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Successful use of dupilumab in a patient with atopic dermatitis and autosomal dominant polycystic kidney disease: a case report

Arlind Kalaja,[1] Barbara Cocuroccia,[2] Donatella Sordi,[2] Anna Dattolo,[3] Sabatino Pallotta,[2] Ignazio Stanganelli,[1] Filomena Russo[2]

[1]Dermatology Department, Ospedale Maggiore di Parma; [2]Dermatology Department, Istituto Dermopatico dell'Immacolata IRCCS, Rome; [3]Laboratory of Experimental Immunology, Istituto Dermopatico dell'Immacolata IRCCS, Rome, Italy

Correspondence: Arlind Kalaja, Dermatological Department, Ospedale Maggiore di Parma, Viale Antonio Gramsci, 14, 43126 Parma, Italy. E-mail: arlind.kalaja@unipr.it

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Abstract

This case report explores the management of a young female with both atopic dermatitis (AD) and autosomal dominant polycystic kidney disease (ADPKD), treated with dupilumab. Although these conditions are distinct, their coexistence poses clinical challenges. Dupilumab, a monoclonal antibody targeting interleukin (IL)-4 and IL-13, is effective for moderate-to-severe AD. This case highlights the safety and efficacy of dupilumab in ADPKD patients, with no adverse renal effects observed.

Introduction

Atopic dermatitis (AD) is a chronic inflammatory skin condition, while autosomal dominant polycystic kidney disease (ADPKD) leads to kidney cysts and renal impairment. Although they are independent conditions, their co-occurrence makes treatment a clinical challenge.

Case Report

A 26-year-old female with a 24-year history of moderate-to-severe AD presented with exacerbation despite previous treatments (topical emollients, corticosteroids, antihistamines, and phototherapy). She also had allergic rhinitis, asthma, and sensitization to cat and dog epithelium. Additionally, she was diagnosed with ADPKD, with stable renal function.

At baseline visit, her AD was severe: Eczema Area and Severity Index (EASI) score of 40, Numerical Rating Scale pruritus (NRSp) of 7, and Numerical Rating Sleep Scale (NRSs) of 10 (Figure 1 a,b). The patient's quality of life was similarly impaired, as reflected by a Dermatology Life Quality Index (DLQI) score of 20, indicating a major reduction in her overall well-being. Additionally, her IgE levels were elevated, exceeding 5,000 IU/mL, consistent with her history of allergic sensitization. Given the severity of her AD and her underlying diagnosis of ADPKD, a decision was made to start therapy with dupilumab.

Treatment and management

Dupilumab was started with a loading dose of 600 mg, followed by 300 mg every two weeks. After 8 weeks of treatment, the patient showed significant clinical improvements (EASI 30; NRSp 1; NRSs 1) (Figure 1 c,d). Her quality of life improved substantially, with the DLQI score dropping to 4, suggesting a much lower impact on her daily activities and well-being. Although lesions persisted on the neck and arms, the patient experienced complete clearance of eczema in other areas. Renal function remained stable, with no changes in serum creatinine or glomerular filtration rate, further confirming the safety of dupilumab treatment in a patient with ADPKD.

Discussion

AD and ADPKD are separate disease entities, yet both are characterized by chronic inflammation. In AD, the immune response is largely driven by the T helper 2 (Th2) axis, with interleukin (IL)-4 and IL-13 playing pivotal roles. These cytokines contribute to skin barrier dysfunction, increased IgE synthesis, and promote intense itching. Dupilumab, a monoclonal antibody that blocks IL-4Rα and thereby inhibits both IL-4 and IL-13 signaling, has proven highly effective for moderate-to-severe forms of AD. In contrast, ADPKD is primarily a genetic disorder caused by mutations in *PKD1* or *PKD2*, leading to progressive renal cyst development, nephromegaly, and eventually kidney failure. While cystogenesis is the hallmark of the disease, inflammatory and fibrotic pathways have been implicated in the progression of renal damage, particularly in the later stages. Recent studies suggest that immune dysregulation may contribute to interstitial fibrosis and disease exacerbation. Although IL-4 and IL-13 are not conventionally involved in the pathophysiology of ADPKD, preclinical evidence indicates that cytokine signaling may influence fibrotic processes, raising the possibility of cross-talk between Th2-driven inflammation and renal tissue remodeling. Despite this theoretical link, clinical data regarding the use of dupilumab in patients with renal disease, especially genetic forms like ADPK, remain limited. The safety profile of dupilumab in patients with impaired kidney function has been explored in a small number of case reports.[1,2] For instance, dupilumab has been administered to patients with Alport syndrome, IgA nephropathy,[3] chronic kidney disease undergoing dialysis, and renal transplant recipients.[4-6] In these reports, the therapy was generally well tolerated, with no significant adverse renal outcomes noted during treatment.[7] However, it is worth noting that a single case report described a flare of IgA nephropathy during dupilumab treatment,[8] though the causative relationship remains unclear due to the complex and multifactorial nature of glomerulonephritis. This underscores the importance of close clinical monitoring and highlights the current gap in understanding regarding the immunological interplay between dupilumab's mechanism of action and renal pathology. In our case, the patient tolerated dupilumab well, with no evidence of renal function decline or disease acceleration over the follow-up period. This adds to the emerging literature suggesting that dupilumab may be a safe therapeutic option for patients with AD who also have renal comorbidities, including ADPKD. Nonetheless, more robust data from larger cohorts or controlled studies are necessary to fully establish the safety profile of dupilumab in this patient population.

Conclusions

This case highlights the efficacy and safety of dupilumab in a patient with moderate-to-severe AD and coexisting ADPKD. The patient experienced dramatic clinical improvement with no adverse events on renal function. Dupilumab represents a viable and safe therapeutic option in patients with AD and concurrent renal disease when monitored carefully. Future prospective studies are warranted to establish long-term safety and to better understand the immune interactions in such comorbid settings.

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Figure 1. a, **b**) Moderate-to-severe atopic dermatitis affecting the trunk and arms. **c**, **d**) Clinical improvement at week 16 following dupilumab therapy.