SAGE Open Medical Case Reports

SAGE Open Medical Case Reports
JCMS Case Reports
Volume 12: 1–2

DOI: 10.1177/2050313X241260491
journals.sagepub.com/home/sco
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Treatment of renal pruritus with dupilumab monotherapy: A case report

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Abstract

Chronic kidney disease-associated pruritus leads to decreased quality of life and is an independent risk factor for mortality. There is limited evidence for treatment of chronic kidney disease-associated pruritus, with only one on-label treatment approved by the FDA and Health Canada. We present a case of a 69-year-old female with a history of chronic kidney disease, who presented to clinic with a several-year history of diffuse, intense pruritus. There were no primary lesions. She was started on dupilumab 600 mg loading dose, then 300 mg subcutaneously every 2 weeks. At her follow-up appointment 5 months after initiation of dupilumab, she reported her pruritus as 1/10, with no interruptions in her sleep. Her creatinine remained elevated and was stable throughout the follow-up period. This case demonstrates sustained improvement in chronic kidney disease-associated pruritus with dupilumab. Further research is required to quantify the efficacy of dupilumab for treatment of chronic kidney disease-associated pruritus.

Keywords

Pruritus, chronic kidney disease, dupilumab, renal

Date received: 15 January 2024; accepted: 12 April 2024

Introduction

Chronic kidney disease-associated pruritus (CKD-aP) leads to decreased quality of life and is an independent risk factor for mortality in patients with chronic kidney disease (CKD) and end-stage renal disease.[1] There is limited evidence for treatment of CKD-aP, with only one on-label treatment approved by the FDA and Health Canada. Although the mechanism is CKD-aP is not fully understood, there is evidence of elevated interleukin (IL)-31, a T-cell derived cytokine, in hemodialysis patients with CKD-aP.[2,3] In this report, we present a novel case of CKD-aP treated with off-label dupilumab, an IL-4 and IL-13 antagonist.

Case

A 69-year-old female with a history of CKD, chronic obstructive lung disease, and hypothyroidism presented to clinic with a several-year history of diffuse, intense pruritus. She rated her pruritus as 10/10, frequently interrupting her sleep. She reported scratching her skin to the point of bleeding. She denied any personal or family history of atopic dermatitis, asthma, or environmental allergies. On examination, she was found to have many erythematous excoriated papules and plaques on the back, chest, and extremities, with hyperpigmented macules on the legs consistent with post-inflammatory hyperpigmentation and many linear hypopigmented atrophic patches on the back consistent with scarring from excoriation. There were no active primary lesions.

A work-up for diffuse pruritus was performed, including complete blood count with differential, creatinine, liver enzymes, IgE, thyroid stimulating hormone (TSH), ferritin, and glucose. She was started on a tapering course of prednisone (30 mg daily for 7 days, then tapering by 5 mg every 5 days) and regular use of emollients. Her pruritus completely resolved while on prednisone by recurred soon after she completed the course. At her 1-month follow-up visit, she again described significant whole-body pruritus and was re-started on a course of prednisone.

Blood work revealed elevated creatinine (218 umol/L, eGFR 20 mL/min/1.73 m^2) and elevated IgE (491 ug/L).

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Complete Blood Count (CBC) was within normal limits with no eosinophilia, as were liver enzymes aside from Alkaline Phosphatase (ALP) which was elevated to 148 U/L. TSH was normal.

Working diagnosis was CKD-aP. She was started on dupilumab 600 mg loading dose, then 300 mg subcutaneously every 2 weeks.

At her follow-up appointment 5 months after initiation of dupilumab, she reported significant improvement. She rated her pruritus as 1/10, with no interruptions in her sleep. She tolerated dupilumab well with no ocular symptoms, facial rash, or injection site reactions. Full body skin examination revealed stable hypopigmented linear patches and post-inflammatory hyperpigmentation, with no active or recently excoriated lesions. Response was sustained at 1 year with 1/10 pruritus. Her creatinine remained elevated and was stable throughout the follow-up period.

Discussion

CKD-aP is defined as pruritus related to kidney disease, with no other culprit comorbid condition or underlying skin disease. The pruritus is most often symmetrically distributed and can be localized or generalized.[4] Most patients with CKD-aP will have xerosis.[4] Evidence of excoriation, with linear erosions, ulcers, and prurigo nodules can be observed.[4] An estimated 40% of patients on hemodialysis have moderate to severe pruritus, leading to fatigue, poor sleep quality, depression, and decreased quality of life, as well as increased risk of mortality.[1]

Despite its prevalence and significant impact on quality of life, there were no on-label treatment options for CKD pruritus until difelikefalin, a selective agonist of kappa opioid receptors, was approved by the Food and Drug Administration in 2021 and Health Canada in 2022. Difelikefalin is approved only for hemodialysis patients and requires frequent monitoring of potassium due to risk of hyperkalemia and can lead to dizziness and somnolence, particularly in elderly patients.[5] Off-label treatment options for CKD-aP have included topical calcineurin inhibitors, phototherapy, neuroleptics, and antidepressants, with variable efficacy and risk of adverse events.[6]

In this case, we present sustained, effective treatment of CKD-aP with dupilumab, a safe medication with a favorable side effect profile and no monitoring requirements. Dupilumab is a fully human monoclonal antibody that inhibits IL-4 and IL-13. Although the mechanism of CKD-aP has not been fully defined, patients with CKD-aP were found to have elevated serum IL-31 compared to hemodialysis patients without pruritus.[2,3] Laboratory research has shown that IL-31 expression in T-helper 2 cells is dependent on IL-4 and could be reduced if antibodies to IL-4 were present.[7] Therefore, it is possible that through inhibition of IL-4, dupilumab reduces IL-31 in patients with CKD-aP.

Conclusions

This case demonstrates sustained improvement in CKD-aP with dupilumab. Further research is required to quantify the efficacy of dupilumab for treatment of CKD-aP.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Consent

Consent for the publication of all patient medical information was provided by the authors at the time of article submission to the journal stating that the patient gave consent for their medical information to be published in print and online and with the understanding that this information may be publicly available.

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