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IP Indian Journal of Clinical and Experimental Dermatology

Journal homepage: www.ijced.org/

Case Report

Zosteriform lichen planus after healed herpes zoster: Report of a new case of Wolf's isotopic phenomenon

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ARTICLE INFO

Article history:
Received 20-10-2022
Accepted 01-11-2022
Available online 26-11-2022

Keywords:
Herpes zoster
Zosteriform lichen planus

ABSTRACT

"The wolf isotopic phenomenon corresponds to the appearance of a skin disease in a place on the body that was previously affected by another, already healed dermatosis." A 35-year-old woman presented with a transversely distributed zosteriform eruption about 12 to 14 cm in length, consisting of erythematous, scaly, moderately pruritic papules on the left flank that spread to the back (does not cross the midline) for several weeks after locally healed herpes zoster (HZ) lesions. No other skin or mucosal sites were included. Routine examination of blood, urine and stool showed no abnormality. A biopsy sample was taken from one of the lesions. Histopathological examination showed typical lichen planus changes, confirming the diagnosis of post-Herpes zoster zosteriform lichen planus (ZLP). The lesions resolved after treatment with topical steroids. Zosteriform lichen planus (ZLP) is an example of a Wolf isotopic phenomenon appearing after HZ at the same site. The exact pathogenesis of ZLP is unknown, it is assumed that persistent viral proteins could be responsible for the hypersensitivity reaction.

1. Introduction

Wolf's isotopic response refers to the appearance of a skin disease in a body site that was previously affected by another unrelated and already healed dermatosis.[1] The term was coined by Wolf et al in 1995, but was already described by Wyburn-Mason, an English neurologist who in 1995 described 26 cases of patients with malignant tumors that developed in the same place of a previous eruption of herpes zoster or herpes simplex.[2,3] The primary lesion is usually shingles, followed by a secondary condition - most often a neoplasm or granuloma annulare.[1] Very rarely it was other inflammatory skin conditions including lichen planus, lichen sclerosus, vitiligo, Kaposi's sarcoma, graft-versus-host disease, and morphea which have been reported in areas previously affected by shingles. The isotopic phenomenon must be distinguished from the isomorphic reaction (or Köebner phenomenon), which refers to the appearance of lesions of the same disease after a traumatic provocation.

2. Case Synopsis

A 35-year-old woman came to our OPD for an eruption on her left flank extending into her back, which had developed progressively after being diagnosed by a physician with Herpes zoster and had been treated with oral valaciclovir prior to her consultation with us. The eruption consisted of reddish-purple scaly papules arranged in a zosteriform pattern over the left flank area extending into the back (Figure 1A,B). The lesions were mildly itchy but not painful. No other skin or mucosal lesions were present. There is no other previous medical history. Family history and menstrual history were not contributory. Routine laboratory tests showed normal values of ESR, CRP and fasting blood sugar. The patient had IgG (but not IgM) antibodies against HSV1 and VZV/HZV (titre 428

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https://doi.org/10.18231/j.ijced.2022.054

IU/ml), suggesting that she had specific immunity against VZV/HZV. Serological tests for HCV and HBV were negative

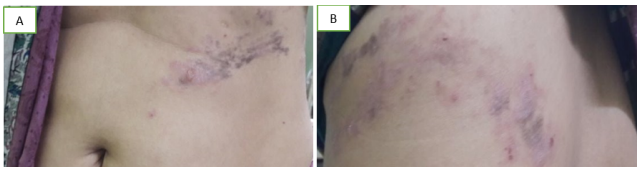

Fig. 1: A,B: Zosteriform eruption over the left flank: showing red-violaceous, scaly papules

3. Histopathology

A skin biopsy taken from a papule on the back showed hyperkeratosis (mostly orthokeratotic), hypergranulosis, acanthosis, vacuolization of the basal layer, the presence of colloid bodies in the lower epidermis and band like subepidermal cleft (Max Joseph space), a dense (lichenoid) infiltrate in the upper dermis consisting of lymphocytes with admixture some melanophages (Figure 2A). PAS staining was negative.

Biopsy findings were diagnostic for lichen planus (LP).

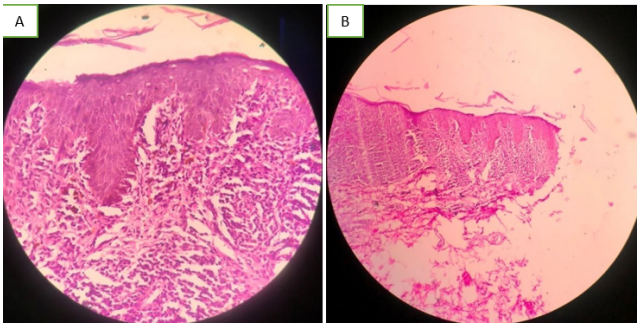

Fig. 2: A,B: Microscopic examination of a skin biopsy shows typical pathologic findings of lichen planus, i.e. orthokeratotic hyperkeratosis, acanthosis, hypergranulosis, subepidermal cleft (Max Joseph space)and a dense band-like subepidermal infiltrate in the upper dermis (hematoxylin-eosin-saffron stain)

The patient was treated with local application of a potent topical steroid (clobetasol) for two months. Two months later the lesions had regressed leaving behind residual, slightly pigmented, asymptomatic macules (Figure 3A-B).

4. Discussion

Zosteriform lichen planus (ZLP) is a very rare manifestation of LP. Its dermatomal distribution allows clinicians to associate it with a previous episode of HZ. ZLP has a predilection for the trunk and legs. The time interval between the onset of HZ and LP is very variable, ranging from 15 days to 5 years. No other concomitant medical

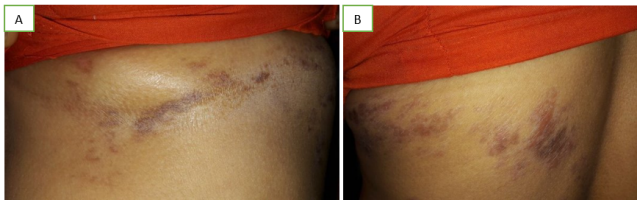

Fig. 3: A,B: After two months treatment with potent topical steroids the lesions regressed leaving residual hyperpigmentation.

conditions were reported. A literature review analyzed 176 cases of isotopic response and found herpes zoster (89%) and herpes simplex (11%) to be the most common initial diseases.[3] The largest group of secondary diseases were granulomatous reactions (31%), especially granuloma annulare (18%). Other diseases were 36 cases of malignant tumors (20%), 15 cases of infectious diseases (9%), 10 cases of lymphomas (6%), 9 cases of leukemic infiltration (5%), 9 cases of lichen planus (5%), 6 cases of morphea (3%) and 4 cases of perforating dermatosis (2%). (Table 1). The pathogenesis leading to the development of secondary disease is not fully understood. It has been suggested that viral particles that remain in the tissues may be responsible for the occurrence of secondary disease. Findings of isolated viral DNA in secondary lesions support this hypothesis.[4] However, the presence of viral DNA is rare and has only been documented in cases where there was a short interval (less than 4 weeks) between the two illnesses.[5] Additionally, it showed no detectable reduction in response rates when systemic antivirals were used to treat herpes infections.[6]

Table 1: Key secondary skin diseases and reported frequencies

Granulomatous reactions	31%
Malignant tumors	20%
Infections (viral, bacterial and fungal)	9%
Lymphomas	6%
Leukemic infiltration	5%
Lichen planus	5%
Morphea	3%
Perforating collagenosis	2%

Some authors hypothesize that after a viral infection, vascular and immunological changes occur and make the skin more susceptible to secondary disease in the same area.[1]

Herpes virus is known for its ability to destroy A-delta and C-nerve fibers in the middle and deep dermis. Damage to peripheral sensory nerves alters the expression profile of neuropeptides and neurotransmitters (substance P, calcitonin gene-related peptide, neuropeptide Y) of these nerves. These neuropeptides mediate immune functions such as mast cell degranulation and the release of pro-inflammatory cytokines. The neuroimmunological response

would create an invisible scar of immune dysregulation limited to the area of initial infection, which has been called the "locus minorus resistentiae", where apparently healthy skin is more susceptible to subsequent disease.[7] In these areas of reduced resistance, hyperreactivity would promote inflammatory processes such as lichenoid and granulomatous dermatitis, and local immunosuppression would lead to tumor infiltration and infections.[1] It has also been suggested that nerve damage may lead to abnormal angiogenesis and cause the development of vascular tumors.[6] It is still not known how herpesvirus infection leads to such a wide variety of secondary diseases and why most people do not show an isotopic response. Genetic, environmental, nutritional, and other unknown factors are believed to contribute.[7] Zosteriform lichen planus (ZLP) should not be confused with linear lichen planus (LLP), as the two forms are distinct.[8,9] In LLP, lesions develop secondary to some trauma (known as the isomorphic phenomenon) and less often spontaneously. They can follow the lines of Blaschka, on the other hand, the isotopic Zosteriform LP follows the dermatomal distribution of the peripheral cutaneous nerve and its branches.

ZLP is mainly treated with topical and intralesional steroids. Lesions regress with post-inflammatory hypo or hyperpigmentation within 4-5 months.[10,11]

5. Conclusion

Zosteriform Lichen Planus as an expression of the Wolf's isotopic phenomenon is a very rare disease and its pathogenesis is still not very well understood. The detection of VZV-DNA in lesions depends on the age of the lesion, as only early lesions contain the viral genome, while viral antigens can persist much longer. It is likely that persistent viral proteins rather than the viral genome are responsible for this hypersensitivity reaction (in addition to other possible immunological, neural, or vascular triggers that remain to be studied).

6. Source of Funding

No financial support was received for the work within this manuscript.

7. Conflict of Interest

None declared.

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Cite this article: Munshi N, Varma K. Zosteriform lichen planus after healed herpes zoster: Report of a new case of Wolf's isotopic phenomenon . *IP Indian J Clin Exp Dermatol* 2022;8(4):263-265.