

## CASE REPORT

# Relieving severe itching caused by scabies with tofacitinib: A case report

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**Key Clinical Message**

In this paper, we present a case of relieving severe itching caused by scabies with tofacitinib. We show that the tofacitinib can quickly alleviate the itching caused by scabies, and this case may indicate a new option for comprehensive treatment of scabies.

**KEYWORDS**

itching, JAK inhibitor, scabies, tofacitinib

## 1 | INTRODUCTION

Scabies is a contagious skin disease caused by scabies mites within the epidermal layer of the human skin. The main treatment of scabies usually includes 10–20% sulfur ointment and 10% Crotamiton to kill scabies mites, relieve itching, and treat complications.<sup>1</sup> Most of them are effective, and a few cannot obtain a good effect due to nonstandard treatment. Patients with scabies always suffer from intense unbearable itching which seriously impacts the patients' quality of life. The exact pathogenesis for the severe itching is not fully understood yet, and antihistamine and glucocorticoid are usually used to control itching and eczematous rash. The itching of many patients cannot be effectively relieved.

Janus kinase (JAK)-STAT signaling pathway has been regarded as an important mediator for itching.<sup>2</sup> Tofacitinib is a selective Janus kinase (JAK) 1/3 inhibitor which has been found to be very effective in reducing various types of itching.<sup>3</sup> We herein present a case of relieving severe itching caused by scabies with tofacitinib.

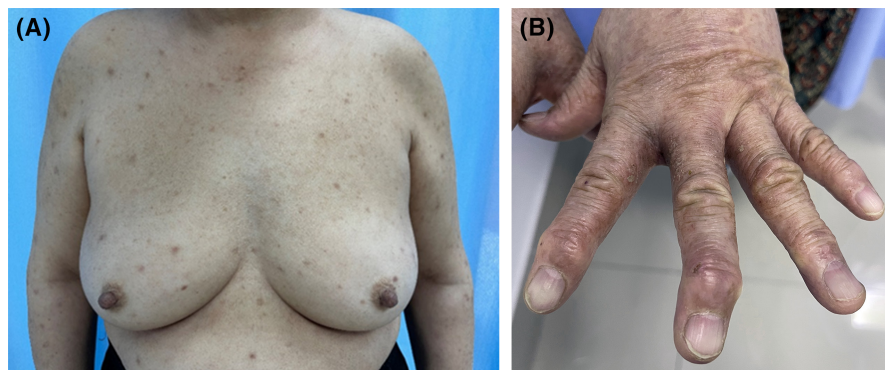
## 2 | CASE REPORT

A 75-year-old woman presented with a rash and itching on the trunk, limbs, and hands for over a month, with no other comorbidities. The patient was diagnosed with “scabies” 2 months ago and was given topical application of 10% sulfur ointment and 0.1% mometasone furoate twice, and oral administration of levocetirizine 5 mg once a day. After treatment, the itching gradually worsened and caused insomnia, seriously affecting sleep and normal life. Due to the perceived poor treatment effect, the medication was discontinued after 2 weeks. Physical examination indicated that needle tip to millet-sized dark red blisters can be seen in the patient's fingers, waist, lower abdomen, and vulva, with scattered distribution (Figure 1). Dozens of soybean-sized nodules can be seen below the neck. Scabies microscopic examination: positive (Figure 2). Pruritus score: visual analog scale (VAS): 8 points; numerical rating scale (NRS): 8.5 points.

Due to a shortage of sulfur ointment in our hospital, the patient was instructed to purchase 10% sulfur ointment

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**FIGURE 1** Typical skin lesions of trunk and upper limbs (A) and left hand (B) at the patient's first visit.



**FIGURE 2** Observation of sarcoptic mite under the microscope (100 $\times$ ).

and apply it externally below the neck for 3 days. Five days before obtaining the ointment, the patient suffered from severe itching of poor effectiveness of antihistamine and was advised to take 10 mg of tofacitinib orally twice a day to ease the symptoms. The itching of the patient was significantly reduced 2h after the first oral administration. After 5 days, the patient underwent external application of sulfur ointment for 3 days. At the follow-up visit 1 week later, the patient's VRS score was 2 points and NRS score was 1.5 points. The blisters and scratches have basically subsided, and some scabies nodules have subsided. This patient continued to receive 5 mg of tofacitinib orally twice a day, and the medication was discontinued 1 week later. After discontinuing the medication, both the VRS score and NRS score of the patient were reduced to 0 point. Two phone follow-up visits were conducted after 2 weeks and 4 weeks, and this patient reported no recurrence of skin

and rash itching. During the treatment process, the patient had no side effects.

### 3 | DISCUSSION

In the treatment of itching caused by scabies nodules of this patient, antihistamine and glucocorticoids did not have a good effect on relieving itching. At the same time, among various types of itchy skin diseases, JAK inhibitors such as tofacitinib have more advantages in terms of onset speed and relief compared to drugs such as antihistamines and glucocorticoids.<sup>4</sup> Moreover, compared to the systemic use of glucocorticoids, JAK inhibitors have fewer side effects and their long-term safety has been recognized.<sup>4</sup> Interestingly, it was reported that oclacitinib was successfully used to treat canine itching caused by scabies mite.<sup>5</sup> Recently, a report containing five cases found that tofacitinib showed excellent efficacy for nodular scabies after ineffective treatment of antihistamines, topical applying and intralesional injection of steroids as well as topical tacrolimus in different combinations.<sup>6</sup>

In recent years, studies have shown that scabies mites and their metabolites are multiple allergens that may trigger various allergic reactions. In 2003, Arlian et al. discovered that scabies mites act on human dermal microvascular epithelial cells, triggering inflammation and immune responses, stimulating the production of interleukin (IL)-1, -6, -8, eotaxin, G-CSF, and TNF in the body- $\alpha$ , ICAM-1. In recent years, it has been found that cytokines such as interleukin-22, -23, and -31 are also involved in the pathogenesis of itching.<sup>3</sup> Tofacitinib can significantly reduce the above itching-related cytokine and may also inhibit the itching by increasing the density of peptidergic epidermal nerve fibers.<sup>7,8</sup>

For this case, we should acknowledge that compared to traditional antipruritic drugs such as antihistamines and glucocorticoids, JAK inhibitors are relatively expensive. However, this patient was only using it for a short period of time, and the medication could be stopped immediately

after the itching relieved, without any withdrawal reactions. Therefore, the cost is acceptable.

The focus of the treatment in this case is to quickly alleviate the itching caused by scabies with tofacitinib, rather than killing scabies. This case not only provides a new option for comprehensive treatment of scabies but also provides a basis for further expanding the scope of use of tofacitinib.

#### AUTHOR CONTRIBUTIONS

**Zhenze Yu:** Conceptualization; data curation; formal analysis; visualization; writing – original draft. **Zhenzhen Wu:** Resources; visualization; writing – original draft. **Fang Sun:** Conceptualization; data curation; investigation; validation; writing – original draft. **Xin Shi:** Conceptualization; data curation; investigation; resources; visualization; writing – review and editing.

#### FUNDING INFORMATION

None.

#### CONFLICT OF INTEREST STATEMENT

There are no conflicts of interest.

#### DATA AVAILABILITY STATEMENT

The authors confirm that the data supporting the findings of this study are available within the article.

#### ETHICS STATEMENT

As this is a single case report, ethics committee approval is not required.

#### CONSENT

The patient in this manuscript has given written informed consent to publication of her case details and images.

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