



# Successful Treatment of Pediatric Generalized Pustular Psoriasis with Secukinumab

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**Abstract:** Generalized Pustular Psoriasis (GPP) is a rare, severe, life-threatening form of psoriasis and often resistant to conventional systemic therapy. It can be induced by deficiency of interleukin (IL)-36 receptor antagonist. Treatment of patients with GPP is often difficult, and there is no consensus on the best options available to date. However, multiple biologics approved for use in plaque-type psoriasis have also been used in GPP. Here, we report a 6-year-old boy with GPP who was misdiagnosed with AGEP and was treated with corticosteroids but did not respond well. He showed significant improvement following secukinumab treatment. Our case report indicates that IL-17A inhibition as a promising therapeutic option for pediatric GPP without combination with other systemic agents.

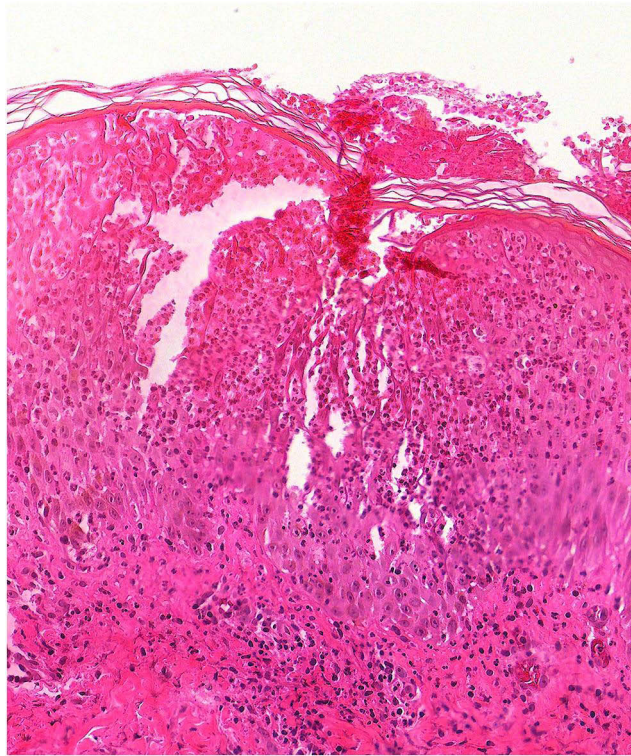
**Keywords:** juvenile pustular psoriasis, biologics, interleukin 17, secukinumab

## Introduction

Generalized pustular psoriasis (GPP) is a rare but severe form of psoriasis in which patients experience recurrent episodes of diffuse cutaneous erythema covered with pinpoint pustules that often coincide with fever, general malaise, and increases in levels of inflammatory markers.<sup>1</sup> GPP accounts for just 0.6–7% of all pediatric psoriasis cases.<sup>2</sup> Conventional first-line treatments for pustular psoriasis include retinoic acid, methotrexate and cyclosporine. However, a growing body of recent evidence suggests that interactions between the IL-36 signaling pathway and the inflammatory cytokines TNF- $\alpha$ , IL-17, and IL-23, are closely associated with the pathogenesis of GPP,<sup>3</sup> prompting the use of IL-36 inhibitors (ie, spesolimab), TNF- $\alpha$  inhibitors (ie, adalimumab), IL-23 inhibitors (ie, guselkumab) and IL-17 inhibitors (ie, secukinumab) for the management of GPP with positive outcomes. In this report, we describe a pediatric case of generalized pustular psoriasis. The patient's cutaneous lesions cleared effectively following secukinumab administration, and there were no instances of adverse events or recurrence over the course of follow-up.

## Case Report

A 6-year-old boy presented to our hospital with a 20-day history of generalized erythema and pustules covering his body that had grown worse over the past week. In another hospital, he had been previously misdiagnosed with acute generalized exanthematous pustulosis (AGEP) and underwent treatment with prednisone acetate tablets, dexamethasone sodium phosphate injections, intravenous methylprednisolone injections (40–60 mg for 7 days), and intravenous gammaglobulin (10 g for 5 days). These treatments failed to alleviate the patient's symptoms. His skin exhibited numerous regions of erythema of varying size coalescing into patches disseminated across his entire body. Superimposed on these lesions were pustules ranging from the size of pinpricks to the size of corn kernels, with some having merged resulting in the formation of large pools of pus. Some of these pustules had ruptured, resulting in a vesicular surface, whereas others had dried such that crusts and flakes remained. A loss of the natural luster of the nail plate was also observed, with some areas of the nail exhibiting point-like concavity. The patient had a body temperature exceeding 38.5°C, and routine laboratory testing revealed that his white blood cell count was elevated at 24,600/ $\mu$ L



**Figure 1** Histopathologic analysis of the skin infiltrate. Neutrophil infiltration into the epidermis, showing the spongiform pustule of Kogoj.

(normal range, 3500–9500/ $\mu$ L), as was his neutrophil count at 19,620/ $\mu$ L (normal range, 1800–6300/ $\mu$ L) and his C-reactive protein (CRP) level at 64.3 mg/L (normal range, 0.17–2.2 mg/L). His pathology was consistent with the pathological changes characteristic of subcorneal pustular dermatosis (Figure 1), and the patient was diagnosed with GPP. Given the severity of his condition and the side effects of methotrexate and cyclosporine, we subcutaneously administered secukinumab (150 mg; 36 kg body weight) on days 1, 7, and 13 with parental consent. After 15 days, the patient's erythema and pustules had largely subsided and his skin had returned to normal with localized areas of hyperpigmentation (Figure 2). His body temperature and laboratory values had also returned to the normal range. The patient underwent maintenance therapy with secukinumab injections once per month for two months after discharge, and he experienced no adverse effects or recurrence over the 12-month follow-up period.

## Discussion

The pathogenesis of GPP has been attributed to mutations in the IL36RN gene.<sup>4</sup> Relative to other clinical subtypes of this disease, pustular psoriasis has been linked to the upregulation of IL-17 at the mRNA level, emphasizing the value of targeting IL-17 when treating GPP.<sup>5</sup> As pediatric GPP may respond poorly to conventional systemic treatment, managing this condition can be difficult.<sup>6</sup> Secukinumab is an IL-17A inhibitor that has been shown to provide rapid clinical responses and sustained remission in adults affected by GPP. While there has been less research focused on the efficacy of secukinumab in pediatric GPP, 5 reports on 8 cases have described the successful use of this medication.<sup>6,7</sup> The risk associated with secukinumab over the long term is comparatively minimal. Commonly reported side effects include nasopharyngitis, diarrhea, and infections of the upper respiratory tract.<sup>8</sup> Occasionally, some rare side effects may also arise, such as paradoxical psoriasis. In some psoriasis patients, skin lesions may transition from plaques to pustules after using IL-17 inhibitors.<sup>9</sup> However, in this case report, the patient did not encounter any adverse events due to the medication. Our case report provides further evidence for dermatologists to take into consideration when evaluating secukinumab as an option for the treatment of generalized pustular psoriasis, particularly when managing pediatric GPP cases that have responded poorly to traditional treatments. As they are safe and efficacious, IL-17 antagonists may be



**Figure 2** Clinical images. (A) Generalized erythematous patches with pustules and areas of desquamation on initial presentation (GPPASI: 42.6, GPPGA:3.5). (B) Following treatment the patient's erythema and pustules had largely subsided, with residual areas of local hyperpigmentation (GPPASI:0.8, GPPGA:0). (C) The patient's skin had returned to normal (GPPASI:0, GPPGA:0).

**Abbreviations:** GPPASI, Generalized Pustular Psoriasis Area and Severity Index; GPPGA, Generalized Pustular Psoriasis Physician Global Assessment.

well-suited to use in cases of GPP. However, large-scale studies will be necessary to confirm that secukinumab is a safe and effective option for GPP management.

## Consent Statement

The patient's parents had provided informed consent for the case details and images to be published. Institutional approval is not required for this case study.

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## Disclosure

The authors report no conflicts of interest in this work.

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