Dupilumab for occupational irritant hand dermatitis in a nonatopic individual: A case report

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INTRODUCTION

Dupilumab is a monoclonal antibody targeting interleukin-4 and interleukin-13 for the treatment of moderate-to-severe atopic dermatitis.[1] We report a case of occupational irritant hand dermatitis in a nonatopic individual that improved on dupilumab.

Abbreviation used:

HECSI: hand eczema severity index

REPORT OF CASE

A 43-year-old male taxi driver with no history of other rashes and no personal or family history of atopy was seen in the general dermatology clinic for a greater than 10-year history of hand dermatitis. He reported topical corticosteroids had only resulted in partial improvement, and other prior treatments had included oral and intramuscular corticosteroids with short-lived benefit. At initial presentation, he had xerotic and thin hyperkeratotic papules and plaques and painful fissures on the bilateral hands, predominantly involving the pulp of all fingers. He lacked any atopic stigmata or eczematous dermatitis on the remainder of the body and did not meet Hanifin and Rajka criteria for atopic dermatitis. He worked as a taxicab driver and reported a history of compulsive hand washing, frequent exposure to cleaning agents, contact with the steering wheel and upholstery in his vehicle, and regular handling of coins and paper money. Comprehensive patch testing was negative. A diagnosis of chronic irritant hand dermatitis was rendered (Fig 1), and a new regimen consisting of topical corticosteroids, gentle skin care, rigorous emolliation, protective gear, and trigger avoidance was attempted. He was not able to wear gloves or apply barrier ointments during the workday because of inconvenience and fear of these being off-putting to customers, and decreasing the frequency of hand-washing with soap and water resulted only in minor improvement. Over the next 3 years, he was treated with topical and systemic corticosteroids, narrow-band ultraviolet B phototherapy, acitretin, and methotrexate without durable response (Table I). He intermittently required dilute bleach baths and courses of oral cephalexin for impetiginization.

Fig 1. Clinical photograph at time of diagnosis of irritant hand dermatitis.

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Table I. Failed therapies for hand dermatitis prior to dupilumab

Treatment	Duration	Response
Topical corticosteroids	>10 y	Partial response
Oral and intramuscular corticosteroids	>10 y	No durable response
Narrowband ultraviolet B, 2 times weekly	5 mo	Partial response
Acitretin, 25 mg daily	1 y	Partial response
Methotrexate, 15 - 20 mg/wk	6 mo	Partial response

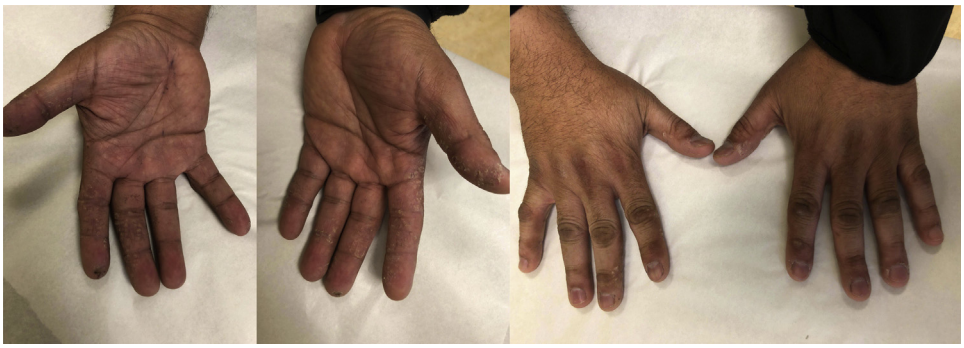

Fig 2. Clinical photographs at time of dupilumab initiation. Moderate involvement of the bilateral palmar and lateral fingers with hyperkeratotic and fissured plaques with HECSI of 33.

In 2019, he presented again to the dermatology clinic after having been lost to follow-up for 2.5 years. At that time, he was using only clobetasol ointment intermittently, reported no change to his exposures, and his hand lesions were noted to have become hyperkeratotic, with a hand eczema severity index (HECSI) of 33 (Fig 2). Dupilumab was started subcutaneously at standard dosing. Use of flurandrenolide tape was resumed, which he had used for years with limited therapeutic efficacy. After 1 month on dupilumab, his condition significantly improved, with a HECSI of 10. At his most recent follow-up visit 5 months after starting dupilumab, he was asymptomatic and had a HECSI of 0 with rare use of topical steroids (Fig 3).

DISCUSSION

We report a case of refractory occupational chronic irritant hand dermatitis with hyperkeratotic morphology successfully treated with dupilumab despite ongoing occupational exposures. Hand dermatitis can be broadly subtyped based on chronicity (acute, subacute, or chronic), etiology (endogenous, such as atopic, or exogenous, such as irritant or allergic), and clinical findings (vesicular, hyperkeratotic, or nummular).[2] Irritant contact dermatitis of the hands is a diagnosis of exclusion. A thorough history, review of the patient's personal and occupational exposures and habits, clinical morphology, and additional testing help confirm the diagnosis. Patch testing should be performed to assess for allergic contact dermatitis. Skin biopsy may be required in certain cases to rule out other dermatoses, such as psoriasis, palmoplantar lichen planus, pagetoid reticulosis, dyshidrosiform pemphigoid, and tinea manuum.

To date, no data exist on the efficacy of dupilumab for chronic irritant hand dermatitis. Prior reports of therapeutic benefit for dermatitis limited to the hands primarily evaluated patients with atopic hand dermatitis[3,4] or lacked information on the cause of hand dermatitis, history of atopy, or history of having undergone patch testing.[5]

The molecular pathogenesis involved in the various subtypes of hand dermatitis are poorly characterized, with the central role of interleukins-4, -5, and -13 in atopic hand dermatitis being best understood.[2] Inflammatory pathways in the chronic phase of irritant hand dermatitis are currently unknown.[6] Acute irritant hand dermatitis is classically understood as the consequence of keratinocyte injury from exposure to a topical agent, which leads to release of tumor necrosis factor α as well as interleukins-1, -6, and -8 by keratinocytes and immune cells, thereby upregulating adhesion molecules, generating inflammation, and producing hyperkeratosis.[7] It is interesting to note that interleukin-4 is one of the many cytokines and chemokines up-regulated by interleukin-1.[6]

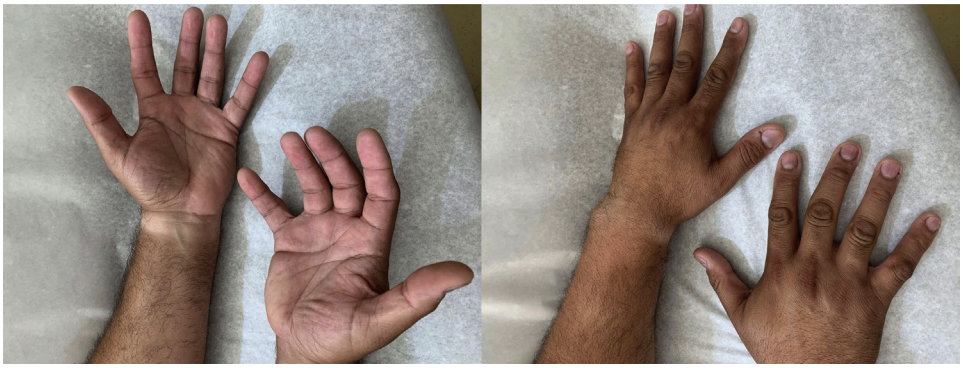

Fig 3. Clinical photographs after 5 months of dupilumab therapy. Complete clearance with HECSI of 0.

Recently, interleukin-4 was suggested to play a role in mediating irritant contact dermatitis; in a murine model of irritant contact dermatitis, basophil-derived interleukin-4 was found to up-regulate eotaxin, thereby attracting eosinophils to sites of topical croton oil application in mice, where they played a central role in generating clinical lesions of irritant contact dermatitis.[8] Moreover, interleukin-4 acts on keratinocytes to decrease cell adhesion, promote hyperplasia, and decrease expression of loricrin and fibronectin, thereby impairing the formation and restoration of an effective epidermal barrier.[9,10] Our report supports a pathophysiologic role of helper T-cell 2 cytokines in irritant contact dermatitis, and it is possible that this role is affected by chronicity, clinical morphology, and the identity of the topical irritant(s).[7]

We report the successful off-label use of dupilumab in treating a patient with chronic refractory irritant hand dermatitis. Our case suggests that dupilumab may be helpful in treatment-refractory cases of chronic irritant hand dermatitis that have not responded to conventional therapy. Furthermore, this report may have important implications regarding the utility of dupilumab in the treatment of individuals who do not meet criteria for atopic dermatitis. Further study is required to corroborate our observation and clarify the role of dupilumab therapy in the treatment of irritant contact dermatitis.

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