

# Successful Treatment of Atopic Dermatitis with a Predominant Nipple Involvement by Abrocitinib During COVID-19 Pandemic: A Case Report

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**Background:** There is limited literature on AD with a predominant involvement of nipple among the adult male group. SARS-CoV-2 infection might have been an exacerbating factor of AD by initiating the “cytokine storm”. Conventional treatment suffers from a dilemma of poor efficacy and a high recurrence. The JAK inhibitors have been clinically applied to treat the AD with a good outcome.

**Patients and Methods:** We present a case of a 28-year-old male AD patient with a predominant nipple involvement successfully treated with JAK inhibitor abrocitinib, with no adverse affects.

**Results:** The case shows a good clinical efficacy of JAK inhibitor abrocitinib in the treatment of AD with a predominant nipple involvement during the COVID-19 pandemic with a rapid and long-term symptomatic relief.

**Conclusion:** JAK inhibitor abrocitinib might become a promising agent for the treatment with AD with a predominant uncommon region like nipple that might be resistant to conventional therapies during the COVID-19 pandemic.

**Keywords:** atopic dermatitis, nipple and areola, JAK inhibitors, abrocitinib, COVID-19

## Introduction

Atopic dermatitis (AD) is a chronically common relapsing inflammatory skin disorder that occurs due to dysregulation of type 2 immune response. The clinical manifestations of AD vary with the age of onset and disease severity. Nipple involvement in adult males with AD is rare. Conventional treatment has poor efficacy and a high recurrence. Oral JAK inhibitors are a newly emerging treatment for AD. Herein, we report a case of a 28-year-old male with AD along with a predominant involvement of the nipple and areola that presented to us during the COVID-19 pandemic and was successfully treated with abrocitinib with no adverse effects.

## Case Presentation

A 28-year-old male presented with erythematous patches on the periareolar region for more than 10 years. Since this did not greatly impact his quality of life, the patient did not seek any treatment for it. In December 2022, the patient reported to our hospital with localized pruritic erythematous patches with exudative erosions on the bilateral nipples and areolas and intense pruritus (Figure 1A). The patient gave a history of experiencing SARS-CoV-2 infection symptoms a week earlier, including loss of smell and taste, weakness, muscle and joint pain, and low-grade fever (38 °C), which was then investigated, and SARS-CoV-2 antibodies were found in the patient. The skin lesions were persistent and recurrent since >5 months. Conventional therapeutic agents, including moisturizers, higher potency corticosteroids, topical calcineurin inhibitors, and UVA1 phototherapy, had been attempted with limited success and usually resulted in flare-ups of the skin



**Figure 1** The skin lesions before and after the abrocitinib therapy. **(A)** The skin lesion on the right nipple and areola before the abrocitinib therapy. **(B)** A week later after the abrocitinib therapy. **(C)** Two weeks later after the abrocitinib therapy.

lesions, particularly around the nipples and areola regions. The patient made his first visit to the department and breast and skin biopsy was recommended to exclude mammary Paget's disease. He refused and then went to the Department of Dermatology for further management. The patient complained that the intense pruritus that accompanied the lesions seriously hampered his quality of life, even causing sleeping disturbances. The patient had seasonal allergic rhinitis with elevated IgE levels, conjunctivitis/blepharitis symptoms, and swollen eyes during the spring/summer season. The patient also had a positive family history (his father had allergic rhinoconjunctivitis). Apart from the lesions on the bilateral nipples and areolas, physical examination revealed similar but milder dry, erythematous scaly plaques on both upper eyelids, the neck, and the periareolar area. Additionally, generalized xerosis of the skin is observed. Based on the typical clinical presentations, the patient was diagnosed with AD using Williams criteria.<sup>1</sup> He fulfilled the major criterion and four minor criteria. The patient refused dupilumab therapy as it is administered by a subcutaneous injection. Given the disease's progression, the ineffective routine plan, and the patient's urgent need for treatment, we decided to initiate the oral abrocitinib, a selective JAK-1 inhibitor, after blood routine examination, biochemistry analysis, coagulation function, and chest CT to rule out the severe infection, coagulation dysfunction, hepatic failure, renal disorder, and tuberculosis. Abrocitinib treatment was initiated at a dosage of 100 mg once a day. The pruritus had reduced significantly the subsequent day. A week later, the nipple and areola lesions had crusted, and the remaining lesions disappeared without any accompanying itching symptoms (Figure 1B). The crusts fell off several days later (Figure 1C). The abrocitinib therapy was discontinued after a 12-week treatment course with no adverse events. Twelve weeks after stopping treatment, there were no signs of relapse. Based on these important clinical benefits, the patient expressed a great satisfaction with the treatment, returned to normal life and regained his confidence.

## Discussion

Multiple factors, such as environmental allergens, psychological stress, sweating, chemical irritants, temperature fluctuations, and wool and lanolin exposure, trigger and exacerbate AD. Moreover, there is an association between viral infections and AD aggravation, which has been reported previously.<sup>2</sup> Magierska et al<sup>3</sup> reported a case of a 23-year-old female patient who experienced an exacerbation of AD skin lesions after contracting SARS-CoV-2 disease. Nipple eczema refers to localized dermatitis of the nipple and areola and often presents bilaterally that typically affects the areola but spares the nipple. It is always characterized by erythematous, crusting, oozing, and erosive papules and nipple discharge is rare and occurs only if the lesions get infected.<sup>4,5</sup> Nipple discharge is considered a minor manifestation of AD; however, it may also be deemed as a non-specific skin symptom. Currently, nipple eczema predominantly occurs in adolescent girls and is regarded as a localized variant of AD.<sup>6–8</sup> However, nipple eczema is rare in males with AD. Herein, we present the case of a 28-year-old male with AD and a predominant manifestation of nipple and areola eczema, which negatively impacted his quality of life. Excluding other possible factors, the presence of SARS-CoV-2 infection could have been an exacerbating factor for AD, which has rarely been reported previously. To date, there is limited literature on a predominant nipple involvement in AD among the adult male group. Although skin manifestations of AD can occur throughout the body, the presence of these in the nipple and areola regions compared to other body parts requires special attention and active and differentiated treatment strategies.

Numerous studies have shown that in the pathogenesis of AD epidermal chemokines, pro-inflammatory cytokines, and pro-angiogenic factors are up-regulated, while antimicrobial peptides and factors responsible for skin barrier function maintenance are down-regulated, which are all induced by the activation of JAK-STAT pathway.<sup>9–11</sup> Abrocitinib was approved by FDA in 2022 to treat moderate and severe AD. It is an oral highly selective JAK-1 inhibitor that influences different important cytokine signalling pathways involved in the AD, like IL-4, IL-13, and IL-31.<sup>12,13</sup> Abrocitinib appears effective and safe for moderate-to-severe AD treatment, with good oral bioavailability and no immunogenicity, thus addressing the partial limitations of biologic drugs.<sup>14</sup> In the present case, the pruritus had significantly reduced the day after initiating abrocitinib treatment, which is consistent with the results of several clinical trials that found that abrocitinib improves pruritus 2 days after initiating treatment. The current case is notable and interesting due to the following findings. Firstly, the skin lesions of our AD patient could have been exacerbated by the concomitant SARS-CoV-2 infection. It has been reported that SARS-CoV-2 infection provokes a “cytokine storm” that causes an over-production of various inflammatory mediators, especially IL-1, IL-6, IL-8, and TNF- $\alpha$ , which is similar to the AD-related cytokine release.<sup>15–18</sup> The release of these cytokines can exacerbate the inflammatory response that aggravates the AD skin lesions.<sup>3</sup> Secondly, the prevalence of nipple eczema as a predominant manifestation of AD is rare in adult males. Therefore, it is essential to record personal atopy history and perform a complete physical examination to search for typical AD lesions on other skin areas. Secondly, this case indicated the effectiveness and safety of a highly selective Jak-1 inhibitor, abrocitinib, on AD lesions with predominant involvement of special sites, such as the nipples and areola. The nipple and areola is thin and tender, and topical therapies always have strong irritation, and owing to the influence of sweat, it will decrease the therapeutic effect. Additionally, the patient in our case had an urgent need for an effective and convenient treatment strategy. Compared to traditional therapy, the rapid effect, safety, and tolerability profile of abrocitinib may increase treatment adherence in our patient. However, several limitations should be highlighted. Firstly, this was a single case, so the results cannot be generalized to all AD patients with a predominant manifestation of nipple eczema. Furthermore, the relationship between SARS-CoV-2 infection and exacerbation of AD is not clearly established and could be coincidental. Furthermore, although treatment with abrocitinib was effective in this case, this does not guarantee that it will be effective in all patients. Furthermore, long-term follow-up is necessary to assess the long-term efficacy and safety of abrocitinib.

## Conclusions

We report the case of an adult male with AD and a predominant manifestation of nipple eczema during the COVID-19 pandemic that might have proven recalcitrant to conventional therapies, wherein abrocitinib demonstrated rapid and long-term symptomatic relief, including resolution of pruritus and skin lesions, and improvement of the patient's quality of life. Nevertheless, larger observational studies are suggested with abrocitinib to completely understand the benefits that it might provide in real-world clinical practice.

## Ethics Statement

The publications of images were included in the patient's consent for publication of the case. The Hospital Ethics Committees of the Affiliated People's Hospital of Hangzhou Medical College approved to publish the case details.

## Consent Statement

Informed consent was provided by the patient for publication of the case.

## Funding

There is no funding to report.

## Disclosure

Yan Teng and Hui Tang are co-first authors for this study. Danfeng Xu and Xiaohua Tao are co-correspondence authors for this study. The authors have no conflicts of interest to declare for this work.

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