

Lichen Planus Arising in Radiation Therapy Treatment Sites

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A 59-year-old woman with a history of metastatic breast cancer presented for evaluation of hyperpigmented, reticulated, pruritic plaques on her left arm and left thigh after undergoing localized radiation therapy to the left breast and left thigh. These painful plaques with surrounding erythema appeared to follow Blaschko lines and punch biopsy results were histologically consistent with lichen planus. Herein we report a case of radiation-induced lichen planus.

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Case Report

A 59-year-old woman with a 10-year history of breast cancer of the left breast with subsequent metastasis in 2003 to the liver, vertebrae, and skull presented to the dermatology clinic in July 2006 for evaluation of hyperpigmented, reticulated, pruritic plaques on her left arm and left thigh (Figure 1). The lesions were painful with surrounding erythema and appeared to follow Blaschko lines. The patient first noticed violaceous shiny plaques in December 2005 after undergoing localized radiation therapy to the left breast and left thigh. Presenting lesions were confined to the radiation treatment sites. Examination of the palms, soles, mucous membranes, and nails did not reveal any involvement. The patient denied prior history of a similar eruption and personal history of any other skin diseases. At the time of development of these eruptions, the patient's medications included acetaminophen, cisplatin, darbepoetin alpha, dexamethasone, diphenhydramine hydrochloride, famotidine,

gemcitabine hydrochloride, hydrochlorothiazide, ondansetron hydrochloride, paclitaxel as well as hydrocodone bitartrate and acetaminophen, prochlorperazine, and valsartan. She was topically treated with triamcinolone acetonide ointment 0.1% twice daily with some improvement.

Punch biopsies of representative plaques on the left arm and left thigh showed predominantly lichenoid interface dermatitis with focal vacuolar changes of the basal layer. In addition, there was orthokeratosis and wedge-shaped hypergranulosis, as well as many dyskeratotic keratinocytes, colloid bodies, and pigment incontinence in the papillary dermis (Figure 2), all histologically consistent with lichen planus. No eosinophils were appreciated in any of the sections. The patient had negative serologies for hepatitis B and C virus infection and no other precipitating factors for development of lichen planus, leading to a diagnosis of radiation-induced lichen planus.

Comment

Lichen planus is an inflammatory disease of the skin and mucous membranes that is characterized by pruritic violaceous papules favoring the extremities.¹ Under light microscopy, lichen planus usually is characterized by a thickened stratum corneum with orthokeratosis, prominent granules in the increased granular cell layer, irregular acanthosis, and sawtooth pattern of the rete ridges. The principal dermal feature of lichen planus is a bandlike interface inflammatory infiltrate consisting of lymphocytes and histiocytes that "hug" the basal layer.¹ Although the etiology and pathogenesis of lichen planus are not fully understood, it has been proposed that lichen planus involves an immunologic disturbance that precipitates both humoral and cellular attacks on the dermoepidermal junction.^{2,3} Lichen planus has been reported to be associated with viral infections such as hepatitis, autoimmune diseases, certain medications, trauma (as part of Köbner phenomenon), vaccinations, and graft-versus-host reactions, as well as reactions to dental restorative material.¹

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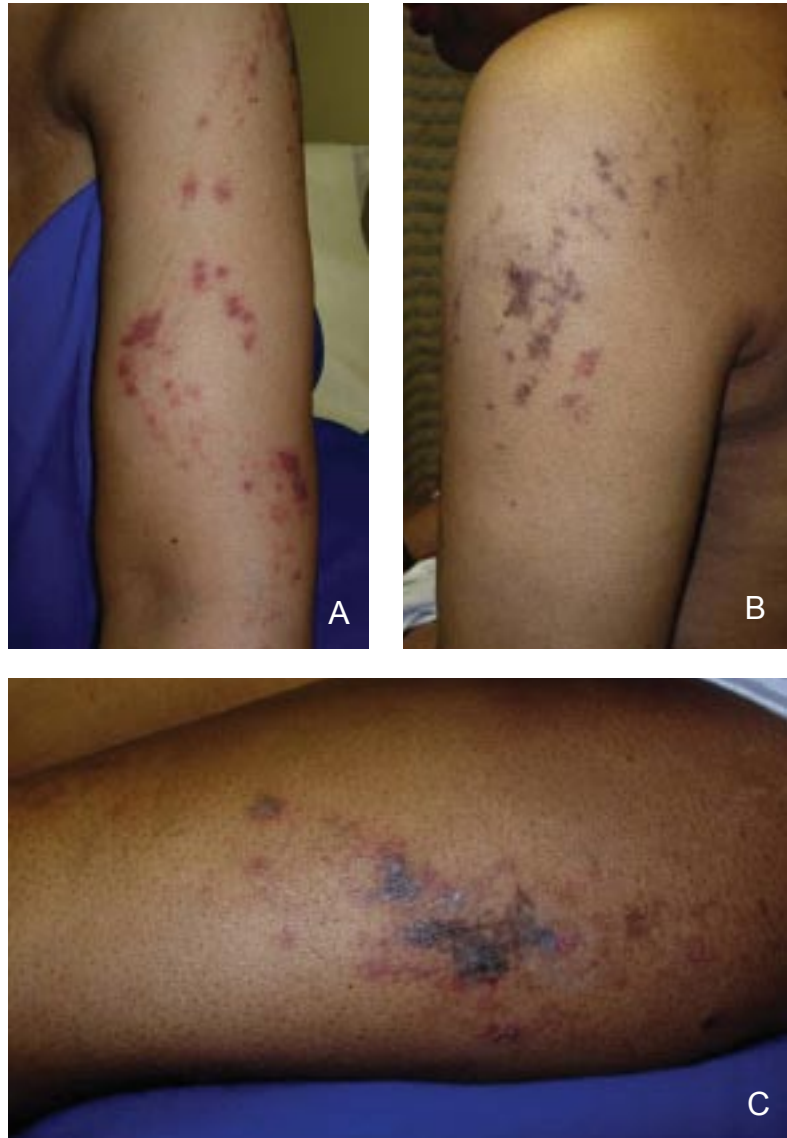


Figure 1. Representative lesions of lichen planus that developed on the patient's left arm (A and B) and left thigh (C) after these sites were treated with radiation therapy.

Herein we present a patient with metastatic breast cancer who developed lichen planus in sites previously treated with radiation therapy. Although there have been reports in the literature of oral lichen planus developing after radiation therapy,⁴ there have been only 4 reported cases of cutaneous lichen planus arising post-radiation therapy in the English language literature.^{1,5-7} One case includes lichen planus developing over the superior mediastinum in a 58-year-old man after completion of treatment with external beam radiotherapy for a poorly differentiated carcinoma of the thyroid gland. Similar to our patient, his lesions were confined to the site of radiation therapy.⁵ Another case described a 56-year-old woman who was treated with local radiotherapy for a high-grade ductal carcinoma in situ of the breast and developed generalized lichen ruber planus with

cutaneous and oral involvement.⁶ There also was a case reported in the literature of a 68-year-old man with lichen planus arising after radiation therapy for penile squamous cell carcinoma.⁷ The fourth case of lichen planus occurring in a site treated with radiation involved a 68-year-old man who received radiation therapy for an infiltrating ductal adenocarcinoma. Initially, his lichen planus was confined to the site of radiation, with eventual progression to the rest of the trunk concurrent with the development of metastases.¹

Conclusion

We believe that our patient represents an interesting example of lichen planus restricted to skin traumatized by radiation therapy. This occurrence of lichen planus could be attributed to what has been

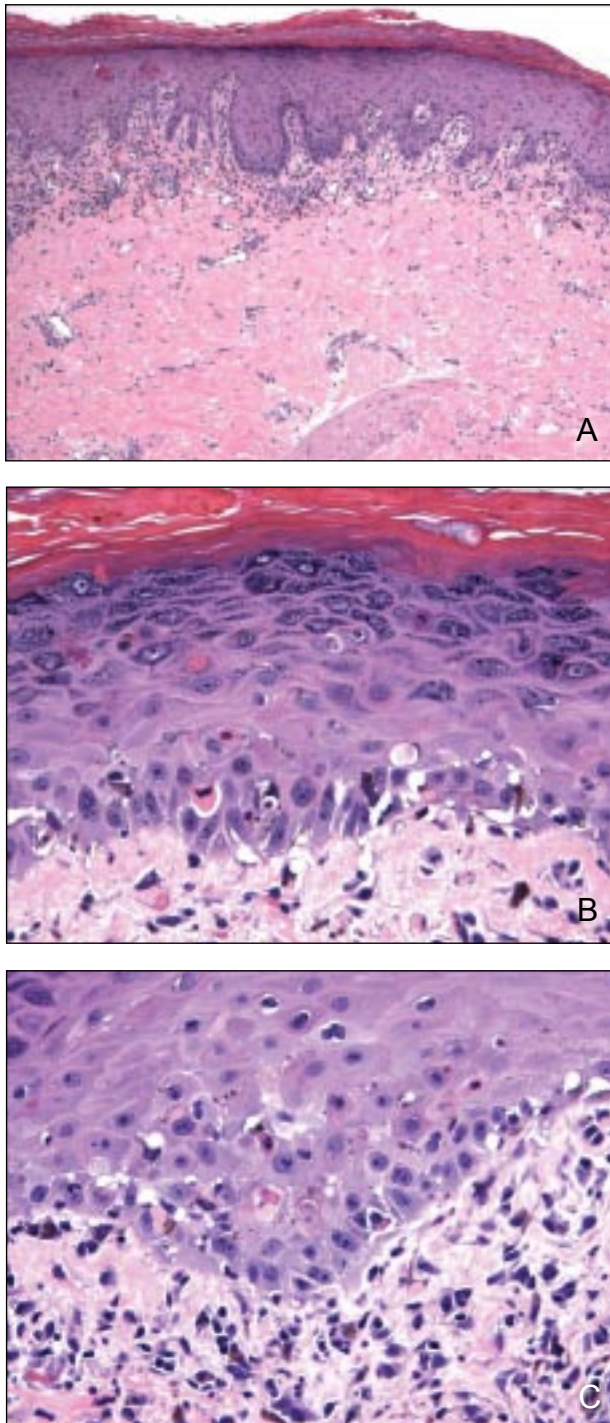


Figure 2. Lichenoid interface dermatitis with orthokeratosis and wedge-shaped hypergranulosis, as well as dyskeratotic keratinocytes, colloid bodies, and pigment incontinence, all consistent with lichen planus (A–C)(H&E, original magnifications $\times 10$, $\times 200$, and $\times 200$, respectively).

previously termed an *isoradiotopic response*, as proposed by Shurman et al⁷ to describe the phenomenon of secondary dermatoses arising in radiation fields. This isoradiotopic response could represent a response to localized radiation-induced injury, which would be a specialized form of the isomorphic response of Köbner, with köbnerization being a well-known phenomenon of lichen planus and other inflammatory dermatoses that usually develop in areas subjected to trauma.^{6,8}

Based on these findings, it is intriguing that radiation therapy can stimulate the development of lichen planus in certain individuals. Because not all patients who are exposed to radiation develop such lesions, it would be interesting to determine if any particular factors predispose a patient to develop lichen planus after being treated with radiation. With the reporting of more patients who display this phenomenon, one could investigate the role of certain factors, such as the dose of radiation, the duration of exposure, and the number of times the patient was exposed to radiation, as well as the concomitant medications the patient is taking, to ascertain their significance in the development of lichen planus occurring in radiation sites.

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