

LETTER



WILEY

Successful and rapid clearance of severe, treatment-resistant atopic dermatitis with dupilumab in a 3-year-old

Dear Editor,

Dupilumab is a monoclonal antibody which selectively inhibits the α -subunit of IL-4 and IL-13, which are involved in the pathogenesis of atopic dermatitis. It is the only targeted systemic treatment FDA approved to treat moderate-to-severe atopic dermatitis in adolescents and adults.¹ As systemic treatment for severe atopic dermatitis in children under 6 years of age is lacking, off-label use of dupilumab is being explored. However, its use is limited by the fact that optimal dosing has not yet been determined in this pediatric patient population. Here, we present a case in which dupilumab was effectively used to treat severe, recalcitrant atopic dermatitis in a 3-year-old.

This 3-year-old Caucasian female presented for evaluation of extensive atopic dermatitis with intense pruritis. She had family history in her sister, and her medical history was significant for other atopic diatheses. She had been hospitalized three times for complications of her atopic dermatitis, including eczema herpeticum and various MRSA infections growing resistant strains of MRSA, requiring treatment with IV antibiotics.

She had failed conservative treatment with bleach baths and wet wraps, pimecrolimus cream, crisaborole cream, cyclosporine, and multiple courses of topical and oral steroids. Notably, she was prevented from taking methotrexate with her concomitant Bactrim use for multi-resistant MRSA. Physical exam was significant for widespread scaling,

erythema, and excoriations with secondary lichenification and foci of impetiginization appearing as honey-colored crusts, covering over 80% body surface area, with an EASI score of 33.8 (Figures 1-3).

She was started on dupilumab 200 mg loading dose followed by a maintenance dose of 100 mg subcutaneously every other week. She began to improve within the first week of her loading dose. Within 1 month, she was almost completely clear of erythema, experiencing virtually no pruritus, and was sleeping most hours of the night, with an EASI score of 3.45 (Figures 4 and 5). She has had no complications since that time. Informed consent was appropriately obtained from this patient's guardian.

Dupilumab is FDA approved for adults and adolescents and has been found to have a favorable side effect profile in both.¹ A phase IIa open-label trial of dupilumab use in adolescents showed similar pharmacokinetics, safety, and efficacy as seen in adults.²

Dupilumab has gained approval in the United States for children 6 years and older with moderate-to-severe atopic dermatitis. A phase II trial showed that adding dupilumab to topical corticosteroids improves measures of overall disease severity and quality of life in pediatric patients.³ Both efficacy and adverse events have been shown to be comparable to those in adolescents and adults.

A multicenter retrospective review of 124 pediatric patients under age 12 showed treatment response comparable to those in adolescent and adult trials. The mean loading dose used was 8.7 mg/kg, and the



FIGURE 1 Clinical appearance 6 months prior to treatment with dupilumab, after treatment failure with cyclosporine. Erythematous, scaling patches with characteristic punched-out appearing erosions of eczema herpeticum are seen



FIGURE 2 Clinical appearance 6 months prior to treatment with dupilumab



FIGURE 3 Clinical appearance 6 months prior to treatment with dupilumab



FIGURE 4 Clinical appearance after 1 month of treatment with dupilumab. Skin is almost completely clear of erythematous and scaling patches

mean maintenance dose was 5.1 mg/kg every 2 weeks, both higher than in adolescent trials.⁴ Similarly, in a case series of six pediatric patients with recalcitrant atopic dermatitis, patients weighing fewer than 40 kg were given a 300 mg loading dose with 150 mg biweekly maintenance doses, and patients weighing 40 kg or more were given a 600 mg loading dose with 300 mg maintenance doses. This resulted in higher weight-based dosing than in the previous study, but all the patients tolerated treatment well and showed similar resolution of symptoms.⁵



FIGURE 5 Clinical appearance after 1 month of treatment with dupilumab. Skin is almost completely clear of erythematous and scaling patches

Our patient's dosage resulted in a weight-based maintenance dose of approximately 5.7 mg/kg. This cleared her eczema within 1 month (one loading dose and one maintenance dose) without any adverse effects. This remarkable outcome supports data from the ongoing phase II trial and aforementioned studies that suggest that dupilumab is an effective treatment option with a favorable side effect profile for pediatric patients with treatment-recalcitrant atopic dermatitis.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

Hannah Dakin 

Christopher Haas 

Department of Dermatology, Louisiana State University Health Sciences Center, New Orleans, Louisiana

Correspondence

Hannah Dakin, Department of Dermatology,
Louisiana State University Health Sciences Center,
1542 Tulane Ave., New Orleans, LA, 70112.

Email: hdakin@lsuhsc.edu

ORCID

Hannah Dakin  <https://orcid.org/0000-0001-9991-7780>

Christopher Haas  <https://orcid.org/0000-0002-8946-1190>

REFERENCES

1. Simpson EL, Bieber T, Guttman-Yassky E, et al. Two phase 3 trials of Dupilumab versus placebo in atopic dermatitis. *N Engl J Med*. 2016; 375(24):2335-2348. <https://doi.org/10.1056/nejmoa1610020>.
2. Cork M, Thaçi D, Eichenfield L, et al. Dupilumab in adolescents with uncontrolled moderate-to-severe atopic dermatitis: results from a phase II a open-label trial and subsequent phase III open-label extension. *Br J Dermatol*. 2019;182:85-96. <https://doi.org/10.1111/bjd.18476>.
3. Cork MJ, Thaçi D, DiCioccio AT, et al. Pharmacokinetics, safety, and efficacy of dupilumab in a pediatric population with moderate to severe atopic dermatitis: results from an open label phase 2a trial. Paper presented at: 75th Annual Meeting of the American Academy of Dermatology; March 3-7, 2017; Orlando, FL.
4. Igelman S, Kurta AO, Sheikh U, et al. Off-label use of dupilumab for pediatric patients with atopic dermatitis: a multicenter retrospective review. *J Am Acad Dermatol*. 2020;82(2):407-411. <https://doi.org/10.1016/j.jaad.2019.10.010>.
5. Treister AD, Lio PA. Long-term off-label dupilumab in pediatric atopic dermatitis: a case series. *Pediatr Dermatol*. 2018;36(1):85-88. <https://doi.org/10.1111/pde.13697>.