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Case Report

Dupilumab as a novel therapeutic option for lichen planus pigmentosus: a case report

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ABSTRACT

Lichen planus pigmentosus (LPP) is a form of lichen planus. It typically presents with pigmented, persistent skin patches. The etiology of LPP remains unclear, and there is no standardized or consistently effective treatment. Investigation of dupilumab, a monoclonal antibody not previously reported in the literature for LPP, may provide a new treatment option for disease management. A 42-year-old woman presented with progressive, pruritic, violaceous to dark brown patches on the neck, chest, and upper back for the past year. A biopsy from the neck and arm confirmed epidermal atrophy and pigment incontinence consistent with LPP. Multiple therapies were tried, including topical tacrolimus, oral cyclosporine, oral isotretinoin, narrowband ultraviolet B phototherapy, and oral dapsone, but the patient did not improve. Thus, off-label dupilumab was initiated with a 600 mg loading dose followed by 300 mg every two weeks. After three months of dupilumab therapy, the patient achieved complete resolution of pruritus and lightening of pigmented lesions. No new lesions developed, and the treatment was well tolerated. This significant clinical response to dupilumab following failure of previous therapies suggests potential efficacy in refractory LPP. The rapid response to dupilumab indicates that the T-helper 2 (Th2) immune pathway, particularly interleukin-4 (IL-4) and interleukin-13 (IL-13) signaling, may contribute to LPP pathogenesis. This is the first case of LPP successfully treated with dupilumab, encouraging the need for further research to judge the drug's efficacy.

Keywords: Lichen planus pigmentosus, Pigmentary disorders, Lichenoid disorders, Dupilumab, Monoclonal antibody

INTRODUCTION

Lichen planus pigmentosus (LPP) is an uncommon form of lichen planus that presents as asymptomatic, gray-brown macules and patches. These lesions have a predilection for sun-exposed and intertriginous sites, such as the face, neck, and upper torso, while typically sparing the palms, soles, nails, and oral mucosa. The condition most commonly arises in middle-aged adults (30-40 years old) with darker skin types (skin phototypes III-VI), especially individuals of South Asian, Middle Eastern, or Latin American descent, and appears to exhibit a female predominance.[1]

The exact etiology remains unclear, though researchers have proposed sun exposure, fragranced cosmetics, and mechanical friction as triggers.[1] Experts believe that a T-cell–mediated immune response to exogenous or altered self-antigens presented by keratinocytes drives the pathogenesis.[2]

Because LPP is rare and shares features with other pigmentary conditions, clinicians often struggle to diagnose it. The disease usually follows a chronic, relapsing course, and patients tend to experience slow and variable responses to treatment. Clinicians use strategies such as photoprotection, topical corticosteroids,

calcineurin inhibitors, and systemic agents when resistance occurs. However, no standardized, consistently effective treatment has been established.[3] Although several treatment options have been explored, outcomes remain inconsistent. To date, there are no published reports on the use of dupilumab, a monoclonal antibody targeting the IL-4 receptor alpha subunit, in LPP. To address this gap, a case of biopsy-confirmed LPP that showed marked and sustained improvement with dupilumab therapy.

CASE REPORT

A 42-year-old woman presented with a one-year history of progressively worsening hyperpigmentation, which began as dark patches on her neck and gradually extended to her chest and upper back, accompanied by itching. Physical examination revealed multiple violaceous to dark brown patches on the neck, along with lighter hyperpigmented macules on the chest and upper back, with no involvement of the lower back or buttocks. There were no signs of skin atrophy, hair loss, or involvement of the mucous membranes or nails.

A diagnostic workup of 4 mm punch biopsies from the right neck and arm was conducted. The biopsies showed epidermal atrophy with loss of rete ridges, sparse dermal lymphocytic infiltrate, and prominent pigment incontinence, consistent with lichen planus pigmentosus (LPP) (Figure 1).

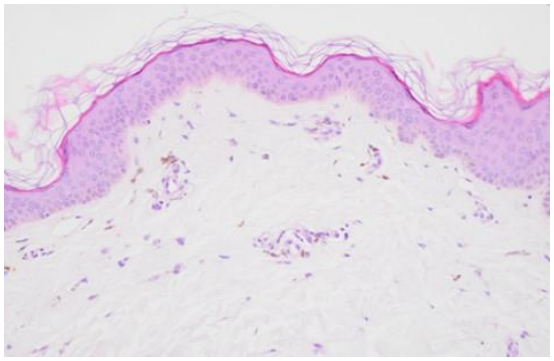

Figure 1: Histology slide from the from the right neck and arm showing atrophy of the dermis with loss of rete pattern and sparse dermal infiltrate with pigment incontinence consistent with lichen planus pigmentosus.

Initial management included the application of tacrolimus 0.1% ointment twice daily, while baseline laboratory tests were ordered to assess the need for potential cyclosporine therapy. The patient was subsequently started on cyclosporine 175 mg twice daily (3 mg/kg), with a plan to taper the dosage in 2-4 months if clinical improvement was observed, followed by a transition to isotretinoin. However, after 3 months, cyclosporine was discontinued as there was no clinical improvement, and the patient was scheduled to undergo sleeve gastrectomy. Before starting isotretinoin, the patient underwent a pregnancy test that was negative, and appropriate counselling was provided. Isotretinoin 20 mg daily was then initiated, accompanied by supportive care, including artificial tears and emollients. Unfortunately, isotretinoin was discontinued after 4 months due to intolerable dryness and lack of clinical response. Due to the failure of all the above, narrowband UVB (NB-UVB) phototherapy was initiated at 100 mJ/cm^2, with 10% incremental increases twice weekly. This was coupled with rigorous sun protection and hydration counselling. After confirming normal G6PD levels, dapsone 100 mg daily was added to the ongoing regimen of tacrolimus 0.1% ointment and phototherapy. Despite these interventions, the patient showed no improvement in hyperpigmentation and continued to experience refractory pruritus 2-3 times weekly, which was severe enough to disrupt her sleep, requiring intermittent use of Elica (mometasone furoate) for symptomatic relief.

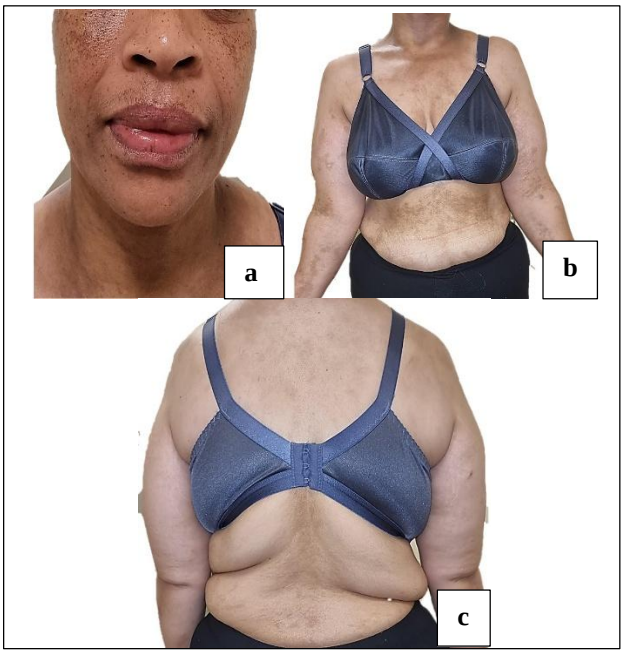

Figure 2: Images of the pigmentary lesions on the patient's face chest and abdomen, and back after starting dupilumab therapy.

Given the resistant nature of her condition, therapy was escalated to dupilumab. The starting dose was 600 mg, followed by 300 mg every other week. Topical pimecrolimus and mometasone were continued on alternate days. Remarkably, within 3 months of initiating dupilumab, the lesions lightened, no new lesions formed, and her pruritus was completely resolved. She tolerated the treatment well (Figures 2).

DISCUSSION

LPP is a chronic, relapsing variant of lichen planus, characterized by hyperpigmented macules and patches.[4] This patient had violaceous-to-dark brown patches on the neck, chest, and upper back with persistent pruritus, confirmed histologically. Previous treatments- including calcineurin inhibitors, cyclosporine, isotretinoin,

phototherapy, and dapsone- failed, confirming a refractory disease.

Following initiation of dupilumab, the patient achieved notable lightening of hyperpigmented lesions, complete resolution of pruritus, and no emergence of new lesions within 3 months. Despite the absence of baseline photographs for objective comparison, the therapeutic efficacy of dupilumab was unequivocal. It proved to be the only therapeutic agent to successfully alleviate the patient's pruritus and lighten the lesions following the failure of all prior lines of therapy. This rapid response is clinically significant, especially given the chronicity and impact of LPP on quality of life, where pruritus often surpasses pigmentary changes in terms of patient burden.

The standard management of LPP remains empirical and proves unsatisfactory in many cases. A study showed that topical corticosteroids and calcineurin inhibitors are typically first-line treatments but often fail to provide sustained benefit, as in our patient.[5] Moreover, clinicians report variable success with systemic therapies such as cyclosporine, isotretinoin, and dapsone.[6] In some case series, isotretinoin modestly improves lichenoid activity rather than pigment clearance.[7] As reported in the literature, our patient either could not tolerate or gain durable benefit from these modalities, underscoring the need for alternative strategies.

Dupilumab, a novel human monoclonal antibody, targets the IL-4 receptor alpha subunit. It inhibits both IL-4 and IL-13 signaling, which drive type 2 inflammation. Regulatory agencies primarily approve it for atopic dermatitis, asthma, and chronic rhinosinusitis with nasal polyposis, and clinicians use it off-label for inflammatory dermatoses.[8] Recent evidence shows that Th2 cytokines play key roles in lichenoid interface dermatitis, overlapping with the Th1/Th17 and Th2 pathways.[9]

Published reports on dupilumab in lichen planus variants are limited, but emerging evidence has shown benefits in oral, hypertrophic, and generalized forms, with improvements noted after failed therapies.[10] Our case contributes to this preliminary evidence by documenting dupilumab's efficacy in LPP, suggesting a potential new therapeutic option for treatment-resistant disease.

CONCLUSION

This report presents the first documented case of LPP successfully treated with dupilumab, resulting in rapid pruritus relief and significant lightening of hyperpigmented lesions after multiple conventional therapies had failed. This case expands the therapeutic landscape of lichen planus pigmentosus, providing strong support for off-label use of dupilumab, especially in pruritus-dominant, Th2-skewed cases unresponsive to conventional therapies. Our findings advance the field by identifying dupilumab as a promising novel therapeutic for refractory, pruritus-dominant LPP and provide a compelling rationale for larger studies to validate its efficacy, define optimal patient selection, and further elucidate the underlying immunologic mechanisms of this challenging condition.

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