

Received Date : 14-Jul-2016  
Revised Date : 28-Aug-2016  
Accepted Date : 07-Sep-2016  
Article type : Letter to the Editor

Corresponding Author Email ID: marie.moncourier@gmail.com

## **Visible light induced solar urticaria is improved by omalizumab**

**Marie Moncourier MD<sup>1</sup>, Safaë Assikar MD<sup>1</sup>, Ioana Matei MD<sup>1</sup>, Nicole Souyri MD<sup>1</sup>, Marion Couture MD<sup>1</sup>, Emilie Rigot MD<sup>1</sup>, Stéphanie Delauménie MD<sup>1</sup>, Christophe Bédane MD,PhD.<sup>1</sup>**

**<sup>1</sup>. Service de dermatologie, hôpital Dupytren, CHU de Limoges, France**

**key words : solar urticaria, omalizumab, visible light**

To the Editor,

**Solar urticaria (SU) is a rare type of physical urticaria triggered by sun exposure with pathognomonic wheal and flare seen within five to ten minutes of sun exposure. The mechanism of action is a type 1 hypersensitivity, Immunoglobulin E mediated, triggered by an unknown photoallergen. Phototesting determines the eliciting action spectrum and the minimal urticaria dose. The first line treatment relay on antihistamines and sun protectors. Other treatment options are phototherapy, plasmapheresis, cyclosporin A, and intravenous immunoglobulin (1). Therefore some SU are resistant to these treatments. The objective of this study was to investigate the variation in phototest results in patients with solar urticaria, triggered mainly by visible light, resistant to antihistamines treatment, receiving two injections of omalizumab, a monoclonal antibody, 150 mg per month for three months.**

This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1111/phpp.12271

This article is protected by copyright. All rights reserved.

We report four cases of solar urticaria triggered by a spectrum including visible light, and improved with omalizumab (table 1).

The first patient was a forty-nine year old woman suffering from solar urticaria for nine years. Phototests were initially positive with visible light (2 minutes) and UVA light (3 J/cm<sup>2</sup>). Previous treatments used were insufficient (antihistamines, PUVA therapy, intravenous immunoglobulin). Omalizumab was introduced. She received two injections of 150 mg twice a month associated with antihistamines. There was an improvement in phototests. Before omalizumab, Minimal urticarial dose (MUD) was 3 J/cm<sup>2</sup> for UVA light and 2 minutes for visible light. Three months after the introduction of omalizumab, MUD was 20 J/cm<sup>2</sup> for UVA light and 5 minutes for visible light. She stopped omalizumab and symptoms recurred. We reintroduced the same treatment and she found an improvement in clinical signs.

The second patient was a forty-nine year old man with a history of allergic rhinitis. He had suffered from solar urticaria for ten years. Phototests were positive with UVA light (MUD = 5.65 J/cm<sup>2</sup>), visible light (MUD = 5 minutes) and UVB light (MUD = 30 seconds). The treatment response with antihistamines and cyclosporin wasn't satisfactory. Omalizumab associated with antihistamines was started with two injections of 150 mg a month. After three months, phototests improved (MUD with UVA light higher than 20 J/cm<sup>2</sup>) with marked clinical improvement. This type of SU was triggered by both UVA, UVB and visible light. Phototests after the reintroduction of treatment were only made with UVA light because UVA light reaction was the most important.

The third patient was a sixteen year old girl who had solar urticaria with positive phototests to visible light at 15 minutes. With antihistamines, the MUD increased to 25 minutes with visible light. She started treatment with omalizumab 150 mg subcutaneously twice a month.

Visible light phototests were negative at 3 months of treatment with clinical improvement allowing prolonged sun exposure.

The fourth patient was a sixty-nine year old woman suffering from solar urticaria for six months with visible light phototests positive in 5 minutes. After the failure of antihistamines, omalizumab was started with 2 injections of 150 mg per month. After 3 months of treatment, visible light phototests were negative at 20 minutes. All patients had a solar urticaria triggered by visible light.

Omalizumab is a monoclonal antibody, 95% humanized, that binds selectively to human immunoglobulin E. Omalizumab reduces the number of circulating immunoglobulin and causes a feedback on their receptors on the mast cells surface. Omalizumab, originally used in asthma, has won the authorization for use in chronic urticaria at 300 mg monthly. We tested successfully this treatment on four patients with solar urticaria. All patients had visible light triggered solar urticaria (table 1). Visible light phototests improved for all patients (table 2). Most patients experienced a good tolerance except one patient (4) who developed a periorbital oedema. All patients reported a marked improvement in their quality of life.

**Despite a small number of patients, our study emphasizes the interest of omalizumab for achieving a good control of the disease. This is confirmed by the improvement of phototests. This is particularly important for visible light induced solar urticaria as physical protection to visible light is particularly difficult. UV light can be stopped by sunscreen whereas visible light is only stopped by physical device.**

Our study confirms that the indication of omalizumab can be extended to solar urticaria. The response was very satisfactory for all patients with solar urticaria triggered by visible light.

Three other cases of solar urticaria successfully treated with omalizumab 300 mg monthly dose have been published (2). Another case improved after 4 injections of 150 mg of

omalizumab (3). Another case showed an improvement of phototests for UVB light but not for UVA light after six injections of omalizumab 400 mg for a man with solar urticaria triggered by UVA and UVB light (4). Another case showed a failure of omalizumab after 3 injections of 150 mg once a month for a solar urticaria to UVA light and visible light (5). In this case the treatment dose used was lower than recommendations (300 mg per month). Recently a 6 year old child with severe SU to visible light ( $MUD = 30 \text{ J/cm}^2$ ) with angioedema received subcutaneous injection of omalizumab with an increase in dose from 75mg to 300mg every four weeks. He remained in remission one year after with negative phototests. (6) A 16 years- old women with SU induced by UVB ( $MUD > 1.2 \text{ J/cm}^2$ ) received injections of omalizumab 375 mg twice a month then 300 mg and 150 mg for 9 months. At the end of the treatment and after a 4 months washout phototests remained negative.(7) However the injection schema was not standardized in all these reported cases. Recently a multicenter phase II study was conducted evaluating the efficiency of omalizumab by measuring at week 12 the proportion of patients without solar urticaria triggered by an ultraviolet dose greater than 10-fold the baseline minimal urticarial dose. 10 patients were included, 2 patients increased MUD tenfold or response rate of 20% ( $p = 0.2639$ ) complete clinical remission was obtained in 3 patients 30%, DLQI was less than 6 in 4 patients (40%), patients described a clinical benefit. This study suggests that omalizumab is an interesting therapeutic option in refractory solar urticaria despite a response to insufficient primary endpoint (8). In this study, the primary endpoint was high MUD improvement (20%). Unlike our study, the spectrum trigger was only UV light. For all our patients visible light triggered the SU. This may explain the good response to treatment with omalizumab which allowed a normal life even during sunny days.

Omalizumab may represent an option if antihistamines fail in solar urticaria with few side effects compared to other therapeutic options, significant improvement in MUD, significant improvement in the quality of life of patients, effective and well tolerated alternative for SU inadequately controlled by antihistamines at high doses.

**Table 1 : characteristics of patients**

| patients | Sex, age (years) | SU duration | Previous treatments                              | Responsible action spectrum             |
|----------|------------------|-------------|--------------------------------------------------|-----------------------------------------|
| 1        | F, 49            | 10 years    | Antihistamines<br>PUVA therapy<br>Immunoglobulin | Visible light<br>UVA light              |
| 2        | M, 49            | 9 years     | Antihistamines<br>Cyclosporin A                  | UVA light<br>UVB light<br>Visible light |
| 3        | F, 16            | 6 months    | Antihistamines                                   | Visible light                           |
| 4        | F, 79            | 6 months    | Antihistamines                                   | Visible light                           |

**Table 2 : results of phototests before and after 3 months of treatment of omalizumab**

| Patients | MUD before 3 months of omalizumab                      | MUD after 3 months of omalizumab                        |
|----------|--------------------------------------------------------|---------------------------------------------------------|
| 1        | Visible light : 2 minutes<br>UVA : 3 J/cm <sup>2</sup> | Visible light 5 minutes<br>UVA : > 20 J/cm <sup>2</sup> |
| 2        | UVA : 5.65 J/cm <sup>2</sup>                           | UVA : > 20 J/cm <sup>2</sup>                            |
| 3        | Visible light : 15 minutes                             | Visible light : > 25 minutes                            |
| 4        | Visible light : 5 minutes                              | Visible light : 20 minutes                              |

## References:

1. Botto NC, Warshaw EM. Solar urticaria. *J Am Acad Dermatol*. déc 2008;59(6):909-920; quiz 921-922.
2. Baliu-Piqué C, Aguilera Peiró P. Three cases of solar urticaria successfully treated with omalizumab. *J Eur Acad Dermatol Venereol JEADV*. 30 janv 2015.
3. Güzelbey O, Ardelean E, Magerl M, Zuberbier T, Maurer M, Metz M. Successful treatment of solar urticaria with anti-immunoglobulin E therapy. *Allergy*. nov 2008;63(11):1563-1565.
4. Waibel KH, Reese DA, Hamilton RG, Devillez RL. Partial improvement of solar urticaria after omalizumab. *J Allergy Clin Immunol*. févr 2010;125(2):490-491.
5. Duchini G, Bäumlér W, Bircher AJ, Scherer K. Failure of omalizumab (Xolair®) in the treatment of a case of solar urticaria caused by ultraviolet A and visible light. *Photodermatol Photoimmunol Photomed*. déc 2011;27(6):336-337.
6. Levi A, Tal Y, Dranitzki Z, Shalit M, Enk CD. Successful Omalizumab Treatment of Severe Solar Urticaria in a 6-Year Old Child. *Pediatr Allergy Immunol Off Publ Eur Soc Pediatr Allergy Immunol*. 14 juill 2015.
7. Arasi S, Crisafulli G, Caminiti L, Guarneri F, Aversa T, Porcaro F, et al. Treatment with omalizumab in a 16-year-old Caucasian girl with refractory solar urticaria. *Pediatr Allergy Immunol Off Publ Eur Soc Pediatr Allergy Immunol*. 28 mai 2015.
8. Aubin F, Avenel-Audran M, Jeanmougin M, Adamski H, Peyron J-L, Marguery M-C, et al. Omalizumab in patients with severe and refractory solar urticaria: A phase II multicentric study. *J Am Acad Dermatol*. mars 2016;74(3):574-575.