

4. Borrás J, Ameijide A, Vilardell L, Valls J, Marcos-Gragera R, Izquierdo A. Trends in cancer incidence in Catalonia, 1985-2002. *Med Clin (Barc)*. 2008;131(Suppl 1):11-8.
 5. Kim HJ, Fay MP, Feuer E.J, Midthune DN. Permutation tests for joinpoint regression with applications to cancer rates. *Stat Med*. 2000;19:335-51.
 6. Thorn M, Ponten F, Johansson AM, Bergstrom R. Rapid increase in diagnosis of cutaneous melanoma in situ in Sweden, 1968-1992. *Cancer Detect Prev*. 1998;22:430-7.
 7. Roder DM, Luke CG, McCaul KA, Esterman AJ. Trends in prognostic factors of melanoma in South Australia, 1981-1992: implications for health promotion. *Med J Aust*. 1995;162:25-9.
 8. Lee JA. The systematic relationship between melanomas diagnosed in situ and when invasive. *Melanoma Res*. 2001; 11:523-9.
 9. Coory M, Baade P, Aitken J, Smithers M, McLeod GR, Ring I. Trends for in situ and invasive melanoma in Queensland, Australia, 1982-2002. *Cancer Causes Control*. 2006;17:21-7.
 10. Forman SB, Ferringer TC, Peckham SJ, Dalton SR, Sasaki GT, Libow LF, et al. Is superficial spreading melanoma still the most common form of malignant melanoma? *J Am Acad Dermatol*. 2008;58:1013-20.
 11. LeBoit PE, Burg G, Weedon D, Sarasin A. World Health Organisation classification of tumours. Pathology and genetics of skin tumours. Lyon: IARC Press; 2006.
 12. Conejo-Mir J, Bravo J, Paz-Pérez JL, Fernandez-Herrera J, Guillen C, Marti R, et al. Día del Euromelanoma. Resultados de las campañas del 2000, 2001 y 2002 en España. *Actas Dermosifiliogr*. 2005;96:217-21.
 13. Cayuela A, Rodríguez-Domínguez S, Vigil E, Conejo-Mir JS. Effect of age, birth cohort and period of death on skin melanoma mortality in Spain, 1975 through 2004. *Int J Cancer*. 2008;122:905-8.
- N. Vilar-Coromina,^{a,b} L. Vilardell,^c A. Cano,^c and R. Marcos-Gragera^{c,d,*}
- ^a*Servei de Dermatologia, Hospital Sant Jaume, Olot, Girona, Spain*
^b*Departament de Medicina, Universitat Autònoma de Barcelona, Barcelona, Spain*
^c*Unitat d'Epidemiologia i Registre de Càncer de Girona, Pla Director d'Oncologia, Departament de Salut, Institut Català d'Oncologia, Girona, Spain*
^d*Universitat de Girona, Girona, Spain*
- *Corresponding author.
 E-mail address: rmarcos@iconcologia.net (R. Marcos-Gragera).

Lichen Sclerosus Atrophicus at an Insulin Injection Site: An Unusual Koebner Phenomenon

Liquen escleroso y atrófico en el lugar de inyección de insulina: fenómeno de Koebner inusual

To the Editor:

Over 30% of diabetic patients develop skin conditions during the course of their disease. The following can occur: a) diseases such as scleredema, bullosis diabeticorum (diabetic bullae), granuloma annulare, waxy skin with limited joint mobility of the fingers, finger pebbling, eruptive xanthomas, yellow skin, and diabetic dermopathy; b) bacterial infections, such as erythrasma, necrotizing fasciitis, and malignant external otitis, and mycotic infections, such as mucocutaneous candidiasis and rhinocerebral mucormycosis; and c) reactions to antidiabetic drugs.¹

The prevalence of adverse skin reactions to insulin has decreased since the appearance of purified and recombinant forms (50%-60% in the 1950s and 1960s to below 3% in the late 1990s). Allergic reactions are usually seen at the site of injection and can appear as early or late erythema, pruritus, and induration. Lipoatrophy, lipohypertrophy, abscesses, xanthomatosis, bullous eruptions, necrosis, purpura, granulomas, hyperpigmentation, keloids, and amyloidosis can also be found at these sites.²

We describe the case of a woman with type 2 diabetes mellitus who developed lichen sclerosus et atrophicus at the sites on the abdomen where she injected insulin.

The patient was a 55-year-old woman with a past history of subtotal thyroidectomy for thyroid follicular adenoma and total hysterectomy with bilateral adnexectomy for endometriosis. She had type 2 diabetes mellitus that had developed 18 years earlier and for which she was started on insulin in 2003. At the time of consultation, the patient was on an insulin regimen of bolus injections of long-acting insulin and short-acting analogs (54 units of insulin glargine in the morning and 6 units of insulin aspart at night), plus metformin and repaglinide. She was referred to our outpatient clinic by her endocrinologist for the assessment of pruritic skin lesions that had appeared 1 year earlier on the abdomen.

Physical examination revealed multiple whitish papules with keratotic follicular plugs on both sides of the abdomen, forming 2 indurated plaques with well-defined borders (Figure 1A). In addition, the central area of the lesion located on the right side of the abdomen was blistered and crusted (Figure 1B). A whitish, shiny plaque with intralesional purpuric elements was observed in the perianal area (Figure 2). The patient reported that the lesions on the abdomen appeared in the area where she regularly injected insulin.

A biopsy of the lesion was taken from the plaque on the right side of the abdomen. Histopathology revealed a thinned epidermis, a small subepidermal vesicle, edema with homogenization of the collagen fibers, and sparse cellularity in the upper dermis. Follicular plugs and a mild chronic inflammatory infiltrate were observed in the mid dermis (Figure 3). Additional tests—complete blood count, biochemistry, levels of antinuclear and anti-extractable nuclear antigen antibodies, thyroid stimulating hormone, protein electrophoresis, immunoglobulin

A



B



Figure 1 A, Shiny whitish plaques formed of groups of multiple papules on both sides of the abdomen. B, Lesion on the right side of the abdomen, with central blisters and crusting.

concentrations, serology for hepatitis B, hepatitis C, human immunodeficiency virus, and *Borrelia burgdorferi*—were normal or negative, except for a blood glucose of 300 mg/dL. Topical treatment was prescribed with clobetasol propionate cream 0.05% applied once daily, leading to a moderate improvement in the lesions after 3 weeks.

Lichen sclerosus et atrophicus is a chronic inflammatory disease more common in women. It can occur at any age, but there are 2 peaks: in the postmenopausal period in women and 10% to 15% of cases in prepubertal children.³ The lesions generally affect the anogenital area, mainly on the internal aspect of the vulva, the perineum, and the perianal region, forming a characteristic figure of eight. Around 15% to 20% of patients also have lesions in extragenital sites, particularly the upper region of the back, neck, periumbilical region, axillas, and wrists.⁴ There are linear forms following the Blaschko lines, so-called zosteriform types in which lichen sclerosus et atrophicus develops on previous herpes zoster scars (the Wolf isotopic response), generalized forms, and bullous lesions.⁵



Figure 2 A well-defined, whitish plaque with intralesional purpuric elements in the perianal region.

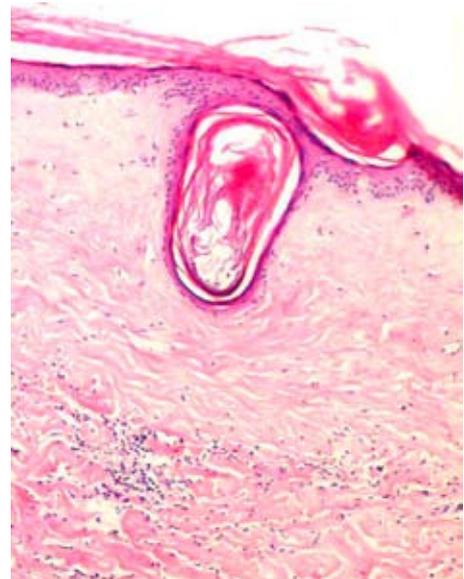


Figure 3 Keratotic plugs and edema with homogenization of collagen and a band-like, chronic inflammatory infiltrate in the upper dermis. Hematoxylin-eosin, original magnification $\times 100$.

The cause of lichen sclerosus et atrophicus is unknown. A series of factors are thought to be involved in its pathogenesis: a) hormonal factors, based on the age of peak incidence; b) autoimmune mechanisms, given the association with autoimmune disorders such as vitiligo, thyroiditis, or pernicious anemia and the higher frequency of organ-specific antibodies; c) infectious factors, such as the human papilloma virus, hepatitis C, and *Borrelia burgdorferi*; d) genetic factors, given that cases of familial lichen sclerosus et atrophicus have been described and have been related to various histocompatibility antigen (HLA) subtypes; e) endocrine factors, as several authors

have found a statistically significant prevalence of diabetes mellitus⁶; and f) repeated trauma (Koebner phenomenon).³

The isomorphic response, also known as the Koebner phenomenon, consists of the appearance of typical lesions of a certain dermatosis in areas of healthy skin that have previously been subjected to different kinds of trauma. They are divided into 4 groups:

1. Category I: a true Koebner phenomenon, only seen with psoriasis, vitiligo, and lichen planus.
2. Category II: a pseudo-Koebner, which includes warts, molluscum contagiosum, and pyoderma gangrenosum.
3. Category III: dermatoses with occasional lesions in areas of trauma, such as Kaposi sarcoma, Darier disease, and erythema multiforme.
4. Category IV: A doubtful isomorphic phenomenon, which appears in diseases such as pemphigus vulgaris, eczema, or lichen nitidus.⁷

Lichen sclerosus et atrophicus is included in category III of the Koebner phenomenon. It has been associated with UV radiation, ionizing radiation, burns, venous hypertension (related to varicose veins), vulvovaginitis, pellagra,⁸ vaccines,⁹ repeated pressure, friction from clothing, trauma, and traumatic and surgical scars.¹⁰ Lichen sclerosus et atrophicus developing on herpes zoster scars (isotopic response) could be included in this group.⁵

In conclusion, the reason for reporting this case was to describe a patient suffering from perianal lichen sclerosus et atrophicus who developed lesions at the site of insulin injections as a result of a Koebner phenomenon, an association that we have not found elsewhere in the literature.

References

1. Ahmed I, Goldstein B. Diabetes mellitus. *Clin Dermatol*. 2006;24:237-46.

2. Richardson T, Kerr D. Skin-related complications of insulin therapy. *Epidemiology and emerging management strategies*. *Am J Clin Dermatol*. 2003;4:661-7.
3. Monteagudo Sánchez B, León Muiños E, Labandeira García J, Ginarte Val M, Used Aznar MM. Liquen escleroso con lesiones extragenitales y genitales. *An Pediatr (Barc)*. 2006;64:397-8.
4. Valdivielso Ramos M, Bueno C, Hernanz JM. Significant improvement in extensive lichen sclerosus with tacrolimus ointment and PUVA. *Am J Clin Dermatol*. 2008;9:175-9.
5. Cabanillas González M, Monteagudo B, de las Heras C, Cacharrón JM. Liquen escleroatrófico lineal blaschoide y zosteriforme. *Actas Dermosifiliogr*. 2009;100:155-7.
6. García Bravo B, Sánchez Pedreño P, Rodríguez Pichardo A, Camacho F. Lichen sclerosus et atrophicus. A study of 76 cases and their relation to diabetes. *J Am Acad Dermatol*. 1988;19:482-5.
7. Weiss G, Shemer A, Trau H. The Koebner phenomenon: review of the literature. *J Eur Acad Dermatol Venereol*. 2002;16:241-8.
8. Reichman O, Sobel JD. Vulvovaginal pellagra and lichen sclerosus complicating carcinoid syndrome. *Obstet Gynecol*. 2009;113: 543-5.
9. Anderton RL, Abele DC. Lichen sclerosus et atrophicus in a vaccination site. *Arch Dermatol*. 1976;112:1787.
10. Vergara G, Betloch I, Albares MP, Pascual JC, Guijarro J, Botella R. Lichen sclerosus et atrophicus arising in urethrostomy scar. *Int J Dermatol*. 2002;41:619-21.

B. Monteagudo,^{a,*} M. Cabanillas,^a D. Bellido,^b
Ó. Suárez-Amor,^a A. Ramírez-Santos,^a and A. de la Cruz^c

^a*Servicio de Dermatología, Complejo Hospitalario Arquitecto Marcide-Novoa Santos, Ferrol, La Coruña, Spain*

^b*Servicio de Endocrinología, Complejo Hospitalario Arquitecto Marcide-Novoa Santos, Ferrol, La Coruña, Spain*

^c*Servicio de Anatomía Patológica, Complejo Hospitalario Arquitecto Marcide-Novoa Santos, Ferrol, La Coruña, Spain*

*Corresponding author.

E-mail address: benims@hotmail.com (B. Monteagudo).

Progressive Macular Hypomelanosis Successfully Treated with Topical Clindamycin and Benzoyl Peroxide

Hipomelanosis macular progresiva resuelta con peróxido de benzoilo y clindamicina tópicos

To the Editor:

Progressive macular hypomelanosis is an acquired skin pigmentation disorder that was initially thought to be related to racial characteristics, but is currently more often associated with the presence of *Propionibacterium acnes*.

A 23-year-old woman was seen for the progressive appearance over a 5-year period of asymptomatic whitish lesions on the trunk (Figures 1A and 2). The lesions were poorly defined, nondesquamating, hypopigmented macules tending to become confluent. The macules were initially located in the center of the chest but had spread centrifugally to affect the neck and the most proximal regions of the upper limbs. The lesions did not improve in summer, but rather tended to stand out more noticeably against the adjacent skin.

The patient had no history of atopic dermatitis or other eczematous disorders, and had never reported pruritus or desquamation of the lesions.

After other causes of acquired hypopigmentation, such as resolving pityriasis alba or pityriasis versicolor, had been ruled out clinically, the patient was diagnosed with