

Successful treatment of severe and recurrent hand eczema with infection in human immunodeficiency virus patients: A case report

SAGE Open Medical Case Reports
JCMS Case Reports
Volume 12: 1–3
© The Author(s) 2024
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/2050313X241260471
journals.sagepub.com/home/sco



Dongmei Chen¹, Wei Liu¹ and Yanxi Li^{1,2} 

Abstract

Hand eczema is a common allergic disease characterized by a chronic relapsing course with a 15% lifetime prevalence. Human immunodeficiency virus-infected individuals have a higher risk of *Staphylococcus aureus* infection which is associated with the severity of hand eczema. Incidences of allergic diseases including hand eczema and chronic itch are higher in patients with human immunodeficiency virus. Pruritus is one of the most common symptoms in hand eczema, sometimes intractable pruritus provokes repeated scratching, picking, disfigurement, and can even worsen the lesion. Currently, there is no ideal treatment for hand eczema, the treatment of hand eczema in human immunodeficiency virus patients is even more difficult. Here, we present a case of recurrent and therapy-resistant hand eczema patients combined with *Staphylococcus aureus* infection, human immunodeficiency virus infection was better improved by being treated with topical ozone therapy.

Keywords

Hand eczema, HIV, ozone therapy

Date received: 19 December 2023; accepted: 31 January 2024

Introduction

The present case reports a 46-year-old man who was referred to our department because of a year-long history of pruritic rash, symmetrical erythema, scale, fissure, and pustules on the hands and wrists (Figure 1(a)). He had a 3-year history of human immunodeficiency virus (HIV) infection and no history of allergic diseases. The patient had no history of contact with irritating substances. Physical examination revealed diffuse edematous erythema with dry scales covering both palms and wrists, scattered and distributed by yellow pustules, linear fissure, and small pieces of erosion. The patient had unbearable itch and pain which affected his normal life and sleep. Laboratory tests revealed eosinophil ratio was elevated to 9.7% (0.4–8), C-reactive protein concentration (CRP) was increased at 15.99 mg/L (0–10), immunoglobulin E (IgE) levels were 1104.86 IU/ml (0–100 IU/ml), IL-10 was 5.61 pg/ml (0–4.91), and IL-6 was 7.82 pg/ml (0–5.30). Bacterial cultures of pustules taken from both hands showed *Staphylococcus aureus* colonization. However, the result of fungal culture is negative. Histology indicated (Figure 1(a)) excessive keratinization with incomplete keratinization,

pustules in the stratum corneum, local sponge edema in the epidermal and infiltration by lymphocytes, dermal papillary edema, and lymphocytes and eosinophils infiltration in the upper dermis (Figure 2). The diagnosis was hand eczema with *S. aureus* infection based on the physical examination and pathology result.

The patient was first treated with topical steroids, mupirocin cream, and moisturizing lotion and showed transitory improvement but the condition worsened when the treatment was discontinued with no clear triggering factors. Since topical treatment could not control the condition and the improvement gap was getting shorter, oral medicines including

¹Department of Dermatology, Chongqing Hospital of Traditional Chinese Medicine, Chongqing, P.R. China

²Blizard Institute, Barts and The London School of Medicine and Dentistry, Queen Mary University of London, London, UK

Corresponding Author:

Yanxi Li, Department of Dermatology, Chongqing Hospital of Traditional Chinese Medicine, No. 40 Daomenkou Street, District Yuzhong, Chongqing 400011, P.R. China.
Email: yanxi345@163.com



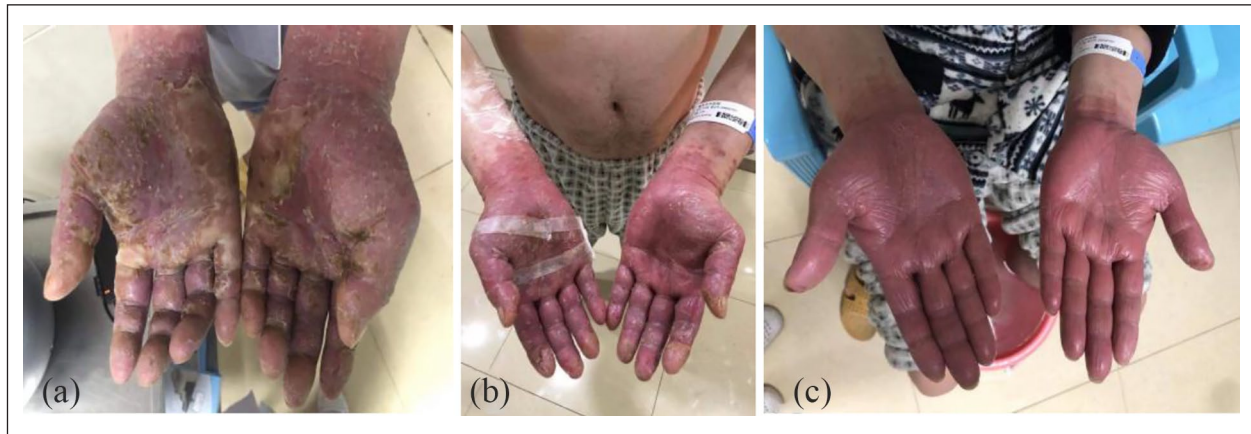


Figure 1. (a) Hand eczema before treatment. (b) After 3-day treatment of topical ozone therapy. (c) After 9-day treatment of topical ozone therapy.

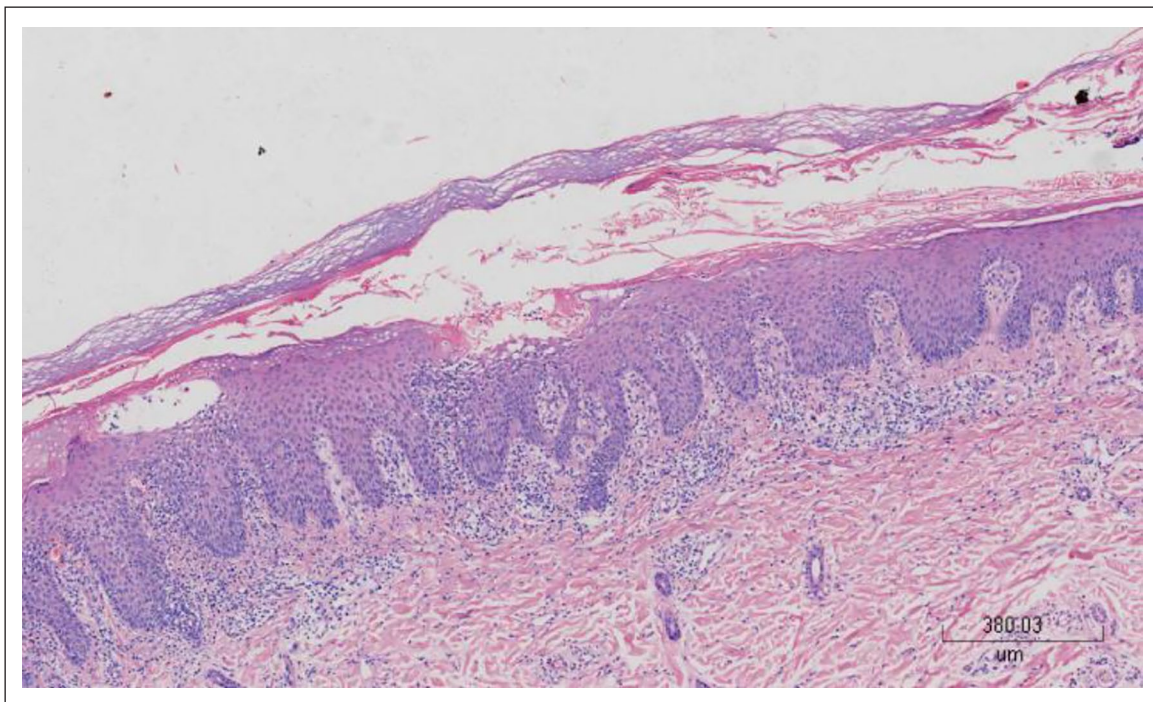


Figure 2. A biopsy of the right hand showed the presence of local sponge edema in the epidermal and infiltrated lymphocytes, lymphocytes, and eosinophils infiltrated in the upper dermis.

antihistamine, tripterygium glycosides, and erythromycin capsules were used but still had poor therapeutic response. Then the patient was treated by diprosan injection once a month. During the injection period, the lesion was partially reduced, but once the injection stopped, the lesion became even more severe than before. Then we tried ozone therapy for the patient. First, we used a 3.0 mg/L concentration of ozonated water under 20°C over 9 days of therapy (20 min every day). The ozonated water was generated by the HZ-2601B Ozone Water Generating Instrument. Then we sprayed the 100 g/L dose of ozone oil on the lesion, and

moisturizing cream was applied externally several times a day after the ozone hydrotherapy. After the 3-day treatment, the lesion was markedly improved (Figure 1(b)), with most of the pustules subsiding and the scale decreased. Nine days later, the erosion surface and fissure healed, pustules disappeared, and swelling of the hands and wrists was greatly decreased (Figure 1(c)). Although the lesion did not return to the normal state, the pain subsided and itchiness significantly reduced. We advised the patient to continue to use the moisturizers. The lesion did not recur after 3 months of telephone follow-up.

HIV patients prove to have an imbalance of Th1/Th2. The Th1 cytokines in serum (IL-2, IFN- γ) declined and Th2-related cytokines (IL-4, IL-10) increased, which shows the immunologic predisposition toward a Th2 phenotype or atopy.⁷ At the same time, elevated IgE levels and hyper-eosinophilia in HIV-infected patients have been confirmed; therefore, there is a significantly increased incidence of allergic disease especially atopic dermatitis in which the incidence rate even rises to 50%.⁷ Our patient has an increased level of IL-10 and IL-6. This also confirms that the patient's immunologic skewing toward a Th2 phenotype and the high level of IgE in serum indicates the patient is in a severe allergic state.

Because of the immunological characteristics of HIV-positive patients, the treatment may be more difficult than for HIV-negative patients. First, low-dose ozone has been demonstrated to possess strong oxidizing properties, making it effective against fungal, viral, and bacterial agents. The topical application of ozone therapy can eliminate 100% of *S. aureus* in 5 min.^{8,9} Second, low-dose ozone can accelerate wound healing and promote skin repair.¹⁰ Third, it also plays a role in immune system regulation during disease treatment. So ozone therapy was widely used in clinical therapy.^{11,12} Given the inflammation, *S. aureus* infection, skin barrier dysfunction, and resistance to traditional therapies observed in our patient, we chose the use of ozonated water and ozonated oil for the treatment of this patient. Although dupilumab demonstrated effectiveness and safety in the treatment of atopic dermatitis, our patient refused to use it due to its high cost. The result conferred the combination of topical ozone therapy and moisturizing cream has great improvement in a short time, which not only significantly improves clinical manifestations but also greatly reduces pain and pruritus. Furthermore, the topical use of ozone therapy avoided the side effects of glucocorticoids or other immunosuppressants.

The limitation of our report is that we did not check the change in Th2-related cytokines, IgE, and CRP after treatment. Further studies are needed to investigate the difference in ozone therapy in HIV-positive and HIV-negative patients with HE.

Author contributions

D.C. and W.L. implemented ozonated hydrotherapy and collected data, Y.L. designed the treatment plan, wrote the paper, and final approval of the version to be published.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Consent statement

The patient in this manuscript has given written informed consent to publication of their case details.

ORCID iD

Yanxi Li  <https://orcid.org/0000-0002-0108-7350>

References

1. Thyssen JP, Johansen JD, Linneberg A, et al. The epidemiology of hand eczema in the general population—prevalence and main findings. *Contact Dermatitis* 2010; 62(2): 75–87.
2. Kotpal R, KP S, Bhalla P, et al. Incidence and risk factors of nasal carriage of *Staphylococcus aureus* in HIV-infected individuals in comparison to HIV-uninfected individuals: a case-control study. *J Int Assoc Provid AIDS Care* 2016; 15(2): 141–147.
3. Haslund P, Bangsgaard N, Jarlöv JO, et al. *Staphylococcus aureus* and hand eczema severity. *Brit J Dermatol* 2009; 161(4): 772–777.
4. Nørreslet LB, Edslev SM, Andersen PS, et al. Colonization with *Staphylococcus aureus* in patients with hand eczema: prevalence and association with severity, atopic dermatitis, subtype and nasal colonization. *Contact Dermatitis* 2020; 83(6): 442–449.
5. Nora SA, Arkhipova GS and Arkhipova EI. Study of indicators of the immune status in HIV-infected patients with concurrent allergic pathology. *Kazan Med Zh* 2021; 102(6): 821–826.
6. Mollanazar NK, Koch SD and Yosipovitch G. Epidemiology of chronic pruritus: where have we been and where are we going? *Curr Dermatol Rep* 2015; 4: 20–29.
7. Rudikoff D. The relationship between HIV infection and atopic dermatitis. *Curr Allergy Asthm R* 2002; 2(4): 275–281.
8. Silva V, Peirone C, Capita R, et al. Topical application of ozonated oils for the treatment of MRSA skin infection in an animal model of infected ulcer. *Biology (Basel)* 2021; 10(5): 372.
9. Song M, Zeng Q, Xiang Y, et al. The antibacterial effect of topical ozone on the treatment of MRSA skin infection. *Mol Med Rep* 2018; 17(2): 2449–2455.
10. Pai SA, Gagangras SA, Kulkarni SS, et al. Potential of ozonated sesame oil to augment wound healing in rats. *Indian J Pharm Sci* 2014; 76(1): 87–92.
11. Machado AU and Contri RV. Effectiveness and safety of ozone therapy for dermatological disorders: a literature review of clinical trials. *Indian J Dermatol* 2022; 67(4): 479.
12. Zeng J, Dou J, Gao L, et al. Topical ozone therapy restores microbiome diversity in atopic dermatitis. *Int Immunopharmacol* 2020; 80: 1–7.