

Occupational Chronic Contact Dermatitis Successfully Treated with Dupilumab: A Case Series

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Keywords

Allergic contact dermatitis · Occupational contact dermatitis · Dupilumab

Abstract

Background: Occupational contact dermatitis may progress to a chronic course with an unfavorable prognosis. Dupilumab has been shown to be effective as a treatment for moderate-to-severe atopic dermatitis as well as other types of dermatitis. **Objectives:** The aim of the study was to describe cases of chronic recalcitrant occupational contact dermatitis treated with dupilumab and with long-term follow-up. **Methods:** A retrospective review of 6 patients treated with dupilumab for chronic occupational contact dermatitis for periods of up to 30 months was performed. **Results:** All 6 patients had a positive and sustainable response, with dermatitis clearance and the ability to sustain work tasks. **Conclusions:** We report a case series of atopic and nonatopic workers with occupational chronic contact dermatitis who failed to achieve remission under various systemic modalities but did so using dupilumab. We suggest considering dupilumab treatment for recalcitrant occupational contact dermatitis.

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Introduction

Irritant and allergic contact dermatitis account for 90–95% of occupational skin diseases and 30% of all occupational diseases [1–3]. Occupational skin diseases have a substantial impact on workers' personal and professional lives, as well as a broader economic impact [4, 5].

Occupational contact dermatitis (OCD) is an inflammatory reaction to exogenous allergens or irritants in the workplace. The prolonged and extensive nature of irritant or allergen exposure that comes with certain vocations may lead to a chronic course with unfavorable prognosis, depending on the potency of the agent [2, 6].

Many treatment modalities have been suggested for the treatment of recalcitrant OCD, with mixed results. However, recent advances have brought immunologically targeted therapies to the field of dermatitis. Dupilumab, a monoclonal antibody against interleukin (IL)-4 and IL-13 signaling, is an approved treatment for moderate to severe atopic dermatitis. Dupilumab has been reported to be effective in reports of contact dermatitis with sample sizes [7] that were not occupation-related. Thus, our case series is the first to describe the long-term follow-up of 6 cases of pure OCD recalcitrant to other systemic treatments, which were effectively treated with dupilumab.

Case No. 1

A 35-year-old female with mucosal atopy, otherwise healthy, presented with a 2-year history of hand and arm dermatitis. She was a single parent, who had been self-employed in a dog grooming business for 7 years. Extensive case-relevant patch testing did not yield positive results. She fulfilled the Mathias criteria for occupation-related irritant contact dermatitis. Unfortunately, she could not change her vocation, and her dermatitis had not responded to topical corticosteroids, phototherapy, alitretinoin, and methotrexate. Dupilumab was begun with a quick total clearance of the dermatitis, allowing the patient to continue working and providing dramatic improvement in quality-of-life measures. Dermatitis clearance has been preserved in this patient for the last 2 years.

Case No. 2

A 57-year-old nonatopic male with a history of obesity and hypertension was followed up in our clinic for 15 years due to chronic recalcitrant hand eczema. He was diagnosed with allergic contact dermatitis in response to an unknown ingredient of ice-coffee powder, which he was exposed to in his work (10 consecutive controls tested as negative). Changing his vocation to one that is of-fice-based and intensive usage of topical treatment, phototherapy, methotrexate, and alitretinoin regimens failed to result in any significant improvement. He was ultimately recognized by workers' compensation insurance as having persistent post-occupational dermatitis. However, during the last year, he was being treated with dupilumab, which induced a quick remission for the first time in the last 15 years that is ongoing.

Case No. 3

A 67-year-old atopic female worked as a hairstylist for the last 40 years. She was sensitized to p-phenylenediamine while working 7 years ago, which expressed as chronic dermatitis of the palms and forearms with occasional generalization. This necessitated systemic corticosteroid courses, resulting in unbalanced diabetes mellitus. Her life circumstances would not allow a vocational change, and phototherapy, methotrexate, and alitretinoin were not successful. Dupilumab was prescribed before 30 months, resulting in near-total remission with minor and rare localized flares that respond to tacrolimus ointment.

Case No. 4

A 44-year-old nonatopic nurse was diagnosed with chronic occupational irritant contact dermatitis in her hands for 10 years. Extensive patch-testing results were negative. Topical and systemic modalities did not result in sufficient and sustainable remissions, jeopardizing her career. Dupilumab treatment for 18 months resulted in complete remission.

Case No. 5

A 26-year-old nonatopic female who worked as a nail technician was diagnosed with acrylate-related occupational allergic airborne contact dermatitis. The rash started within the first year of her career and lasted for 5 years. She was reluctant to change her profession and tried methotrexate, but without plausible results. Dupilumab treatment for the last 2 years resulted in a complete clearance of the rash that is ongoing.

Case No. 6

A 51-year-old atopic EEG technician was diagnosed with chronic occupational irritant contact dermatitis in her hands for 5 years. Extensive patch-testing results were positive for nickel and formaldehyde, irrelevant for her skin condition and current exposures. Topical and systemic modalities including methotrexate and alitretinoin did not result in sufficient and sustainable remissions. Dupilumab treatment for 6 months resulted in complete remission, for the first time in the last 5 years.

Discussion

Early studies published prior to this century have shown a very poor prognosis of OCD, ranging between 8 and 33% for total clearance [8, 9]. Improvements in understanding the underlying reasons for these low rates have resulted in better prognosis [10]; however, at least a third of patients with OCD remain nonresponders. The risk factors for poor prognosis of OCD are multifactorial, derived by both endogenous and occupational exposure-related factors: the type of contact dermatitis (allergic has a better prognosis than irritant), atopic background, and potency of the irritant or offending allergen. In the real world, vocation change is not applicable to some workers, leading to a cyclic situation. However, where job change is possible, more than 10% of cases may continue to have chronic dermatitis, which Wall and Gebauer termed "persistent post-occupational dermatitis" [11].

The monoclonal antibody treatment Dupilumab was approved by the FDA in 2017 for the treatment of moderate-to-severe atopic dermatitis, and its high efficacy in treating atopic dermatitis has motivated clinicians to apply Dupilumab for other off-label uses, for both dermatitis and non-dermatitis conditions with encouraging results. Aggregated data shows long-term high safety profile. The most common adverse effects of dupilumab include injection site reaction, conjunctivitis, and headache, which are mostly well tolerated.

Goldminz has published a case series of three atopic individuals with allergic contact dermatitis, with two of

them occupation-related. Both had near-total clearance at 13 and 6 months of follow-up [12]. Similarly, Zhu et al. [13] reported a case of a nonatopic taxi driver with occupational long-term irritant contact dermatitis who had a good response to dupilumab in a 5-month follow-up period.

However, recent case reports have also shown treatment failure of dupilumab for cases of occupational allergic and irritant contact dermatitis [14, 15]. Our case series is the first to describe the long-term follow-up of up to 30 months in recalcitrant cases of both allergic and irritant occupation-related contact dermatitis.

Treatment was successful in both allergic and irritant contact dermatitis, regardless of atopy status and ongoing occupational exposures. It has been postulated that IL-4 plays a role in mediating irritant contact dermatitis in a murine model [16]. It has also been suggested that TH2 polarization exists in some forms of allergic contact dermatitis [17], explaining the effectiveness of dupilumab treatment. Interestingly, dupilumab was shown to be highly effective in the case of persistent post-occupational dermatitis, suggesting a new hope for this challenging entity.

Conclusion

We report a case series of workers with OCD who were successfully treated with dupilumab in a long-term follow-up. This treatment offers a new hope for patients with unfavorable prognosis.

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Statement of Ethics

Ethics approval was obtained from the Human Research Ethics Committees of Tel Aviv Sourasky Medical Center (0573-17-TLV). Written informed consent was obtained from the patients for publication of this case series.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

D.S. contributed to study design, data acquisition and interpretation, and manuscript drafting and revising. A.L. contributed to data acquisition and manuscript drafting. M.L. contributed to review and revision of the manuscript. S.M. contributed to data acquisition and interpretation, manuscript drafting, review of the manuscript, and approval of the final version.

Data Availability Statement

All data generated or analyzed during this study are included in this article. Further inquiries can be directed to the corresponding author.