

# Omalizumab treatment in severe adult atopic dermatitis

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## Summary

**Atopic dermatitis (AD) is one of the most common chronic skin diseases. Treatment options include lubricants, antihistamines, and corticosteroids in either topical or oral forms. Severe AD is frequently recalcitrant to these medications. We reported three cases of severe AD patients who had elevated of IgE levels and failed to response to several prior medical treatment.**

**After being treated with Omalizumab (humanized monoclonal anti-IgE antibody), the patients had marked alleviation of symptoms with improved Eczema Area and Severity Index (EASI) and pruritic scores. No patient experienced adverse effect. (*Asian Pac J Allergy Immunol 2011;29:357-60*)**

**Key words:** *Omalizumab, IgE levels, EASI score*

## Introduction

Atopic dermatitis (AD) is one of the most common skin diseases and causes chronic and severe pruritis. AD typically develops in early childhood or infancy and often resolves with time. Unfortunately, some patients have persistent AD throughout their lifetime.<sup>1</sup> Most AD patients also have a personal or family history of allergic rhinitis or asthma which involve the pathologic pathway of IgE reactivation.<sup>2,3</sup>

Conventional therapies for AD include topical agents e.g., steroids, topical calcineurin inhibitors, phototherapy and oral medications e.g. azathioprine, cyclosporine, mycophenolate mofetil, methotrexate, prednisone, etc.<sup>4</sup> Oral medications are generally reserved for moderate to severe AD because of their systemic toxicities e.g., adrenal suppression, diabetes, renal toxicity, liver toxicity and myelosuppression.

Omalizumab is a humanized monoclonal anti-IgE antibody that binds to the IgE molecule at the high-affinity FcεRI receptor binding site. The drug has been approved by the Food and Drug Administration for adults and adolescents (12 years of age and above) with moderate to severe persistent asthma<sup>5</sup> Since AD shares a common pathologic mechanism, that is IgE reactivation, with asthma, omalizumab has been tested as a systemic therapy for recalcitrant AD associated with elevated IgE levels. We reported three cases of severe AD in adults who were successfully treated with Omalizumab. During their course of treatment, the patients were evaluated every 4 weeks by the same dermatologist (S.T.) using Eczema Area and Severity Index (EASI) and patient pruritic scores<sup>6</sup>. The scores range from 0-10, with a score of 0 denoting no symptom and score of 10 indicating severe itching.

## Case series

### Case 1

A 35 year-old Thai male was diagnosed AD because of chronic, relapsing and pruritic eczema occurring on the face, trunk and flexural part of his extremities during his childhood. He also had a previous history of atopy. His AD symptoms had been resistant to medication; prior therapies included topical corticosteroids (triamcinolone), emollients, systemic corticosteroids and H1 antihistamines (loratadine, hydroxyzine). He routinely came to the dermatology clinic for medication which failed to produce improvement. At the time of his consultation at our clinic, AD lesions were involving approximately 80% of his total body surface area.

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**Figure 1.** Case 1, clinical appearance before treatment (on the left) and 4-month follow-up after treatment (on the right).

He was otherwise healthy. Laboratory testing revealed a serum IgE level of 977 IU/mL. We excluded other causes of his high IgE level, e.g., parasite by CBC and stool examination. Treatment with omalizumab was started using 300 mg subcutaneous injections and repeated every 2 weeks. Topical steroid and emollient were allowed during omalizumab treatment. The patient noted an improvement at 4 months, with 50% reduction in EASI scores (EASI scores from 12 to 6) (Figure 1) and 43 % decrease in the pruritic scores (score of 7 to 3) after 8 cycles of biweekly omalizumab injections. No serious side effect was experienced. However, his AD symptoms recurred 6 months after omalizumab cessation.

#### Case 2

A 40-year-old Thai female had more than 30 years history of chronic AD and allergic rhinitis; she was diagnosed with AD by chronic relapsing pruritic eczema and a personal and family of atopy. She presented to our clinic with severe chronic pruritic plaques on the flexural areas of her arms, legs and face. She had undergone prolonged treatment with multiple doses of oral prednisolone, various antihistamines (hydroxyzine, fexofenadine, ceterizine, desloratadine), topical tacrolimus, topical steroid, and emollients without any improvement. Her serum IgE level was 215.5 IU/mL. We started omalizumab 300 mg subcutaneous injection monthly with oral antihistamine and topical steroid therapy. Although her EASI score was slightly decreased (scores of 8 to 7), she reported 25% improvement in the pruritic score (scores of 8 to 6) after her second injection without any adverse reaction. In view of her pruritic symptom improvement, we



**Figure 2.** Case 3, clinical appearance before treatment (on the left) and 3 months after clinical follow-up (on the right).

stopped omalizumab and follow-up visit for every 2 months. Her AD was clinically stable during 1-year follow up.

#### Case 3

A 23-year-old Thai female with a 9 year history of AD presented with intractable pruritic eczema on her back, abdomen and the flexural areas of her arms. She also had history of allergic rhinitis, asthma, and prurigo nodularis. The patient had been treated with emollients, topical corticosteroids (triamcinolone), antihistamines (loratadine, hydroxyzine), and multiple doses of oral prednisolone and cyclosporine. Her AD symptoms showed no improve and she was sent to our clinic. Her serum IgE level was 277 IU/mL when omalizumab 300 mg subcutaneous injections were started (monthly schedule). We allowed the patient to continue her topical steroid and antihistamine. Her EASI score showed a 30% improvement (scores of 10 to 7) while the pruritic score was nearly 50% decreased (scores of 9 to 5) after 2 injections of omalizumab (Figure 2.). However the patient was lost to follow-up after her second visit.

The EASI and patient pruritic scores of three cases who were treated with omalizumab were shown in Figure 3 and 4.

#### Discussion

Elevated serum IgE levels and high-affinity FcεRI receptors on mast cells and mononuclear cells are immunologic characteristic of AD. These pathologic mechanisms led to an innovative treatment with a pharmacotherapeutic targeted agent.<sup>4</sup> Omalizumab is a humanized monoclonal anti-IgE antibody that binds to the IgE molecule at the high-affinity FcεRI

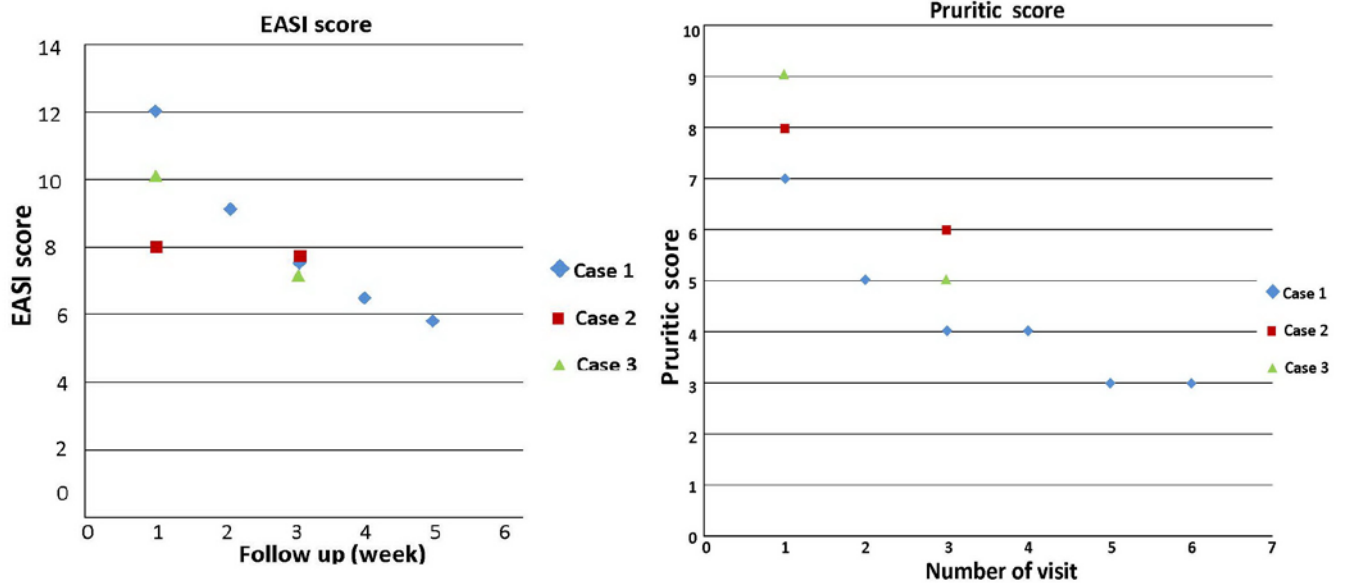


Figure 3. Values of EASI scores.

receptor binding site on mast cells and other immune cells.<sup>7</sup> These actions cause a reduction of serum levels of IgE and blockage of histamine release from mast cells with the ultimate result of a decrease in allergic symptoms. The drug has been reported for treatment of asthma, allergic rhinitis, occupational latex allergy, and AD.<sup>5,8-11</sup>

Omalizumab is usually indicated when serum IgE level is above 100 IU/ml. However, those using the drug should be cautious about using the drug when the level exceeds 700 IU/ml until the investigations for other underlying diseases e.g., parasitic infestation have been excluded.<sup>12</sup> Dosages and schedule for omalizumab, which is administered via subcutaneous injection, range from 150 to 300 units every 2 to 4 weeks depending on serum IgE levels and the severity of the disease.<sup>13</sup> The most common adverse effects of omalizumab include headache, dizziness and acute urticaria.<sup>14</sup> However, although anaphylactic events have been reported in clinical trials for omalizumab, the risk is very low (approximately 0.2%).

There have been previous reports of success using omalizumab in atopic dermatitis patients. Amrol reported 3 cases with severe and resistant atopic dermatitis whose cutaneous symptoms significantly improved by treatment with omalizumab.<sup>15</sup> Sheinkopf's pilot study indicated that omalizumab was effective in treating all 21 AD patients with moderate to severe persistent allergic asthma.<sup>16</sup> Furthermore, Se-young et al. reported

improvement of recalcitrant atopic dermatitis during 8 months of treatment.<sup>17</sup> On the other hand, there have also been reports of unsuccessful omalizumab treatment in recalcitrant atopic dermatitis.<sup>18</sup> Our three patients were diagnosed as having AD according to the criteria of Hanifin and Rajka.<sup>19</sup> They showed improvement of the pruritic scores after 2 months of omalizumab treatment.

To the best of our knowledge, this is the first case series in Thailand which describes successful treatment with omalizumab, without any adverse effect, in patients with severe AD. More experience with omalizumab for AD treatment is required in larger number of patients or in a clinical trial to confirm this positive finding.

### Conflicts of interests

Both authors declare no conflict of interest.

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### References

1. Hanifin JM, Rajka G. Diagnostic features of atopic dermatitis. *Act Derm Venerol Suppl (Stockh)*. 1980;92:44-7.
2. Stingl G. IgE-mediated, FcεRI-dependent allergen presentation: a pathogenetic factor in atopic dermatitis. *J Am Acad Dermatol*. 2001;45:S17-20.
3. Hanifin JM, Chan S. Biochemical and immunologic mechanisms in atopic dermatitis: new targets for emerging therapies. *J Am Acad Dermatol*. 1999;41:72-7.

4. Tofte SJ, Hanifin JM. Current management and therapy of atopic dermatitis. *J Am Acad Dermatol.* 2001; 44:S13-6.
5. Busse W, Corren J, Lanier BQ, McAlary M, Folwer-Taylor A, Cioppa GD, et al. Omalizumab, anti-IgE recombinant humanized monoclonal antibody, for the treatment of severe allergic asthma. *J Allergy Clin Immunol.* 2001;108:184-9.
6. Hanifin JM, Thurston M, Omoto M, Cherill R, Tofte SJ, Graeber M. The eczema area and severity index (EASI): assessment of reliability in atopic dermatitis. EASI Evaluator Group. *Exp Dermatol.* 2001;10:11-8.
7. Graves JE, Nunley K, Heffernan MP. Off-label uses of biologics in dermatology: Rituximab, omalizumab, infliximab, etanercept, adalimumab, efalizumab, and alefacept. *J Am Acad Dermatol.* 2007;56:e55-79.
8. Lane JE, Cheyney JM, Lane TN, Kent DE, Cohen DJ. Treatment of recalcitrant atopic dermatitis with omalizumab. *J Am Acad Dermatol* 2006;54:68-72.
9. Sheinkopf LE, Rafi AW, Do LT, Katz RM, Klaustermeyer WB. Efficacy of omalizumab in the treatment of atopic dermatitis: a pilot study. *Allergy asthma proc* 2008;29:530-7.
10. Leynadier F, Doudou O, Gaouar H, Le Gros V, Bourdeix I, Guyomarch-Cocco L, et al. Effect of omalizumab in health care workers with occupational latex allergy. *J Allergy Clin Immunol.* 2004;113: 360-1.
11. Vignola AM, Humbert M, Bousquet J, Boulet LP, Hedgecock S, Blogg M, et al. Efficacy and tolerability of anti-immunoglobulin E therapy with omalizumab in patients with concomitant allergic asthma and persistent allergic rhinitis: SOLAR. *Allergy.* 2004; 59: 709-17.
12. Hagel I, Di Prisco MC, Goldblatt J, Le Souef PN. The role of parasites in genetic susceptibility to allergy: IgE, helminthic infection and allergy, and the evolution of the human immune system. *Clin Rev Allergy Immunol.* 2004 ;26:75-83.
13. Lin H, Boesel KM, Griffith DT, Prussin C, Foster B, Romero FA, et al. Omalizumab rapidly decreases nasal allergic response and FcεRI on basophils. *J Allergy Clin Immunol.* 2004;113:297-302.
14. Corren J, Diaz-Sanchez D, Saxon A, Deniz Y, Reimann J, Sinclair D, et al. Effects of omalizumab, a humanized monoclonal anti-IgE antibody, on nasal reactivity to allergen and local IgE synthesis. *Ann Allergy Asthma Immunol.* 2004; 93: 243-8.
15. Amrol D. Anti-immunoglobulin E in the treatment of refractory atopic dermatitis. *South Med J.* 2010;103:554-8.
16. Park SY, Choi MR, Na JI, Youn SW, Park KC, Huh CH. Recalcitrant atopic dermatitis treated with omalizumab. *Ann Dermatol.* 2010;22:349-52.
17. Krathen RA, Hsu S. Failure of omalizumab for treatment of severe adult atopic dermatitis. *J Am Acad Dermatol.* 2006;53:338-40.