


# Successful Treatment of Severe Nail Lichen Planus with Janus Kinase I Inhibitor Abrocitinib

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**Abstract:** Nail lichen planus (NLP) is a chronic inflammatory disease that presents a significant therapeutic challenge. It can progress rapidly, leading to impaired nail morphology and function. Currently, there is no established standard therapy due to limited efficacy or potential for significant adverse reactions. In this report, we present a case of very severe NLP successfully treated with the Janus kinase 1 (JAK1) inhibitor abrocitinib, with no associated discomfort.

**Keywords:** nail lichen planus, Janus kinase 1 inhibitor, abrocitinib

## Introduction

Lichen planus (LP) is a chronic inflammatory disease usually affecting the skin, mucosa, hair and nails. Nail lichen planus (NLP) is an important variant of LP, characterized by nail changes that often result in marked cosmetic and functional impairments. NLP can present either as isolated nail lesions or alongside mucocutaneous involvement. Early diagnosis of NLP is essential, as advanced stages of the disease usually lead to permanent nail damage, which can significantly affect patients' daily life. However, NLP is challenging to diagnose due to its atypical clinical features overlapping with other nail disorders, such as nail psoriasis. Moreover, treatment of NLP is equally challenging. Identifying an optimal therapy that combines high efficacy with minimal adverse effects remains controversial. Herein, we reported a case of severe NLP successfully treated by the Janus kinase 1 inhibitor, abrocitinib, a novel and potential option for the future NLP treatment.

## Case Presentation

A 31-year-old female patient visited our department presenting with a 3-year history of progressive nail changes affecting all her finger nails and toenails (Figure 1). Her medical history was unremarkable, with no other illnesses or ongoing treatments. She reported no discomfort, and there were no visible rashes on her skin, hair, or oral mucosa.

Upon physical examination, we observed significant nail damage, including longitudinal ridges and grooves, splitting, and splinter hemorrhages. To better assess the extent of the damage, polarized light dermoscopy was used, revealing nail fold hyperpigmentation, onycholysis, nail bed dyschromia, erythema of the nail bed, and hemorrhages (Figure 2). The normal anatomical structure of the fingers appeared to be almost completely absent. These nail changes had a significant cosmetic impact and severely affected the patient's daily life. To establish a definitive diagnosis, a longitudinal nail biopsy was performed (Supplementary Figure 1), which revealed epithelial hyperplasia of the nail bed, along with infiltration of lymphocytes and eosinophils in the granular layer. Additionally, lymphocytes, plasma cells, and eosinophils were present in the superficial dermis (Figure 3). Based on these clinical findings and histopathological evidence, the diagnosis of nail lichen planus (NLP) was confirmed.



**Figure 1** Clinical manifestation of nails before abrocitinib treatment.

Regarding treatment, topical tacrolimus ointment was firstly applied but showed no improvement. The patient declined systemic glucocorticoids and immunosuppressive therapy due to safety concerns. After careful consideration, we initiated treatment with the Janus kinase (JAK) 1 inhibitor abrocitinib at a dosage of 100 mg orally per day. To ensure the patient's safety, we conducted a thorough medical evaluation. Routine laboratory tests, including full blood count, blood biochemistry, and autoantibody screening, revealed no abnormalities. Serum tests for hepatitis B, human immunodeficiency virus (HIV), and tuberculosis (T-SPOT) were all negative. A chest CT scan also showed no abnormalities.

Four months later, partial normalization was observed in the proximal nails of her fingers. Seven months later, the majority of her fingernails had returned to a healthy condition (Figures 2 and 4), and her toenails showed significant improvement. No complaints of discomfort were reported during the whole therapy. Interestingly, the patient stopped taking the medication on her own after 7 months, resulting in a rapid deterioration of her condition. She restarted treatment shortly thereafter. At the time of writing, the patient is continuing therapy and is being regularly followed up.

## Discussion

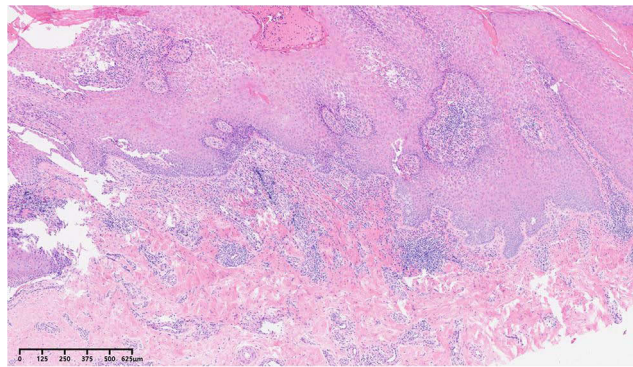
NLP is a chronic, recurrent immune-mediated disorder of unknown etiology, which presents a significant diagnostic and therapeutic challenge. It affects approximately 10–15% of patients with lichen planus and can lead to irreversible nail damage, including nail loss and scarring, without proper and effective treatment.<sup>1</sup>

Early recognition and timely treatment are crucial in preventing disease progression. However, the diagnosis and management of NLP are complicated by the absence of specific diagnostic criteria and the overlap of its clinical features with other nail disorders. Common manifestations of NLP include longitudinal ridging, nail thinning, lamina fragmentation, onycholysis, erythema of the lunula, and pterygium.<sup>2</sup> However, many of these signs are also observed in other diseases such as nail psoriasis, idiopathic trachyonychia, and trauma, complicating the diagnostic process. Dermoscopy is an indispensable, non-invasive tool that aids in the recognition of nail diseases, allowing physicians to detect subtle changes in the nail bed and plate. Besides, pathological examination remains the gold standard for diagnosis. The basal layer is destructed and there is a dense, bandlike infiltrate composed of lymphocytes and melanophages.

In terms of treatment, few therapies have proven consistently effective for NLP. Topical treatments, such as corticosteroids and tacrolimus ointment, have limited efficacy due to poor penetration, and are generally only useful for localized lesions. Intralesional triamcinolone acetonide is often recommended, but the procedure is painful and requires repeated injections, making it less suitable for patients with widespread nail involvement. Systemic treatments, including corticosteroids and traditional immunosuppressants like cyclosporine and methotrexate, may be beneficial for some patients, but carry the risk of long-term complications and disease relapse when the medications are tapered or discontinued.<sup>3</sup>



**Figure 2** Dermoscopic images of finger nails during the abrocitinib treatment. (a) Before treatment. (b) 4 months of abrocitinib treatment. (c) 7 months of abrocitinib treatment.



**Figure 3** Pathological picture of nails (\*40).



**Figure 4** Comparison of finger nails during the abrocitinib treatment. Before treatment, 4 months of abrocitinib treatment and 7 months of abrocitinib treatment.

According to the literature review, few high quality papers about NLP therapy were published. Currently, the treatment of NLP is largely guided by clinical experience and evidence from several case series and case reports.<sup>3</sup> Physicians are still actively searching for more effective medications.

To improve treatment outcomes, it is essential to clarify the etiopathogenesis of NLP. However, evidence about the specific mechanisms of NLP remains scarce. As noted earlier, NLP is a subtype of lichen planus (LP), and its pathophysiology is thought to be the same as that of LP. While the exact mechanism of LP is not fully understood, it has been reported that multiple immune cells, including myeloid dendritic cells, T cells, and NK cells, are involved. A range of cytokines like interleukin (IL) -12, IL-18, IL-22, interferon-alpha (IFN- $\alpha$ ), IFN-gamma (IFN- $\gamma$ ) and tumor necrosis factor-alpha are activated in the tissue of LP patients.<sup>4</sup> Notably, IFN- $\gamma$  and IL-21-A dominated the inflammation in cutaneous LP.<sup>5</sup> Moreover, Lernia has suggested the IFN- $\gamma$ /CXCL10 axis plays a key role in the pathogenesis of LP, with the IFN- $\gamma$ -activated chemokine CXCL10 being strongly expressed in the serum of LP patients. In terms of JAKs, particularly JAK1 and JAK2, are closely involved in the transduction of IFN- $\gamma$  signals, they may represent potential targets for LP treatment.<sup>6</sup> Given the fact that NLP is a special and often intractable form of LP, it may respond to novel, promising therapies targeting the JAK pathways.

Referring to JAKs, they are non-receptor tyrosine kinases consisting of four members: JAK1, JAK2, JAK3, and tyrosine kinase 2. The JAK-signal transducer and activator of transcription (STAT) signaling pathway they mediate is involved in multiple complex biological processes, including cell proliferation, differentiation, apoptosis, and immune regulation. This pathway has also been implicated in the pathogenesis of various inflammatory diseases such as rheumatoid arthritis, psoriasis, atopic dermatitis, and vitiligo. And up to now, JAK inhibitors have been successfully prescribed to treat a series of related diseases.<sup>7,8</sup>

In recent years, various JAK inhibitors have been developed. The first generation of JAK inhibitors, which targeted multiple JAKs (pan-JAK inhibitors), included drugs such as tofacitinib (JAK1/2/3), ruxolitinib (JAK1/2), and baricitinib (JAK1/2). However, these drugs were associated with a higher incidence of adverse effects, including major adverse

**Table 1** Summary of Published Reports of JAK Inhibitors for Nail Lichen Planus

First Author	Sex/Age	Disease Duration	Previous Treatment	JAK Inhibitor	Outcome	Recurrence	Adverse Events
Iorizzo <sup>11</sup>	F/57y	2y	Intralesional injections of triamcinolone acetonide; oral alitretinoin	Tofacitinib	SI in 6 months	None	None
Pünchera <sup>12</sup>	F/60s	1y	Intramuscular triamcinolone injections; oral acitretin; methotrexate	Baricitinib	CR in 6 months	A slight recurrence after reducing the dose	NA
Huang <sup>13</sup>	F/41y	2y	Topical treatment	Tofacitinib	SI in 6 months	None	None
He <sup>14</sup>	M/30s	2y	Topical treatment; oral acitretin	Baricitinib	CR in 6 months	None	None
He <sup>15</sup>	F/39y	1y	Topical treatment	Abrocitinib	SI in 6 months	None	None
Our case	F/31y	3y	Topical treatment	Abrocitinib	SI in 6 months	An obvious recurrence after a short discontinuation	None

**Abbreviations:** F, female; M, male; NA, not applicable; y, years; CR, complete remission; SI, significant improvement.

cardiovascular events, cancer, and venous thromboembolism, leading to black-box warnings from the FDA.<sup>9,10</sup> Therefore, the second-generation of JAK inhibitors with greater receptor selectivity have been developed for better security and are now available on the market.

Several case reports have demonstrated that NLP patients can be effectively treated with JAK inhibitors (Table 1). Given an overall consideration, we prescribed abrocitinib, a highly selective JAK1 inhibitor, to treat NLP in the case. The medication rapidly halted disease progression and ultimately reversed the severe nail abnormalities with no adverse event.

In conclusion, NLP presents a clinical challenge in both diagnosis and treatment. In our case, successful therapy with abrocitinib offers new insight. Abrocitinib shows promise as a treatment for NLP, though further studies and observations are necessary to confirm its effectiveness and safety.

## Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## Ethical Statement and Informed Consent

The ethics committee of Hangzhou First People's Hospital approved to publish the case details (2025ZN005-1). Written informed consent for publication of case details and accompanying images was provided by the patient.

## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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## Disclosure

No known potential conflicts of interest with this work.

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