

CASE REPORT

Iran J Allergy Asthma Immunol

August 2022; 21(4):484-487.

Doi: 10.18502/ijaai.v21i4.10296

Occupational Chronic Hand Dermatitis in Hospital Environment Successfully Treated with Dupilumab: A Case Report

Hui Gan^{1,2}, and Ya-dong Gao¹

¹ Department of Allergology, Zhongnan Hospital of Wuhan University, Wuhan, China

² Department of Allergy and Clinical Immunology, Guangzhou Institute of Respiratory Health, State Key Laboratory of Respiratory Disease, National Clinical Research Center for Respiratory Disease, First Affiliated Hospital of Guangzhou Medical University, Guangzhou, China

Received: 23 November 2021; Received in revised form: 1 March 2022; Accepted: 12 March 2022

ABSTRACT

Dupilumab is approved to treat mild to moderate atopic dermatitis. It is unclear, however, whether Dupilumab is effective for occupational hand eczema. In this article, we describe a 29-year-old nurse who developed severe hand eczema after working in a hospital for 6 years and received inadequate relief from routine treatment. Dupilumab was administered to the patient with great results.

Keywords: Dupilumab; Eczema; Occupational dermatitis

INTRODUCTION

Occupational skin disease is common and caused by different hazard factors. According to the pathogenesis, occupational dermatitis is usually divided into allergic contact dermatitis and irritant contact dermatitis. The hands are the organ most commonly affected by occupational dermatitis.¹ Occupational hand eczema seriously affects the quality of life and work efficiency of patients, who even has to change jobs because of this.² Hand eczema is routinely treated with topical drugs, including local glucocorticoids and calcineurin inhibitors. Sometimes it cannot be completely relieved, and systemic immunosuppressive drugs are required, but it may lead to side effects and recurrence of symptoms

after drug withdrawal.³ Dupilumab is a fully-humanized monoclonal antibody directly targeting the interleukin (IL)-4 receptor α (IL-4R α) subunit that blocks signaling of both IL-4 and IL-13, the two key Th2 cytokines.⁴ Dupilumab is currently approved for the treatment of atopic dermatitis (AD), but not isolated hand eczema. Here, we report a case of occupational hand eczema in a hospital environment treated with Dupilumab successfully.

CASE REPORT

A 29-year-old female nurse complained about a rash on her hand for 5 years. The rash was flaky erythema with dry and molting skin, accompanied by severe itching that was unbearable. There was no obvious rash or itching on the skin beyond the hand. She noticed that the rash normally occurred during work and was almost totally relieved after a 4-week holiday. She has worked

Corresponding Author: Ya-dong Gao, PhD;
Department of Allergology, Zhongnan Hospital of Wuhan University,
Wuhan, China. Tel: (+86 027) 6781 2536, E-mail:
gaoyadong@whu.edu.cn

Hand Dermatitis Treated with Dupilumab

in the General Medicine Department for 6 years. She had no other allergic diseases, and no history of food allergy, drug allergy, and other diseases. She also had no family history of allergic diseases. She was diagnosed with hand eczema and was treated with a topical corticosteroid (Fluticasone Propionate cream), calcineurin inhibitors (Pimecrolimus), and oral histamine H1 receptor antagonists. The treatment improved hand rashes and itching symptoms initially. However, these treatments eventually failed to control the symptoms and the development of rash over time, especially in the past 2 years. She had to use oral prednisone for a week or two to control the symptoms since the hand eczema seriously affected her work and sleep. About half a month after prednisone withdrawal, the symptoms and rash recurred again. During the past five years, she had one episode of periocular eczema, which was cured after applying Fluticasone Propionate cream.

After the outbreak of COVID-19, her hand rash occurred more frequently and more severe than before. In December 2020, she was transferred to the Allergy Department. After detailed medical history, her hand eczema onset was also related to eating some kinds of food, especially those with pungent odors, such as green onions, ginger, garlic, and peppers. Rubber gloves and disinfectants can aggravate hand eczema. She once tried nitrile gloves for some days, and it seems that the hand symptoms can be partially relieved. Allergen skin prick test results: dust mites (2+), spring pollen (-), autumn pollen (-), cat dander (-), dog dander (-), Alternaria (-), milk (-), egg (-), river crab (-), river shrimp (-). The

allergen-specific IgE test (ImmunoCAP): d1 5.87 kU/L, d2 7.0 kU/L, and total IgE 57.7 kU/L. Patch test was performed with the Chinese baseline test series with 20 kinds of common compounds and metals (including Cobalt chloride, Sulfhydryl mixture, Imidazolidinyl urea, P-phenylenediamine, N-cyclohexylthiopeptide lactone, Potassium dichromate, Ethylenediamine dihydrochloride, rosin, formaldehyde, Bisphenol-A type epoxy resin, Bronopol, Thiuram mixture, Paraben mixture, nickel sulfate, sesquiterpene lactone mixture, aromatic mixture, methyl chloroisoithiazole, black rubber mixture, carba mixture and Quart 15) and the results were negative. Therefore, she was diagnosed with occupational hand eczema. Evaluation using the hand eczema severity index (HECSI), indicated severe disease (HECSI: 116/360).⁵ The patient refused to change her job. Dupilumab was recommended for the patients. After informed consent for the off-label use, Dupilumab was started as a 600 mg loading dose and followed by 300 mg every other week, and skin topical drug and antihistamines were continued. After 4 weeks of treatment, her hand skin lesions and itching symptoms improved significantly (Figure 1). HECSI was reduced to as low as 15 and we found no drug-related adverse reactions occurred during the treatment. Dupilumab injection was changed to 300 mg every 3 weeks due to the high cost after 4 months of treatment, follow-up was conducted for 3 months. As of the writing of this article, the patient was still working in a hospital. Her hand eczema is well controlled, and the itching symptom is mild.

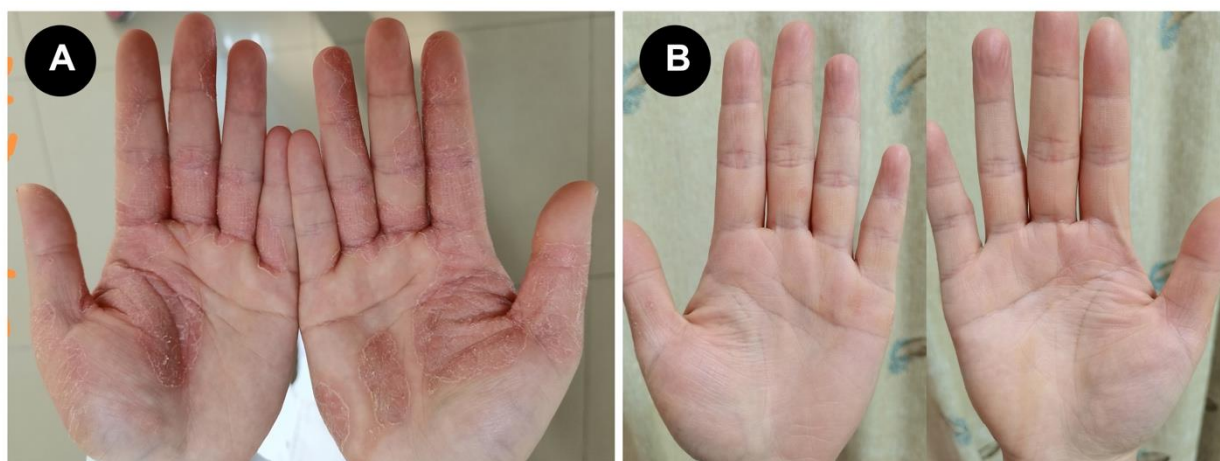


Figure 1. Photos of the patient's hands before and after treatment. A: The photo of hands before treatment with Dupilumab showed symmetrical dark red infiltrative erythema on the palms of hands and the roots of fingers, with dry and desquamated surfaces. B. The skin lesions of the hand were almost healed after 4 months of treatment with Dupilumab.

DISCUSSION

The incidence rate of hand eczema is higher among medical workers, especially nurses working on the front line.^{6,7} After the COVID-19 outbreak, the incidence rate of hand eczema was reported to be higher and more severe because of frequent hand washing and disinfection.⁸ The diagnosis of occupational hand eczema is relatively easy, mainly based on clinical history, symptoms, patch test, etc.⁹ However, due to the complicated working environment and the lack of diagnostic reagents, it is often difficult to identify the accurate allergen that causes eczema.⁹ Conventional treatments for hand eczema include basic skin care, topical glucocorticoids, calcineurin inhibitors, phototherapy, and systemic immunosuppressive therapy.³ These therapies usually work well, but sometimes fail, especially when patients are difficult to change their occupational environment.

In our case, the patient has suffered from chronic hand eczema for more than 5 years, and the routine treatment was poor, which has a great impact on her life and work. Based on her medical history, she was more likely to be allergic to hospital environmental disinfectants and rubber gloves. However, due to the limitation of patch reagents, no specific allergen was identified. However, her hand eczema improved significantly during her 4-week seaside vacation, suggesting that her eczema was closely related to the work environment.

Dupilumab is a biological drug that targets the receptors for IL-4 and IL-13. In 2020, it was approved for the treatment of moderate to severe atopic dermatitis in mainland China. We have treated some cases of severe eczema with Dupilumab and the patients responded well. The efficacy and safety of dupilumab in the treatment of eczema refractory to conventional treatments have been validated in clinical studies in Europe, the United States and other countries.^{10,11} Consistent with our case, several case reports also showed good effects and safety of Dupilumab for the treatment of isolated hand eczema.¹²⁻¹⁴ After 4 months of treatment, the patient's hand eczema almost completely subsided, and the itching symptoms were also significantly relieved.

As far as we know, this is the first case report from China on the successful use of Dupilumab in the treatment of occupational eczema caused by

hypersensitivity to the hospital environment. It showed that Dupilumab was effective and safe for the treatment of hand eczema. However, more cases and longer observations are needed to further validate the long-term efficacy and safety of Dupilumab in the treatment of hand eczema.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

ACKNOWLEDGEMENTS

The authors acknowledge the patient for her support and cooperation in completing this article.

REFERENCES

1. Fregert S. Occupational dermatitis in a 10-year material. *Contact Dermatitis*. 1975;1(2):96-107.
2. Agner T, Elsner P. Hand eczema: epidemiology, prognosis and prevention. *J Eur Acad Dermatol Venereol*. 2020;(34 Suppl 1):4-12.
3. Elsner P, Agner T. Hand eczema: treatment. *J Eur Acad Dermatol Venereol*. 2020;(34 Suppl 1):13-21.
4. Gandhi NA, Bennett BL, Graham NM, Pirozzi G, Stahl N, Yancopoulos GD. Targeting key proximal drivers of type 2 inflammation in disease. *Nat Rev Drug Discov*. 2016;15(1):35-50.
5. Oosterhaven JAF, Schuttelaar MLA. Responsiveness and interpretability of the Hand Eczema Severity Index. *British J Dermatol*. 2020;182(4):932-9.
6. Stingni L, Lapomarda V, Lisi P. Occupational hand dermatitis in hospital environments. *Contact Dermatitis*. 1995;33(3):172-6.
7. Molin S, Bauer A, Schnuch A, Geier J. Occupational contact allergy in nurses: results from the Information Network of Departments of Dermatology 2003-2012. *Contact Dermatitis*. 2015;72(3):164-71.
8. Guertler A, Moellhoff N, Schenck TL, Hagen CS, Kendziora B, Giunta RE, et al. Onset of occupational hand eczema among healthcare workers during the SARS-CoV-2 pandemic: Comparing a single surgical site with a COVID-19 intensive care unit. *Contact Dermatitis*. 2020;83(2):108-14.
9. Lampel HP, Powell HB. Occupational and Hand Dermatitis: a Practical Approach. *Clin Rev in allergy & immunology* 2019; 56(1):60-71.

Hand Dermatitis Treated with Dupilumab

10. Beck LA, Thaçi D, Hamilton JD, Graham NM, Bieber T, Rocklin R, et al. Dupilumab Treatment in Adults with Moderate-to-Severe Atopic Dermatitis. *New England Journal of Medicine* 2014; 371(2):130-139.
11. Faiz S, Giovannelli J, Podevin C, Jachiet M, Bouaziz J-D, Reguiat Z, et al. Effectiveness and safety of dupilumab for the treatment of atopic dermatitis in a real-life French multicenter adult cohort. *J Am Acad Dermatol*; 2019;81(1):143-51.
12. Waldman RA, DeWane ME, Sloan B, Grant-Kels JM, Lu J. Dupilumab for the treatment of dyshidrotic eczema in 15 consecutive patients. *J Am Acad Dermatol*. 2020;82(5):1251-2.
13. Halling AS, Zachariae C, Thyssen JP. Severe treatment-resistant acute and recurrent vesicular chronic hand eczema successfully treated with dupilumab. *Contact Dermatitis*. 2020;83(1):37-8.
14. Zirwas MJ. Dupilumab for hand eczema. *J Am Acad Dermatol*. 2018;79(1):167-9.