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**Letter**

**Uremic pruritus treated successfully with the Goeckerman Program**

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**Abstract**

Uremic pruritus (UP) is a common condition among patients with chronic kidney disease (CKD) on hemodialysis (HD). We report a case of severe UP recalcitrant to conventional therapy including topical corticosteroids, anti-histamines, and phototherapy, which was treated successfully with the Goeckerman regimen consisting of topical coal tar, topical corticosteroids, and broadband UVB (BB-UVB). Little is known about the pathophysiology of UP, and there is currently no consensus or evidence-based treatments for UP. Although further studies are necessary, Goeckerman therapy may be a promising treatment option when available for severe UP intractable to conventional therapies.

**Keywords: uremic pruritus, chronic kidney disease, Goeckerman, phototherapy**

**Introduction**

Uremic pruritus (UP) is a common condition among patients with chronic kidney disease (CKD) on hemodialysis (HD). A recent study showed that the impact of this disease on quality of life (QOL) is proportional to the intensity of itch [1]. We report a case of severe UP recalcitrant to conventional therapy with significant negative impact on QOL, which was treated successfully with the Goeckerman regimen consisting of topical coal tar and broadband UVB (BB-UVB).

**Case synopsis**

A 71-year-old male with end-stage renal disease (ESRD) secondary to chronic glomerulonephritis on HD 4 times per week presented with a 2 year history of UP. He had tried topical emollients, topical corticosteroids, and anti-histamines. He also underwent one year of narrow-band UVB (NB-UVB) treatments 3 times/week at an outside dermatology office without improvement. At the University of California San Francisco (UCSF) Phototherapy and Skin Treatment Center, the patient was started on BB-UVB. After 6 months of 3 times per week treatments, he received up to 190mJ per treatment session and noted only 20% improvement in the level of itch with persistent significant negative impact on QOL. He was then enrolled in the Goeckerman Day Treatment Program.

In the Goeckerman Program, the patient received BB-UVB followed by application of 2% coal tar under plastic occlusion for 4-5 hours per day, 5 days per week. Triamcinolone 0.1% ointment was also combined with coal tar for the first 5 days. He continued

HD 4 times per week. After only 5 treatment sessions, his pruritus resolved. He completed a total of 23 treatment sessions with complete remission of his pruritus.

## Discussion

The intensity of itch in patients with UP is commonly reported as mild or moderate, which is likely due to improvements in dialysis modalities, access, and adequacy [1]. However, UP can be severe in some cases with significant reduction in QOL and impaired sleep, which independently contribute to increased mortality in these patients [2]. Such cases require intensive treatment.

The pathophysiology of UP is not well understood. Uremia has been found to activate itch fibers through systemic inflammation and immune dysregulation [3]. There is also evidence that patients with CKD may have primary alterations in nociceptive sensory pathways of the peripheral and central nervous systems [4]. In addition, there may be an imbalance of opioid receptors, suggesting a strong neuropathic mechanism of pruritus in patients with CKD [4]. Current accepted treatments for UP include topical therapies such as emollients, capsaicin, corticosteroids, and calcineurin inhibitors. Systemic agents such as anti-histamines, gabapentin, and  $\mu$ -opioid receptor antagonists can also be used. However, interestingly, UVB phototherapy is the only treatment modality that has shown clinically significant improvement in UpToDate® [5].

At UCSF, BB-UVB is the phototherapy modality of choice for the treatment of pruritus. In the present case of UP, the patient experienced only mild improvement with BB-UVB alone and thus was started on Goeckerman therapy with complete resolution of pruritus. The effectiveness of coal tar for the treatment of UP is not known and has not been studied. We speculate that coal tar increases the efficacy of UV light, leading to better outcomes when phototherapy and coal tar are used concurrently. Furthermore, the patient had previously tried topical corticosteroids alone, which did not provide adequate relief of his symptoms. A medium-potency topical corticosteroid under plastic occlusion was used for the first 5 treatment sessions along with coal tar and phototherapy when the patient had the rapid resolution of pruritus. Therefore, it is possible that better cutaneous absorption of the topical corticosteroid may have contributed to the resolution of this patient's symptoms. On the other hand, given remission was maintained on coal tar and phototherapy for weeks following discontinuation of the topical corticosteroid, it may be argued that the topical corticosteroid may not have played such a large role in the treatment of this patient's symptoms.

Goeckerman therapy may be a promising treatment option when available for severe UP with significant impact on QOL intractable to conventional therapies. It is also useful for patients who are unable to tolerate systemic agents for treatment of UP, as side effects of Goeckerman regimen are limited to mild burning or itching. Further research is needed to better understand the effectiveness and mechanism of action of the combination of phototherapy, coal tar, and topical corticosteroids for the treatment of UP.

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