


Successful Treatment with Secukinumab in an Erythrodermic Psoriasis Patient with End-Stage Kidney Disease on Hemodialysis: A Case Report

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Abstract: Patients with erythrodermic psoriasis (EP) complicated by end-stage renal disease (ESRD) requiring hemodialysis are extremely rare in clinical practice, and treatment options for this specific population remain highly limited. Herein we report a case of an EP patient with ESRD, in whom treatment with an interleukin-17 (IL-17) inhibitor secukinumab not only rapidly alleviated erythrodermic symptoms but also resulted in a certain degree of improvement in renal function. At the 7-month follow-up, the patient maintained skin lesion clearance with no deterioration in renal function—a finding that has not been consistently documented in previous literature. This case suggests that for patients with psoriasis complicated by kidney disease IL-17 inhibitors may serve as a potentially favorable therapeutic option.

Keywords: erythrodermic psoriasis, end-stage renal disease, IL-17 inhibitor case report

Introduction

Psoriasis, a chronic immune-mediated skin disease, affects an estimated 0.51% to 11.43% of adults worldwide.¹ Erythrodermic psoriasis (EP), a rare and severe form, typically develops from poorly controlled psoriasis, abrupt withdrawal of anti-psoriasis medications, adverse drug reactions, or underlying systemic infections. Prompt and appropriate treatment is crucial, as EP can be life-threatening. Traditionally, EP has been managed with medications like cyclosporine, acitretin, and methotrexate. However, these drugs are often nephrotoxic, meaning they can harm the kidneys, and are unsuitable for patients already on hemodialysis.

Renal disease is well-recognized as one of the comorbidities linked to psoriasis.^{2,3} However, the pathogenesis underlying comorbidities in patients with psoriasis remains to be fully elucidated. Notably, studies have observed that the pathological processes in renal diseases are initiated by T helper 17 (Th17) cells and interleukin-17 (IL-17).^{4,5} IL-17 inhibitors have been widely established for the treatment of plaque psoriasis; though case reports documenting their successful application in EP also exist.^{6–9} However, no clear clinical recommendations have been defined for their dosage in this context. Furthermore, whether IL-17 inhibitors can improve renal function in patients with psoriasis complicated with end-stage renal disease (ESRD) remains rarely reported in the literature.

Herein, we report a case of an EP patient complicated with ESRD: IL-17 inhibitors rapidly improved the patient's erythrodermic symptoms, and furthermore, the patient's renal function showed a certain degree of improvement.

Case Report

A 67-year-old man presented with a 40-year history of psoriasis that had been resistant to treatment. Despite phototherapy and topical medications like calcipotriol and betamethasone, his skin lesions persisted and worsened progressively. Six years ago, he was diagnosed with ESRD and anemia secondary to chronic kidney disease (CKD) and began regular hemodialysis treatment, during most of the clinical monitoring period, the patient's serum creatinine remained stable at approximately 12–13 mg/dL. In June 2023, his skin lesions rapidly deteriorated, developing erythema and scaling across his entire body. He also experienced fever and fatigue. Based on clinical manifestations, he was diagnosed with EP, with a Psoriasis Area and Severity Index (PASI) score of 46.2 (Figure 1). Laboratory tests revealed an elevated serum creatinine level of 21.6 mg/dL. Tests for tuberculosis, hepatitis viruses, HIV, and syphilis were negative.

Given that biologics exhibit a more rapid onset of action than conventional systemic agents, guidelines recommend biologics as a treatment option for acute-phase EP¹⁰. Furthermore, previous studies and case reports have documented the successful use of interleukin-17 (IL-17) inhibitors in the management of EP. After obtaining informed consent for the off-label use of biologics, we initiated treatment with secukinumab at a dose of 300mg subcutaneously every 10 days due to his financial constraints. After three doses, the frequency was switched to monthly injections. Following the first injection, the patient's body temperature returned to normal reference range, and his skin lesions showed rapid improvement, concurrently, his PASI score decreased to 28.2, and his serum creatinine level decreased to 7.4 mg/dL. After one month, the patches had nearly resolved, and he achieved a PASI score of 2.4, representing a PASI-95 response (95% decrease in PASI). At the 7th-month follow-up after treatment, the patient had no recurrence of skin lesions and no adverse events occurred. The serum creatinine level was 7.7 mg/dL, which indicates that the patient's renal function continued to maintain an improved state.

Discussion

As research on psoriasis deepens, it is now recognized as a systemic inflammatory disease, increasing the risk of diabetes, metabolic disorders, cardiovascular diseases and kidney diseases.^{2,3} Studies have shown that severe psoriasis is an independent risk factor for the development of chronic kidney disease (CKD) and end-stage renal disease (ESRD), with severe psoriasis conferring a nearly twofold higher risk of CKD and a threefold higher risk of ESRD, respectively.^{11–13} The exact mechanisms by which psoriasis can affect the kidneys are still being explored. Some theories suggest immune-mediated kidney damage, drug induced kidney injury, and chronic kidney damage as potential causes.¹⁴ Recent studies have found that IL-17 and Th17 cells in a variety of immune function is crucial to the kidneys and the level of increase is a common feature of many kidney diseases.^{4,5} Renal inflammation and the progression of diabetic kidney disease (DKD) are promoted by Interleukin IL-17A, and experimental DKD is improved when IL-17A is deficient.^{15,16} Such findings may yield valuable insights for treating kidney diseases, however, based on our current understanding, there are no additional studies being conducted to explore Th17-targeting agents in renal autoimmune diseases.

IL-17A signaling and Th17 cells were confirmed as being involved within plaque and erythrodermic psoriasis.^{17,18} While IL-17 inhibitors are used off-label in the management of EP, a handful of case reports have confirmed their successful application.^{6–9} Notably, there are few documented reports on treating EP patients who also have ESRD. Patients with kidney disease might experience CKD progression with receiving anti-TNF or anti-IL-12/23 biologics, whereas those treated with anti-IL-17 biologics maintained stable CKD status.¹⁹

IL-17 inhibitor secukinumab demonstrated high sustained efficacy and a favourable safety profile in patients with different psoriasis types (erythrodermic, vulgaris, and psoriatic arthritis) undergoing hemodialysis.^{20–22}

Our patient, on hemodialysis for the past 6 years, recently developed severe EP. After careful consideration, we opted to treat him with secukinumab. Consistent with previous reports,^{6–9} Secukinumab effectively treated the patient's EP. Notably, this agent appeared to have a faster onset of action in our patient; even with a lower-than-typical dosage, it still achieved therapeutic effects comparable to those of standard dosing regimens. Furthermore, the patient's serum creatinine levels decreased gradually during treatment—indicating an improvement in renal function, a finding that has not been consistently reported in previous studies.



Figure 1 Clinical appearance (a–c) Before secukinumab treatment, diffused erythema and scales covered all over the body. (d–f) After the first treatment of secukinumab, the skin lesions rapidly improved. (g–i) After the third treatment of secukinumab, the patches had almost regressed and he obtained a PASI-95 response.

The patient reported no family history of kidney disease and had no history of hypertension, diabetes mellitus, kidney stones, or urinary tract infections prior to the diagnosis of ESRD. He also denied any history of nephrotoxic drug use. Notably, previous studies have suggested that psoriasis may induce renal disease, as both conditions share a common pathogenesis centered on interleukin-17 (IL-17) and T helper 17 (Th17) cells. In this case, following the administration of an IL-17 inhibitor, both the patient's psoriasis and renal function improved; given this concurrent improvement, we hypothesize that the patient's kidney disease was highly likely psoriasis-induced. For patients with psoriasis complicated by kidney disease—particularly when the renal condition is suspected to be psoriasis-related—IL-17 inhibitors may potentially represent a more favorable treatment option.

Although this patient did not receive the standard therapeutic dosage for plaque psoriasis as recommended in the package insert, this did not impair the therapeutic efficacy for his EP. Notably, this study has limitations, including a small sample size and a relatively short follow-up duration. While this single case cannot be generalized to all patients with EP, it does provide a basis for future clinical trials to include lower-dosage arms—specifically to explore whether Secukinumab can achieve therapeutic effects for EP at reduced doses, which would in turn enhance the pharmacoeconomic profile of treatment.

Conclusion

In conclusion, our case highlights the potential of secukinumab for treating EP in patients with ESRD on hemodialysis. Further studies are warranted to confirm these findings and establish broader treatment guidelines.

Abbreviations

EP, erythrodermic psoriasis; ESRD, end-stage renal disease; CKD, chronic kidney disease; PASI, Psoriasis Area and Severity Index; HIV, human immunodeficiency virus; Th17, T helper cell 17; IL, interleukin; TNF, Tumor necrosis factor.

Data Sharing Statement

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

Informed Consent Statement

Informed written consent was obtained from the patient for publication of this report and any accompanying images.

This manuscript has been approved for publication by the institution. Institution name: The People's Hospital of Liaoning Province.

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Disclosure

The authors declare that they have no conflict of interest to disclose.

References

1. Michalek IM, Loring B, John SM. A systematic review of worldwide epidemiology of psoriasis. *J Eur Acad Dermatol Venereol.* 2017;31(2):205–212. doi:10.1111/jdv.13854
2. Takeshita J, Grewal S, Langan SM, et al. Psoriasis and comorbid diseases: epidemiology. *J Am Acad Dermatol.* 2017;76(3):377–390.
3. Bu J, Ding R, Zhou L, Chen X, Shen E. Epidemiology of psoriasis and comorbid diseases: a narrative review. *Front Immunol.* 2022;13:880201.
4. Dolff S, Witzke O, Wilde B. Th17 cells in renal inflammation and autoimmunity. *Autoimmun Rev.* 2019;18(2):129–136.
5. Zhang T, Huo H, Zhang Y, et al. Th17 cells: a new target in kidney disease research. *Int Rev Immunol.* 2024;43(5):263–279.
6. Panda M, Raj C, Panda AK, Debata I. Secukinumab in erythrodermic psoriasis: real world experience of 6 patients successfully treated by injecting at unconventional sites. *Indian J Dermatol.* 2021;66(6):677–680.
7. Liu LC, Jin XH, Sun C, Xia JX. Two cases of refractory erythrodermic psoriasis effectively treated with secukinumab and a review of the literature. *Dermatol Ther.* 2021;34(2):e14825.
8. Carriero M. Erythrodermic psoriasis and palmoplantar hyperkeratosis successfully treated with secukinumab: a case report. *Drug Target Insights.* 2022;16:1–5.
9. Damiani G, Pacifico A, Russo F, et al. Use of secukinumab in a cohort of erythrodermic psoriatic patients: a pilot study. *J Clin Med.* 2019;8(6):770.
10. Rosenbach M, Hsu S, Korman NJ, et al. Treatment of erythrodermic psoriasis: from the medical board of the National Psoriasis Foundation. *J Am Acad Dermatol.* 2010;62(4):655–662.
11. Chi CC, Wang J, Chen YF, Wang SH, Chen FL, Tung TH. Risk of incident chronic kidney disease and end-stage renal disease in patients with psoriasis: a nationwide population-based cohort study. *J Dermatol Sci.* 2015;78(3):232–238.
12. Jing X, Zhuyuan W, Aijun C, Jianxia X, Kun H, Ping W. Association of psoriasis with chronic kidney disease and end-stage renal disease: a systematic review and meta-analysis. *Front Med Lausanne.* 2023;10:1175477.
13. Ungprasert P, Raksasuk S. Psoriasis and risk of incident chronic kidney disease and end-stage renal disease: a systematic review and meta-analysis. *Int Urol Nephrol.* 2018;50(7):1277–1283.

14. Visconti L, Leonardi G, Buemi M, et al. Kidney disease and psoriasis: novel evidences beyond old concepts. *Clin Rheumatol*. 2016;35(2):297–302.
15. Tan HB, Zheng YQ, Zhuang YP. IL-17A in diabetic kidney disease: protection or damage. *Int Immunopharmacol*. 2022;108:108707.
16. Ma J, Li YJ, Chen X, Kwan T, Chadban SJ, Wu H. Interleukin 17A promotes diabetic kidney injury. *Sci Rep*. 2019;9(1):2264.
17. Xing X, Liang Y, Sarkar MK, et al. IL-17 responses are the dominant inflammatory signal linking inverse, erythrodermic, and chronic plaque psoriasis. *J Invest Dermatol*. 2016;136(12):2498–2501.
18. Moy AP, Murali M, Kroshinsky D, Duncan LM, Nazarian RM. Immunologic overlap of helper T-cell subtypes 17 and 22 in erythrodermic psoriasis and atopic dermatitis. *JAMA Dermatol*. 2015;151(7):753–760.
19. Chen CB, Huang YT, Hsiao CC, Chang SH, Chi CC. Real-world effects of biologics on renal function in psoriatic patients: a retrospective study. *BioDrugs*. 2022;36(5):657–666.
20. Ikuma D, Oguro M, Hoshino J, et al. Efficacy of secukinumab for plaque psoriasis in a patient on hemodialysis. *CEN Case Rep*. 2020;9(1):55–58.
21. Mukai M, Kurihara Y, Ito Y, et al. Successful treatment with secukinumab of three psoriatic patients undergoing dialysis. *J Dermatol*. 2020;47(1):e26–e8.
22. Pizzatti L, Mugheddu C, Sanna S, Atzori L, Rongioletti F. Erythrodermic psoriasis in a dialyzed patient successfully treated with secukinumab. *Dermatol Ther*. 2020;33(3):e13348.

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