



Wolf's Isotopic Response - A Rare Phenomenon

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Abstract

Wolf's isotopic response, an intriguing dermatological phenomenon, challenges our understanding of the intricate interplay between prior skin conditions and the skin's immune responses. It involves the emergence of a new skin disorder at the site of a previously healed or unrelated dermatosis, often presenting with distinct histopathological features. While the precise mechanisms remain elusive, hypotheses include localized immune dysregulation and latent microbial agents. This phenomenon has been documented in various clinical scenarios, necessitating a multidisciplinary approach for diagnosis and treatment. The case presented here, with Hypertrophic Lichen Planus developing as a Wolf's isotopic response over a resolved Tinea Cruris infection, underscores the complexity of this phenomenon and its implications for dermatological practice, offering a captivating glimpse into the dynamic nature of skin immunology.

Keywords: Wolf's isotopic response, Skin immune responses, Histopathological features, Localized immune dysregulation, Hypertrophic Lichen Planus

Introduction

Wolf's isotopic response is a rare phenomenon in which a new skin disease develops at the site of a previously healed skin disease¹. Hypertrophic lichen planus is a variant of lichen planus characterized by hyperkeratosis, hypergranulosis, and pseudoepitheliomatous hyperplasia². Tinea Cruris is a common fungal infection of the skin. We present a rare case of Hypertrophic lichen planus as a Wolf's isotopic response over a healed Tinea Cruris infection.

Case Report

A 15-year-old female first presented with itchy annular lesions over bilateral thighs, for which a clinical diagnosis of tinea Cruris was made and the

patient was treated with systemic and topical anti fungals for 4 weeks. The patient was reviewed after 4 weeks. During examination, no active infection was found and there was only post inflammatory hyperpigmentation. Two weeks later patient presented with itchy oozy lesions over previous tinea infection site (Fig.1). A punch biopsy was performed.

Microscopic examination of the biopsy revealed hyperkeratosis, parakeratosis, hypergranulosis, and pseudoepitheliomatous hyperplasia in the epidermis. The dermis showed a dense band-like infiltrate composed of lymphocytes and eosinophils. Papillary dermis showed edema with dilated superficial dermal vessels and a mild to moderate perivascular and

periadnexal lymphoplasmacytic infiltrate which was consistent with hypertrophic lichen planus (Fig.2) . The diagnosis of Hypertrophic Lichen Planus over healed Tinea Cruris was made, which is a rare occurrence called Wolf's isotopic response.

The patient was treated with emollients and a combination of corticosteroids with salicylic acid. The patient showed significant improvement in symptoms, and follow-up after 2 months showed near-complete resolution of lesions.

Discussion

Wolf's isotopic response, a captivating dermatological phenomenon, manifests as the emergence of a new skin disorder at the site of a previously healed or unrelated dermatosis, presenting a dynamic interplay of various factors¹. The phenomenon underscores the unpredictability of skin immunology, and while hypotheses include localized immune dysregulation and latent microbial agents, the exact mechanisms remain elusive³. The etiology of Wolf's isotopic response (WIR) remains enigmatic, giving rise to debates about its classification as either a variant of the isomorphic response (Koebner phenomenon) or a distinct entity. The concept of "locus minoris resistentiae" ('place of least resistance') suggests that once tissue experiences inflammation, it retains a memory of the event, potentially leading to modified reactions⁴. Yao and Liu propose that WIR may arise from type III/IV hypersensitivity reactions triggered by continuous viral residual antigens, peripheral nerve damage, neuropeptide release, and dysregulated angiogenesis. In contrast, Happle and Kluger argue that WIR is not distinct from the Koebner reaction, dismissing it as a

"historical error." However, Nwabudike and Tatu challenge this perspective, suggesting WIR as a Koebner phenomenon variant and proposing its categorization as a type V response¹. These discussions underscore the ongoing complexity surrounding the origin and classification of WIR within dermatological phenomena.

Conclusion

Wolf's isotopic response is a rare phenomenon that can occur in various skin diseases. Clinicians should be aware of this phenomenon, especially when evaluating patients with new skin lesions at the site of a previously healed skin lesion. This case report highlights a rare occurrence of hypertrophic lichen planus in response to healed lesions of Tinea Cruris, which is known as the Wolf's isotopic response. Early diagnosis and appropriate treatment can help prevent complications and improve patient outcomes.

Acknowledgement

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Fig.1 Multiple oozy lesions present on post inflammatory hyperpigmentation over bilateral thighs



Fig.2 Histopathology specimen on low power microscopy showing hyperkeratosis, parakeratosis, hypergranulosis, and pseudoepitheliomatous hyperplasia. Dermis exhibits a dense band-like infiltrate with lymphocytes and eosinophils, along with papillary dermal edema, dilated superficial vessels, and a mild to moderate perivascular and periadnexal lymphoplasmacytic infiltrate.

