-S9W/12) irradiation using a UV-mate light source for skin tests (Yayoi, Tokyo) did not induce wheals 30 min after exposure. Based on history and provocation test results, he was diagnosed with solar urticaria caused by visible light.

The application of sunscreen did not prevent wheals, and several antihistamines were used, but



Figure 1: Erythema with itching and burning sensation appeared on the face (a), and a swelling also appeared on the back of the neck (b) after walking for about 20 minutes.

did not relieve the symptoms. In an attempt to prevent the induction of urticaria, the skin was irradiated with visible light after the topical application of BB cream and two types of commercial sunscreens without foundation content (Figure 3). After 5 min of irradiation, the untreated areas and areas where sunscreen was applied developed a wheal; however, the area where BB cream was applied did not develop a wheal. Based on these results, we hypothesized that BB creams containing foundation may effectively suppress solar urticaria. Sixteen months after the onset of the disease, the patient continued to have symptoms; however, he currently shades his skin and applies BB cream externally to areas where shading is not possible to prevent the development of wheals.

Discussion

Solar urticaria is a rare disease that causes swelling triggered by Ultraviolet Radiation (UVA and/or UVB) and/or visible light, and is also considered a type of physical urticaria [1]. After a few minutes of sun exposure, an itchy or burning rash appears, which usually disappears after 1 h to 2 h. Anaphylaxis may occur in severe cases. According to one report, solar urticaria accounts for 0.4% of all urticaria [3]. Most cases occur between the ages of 20 and 40 years, with the greatest number of cases occurring in individuals in their

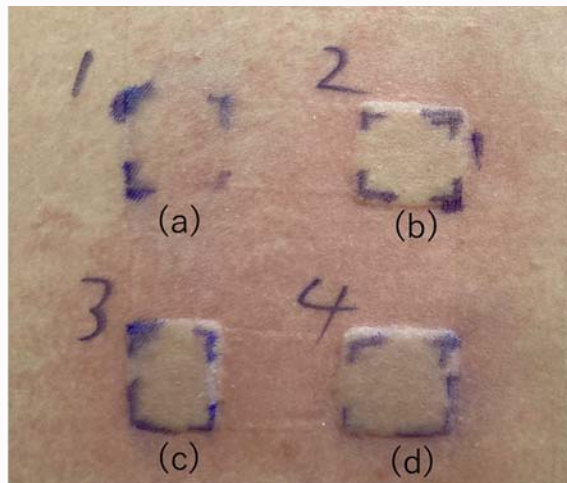


Figure 3: Visible light irradiation tests to find a way to prevent the induction of urticaria. The skin was irradiated with visible light after topical application of Blemish Balm cream (a) and two types of commercial sunscreens (c, d). After 5 minutes of irradiation, the areas with nothing applied (b) and where sunscreen (c, d) was applied developed a wheal, but the area where Blemish Balm cream (a) was applied did not develop a rash.

20s [4]. Although its pathogenesis has not been clarified, it has been suggested that photosensitizers in the serum may react at a particular wavelength and become photoallergens [5].

Other photodermatoses, such as polymorphic sun-rashes and porphyria, should be excluded. Drug-induced solar urticaria has been reported, and it is important to obtain drug history. The patient had been taking allopurinol for hypercholesterolemia for one month before the onset of symptoms, considering the possibility of drug-related complications, he discontinued the medication, but his symptoms did not improve.

The mechanism of the disease's pathogenesis remains entirely unclear. The predominant spectrum differs according to racial and geographic differences, with Ultraviolet (UV) - A and visible light often being the wavelengths of action in European countries and visible light in Asian countries. It was reported that in solar urticaria, there is a spectrum of inhibition of wheal formation [6]. Figure 2 (a) and Figure 3 were irradiated with the same amount of light, but the irradiation time required to induce urticaria was different. We

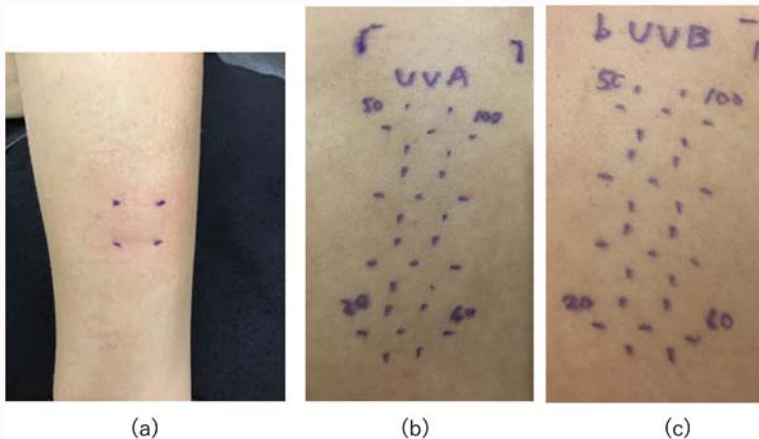


Figure 2: Provocation and action spectrum tests. Exposure to (a) visible light for 11 min from a distance of 15 cm induced wheal and edematous erythema. Exposure to (b) 3.0-5.0 J/cm² of Ultraviolet (UV) -A induced and (c) 60-300 mJ/cm² of Ultraviolet (UV) -B induced no reaction 30 min after exposure.

speculated that the different sites of irradiation and the degree of exposure to light of the inhibition spectrum before presenting to the hospital may have affected the time until the wheals appeared. Figure 2 (a) was irradiated on the arm and Figure 3 was irradiated on the back.

Treatment of solar urticaria is challenging, and this urticaria is poorly controlled. There is no specific treatment; only symptomatic treatments such as antihistamines, sun avoidance, a hardening treatment, and a sunscreen are provided. In recent years, several treatments using omalizumab have been reported [7,8]; however, there have also been reports of non-response [9]. Owing to its high cost, omalizumab cannot be easily used. Common sunscreens can protect against UVA and UVB but not visible light; therefore, they cannot protect against solar urticaria caused by visible light, as noted in this case. BB cream was developed in Germany to protect the skin and cover its blemishes. Although there are no studies that provide scientific evidence that BB creams block visible light, we can speculate that, like sunscreens, BB creams also contain zinc oxide and titanium dioxide. However, the zinc oxide and titanium dioxide in BB creams have larger particles than those in sunscreens, allowing them to block visible light and produce an effect similar to that of light shielding. It is also possible that the foundation in BB creams physically blocks visible light. Therefore, it is assumed that BB creams are effective in preventing solar urticaria, which is caused not only by visible light but also by UVA and UVB.

In summary, this case of solar urticaria was identified using irradiation tests as being caused by visible light. Sunscreen and antihistamines were ineffective; however, BB creams prevented the induction of wheals by physically shaded visible light.

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