NEWS, VIEWS, AND REVIEWS

Understanding Topical Steroid Withdrawal: Where Are We Now?

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INTRODUCTION

Topical steroid withdrawal (TSW) is a drug-related dermatosis that is often associated with the sudden termination of medium-to-high potency topical corticosteroids (TCS) after prolonged unsupervised use or misuse, often for conditions such as atopic dermatitis, contact dermatitis, or dermatophytosis.[1] The definition of "prolonged" topical corticosteroid use varies depending on the potency of the steroid, the underlying medical condition, and the site of application.[1,2] However, general guidelines recommend limiting continuous use to 1 to 2 applications per day for a total duration of 3 weeks for very high potency TCS and 12 weeks for medium- to high- potency TCS.[2] Shorter treatment durations are typically advised for children and for sensitive areas such as the face and intertriginous regions.[1]

TSW has received increasing attention on online platforms such as social media. A recent observational study assessed the top 100 videos with the hashtag #topicalsteroidwithdrawal discussing TSW on TikTok. Overall, these videos reached over 200 million individuals, with 45 million likes, 90,000 comments, and 100,000 shares, but only 10% of the 100 videos clearly defined TSW.[3] Of note, all of these videos were created by personal accounts, with the absence of dermatologists, brands, or organizations on the platform to discuss TSW or its approved treatments.[3] Misinformation about TSW can lead to fear and avoidance of TCS and impede successful treatment. This fear of TCS, termed "#Corticophobia," is a complex phenomenon, influenced by fear of adverse effects, misinformation, and limited TCS education, that may lead to patient noncompliance with the TCS regimen.[4] Given these considerations, this review aims to provide an update on the clinical presentation, pathophysiology, diagnostic challenges, and treatment options in TSW.

Clinical Presentation

TSW may present with localized symptoms of erythema, painful skin, burning, edema, atrophy, paresthesia, papules, nodules, and desquamation. Systemic manifestations, including sleep disturbances, tremors, fatigue, and mood alterations, may also occur.[1] These symptoms most often present in areas of sensitive skin, such as the face and scrotum, but may affect any area of the body.[1]

The two main classifications of TSW include the papulopustular and erythematoedematous subtypes.[1] The papulopustular subtype presents with erythema, papules, and pustules and is predominantly observed following steroid use for cosmetics and pigmentation alterations. The erythematoedematous subtype presents with erythema, burning, edema, and a scaling sensation and is often observed among patients with chronic atopic dermatitis.[1] These symptoms may present as early as days to weeks after termination of TCS, and while symptoms often originate in the location of topical corticosteroid use, symptoms may spread beyond the applied areas.[1]

Pathophysiology

The pathophysiology of TSW is not fully understood, though current evidence supports an inflammatory process involving dysregulated nicotinamide adenine dinucleotide (NAD^+) metabolism.[5] A study published in March 2025 by Shobnam et al at the National Institutes of Health's (NIH's) National Institute of Allergy and Infectious Disease, proposed that TSW may result from overactivation of mitochondrial complex I, which increases formation of NAD^+, potentially driven by upregulated complex I expression or increased NADH availability via tryptophan metabolism.[5] The study compared 16 participants with TSW symptoms to 10 patients with atopic dermatitis and 11 healthy controls and found that the TSW group exhibited increased levels of NAD^+ compared with the atopic dermatitis and healthy control groups.[5] A follow-up study used cultured skin cells and a mouse model to investigate the role of topical steroids in NAD^+ formation. The researchers simulated TSW conditions and observed increased NAD^+ production in response to topical steroid use.[5] These findings suggest a potential mechanistic link to NAD^+ metabolism, but further research is needed to better understand its role in TSW.

Challenges in the Diagnosis of Topical Steroid Withdrawal

Diagnosing TSW remains challenging due to its overlapping features with atopic dermatitis, also a clinical diagnosis, and the absence of universally accepted diagnostic criteria. Misdiagnosing a flare of atopic dermatitis as TSW, or TSW as worsening or new-onset atopic dermatitis, can be equally harmful, delaying healing, invalidating patient concerns, and causing psychological distress.[6,7] Accurate recognition and diagnosis by clinicians are crucial, as a lack of support may leave patients feeling dismissed, erode trust in the medical system, and lead to self-diagnosis and self-management.[7]

Shobnam et al aimed to create diagnostic criteria that define TSW.[5] Researchers analyzed data from 1,889 adults with eczematous skin disorders to distinguish individuals with self-diagnosed TSW from those without TSW symptoms, and to determine diagnostic criteria

unique to TSW. Major and minor criteria were determined by clinicians, with TSW defined as the presence of at least one major criterion and three minor criteria.[5] Major criteria are characterized by symptoms present in at least 80% of participants with TSW and distinct from atopic dermatitis, and include burning, flushing, and thermodysregulation. Minor criteria include bone-deep itch, profuse peeling, red sleeve (an erythematous rash with sharply demarcated borders), loose skin, hair loss, neuropathic pain, lymphadenopathy, swelling, and eye dryness.[5] This proposed diagnostic criterion has an estimated sensitivity of 92%, but specificity and accuracy could not be assessed, highlighting the need for further research to support the refinement, standardization, and clinical adoption of these criteria.[5]

Advanced Treatments

Treatment for TSW is challenging due to the lack of a treatment protocol, diagnostic challenges, and the variety of clinical symptoms.[1] Treatments aimed at alleviating physical symptoms include emollients, moisturizers, and cold compresses or ice. Pruritus may be treated with antihistamines and doxepin, and analgesics may be used to treat pain.[1] Immunosuppressants and/or phototherapy may be recommended for more severe symptoms. Alternative treatment approaches reported in the literature include gabapentin, topical tranexamic acid, cyclosporine, tetracyclines, intravenous immunoglobulin, calcineurin inhibitors, and dupilumab.[8,9] Of note, many proposed treatment options are also effective in the management of atopic dermatitis, which may account for this apparent success.[8] Even with treatment, complete resolution may take between 6-18 months, with prolonged courses extending up to 5 years.[1] Psychological support is a key factor in disease management, as research shows a high burden of anxiety and depression.[9]

In light of recent findings from Shobnam et al, novel treatments targeting mitochondrial complex I blockade show promise in the management of TSW.[5] Open-label trials using mitochondrial complex I inhibitors, including metformin and berberine, have resulted in marked symptom improvement, suggesting potential implications for future TSW treatment.[5]

CONCLUSIONS

Although significant progress has been made in understanding the pathophysiology and treatment of TSW, it remains a complex dermatologic condition that demonstrates diagnostic and therapeutic challenges, as there remains a lack of standardized diagnostic criteria and evidence-based treatment. Social media platforms provide a source for public awareness, but allow for widespread misinformation, enabling steroid phobia and poor disease management. Continued research and clinician engagement, through patient education and cautious prescribing, are crucial.

DISCLOSURE

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