SKIN

BRIEF ARTICLE

Zosteriform Lichen Planus as a Manifestation of Wolf's Isotopic Response

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ABSTRACT

Background: Wolf's isotopic response has been described in association with malignancy, infections, and inflammatory disorders. Lichenoid tissue reactions are a rare but recognized example of this phenomenon; only 41 cases of zosteriform lichen planus exist in publication. This case adds to the minimal literature describing lichenoid inflammatory dermatosis compatible with Wolf's isotopic response.

Methods: A literature review was conducted along with a case description is presented.

Results: A man in his 30s with a history of herpes zoster presented with a pruritic rash on his left arm. Clinical and histopathological evaluation were consistent with lichen planus in the distribution of a healed herpes zoster rash. The skin lesions improved after six weeks of treatment with clobetasol 0.05% ointment twice daily.

Conclusions: The presentation of lichen planus as Wolf's isotopic response is uncommon, but responsive to standard topical therapy.

INTRODUCTION

Wolf's isotopic response is the occurrence of a new skin disorder at the site of another unrelated and already healed skin disease.[1] Formally characterized in 1995, Wolf's isotopic response was reported in the literature as early as 1955, when Wyburn-Mason described 26 cases of malignant tumors (i.e., squamous cell carcinoma, basal cell carcinoma, breast carcinomas) arising in areas of previous varicella zoster (VZV) and herpes simplex virus (HSV) infections.[2] Subsequent studies have confirmed a predilection for epidermal carcinomas to develop in skin previously affected by herpes viruses.[3] Wolf's isotopic response has also been noted after dermatophyte infections, mycobacterial infections, erythema multiforme, and even striae distensae.[4-6] Moreover, this phenomenon has been seen in association with various inflammatory disorders arising months to years after herpes virus infections, including granulomatous dermatoses (most commonly granuloma annulare), leukemic and lymphomatous infiltrations, acneiform eruptions, and less commonly lichenoid reactions.[3,7]

Lichenoid tissue reactions are a rare but recognized example of Wolf's isotopic response. In a recent case series of 24 patients with clinical and historical findings compatible with Wolf's isotopic response, one patient was diagnosed with lichen planus (LP), one with lichen planopilaris, and three with lichen sclerosis et atrophicus.[7] This case adds another example of a lichenoid inflammatory dermatosis compatible with Wolf's isotopic response to the literature.

CASE

A man in his 30s presented with a two-month history of a pruritic eruption on his left arm. He reported pain at the onset of the eruption, but otherwise denied fever, chills, diaphoresis, nausea, or weight loss. His medical history was significant for metastatic oropharyngeal squamous cell carcinoma previously treated with chemotherapy and radiation, currently undergoing pembrolizumab immunotherapy. He also reported a history of shingles and had been taking valacyclovir for two months prior to his current presentation. Physical examination revealed erythematous and violaceous papules in a linear dermatomal distribution involving the left axilla, upper arm, and volar forearm (Figure 1). The remainder of the physical exam was unremarkable.

Histopathology showed dermatitis with hyperkeratosis, acanthosis, prominent granular layer, and a lymphocyte-predominant, band-like inflammatory infiltrate obscuring the dermal-epidermal junction (Figure 2A, B). Sawtoothing of the rete ridges and occasional dyskeratotic keratinocytes within the lower third of the epidermis were present. The papillary

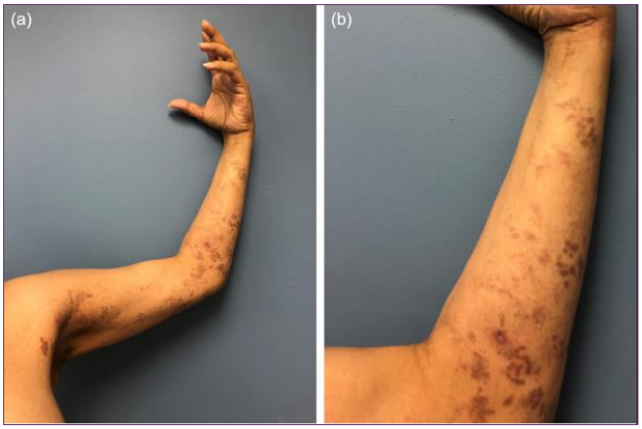

Figure 1. Violaceous papules in a dermatomal distribution

dermis showed papillary dermal fibroplasia and scattered melanophages, and the dermis showed variable perivascular lymphocytic infiltrate. Herpes viral immunostains and PCR for herpes simplex virus (HSV) and varicella zoster virus (VZV) DNA were negative. Presence of dermal melanophages in the biopsy indicated some chronicity to the lesion.

The patient was treated with clobetasol 0.05% ointment twice daily to the affected areas. He required gabapentin to control his pruritus due to lack of response with oral antihistamines. He noted greater than ninety percent improvement in his eruption and pruritus after six weeks of therapy.

DISCUSSION

LP classically presents as violaceous, intensely pruritic papules or plaques affecting the skin, mucous membranes, and nails. Histopathology classically shows lichenoid inflammation, such as hyperkeratosis without parakeratosis, vacuolization of the basal layer, and band-like lymphocytic infiltrate at the dermal-

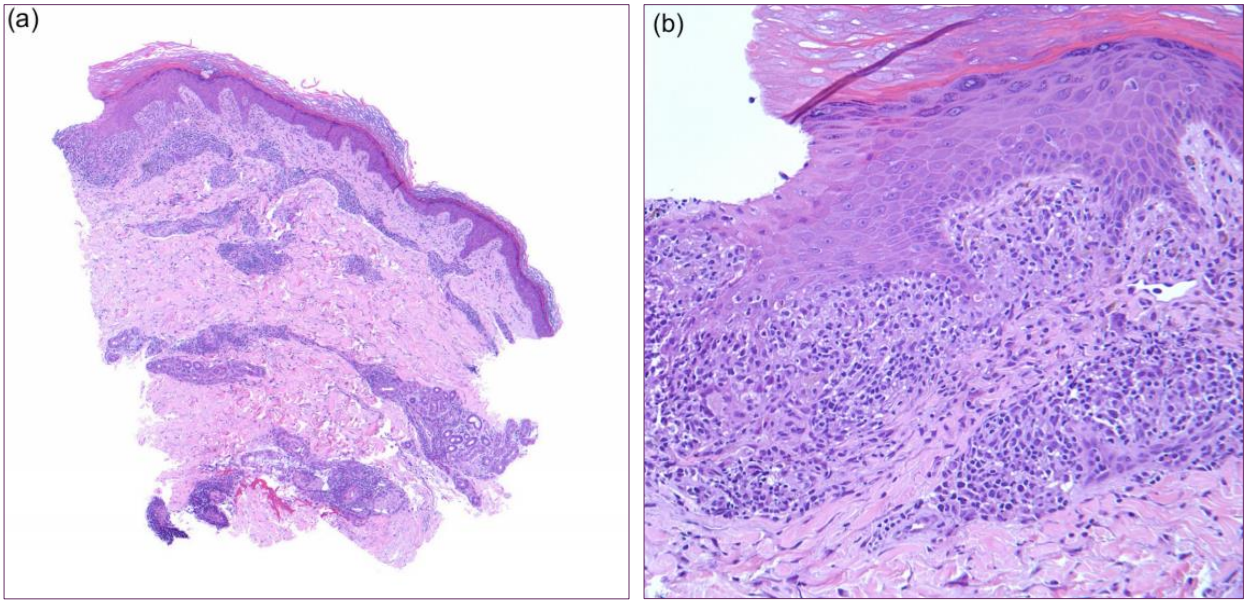

Figure 2 A) Biopsy specimen at original magnification x50 remarkable for hyperkeratosis, acanthosis, and saw-tooth rete ridges **B)** Biopsy specimen at original magnification x400 demonstrating dyskeratotic keratinocytes within the lower third of the epidermis and band-like lymphocytic infiltrate at dermal-epidermal junction

epidermal junction. The clinical and histologic findings herein were compatible with LP in the distribution of a healed VZV infection, consistent with Wolf's isotopic response.

Literature review indicates at least 41 cases of zosteriform LP have been published.[4,7,8] While poorly understood, the pathophysiology of this presentation is hypothesized to be caused by an immune reaction to antigenically altered keratinocytes after resolution of a VZV eruption, when VZV DNA is no longer detectable via PCR.[8] Immune system dysregulation may also play a role in the latent expression of LP.[9] Other cases have suggested persistent VZV antigens, cutaneous nerve and microcirculation compromise, and neuropeptide secretion may precipitate zosteriform LP through interaction with the skin, and nervous and immune systems.[1,8] The temporal delay between primary VZV eruption and the subsequent presentation of zosteriform LP can range from 15 days to five years. Zosteriform LP only presenting after a recurrence of VZV has also been reported.[8]

The clinical and histologic findings in this case allowed us to conclude the patient's eruption was not due to VZV itself. The clinical lack of vesicles or erosions and histological lack of chromatin margination, intranuclear inclusions, ballooning degeneration of keratinocytes, or intraepidermal vesiculation were inconsistent with a VZV eruption. Although VZV resistance to acyclovir and its pro-drug valacyclovir has been reported in immunocompromised patients, PCR analysis further confirmed the absence of a resistant viral strain in this case.[10] Furthermore, although LP often resolves with significant post-inflammatory hyperpigmentation, the histologic evidence of lymphocytic infiltrate indicated the eruption was ongoing and not yet healed.

Additional differential diagnoses for this case included linear LP, lichen striatus, and Koebnerization of either. The Koebner phenomenon is an isomorphic appearance of the same disease in previously unaffected areas of the skin secondary to trauma.[11] Similar to Wolf's isotopic response, the Koebner phenomenon indicates the presence of lasting immune alterations and physiologic changes after extrinsic insult that may share similar underlying mechanisms.

Whereas linear LP is an isomorphic phenomenon clinically comparable to zosteriform LP[12], lichen striatus presents as a largely asymptomatic, linear, unilateral, and hypopigmented eruption often involving extremities. All demonstrating lichenoid inflammation, these three presentations may be indistinguishable on histologic grounds alone; however, linear LP and lichen striatus follow the lines of Blaschko rather than a dermatomal pattern. This patient's eruption followed the C8 dermatome, which crosses several lines of Blaschko. In this case, the histological absence of parakeratosis and significant spongiosis, and the presence of characteristic saw-tooth rete ridges favored LP, but this example nonetheless highlights the importance of using morphology in diagnostic dermatology.

CONCLUSION

Here, we report a rare case of active LP in the dermatomal distribution of resolved herpes zoster infection compatible with Wolf's isotopic response. Although an uncommon presentation of LP, it was successfully treated with standard topical therapy once appropriately diagnosed. This case underscores the importance of incorporating historical, histologic, and morphological findings in clinical practice

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