

Erythrodermic Psoriasis in a Patient with Plaque Psoriasis Who Presented with Symptoms of Niacin Deficiency: A Special Case Report

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Abstract: Psoriasis is relatively common in clinical practice, whereas niacin deficiency is relatively rare. We describe the clinical case of a patient with plaque psoriasis for over 20 years who also had a concomitant latent tuberculosis infection. After secukinumab and anti-tuberculosis treatment for 1 year, the psoriatic rash mostly resolved, but atypical symptoms of niacin deficiency suddenly appeared. The patient's symptoms rapidly subsided after experimental treatment with niacin. After 2 weeks, the patient suddenly developed an erythroderma-like rash, manifesting as large areas of erythema and plaque psoriasis throughout the body. The patient was admitted to the hospital and treated with an anti-inflammatory, biologic adalimumab, tripterygium glycoside, and sodium thiosulfate. The patient was discharged after a week. This case suggests the need for caution and to look out for the emergence of new symptoms when treating patients with moderate-to-severe plaque psoriasis, especially with biologics.

Keywords: psoriasis, niacin deficiency, case report

Introduction

Psoriasis is a chronic inflammatory disease characterized by erythematous plaques, with pathological manifestations of incomplete keratinization, hyperkeratosis, Munro's microabscesses in the stratum corneum, papillae vasodilation, and inflammatory cell infiltration. In the outpatient clinic, it is not difficult to diagnose psoriasis based on typical rash characteristics. However, sometimes it must be differentiated from seborrheic dermatitis, pityriasis rubra pilaris, ringworm, and other diseases. Niacin deficiency is a rare nutritional deficiency disorder that can simultaneously involve multiple systems and clinically manifests as dermatitis, diarrhoea, and dementia; thus, it is also known as "3D syndrome".¹ However, very few patients exhibit the complete triad, with 33% of patients reportedly having dermatitis as the only clinical manifestation.² Niacin deficiency may appear clinically as a sunburn-like rash, but it is unclear whether there is a connection between the two and whether niacin deficiency can induce erythrodermic psoriasis. Herein, we report a case in which the symptoms of niacin deficiency suddenly appeared after the nearly complete treatment-induced resolution of the psoriatic rash. This was subsequently followed by an erythroderma-like rash. We hope that the preliminary results of this case will serve as a reference for future studies.

Case Presentation

The patient was an older male weighing 80 kg with recurrent episodes of erythematous rash and plaque formation throughout the body for over 20 years. The patient visited our hospital in November 2019 (Figure 1) and was diagnosed with severe plaque psoriasis. Subcutaneous injections of 300 mg secukinumab were then administered monthly. Concurrently, 0.45 g of rifampin and 0.3 g of isoniazid were administered orally four times daily as anti-tuberculosis treatment. A re-examination in June 2020 showed that the systemic rash had generally resolved (Figure 2). The T-spot test was found negative; hence, the anti-tuberculosis treatment was suspended. In January 2021, the T-spot test was again positive, and anti-tuberculosis treatment was resumed after consultation with the Department of Infectious Disease. An examination in August 2021 revealed a scald-like



Figure 1 Large dark red patches can be seen on the back of the buttocks, with a large number of silver-white scales attached to them, most of which are fused into pieces, which are map-shaped and annular, and local skin lesions show lichen-like changes.

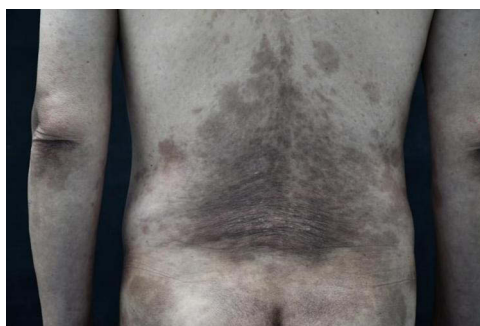


Figure 2 Erythematous scales on the buttocks and back basically subsided, leaving hazel pigmentation.

rash on the buttocks and back (Figure 3) accompanied by redness, swelling, heat, pain, occasional nausea and vomiting, poor appetite, and delayed response. On August 27, 2021, the patient was switched to subcutaneous injections of adalimumab, 80 mg on the first day, followed by 40 mg every 2 weeks, and 0.1 g of oral azithromycin one time daily. The rash continued to worsen over 4 days (Figure 4). The patient's medical history was ascertained in detail, and we learned that the patient had a long history of alcohol consumption and had travelled with intense sun exposure before the onset of the disease. We suspected niacin deficiency. However, since there were no tests for the detection of niacin levels available in our hospital, we presumptively administered 0.3 g of oral niacin three times daily, discontinued antibiotic treatment, and continued administration of adalimumab and anti-tubercular drugs. The patient was re-examined 10 days later; he was found to have significant regression of the redness and swelling, with large patches of residual pigment deposition (Figure 5). Two weeks later, the patient developed extensive erythema and desquamation on the whole body with severe itching; hence, he was admitted to the hospital for observation. On the basis of the original treatment plan, we added *Tripterygium wilfordii* polyglycosides tablets 10

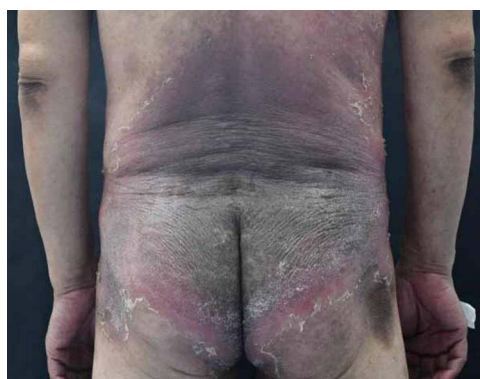


Figure 3 A large, diffuse dark erythema on the back of the buttocks with thickened skin and bright red margins, scales and hyperpigmentation.



Figure 4 The erythema infiltration of the buttocks was aggravated, and part of the skin was pink and the pain was severe.

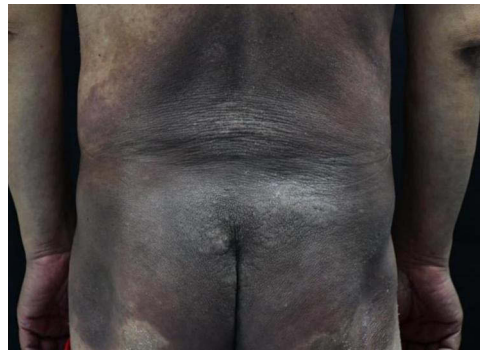


Figure 5 The redness and swelling subsided, the pain was relieved, and a large area of pigmentation remained.

mg orally three times daily, and sodium thiosulfate 0.64 g intravenously for symptomatic treatment. After that, the patient's condition improved and was discharged after 1 week.

Discussion

Pellagra is a nutritional disorder caused by the deficiency of niacin or its precursor tryptophan and can simultaneously involve multiple systems. Clinically, it manifests as (i) symmetrical photosensitive rash, (ii) gastrointestinal symptoms, and (iii) neuropsychiatric dysfunction. The rash resembles a sunburn at the early stages of the disease, starting with acute onset erythema. This gradually transforms into an acute exudative rash on the exposed areas, such as the hands, face, neck, and chest, with pruritus, a burning sensation, and sometimes accompanied by blistering. Gastrointestinal symptoms include loss of appetite, nausea, vomiting, epigastric discomfort, abdominal pain, and increased salivation. Neuropsychiatric symptoms include depression, memory loss, and hallucinations. Niacin, also known as vitamin B3, is obtained from the diet and is abundant in meat, fish, nuts, eggs, grains, rice, and milk.³ Niacin deficiency is rare in people with a regular, healthy daily diet and is more common in developing countries than in developed countries; it persists in certain populations in developed countries, such as those with alcoholism, anorexia nervosa, malnutrition, HIV infection, and with the use of certain medications such as antiepileptics, azathioprine, and isoniazid.⁴ The disease tends to occur in summer and autumn and tends to recur. Among the various causes of niacin deficiency reported in domestic and international literature, alcoholism accounts for the largest proportion, followed by medications, insufficient dietary intake, malabsorption, metabolic disorders, excessive loss, and various unknown causes.^{5,6} The diagnosis of the present case was confirmed primarily based on medical history, clinical presentation, and experimental treatment. After a variety of symptomatic treatments did not yield significant results, a detailed history was elicited from the patient and his family, and we learned that the patient had a long history of alcohol consumption and had travelled with prolonged sun exposure before the onset of the disease. This history, typical skin lesions, flat affect, and delayed response made us consider the possibility of niacin deficiency. Although the symptoms were atypical, they subsided rapidly after experimental administration of oral niacin. The history of long-term alcohol consumption, oral anti-tuberculosis medication, and the use of biologics could be the primary

causes of niacin deficiency in this case. One other case of niacin deficiency has been reported in China, but it is unclear whether the deficiency was caused by an adverse reaction to oral isoniazid or by loss of appetite after administering anti-tuberculosis medication.⁷ Individual cases of concomitant niacin deficiency in patients with psoriasis have been reported in China and abroad.^{8,9} Niacin deficiency caused by the use of biologics has not been reported, and it remains to be determined whether the relationship between psoriasis and niacin deficiency is causal or coincidental.

Conclusion

In this case report, we could not confirm whether a definite link exists between niacin deficiency, biologics, and psoriasis. However, the case suggests the need for caution when using biologics and to look out for the emergence of new symptoms when treating patients with moderate-to-severe plaque psoriasis. Additionally, timely and accurate judgments in eliciting a patient's medical history and assessing responses to drug treatment are needed.

Data Sharing Statement

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

Ethics Approval and Informed Consent

Informed consent for publication of the case details and associated images was obtained from the patient, and all procedures were performed in accordance with the Helsinki Declaration. Institutional approval was not required to publish the case details.

Consent for Publication

The patient has viewed the article contents and has provided consent for its publication in the journal.

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Disclosure

The authors report no conflicts of interest in this work.

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