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**Single Case**

# Possible Efficacy of Vedolizumab, an Anti-α4β7 Integrin Antibody, in Palmoplantar Pustulosis

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**Keywords**
Vedolizumab · α4β7 integrin · Palmoplantar pustulosis

**Abstract**
Palmoplantar pustulosis (PPP) is a chronic skin inflammatory disease in which blisters and pustules repeatedly develop on palms and soles. PPP is often refractory to topical therapy, oral therapy, phototherapy, and biologics that are usually applied for PPP. We report a patient with PPP improved by vedolizumab (anti-α4β7 integrin antibody) treatment for ulcerative colitis, suggesting the possibility of a new molecular target for PPP therapy.



## Introduction

Palmoplantar pustulosis (PPP) is a chronic skin inflammatory disease in which blisters and pustules repeatedly develop on palms and soles. PPP is often refractory to topical therapy, oral therapy, phototherapy, and biologics that are usually applied for PPP. However, treatments for PPP are often challenging. Since smoking, metal allergies, or chronic focal infections such as tonsillitis, sinusitis, and dental caries are aggravating factors of PPP, education and explanation for patients' lifestyles are essential [1]. If topical treatments and phototherapy do not achieve satisfactory improvement, systemic therapies are considered: cyclosporine, apremilast, and biologics such as guselkumab [2]. Since some patients still do not improve sufficiently with these medicines, other effective medicines are desired for refractory PPP. We report a patient with PPP who improved with vedolizumab treatment for ulcerative colitis.

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## Case Report

A woman in her 50s, with a history of surgery for a root canal cyst and no smoking habit, had suffered from erythema, desquamation, vesicles, and pustules on her palms and soles for 4 months without any joint pain or other symptoms (Fig. 1a). Under the clinical diagnosis of PPP, we treated her with topical steroids, topical 10% salicylic acid in vaseline, and oral biotin and *Clostridium butyricum* (Miya BM®), but the skin lesions did not improve. The patient had ulcerative colitis and had been treated for 2 years with oral and/or enteral steroids, oral and/or enteral mesalazine, oral azathioprine, and anti-TNF-α antibodies adalimumab and golimumab, a few times, respectively. Since her ulcerative colitis was refractory to these treatments, she switched to anti-α4β7 antibody vedolizumab 2 months after her first visit to our dermatology clinic. She gradually improved gastrointestinal symptoms such as bloody stools and diarrhea after 2 weeks of vedolizumab treatment, and stools became normal after 3 months. Symptoms of PPP also improved after 9 months of vedolizumab treatment, leaving only mild keratosis on the soles (Fig. 1b). Since then, there has been no recurrence of PPP for 2 years. No additional medication for ulcerative colitis was administered in this case.

## Conclusion

Vedolizumab is an anti-α4β7 integrin antibody, which acts against α4β7 integrin on lymphocytes, inhibits lymphocyte adhesion to mucosal addressin cell adhesion molecule-1 (MAdCAM-1), and improves inflammatory bowel diseases by suppressing T-cell homing to the gastrointestinal tract. Since the intestinal environment contributes to development of various diseases [3], the improvement of the intestinal environment might alleviate PPP symptoms, although the direct relationship between the intestinal environment and PPP has not been elucidated. In other inflammatory skin diseases such as psoriasis, the expressions of MAdCAM-1 and ITGB7 were not enhanced [4]. However, MAdCAM-1 is not the sole ligand of α4β7 integrin, but α4β7 integrin binds to vascular endothelial cell adhesion molecule-1 (VCAM-1) and fibronectin [5]. Since endothelial cells in PPP lesions express VCAM-1 while those in healthy skin do not [6], vedolizumab might directly improve skin symptoms by acting on endothelial cells in PPP skin lesions to suppress lymphocyte infiltration. Although it is not conclusive whether vedolizumab improved PPP symptoms by its direct action on α4β7 integrin to VCAM-1 interaction or by indirect action through intestinal environment improvement, the present case suggests that vedolizumab would be an option of PPP treatment with a new mode of action. This indirect action might explain the delayed effect of vedolizumab 9 months after the start of therapy. The limitation of this report is that we could not completely reject the possibility of PPP development as a paradoxical reaction of anti-TNF antibody because the patient developed PPP skin lesion after anti-TNF antibody treatment. The median time from starting adalimumab to developing a skin reaction was 12 months [7]. Thus, we thought that the possibility of developing a paradoxical reaction in our case was relatively low because the patient was treated with adalimumab and golimumab for total of 5 months and the skin lesion did not improve even with topical treatment after cessation of anti-TNF antibody. We believed that a future clinical study could provide a promising therapy for PPP patients when conventional treatments are ineffective. Although further research is necessary to understand the underlying mechanism, this case provides the possibility of a new molecular target for PPP therapy. The CARE Checklist has been completed by the authors for this case report, attached as online supplementary material (for all online suppl. material, see www.karger.com/doi/10.1159/000529080).

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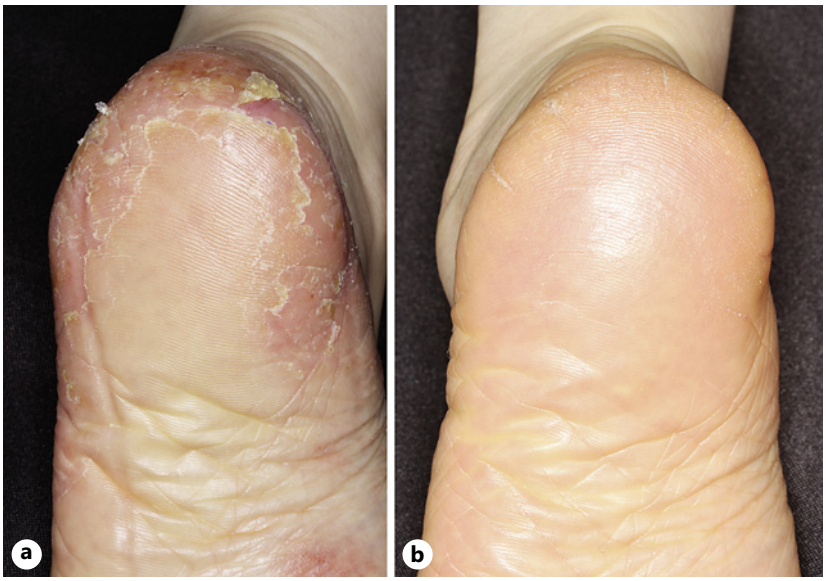


**Fig. 1.** Clinical images of palmoplantar pustulosis lesions on the sole. **a** Before vedolizumab treatment. **b** After 9-month administration of vedolizumab, the sole lesion improved.

## Statement of Ethics

This article was conducted ethically in accordance with the Declaration of Helsinki. Ethics approval was not required for this single case report in accordance with local/national guidelines. The patient's written informed consent to publish the case and clinical images was obtained.

## Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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## Author Contributions

Hitoshi Terui, Rintaro Moroi, and Kenshi Yamasaki were involved in the conception and preparation of this manuscript and in the care of the patient and drafted the manuscript and figures. Atsushi Masamune, Setsuya Aiba, and Kenshi Yamasaki critically revised the manuscript for important intellectual content. Hitoshi Terui, Rintaro Moroi, Atsushi Masamune, Setsuya Aiba, and Kenshi Yamasaki have all provided final approval for this version of the manuscript to be published.

## Data Availability Statement

All data generated or analyzed during this study are included in this article and its online supplementary material. Further inquiries can be directed to the corresponding author.

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