

Future studies are needed to confirm whether omalizumab can impair glucose homeostasis.

Omalizumab is generally safe and well tolerated. In addition, this drug can help cut down OCS doses and lower the risk of OCS-induced irreversible side-effects, such as DM, in patients with severe asthma requiring OCS. However, consistent with our case, omalizumab can induce the unexpected complication of impaired glucose homeostasis, particularly in patients with DM. Therefore, we should closely monitor patients treated with omalizumab, including their glucose level.

Conflict of interest

All authors have no conflict of interest regarding to this report.

References

1. Global Initiative for Asthma (GINA). Global Strategy for Asthma Management and Prevention; 2014. www.ginasthma.org/ Date last accessed: January 2015. Date last updated: May 2014.
2. Samitas K, Delimpoura V, Zervas E, Gaga M. Anti-IgE treatment, airway inflammation and remodelling in severe allergic asthma: current knowledge and future perspectives. *Eur Respir Rev.* 2015;24:594–601.
3. Cersosimo E, Solis-Herrera C, Trautmann ME, Malloy J, Triplitt CL. Assessment of pancreatic β -cell function: review of methods and clinical applications. *Curr Diabetes Rev.* 2014;10:2–42.

4. Lai T, Wang S, Xu Z, Zhang C, Zhao Y, Hu Y, et al. Long-term efficacy and safety of omalizumab in patients with persistent uncontrolled allergic asthma: a systematic review and meta-analysis. *Sci Rep.* 2015;5:8191.
5. Yalcin AD, Gorczyński RM, Cilli A, Strauss L. Omalizumab (anti-IgE) therapy increases blood glucose levels in severe persistent allergic asthma patients with diabetes mellitus: 18 month follow-up. *Clin Lab.* 2014;60:1561–4.
6. Macglashan DW Jr, Saini SS. Omalizumab increases the intrinsic sensitivity of human basophils to IgE-mediated stimulation. *J Allergy Clin Immunol.* 2013;132:906–11.
7. Ishiwata Y, Yasuhara M. Gatifloxacin-induced histamine release and hyperglycemia in rats. *Eur J Pharmacol.* 2010;645:192–7.

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Allergic bronchopulmonary aspergillosis treated successfully with omalizumab



Dear Editor,

Allergic bronchopulmonary aspergillosis (ABPA) is caused by a hypersensitivity response of type 2 T helper (Th2) lymphocytes to antigens, mostly *Aspergillus fumigatus* (*A. fumigatus*).¹ This abnormal host response to *A. fumigatus* in a subset of patients with asthma or cystic fibrosis (CF) is likely due to genetic susceptibility that predisposes patients to the risk of developing ABPA. This is characterised by an increased total IgE and *Aspergillus*-specific IgE, IgG, and IgA in the serum and bronchoalveolar lavage.² The International Society for Human and Animal Mycology (ISHAM) and the Rosenberg–Patterson criteria are most often used to diagnose ABPA.^{3,4}

Omalizumab is a humanized monoclonal anti-IgE antibody with licensed indication in severe allergic asthma. There are clinical studies that have also shown benefit in the use of *omalizumab* in ABPA patients without and with cystic fibrosis.^{5,6} However, the safety and efficacy of *omalizumab* in ABPA needs further evidence.

The authors described a 45-year-old caucasian man with long standing atopic asthma with frequent exacerbations, and ABPA diagnosed at the age of 42 years. CF was

excluded. At the time of ABPA diagnosis, his predicted forced expiratory volume in 1 s (FEV1) was 58% and after bronchodilator was 62%. All Rosenberg–Patterson criteria were met, including central bronchiectasis with pulmonary infiltrates in all lobes evidenced in a thoracic CT scan. Peripheral blood eosinophils were 570/mm³ under systemic steroids, total IgE was 2674 IU/mL and AF-specific IgE was 30.50 kU/L. No precipitating antibody against AF antigen was found. The patient was treated with prednisolone 40 mg/day, inhaled salmeterol/fluticasone propionate combination 50/500 mcg twice a day and montelukast 10 mg/day. We could not taper the prednisolone dose because of frequent exacerbations.

Oral itraconazole was not administered because the patient was taking atorvastatin (since a previous cerebral stroke), and also because of his history of hepatotoxicity due to azathioprine (which he has been prescribed in the past for his severe dermatitis).

Despite the optimising treatment, frequent exacerbations of his pulmonary disease occurred. So, one year after ABPA diagnosis the patient began treatment with *omalizumab* 600 mg subcutaneously every 2 weeks (the maximum recommended dosage; dose and dose frequency were based on the patient's weight and on pre-treatment serum IgE IU/mL). The authors evaluated the frequency of exacerbations, the Asthma Control Test score (ACT), lung function, peripheral blood eosinophils, total IgE, and blood AF-specific IgE.

Table 1 Changes in laboratory and clinical findings after *omalizumab* treatment.

	Before omalizumab	After 6 months	After 12 months	After 18 months
Eosinophils (/mm ³)	570	200	160	90
Total IgE (IU/mL)	2674	1683	1600	1950
AF-specific IgE (kU/L)	30.50	–	60.30	60.30
%FEV1.0	58	68	78	–
ACT score	17	25	25	25

ACT = Asthma Control Test; AF = *Aspergillus fumigatus*; FEV1.0 = forced expiratory volume in 1 second; Ig = immunoglobulin.

Following 6 months of *omalizumab*, improvements were observed in lung function (FEV1 68%) and the ACT changed from 21 to 25. Peripheral blood eosinophils reduced from 570/mm³ to 200/mm³, total IgE decreased from 2286 to 1683 IU/mL. Prednisolone was reduced to 10 mg/day.

After 12 months, ACT remained stable, total IgE was 1600 IU/mL, peripheral blood eosinophils decreased to 160/mm³, AF-specific IgE raised to 60.30 kU/L. Prednisolone was stopped. FEV1 (%) improved to 78, and a negative bronchodilator response maintained.

At 18 months of treatment, total IgE was 1950 U/mL, blood eosinophils decreased to 90/mm³, AF-specific IgE had not changed and *Aspergillus* precipitins were not detected. (Table 1).

There were no exacerbations or hospitalizations during the whole follow-up period.

There were no adverse events reported during treatment with *omalizumab*.

The authors present the case of a patient with severe asthma and steroid-dependent ABPA who was successfully weaned from systemic steroid therapy using *omalizumab*. Corticosteroid-sparing effect of *omalizumab* is a clinically relevant finding in this case, with a major improvement in asthma symptoms and a reduction in the inflammatory markers: blood eosinophilia and total serum IgE (Table 1). It is not known if the reduction in total serum IgE and eosinophilia is part of the natural course of ABPA or a marker for successful treatment with *omalizumab*. Lin et al.,⁷ also suggest that serum IgE in patients treated with *omalizumab* is still an important marker of disease activity. Mummadj et al.⁸ showed that in patients with severe asthma treated with *omalizumab* serum IgE concentration may have clinically significant variability over time, affecting dosing.

The time that *omalizumab* treatment has to develop a response suggests that IgE antibodies might have an important role in airflow obstruction in ABPA. The serum free IgE are reduced in a dose-dependent manner within two hours of administration of *omalizumab*.

In our patient a significant FEV1 improvement was achieved, with only a mild bronchial obstruction remaining. Initial studies with *omalizumab* showed that, although in patients with asthma the exacerbation rate declines during treatment, the effects on lung function remain relatively small.⁹ More recently, some studies have shown that anti-IgE treatment may prevent or reverse, directly and/or indirectly, airway remodelling changes.¹⁰ The effects of *omalizumab* on preventing the initiation and further propagation of the allergic inflammation cascade may explain why in our patient the improvement in the FEV1 exists, despite the relative stability after 6 months of the total IgE.

In conclusion, *omalizumab* was effective in reducing exacerbations and the need for systemic corticosteroids as well as in improving asthma symptoms, in a patient with asthma and ABPA who had previously shown an unsatisfactory response to corticosteroids.

Treatment with *omalizumab* should be considered in asthmatic patients with ABPA who require prolonged use of oral steroids or have frequent relapses of the disease.

Further double-blind, randomised, placebo-controlled studies are necessary to clarify the role of anti-IgE treatment in ABPA.

Conflicts of interest

The authors have no conflicts of interest to declare.

References

- Incorvaia C, Mauro M, Russello M, Formigoni C, Riario-Sforza GG, Ridolo E. Omalizumab, an anti-immunoglobulin E antibody: state of the art. *Drug Des Dev Ther.* 2014;8: 197–207.
- Aydin O, Sozener ZC, Soyuyigit S, Kendirlihan R, Gençtürk Z, Mısırlıgil Z, et al. Omalizumab in the treatment of allergic bronchopulmonary aspergillosis: one center's experience with 14 cases. *Allergy Asthma Proc.* 2015;36: 493–500.
- Rosenberg M, Patterson R, Mintzer R, Cooper BJ, Roberts M, Harris KE. Clinical and immunologic criteria for the diagnosis of allergic bronchopulmonary aspergillosis. *Ann. Intern. Med.* 1977;86:405–14.
- Agarwal R, Chakrabarti A, Shah A, Gupta D, Meis JF, Guleria R, et al. ABPA complicating asthma ISHAM working group. Allergic bronchopulmonary aspergillosis: review of literature and proposal of new diagnostic and classification criteria. *Clin. Exp. Allergy.* 2013;43:850–73.
- Stanziola A, Vitale C. Combined therapy omalizumab and voriconazole in allergic bronchopulmonary aspergillosis. *Allergy.* 2012;67:453–4.
- Josserand-Nové R, Grard S, Auzou L, Reix P, Murriss-Espin M, Brémont F, et al. Case series of omalizumab for allergic bronchopulmonary aspergillosis in cystic fibrosis patients. *Pediatr. Pulmonol.* 2017;52:190–7.
- Lin RY, Sethi S, Bhargava GA. Measured immunoglobulin E in allergic bronchopulmonary aspergillosis treated with omalizumab. *J. Asthma.* 2010;47:942–5.
- Mummadj SR, Hatipoglu US, Gupta M, Bossard MK, Xu M, Lang D. Clinically significant variability of serum IgE concentrations in patients with severe asthma. *J. Asthma.* 2012;49: 115–20.
- Holgate ST, Chuchalin AG, Hébert J, Lötvall J, Persson GB, Chung KF, et al. Efficacy and safety of a recombinant

anti-immunoglobulin E antibody (omalizumab) in severe allergic asthma. *Clin. Exp. Allergy*. 2004;34:632–8.

10. Samitas K, Delimpoura V, Zervas E, Gaga M. Anti-IgE treatment, airway inflammation and remodelling in severe allergic asthma: current knowledge and future perspectives. *Eur Respir Rev*. 2015;24:594–601.

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Atypical pyoderma gangrenosum simulating pectoral abscess managed using negative pressure wound therapy



To the Editor,

Pyoderma gangrenosum (PG) is an ulcerative neutrophilic dermatosis of uncertain aetiology that is generally found in the extremities. It usually presents as painful skin ulcers.

We present a case of a patient with atypical PG that was satisfactorily treated using negative pressure wound therapy (NPWT) and immunosupresor therapy.

A 35-year-old female with inflammatory intestinal disease and a history of PG in lower extremities during pregnancy, was sent to our institution for pain and swelling at paraesternal level of 3 days of evolution without previous traumatism of the region. We performed a chest CT scan that revealed the presence of an erosive arthropathy of the left sternoclavicular joint; with a lesion of 30 mm in the thickness of the ipsilateral pectoral musculature related to an abscess (Fig. 1). We punctured the lesion under ultrasound control. This revealed purulent material, which we later drained, before wide debridement of the abscess and starting empirical antibiotic treatment.

Over the days following the drainage, the patient's evolution was negative with a large increase in purulent exudate from the wound, fever and signs of sepsis with progression of the ulcer (Fig. 2A and B).

All the microbiological cultures were negative, so as we suspected PG, a tissue sample was sent for a histopathological study.

In view of the fact that the wound was clearly worsening, combined with the impossibility of controlling the exudate we decided to place a NPWT system, combined with intensive immunosupresor therapy and broad-spectrum antibiotics (Fig. 2C).

Seven days after starting treatment with NPWT the exudate was controlled and the ulcer had stabilised, with granulated tissue appearing at the back of the wound (Fig. 2D). Thus the NPWT system was removed to prevent the growth of ulcer secondary to pathergy that could cause the NPWT system.

Finally the histopathological study of the tissue sample demonstrated central necrosis and ulceration of the epidermis and dermis surrounded by an intense acute inflammatory cell infiltrate, with a peripheral mixed to chronic inflammatory cell infiltrate. We also looked for neutrophils and fibrin in superficial vessels without histologic evidence of vasculitis. All of these findings were PG-compatible features.

The patient's evolution was finally successful, and complete healing of the ulcer achieved 4 months after onset of symptoms (Fig. 2E).

Pyoderma gangrenosum is a neutrophilic dermatosis, which was first described by Brocq in 1916 and later named by Brunsting in 1930, which is characterised by papules, pustules or vesicles in the skin that quickly transform into a painful ulcer with violet, raised and up to 20 cm diameter margins.

PG has an incidence of 0.3–1/100,000 and typically affects middle-aged patients. Four clinical variants of PG have been described: the ulcerative, pustular, bullous and vegetative type. In 80–90% of patients the lesions are reported in the lower limbs, though they may be seen in any part of the human topography, as was the case of our patient who had had a first episode of PG in lower limbs and a recurrence years later in the chest.¹

The diagnosis of PG, as in our case, is usually reached by exclusion, although frequently the typical morphology of the injury will lead us to suspect its presence. There is no specific treatment and PG management consists of suppression of the inflammatory activity, treatment of the underlying disease, the promotion of ulcer healing and pain control.



Figure 1 CT chest scan showing a 3 cm diameter lump at the level of the left pectoral muscle (arrow).