# Dupilumab for the treatment of pityriasis lichenoides chronica

Charissa N. Obeng-Nyarko, MS,[a] Kevin Puerta Durango, BS, BA,[b] Shanelle Jackson, BS,[c] Olaf Rodriguez, MD,[d] and Nicholas K. Mollanazar, MD, MBA[d]

***Key words:*** pityriasis lichenoides; pityriasis lichenoides chronica.

## INTRODUCTION

Pityriasis lichenoides (PL) is a cutaneous inflammatory skin disease that manifests in 3 variants: pityriasis lichenoides et varioliformis acuta, pityriasis lichenoides chronica (PLC), and febrile ulceronecrotic-Mucha-Habermann disease.[1-4] A common manifestation of PL is the eruption of erythematous papules on the trunk, flexural surfaces, and extremities.[1-4] The pathophysiology of PL has yet to be understood. Currently, there are 3 pathogenic theories linked to PL: infectious agents, lymphoproliferative disorders, and hypersensitivity vasculitides.[2-4] To date, there is no unifying pathophysiology for PL.

Although there are no Food and Drug Administration-approved treatments for PL, topical or systemic corticosteroids, oral antibiotics, systemic immunosuppressants, and phototherapy are commonly used.[1-5] There are limited reports of biologic therapy for pityriasis lichenoides.[6] In this case report, we present 2 patients with PLC successfully treated with dupilumab.

*Abbreviations used:*

PL: Pityriasis lichenoides
PLC: Pityriasis lichenoides chronica

## CASE 1

A 21-year-old male presented with a 2-year history of a rash on his upper and lower extremities, trunk, back, and groin. The patient denied any history of contact exposures or unprotected oral or penetrative intercourse. No fever, chills, nausea/vomiting, joint pain, or other symptoms of illness were reported. The patient reported minimal itching. Past medical history was remarkable for eczema, allergies, and supraventricular tachycardia. On physical exam, multiple erythematous, scaly, excoriated papules were visualized on the trunk (body surface area >10%) (Fig 1, *A*). The extensor surfaces of the upper extremities revealed widespread scaly, hypopigmented papules (Fig 1, *B*). Genital exam was deferred. Erythematous papules with linear burrowing were also found in interdigital webspaces of his hands. Due to the rash distribution and question of burrows, scabies treatment with 5% permethrin cream and triamcinolone 0.1% ointment was initiated. There was no improvement after treatment. At this time, pityriasis rosea was also considered. One month later, due to treatment failure of rash, a laboratory work-up was done. Serology tests for human immunodeficiency virus (HIV), Hepatitis B and C, tuberculosis, and syphilis were all negative. Complete blood count and comprehensive metabolic panel were also unremarkable. Histopathologic findings from several biopsies revealed epidermal acanthosis,

From the Florida State University College of Medicine, Tallahassee, Florida[a]; Geisel School of Medicine at Dartmouth College, Hanover, New Hampshire[b]; Michigan State University College of Human Medicine, East Lansing, Michigan[c]; and Department of Dermatology, University of Pennsylvania, Philadelphia, Pennsylvania.[d]

Funding sources: None.

Financial disclosures: NKM has served as an advisory board member for Abbvie, Boehringer Ingelheim, Galderma, Janssen, Leo Pharma, Menlo Therapeutics Inc, Novartis, Regeneron Pharmaceuticals, Sanofi, Trevi Therapeutics, an investigator for Sanofi, and consultant for Galderma, Novartis, Regeneron Pharmaceuticals, and Sanofi. All other authors have no financial disclosures.

Patient consent: The authors obtained written consent from patients for their photographs and medical information to be published in print and online and with the understanding that this information may be publicly available. Patient consent forms were not provided to the journal but are retained by the authors.

IRB approval status: Not applicable.

Correspondence to: Charissa N. Obeng-Nyarko, MS, Florida State University College of Medicine, 1115 West Call St, Tallahassee, FL 32304. E-mail: cno19a@med.fsu.edu.

JAAD Case Reports 2024;50:9-11.
2352-5126



https://doi.org/10.1016/j.jdcr.2024.05.021

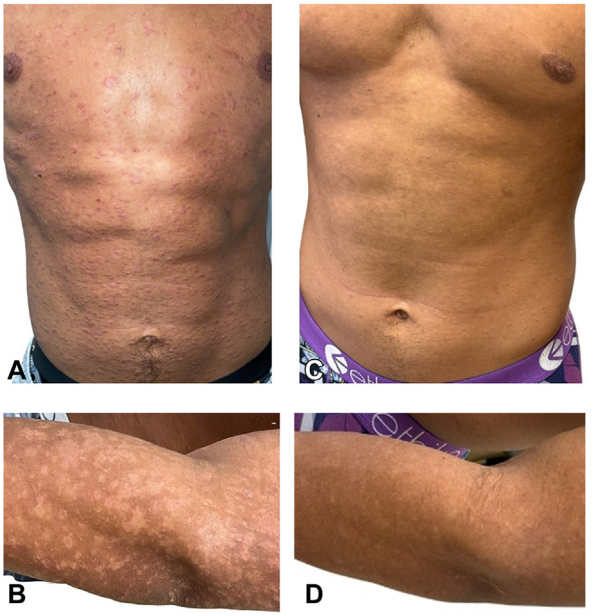


**Fig 1.** Case 1 on initial presentation with truncal erythematous, excoriated papules, (**A**) and multiple hypopigmented ovoid papules on lateral arm (**B**). After 1.5 years on dupilumab, there is resolution of erythematous lesions with minimal scarring (**C** and **D**).

lymphocytes in the dermal-epidermal junction associated with focal basovacuolar change, and a mild perivascular inflammatory infiltrate in the superficial dermis (Fig 2). CD3 stains highlighted the T-lymphocytes, and the CD4:CD8 ratio was within normal limits. Periodic acid-Schiff stains were negative for fungal organisms. These findings were consistent with PLC. Prior biopsies showed no spongiosis and the patient reported minimal itch, making a spongiotic or hypersensitivity reaction less likely. Treatment with a 4-week prednisone taper, 0.05% clobetasol ointment, and 0.1% tacrolimus ointment failed to provide adequate disease control. There are no Food and Drug Administration-approved treatments for PLC as all current treatments are based on case reports. Methotrexate and phototherapy were discussed, but the patient declined both. The patient expressed an interest in avoiding systemic immunosuppression, so a trial of dupilumab was discussed, which the patient agreed to. Dupilumab was initiated with a loading dose of 600 mg and then 300 mg every other week. For over 1 year, the patient has sustained complete resolution of lesions on dupilumab exclusively. (Fig 1, *C* and *D*).

## CASE 2

A 56-year-old woman presented for evaluation of an erythematous rash. The patient developed the

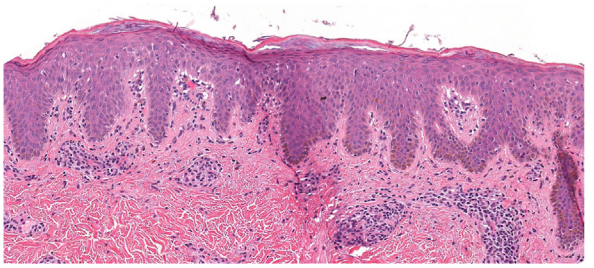

**Fig 2.** Pityriasis lichenoides chronica. Histopathologic examination of a representative biopsy**:** Classic features of pityriasis lichenoides chronica, including parakeratosis, a mild superficial perivascular and lichenoid lymphocytic infiltrate, focal interface change, exocytosis of small numbers of lymphocytes, and extravasated dermal and intraepidermal erythrocytes.

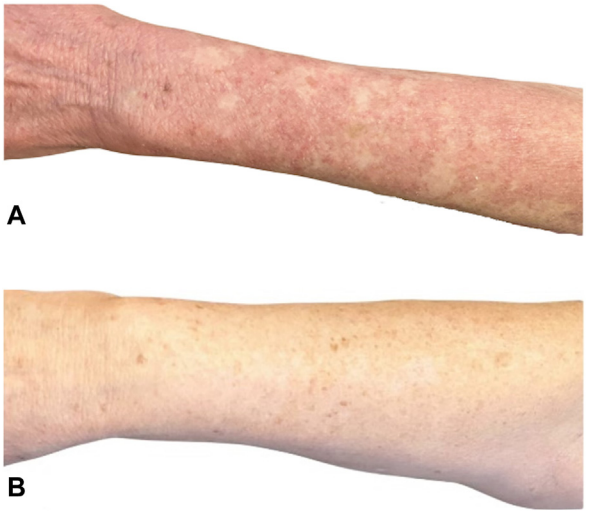


**Fig 3.** Case 2 on initial presentation with diffuse erythematous papules on forearm (**A**). After 1 month of treatment, erythematous patches begin to fade (**B**).

rash shortly after returning from vacation 5 months prior. She denied use of any new medications or products. Significant conditions noted in past medical history included hyperlipidemia, anxiety, and depression. On physical exam, diffuse erythematous papules, and plaques with scale were appreciated on the head, face, neck, trunk, upper and lower extremities (>50% body surface area) (Fig 3, *A*). The patient was started on Cephalexin 250 mg and topical 1% triamcinolone cream due to suspicion of folliculitis. Due to treatment failure, punch biopsies were performed. The histopathologic findings included parakeratosis, a mild superficial perivascular and lichenoid lymphocytic infiltrate, focal interface change, exocytosis of small numbers of lymphocytes, and extravasated dermal and intraepidermal erythrocytes, consistent with a diagnosis

of PLC. Differential diagnoses included pityriasis lichenoides spectrum dermatitis or eosinophilic-poor hypersensitivity reaction. The patient was previously managed with phototherapy which helped with the pruritis; however, it was ineffective in eradicating the rash. Since antibiotics and topical steroids were sub-optimal, we discussed oral methotrexate and its safety profile, but the patient declined. The patient elected to start on dupilumab at a loading dose of 600 mg and then 300 mg every other week. The appearance of the rash significantly improved after the first 3 doses and eventually completely cleared (Fig 3, *B*). The patient maintained clear skin on treatment at 10-month follow up.

## DISCUSSION

Recent research has demonstrated that the inflammatory response observed in PLC is stimulated by the inflammasome complex composed of nucleotide-binding oligomerization domain-like receptor containing pyrin domain 1 (NLRP1) and nucleotide-binding oligomerization domain-like receptor containing pyrin domain (NLRP3).[7] This complex ultimately leads to the production of interleukin-18 (IL-18), a pro-inflammatory cytokine that has been demonstrated to regulate type 1 and 2 inflammation.[7] For this reason, it is believed that some forms of PLC may respond to Th2-mediated blockade.

Dupilumab, an IL-4R alpha antagonist, is a human monoclonal antibody that inhibits type 2 inflammatory signaling pathways mediated by interleukin IL-4 and IL-13.[6,8-10] The effectiveness of dupilumab for the treatment of chronic pruritic diseases like atopic dermatitis and prurigo nodularis is well-documented.[8-10] In addition, dupilumab has been used off-label to treat other pruritic conditions including lichen planus, uremic pruritus, and bullous pemphigoid.[8-10] In this report, we demonstrate the successful use of dupilumab in 2 separate cases. These findings indicate the role of type 2 inflammatory processes in the pathogenesis of PLC. Additional research is necessary to further investigate the role of type 2 inflammation in PLC.

### Conflicts of interest

None disclosed

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