Wolf's Isotopic Response Seen as a Rare Occurrence of Pityriasis Lichenoides et Varioliformis Acuta (PLEVA) Lesions Over Healed Lesions of Tinea Corporis

Dear editor,

Wolf's isotopic response refers to the occurrence of a new skin disorder exactly at the site of another one, already healed and unrelated dermatosis. Pityriasis lichenoides et varioliformis acuta (PLEVA) is an acute inflammatory skin condition. PLEVA manifesting as an isotopic response phenomenon is extremely rare, and we report one such case.

A 15-year-old boy treated for tinea corporis 2 months back presented with a history of tiny, grouped fluid-filled lesions occurring in crops over areas of healed tinea lesions over the back and lower limbs of 20 days duration. The fluid-filled lesions burst on their own in 2–3 days to crust eventually. Lesions were mildly itchy and did not disturb his sleep. There was no history of fever, arthralgia, or any mucosal lesions.

General and systemic examination was essentially normal. Dermatological examination revealed grouped crusted papulovesicular lesions over the back and legs localized to postinflammatory hyperpigmented healed tinea lesions [Figure 1]. Examination of the mucosal areas, scalp, hair, nails, palms, and soles was essentially normal.

Tzanck smear from the vesicle did not reveal any acantholysis or multinucleated giant cells. All biochemical and hematological investigations were within normal limits. Skin biopsy showed epidermis showing a central zone of acanthosis, mild parakeratosis, prominent spongiosis, prominent lymphocytic exocytosis, and moderate perivascular lymphomononuclear cell infiltrate around the upper dermal capillary plexus [Figure 2]. The papillary dermal capillaries were congested. Few necrotic keratinocytes were seen in the stratum spinosum layer having dense eosinophilic cytoplasm and pyknotic nuclei [Figure 3]. Immunohistochemistry revealed marked predominance of CD8 T lymphocytes [Figure 4a] and expression of HLA-DR in keratinocytes [Figure 4b].

Based on the above features, a final diagnosis of PLEVA was given; however, localization of PLEVA lesions to only the healed tinea lesions site was interesting. The patient was treated with an oral antibiotic in form of capsule doxycycline for 30 days and topical steroids (0.1% mometasone cream) tapered over the next 6 weeks with excellent response.

The proposed etiologies of isotopic response are viral, immunologic, neural, vascular, and “locus minoris resistentiae,” which means a site of lessened resistance. Response have been classified as granulomatous reactions, malignant tumors, leukemic infiltrates, dermatoses secondary to immunologic dysfunction, infections, comedonic reactions, and other miscellaneous conditions.

Most cases of isotopic response have been described in healed lesions of herpes zoster. The second disease has been reported to be granuloma annulare, Kaposi's sarcoma, leukemia cutis, metastasis, sarcoidosis, acne, lichen planus, granulomatous folliculitis, tinea, verrucae plana, molluscum contagiosum, squamous cell carcinoma, basal cell carcinoma, or multiple epidermoid cysts.

The exact pathogenesis for causation of Wolf’s isotopic phenomenon is still speculated upon. It is thought that the healed skin continues to show microscopic and physiologic changes for a long time after the initial insult and some

Figure 1: Grouped crusted papulovesicular lesions over the back localized to postinflammatory hyperpigmented healed tinea lesions.

[1] Pityriasis lichenoides et varioliformis acuta (PLEVA) is an acute inflammatory skin condition.

[2] PLEVA manifesting as an isotopic response phenomenon is extremely rare, and we report one such case.

[3] General and systemic examination was essentially normal. Dermatological examination revealed grouped crusted papulovesicular lesions over the back and legs.

[4] Tzanck smear from the vesicle did not reveal any acantholysis or multinucleated giant cells. All biochemical and hematological investigations were within normal limits.

[5] Skin biopsy showed epidermis showing a central zone of acanthosis, mild parakeratosis, prominent spongiosis, prominent lymphocytic exocytosis, and moderate perivascular lymphomononuclear cell infiltrate around the upper dermal capillary plexus.

[6] The papillary dermal capillaries were congested. Few necrotic keratinocytes were seen in the stratum spinosum layer having dense eosinophilic cytoplasm and pyknotic nuclei.

[7] Immunohistochemistry revealed marked predominance of CD8 T lymphocytes and expression of HLA-DR in keratinocytes.

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[10] The proposed etiologies of isotopic response are viral, immunologic, neural, vascular, and “locus minoris resistentiae,” which means a site of lessened resistance.

[11] Response have been classified as granulomatous reactions, malignant tumors, leukemic infiltrates, dermatoses secondary to immunologic dysfunction, infections, comedonic reactions, and other miscellaneous conditions.

[12] Most cases of isotopic response have been described in healed lesions of herpes zoster. The second disease has been reported to be granuloma annulare, Kaposi's sarcoma, leukemia cutis, metastasis, sarcoidosis, acne, lichen planus, granulomatous folliculitis, tinea, verrucae plana, molluscum contagiosum, squamous cell carcinoma, basal cell carcinoma, or multiple epidermoid cysts.

[13] The exact pathogenesis for causation of Wolf’s isotopic phenomenon is still speculated upon. It is thought that the healed skin continues to show microscopic and physiologic changes for a long time after the initial insult and some
of these changes may in fact be responsible for the occurrence of a new dermatosis.[2] Neural theory suggests that neuropeptides like substance P, bradykinin, serotonin, vasoactive intestinal peptide, calcitonin gene-related peptide, α-melanocyte-stimulating hormone, and nerve signals from damaged nerve endings are the initiating events in isotopic response.

Vascular theory suggests that alteration of the local vasculature may provide a favorable environment for localization of immune cells to the same site by upregulation of adhesion molecules. The significant role of a hyperactive immune system forms the basis of a variety of inflammatory and granulomatous skin diseases. Immune instability may account for the reports of isotopic response in patients with human immunodeficiency virus infection and myelodysplastic syndrome. It has also been suggested that tumor necrosis factor-α (TNF-α) may have a role in Wolff’s isotopic response as it is an important mediator in a variety of inflammatory and granulomatous diseases.[2]

Hence, with PLEVA and dermatophytosis both being inflammatory dermatoses, the role of vascular mechanisms, the hyperactive immune system, and TNF-α seems likely to be the cause of this isotopic response.

Earlier Ghosh et al.[4] reported large annular lesions of lichen planus at the site of tinea lesions as an isotopic response. Verma et al.[5] reported the development and localization of herpes zoster or varicella over sites of healed superficial dermatophytosis in three patients. The cause of varicella or zoster appearing at the site of healed dermatophytosis given by the authors is the phenomenon of T-cell exhaustion at these sites, which is characterized by a stepwise and progressive loss of T-cell functions. Theory of persistent dermatophyte antigens, despite resolution of lesions, may have led to exhaustion of CLA+ T cells in these cases, eventually leading to the affected sites becoming immunocompromised districts.[5]

Inamdar et al.[6] have reported PLEVA showing isomorphic response; however, PLEVA as isotopic response was not reported in the literature.

Hence, we report this case because of its rarity. The patient is presently under follow-up and is doing well with no fresh complaints.

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Conflicts of interest
There are no conflicts of interest.

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Figure 2: Epidermis with marked spongiosis and moderate perivascular lymphomononuclear cell infiltrate around the upper dermal capillary plexus (H&E 100x)

Figure 3: Few necrotic keratinocytes in the stratum spinosum layer having dense eosinophilic cytoplasm and pyknotic nuclei (H & E 400x)

Figure 4: Immunohistochemistry (IHC) revealed marked predominance of CD8 T lymphocytes (a) and expression of HLA-DR in keratinocytes (b)
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