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Linear psoriasis following the typical distribution of the sciatic nerve

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Abstract

Background: Some studies suggest that the nervous system plays a role in the onset of psoriasis and psoriasis flares including the symmetry of lesions, sparing of denervated skin and the role of stress in inducing lesions.

Main observations: We describe an unusual case of psoriasis occurring in the same distribution as sciatic pain from a prolapsed intervertebral disc. The patient, a 45-year-old man with plaque psoriasis was treated with ustekinumab for 104 weeks, at a standard dose. During the eight month of therapy he developed an asymptomatic linear eruption on the left lower extremity along the distribution of the sciatic nerve. On examination, erythematous scaly plaques were noted. Histopathology confirmed the diagnosis of psoriasis. The treatment was continued and clobetasol proprionate 0.05% cream was added. At week 12 after the eruption, the patient reported a pain radiating through the buttock and posterior left leg during jogging. Magnetic resonance imaging showed lumbar disc herniation with compression of the L5—S1 spinal nerve roots. The patient stopped running and the psoriasis spontaneously receded, in a slow but complete fashion, without any local treatment.

Conclusion: There is substantial evidence that nerves play a key role in the pathogenesis of psoriasis. We hypothesized that local TNF-alpha, neuropeptides and nerve growth factor, which are produced by nerve root compression, played a critical role in this case of psoriasis onset in an area of pain from a bulging lumbar intervertebral disc. To our knowledge, a correlation of psoriasis and nerve root compression has not been described previously. (*J Dermatol Case Rep*. 2015; 9(1): 6-11)

Introduction

During the last few years, a modern concept of an interactive network between cutaneous nerves, the neuroendocrine axis, and the immune system has been established.[1] In dermatology, there is evidence that the cutaneous nervous system contributes to the pathogenesis of urticaria, psoriasis, atopic dermatitis, contact dermatitis, hypersensitivity reactions, prurigo, pruritus, and wound healing.[2-4]

A dense network of sensory nerves releases neuropeptides, thereby modulating inflammation, cell growth, and the immune responses in the skin.

The nervous system has been implicated in several inflammatory skin disorders based on evidence such as symmetry of lesions, sparing of denervated skin and the role of stress in inducing lesions.[5]

Additional evidence for the immunological influences of the nervous system comes from spinal cord injury patients. Following spinal cord injury, these patients tend to present with inadequate immune function, reflected by an increased susceptibility to bacterial infection as well as a decrease in the number of natural killer cells, T cells, and cellular adhesion molecules as well as a decrease of natural killer cells, T cells, and cellular adhesion molecules on the peripheral blood.[6] The pathophysiology of these changes is not well-understood. In addition to direct neural changes, stressors due to spinal cord injury may have a role.[7]

Clinical cases show that deprivation of neuronal innervation of the skin, for example due to surgical denervation, results in resolution of plaque psoriasis. One report demonstrates a patient with chronic psoriasis vulgaris who experienced complete unilateral remission of his disease within

months following brachial plexus palsy due to a shoulder dislocation. The psoriasis reappeared as the nerves and sensations recovered.[8]

In support of this possibility, there is a well-described murine model of psoriasiform dermatitis involving the actions of Th17 cells where the rash clears upon denervation of affected skin.[9]

Chemically distinct, neuropeptides exhibit characteristic patterns of localization within the peripheral sensory nervous system (PNS), and central nervous system (CNS) and, acting as neurotransmitters and/or neuromodulators, possess the ability to stimulate a range of diverse biological activities. Neuropeptide transmitters such as vasoactive intestinal polypeptide (VIP), pituitary adenylate cyclase-activating peptide (PACAP), calcitonin gene-related peptide (CGRP) and substance P (SP) are able to regulate both acute and chronic aspects of cutaneous inflammatory processes, such as vascular motility, cellular trafficking, and trophism.[10] SP is chemotactic to neutrophils,[11] activates T cells,[12] and releases interleukin-1 from keratinocytes.[13]

VIP is mitogenic to keratinocytes,[14] CGRP acts synergistically with SP to stimulate keratinocyte proliferation[15] and both VIP and CGRP are potent mitogenics for endothelial cells.[16]

Results show that during the first hours following acute psychological stress, SP,CGRP, VIP and NPY are released by nerve endings in the skin. Psoriasis patients who experience high levels of stress show increased expression of VIP and CGRP in their lesional skin.[17]

We describe an unusual case of psoriasis occurring in the same distribution as sciatic pain from a prolapsed intervertebral disc.

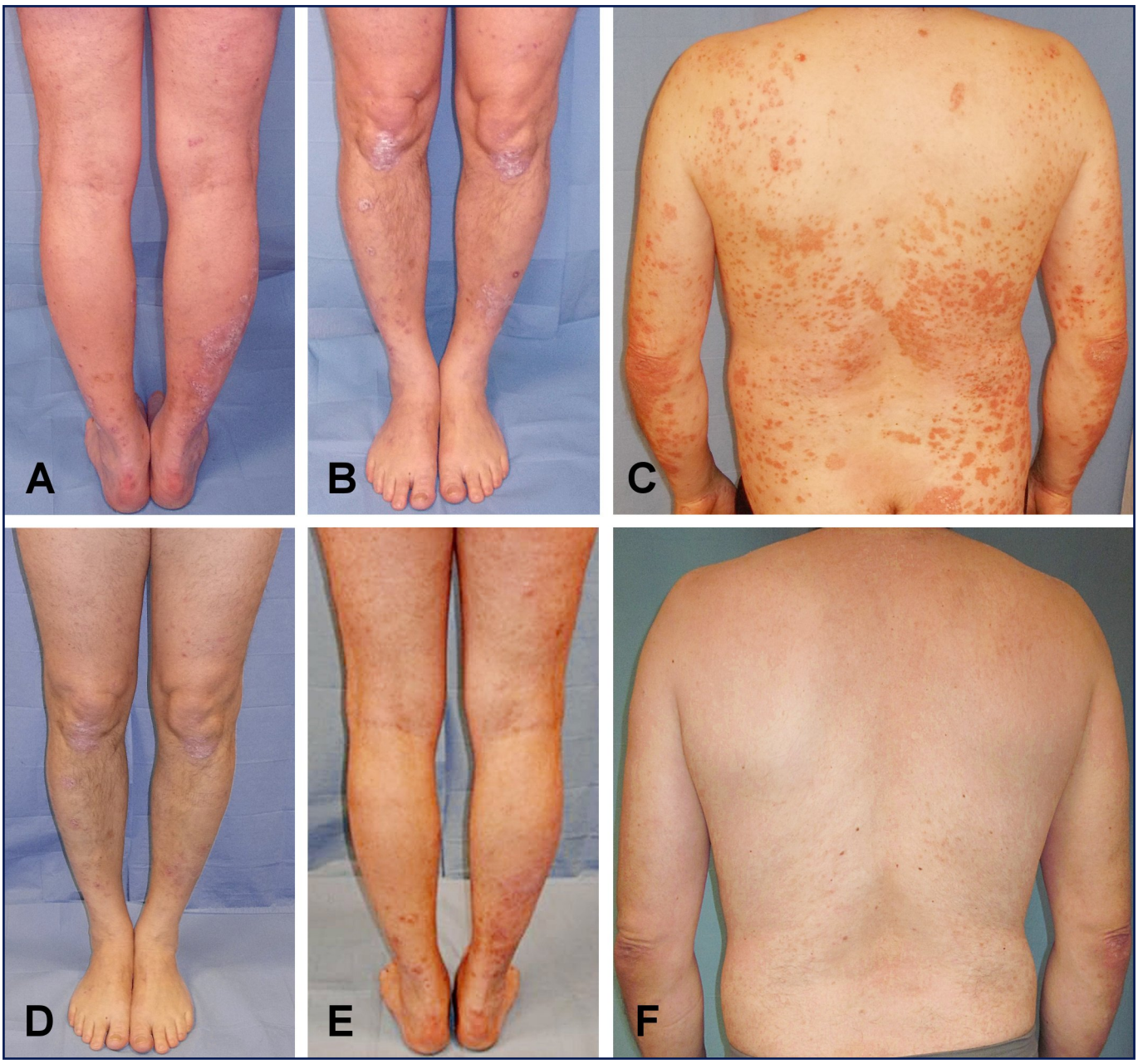

Figure 1

A, B, C Baseline; D, E, F After 12 weeks of ustekinumab treatment.

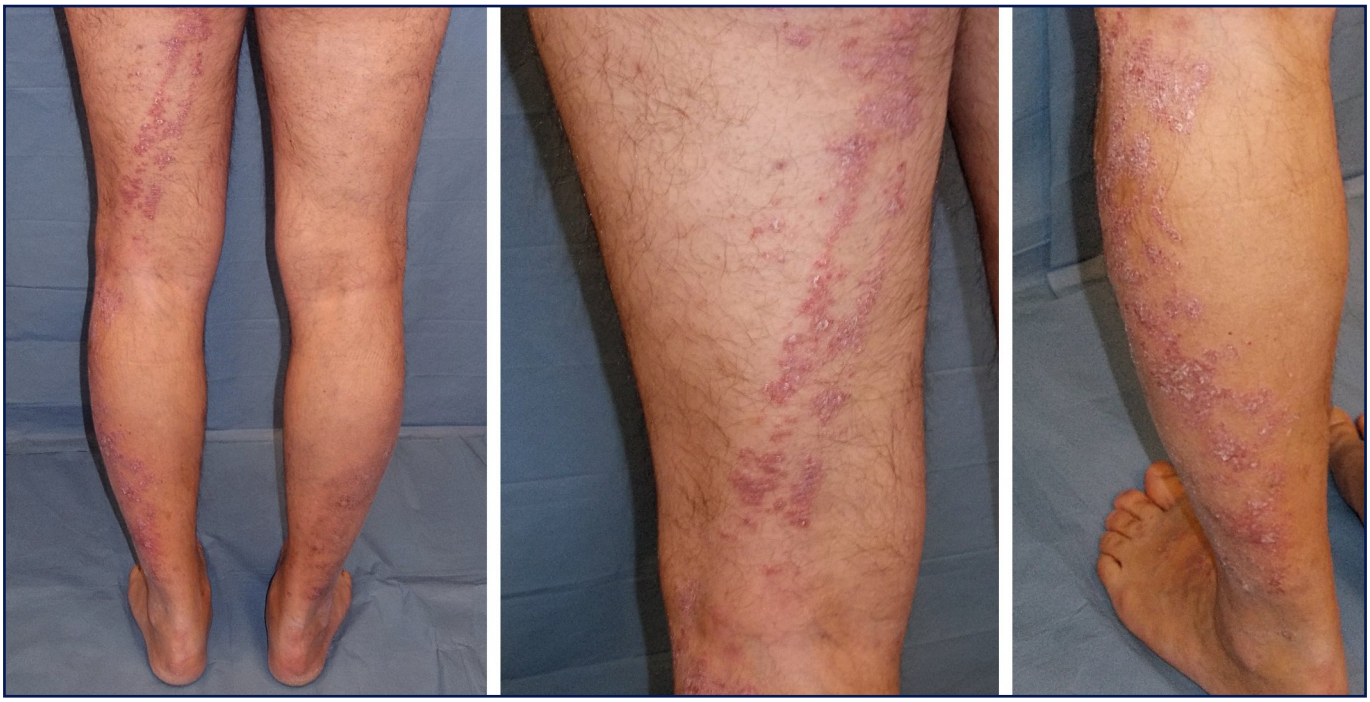

Figure 2
Linear eruption of psoriasis.

Case report

A 45-year-old man with a 24-year history of moderate-to-severe plaque psoriasis was referred to our department in April 2012 due to worsening of psoriasis with a Psoriasis Area and Severity Index (PASI) score of 12.

He had been previously treated with topical and systemic drugs, such as cyclosporine, methotrexate and etanercept, that were discontinued for loss of efficacy.

Complete laboratory and instrumental tests were performed, including chest X-ray, ECG, QuantiFeron TB-Gold, complete blood count, complete liver profile, creatinine, auto-antibodies (ANA, anti-dsDNA, ENA, LAC, anti-cardiolipin, anti-citrullin), C-reactive protein, tumor markers, hemoculture, and urinoculture; no significant abnormal results were found. We therefore decided to start therapy with ustekinumab 45 mg s.c. (body weight was 70 kg).

After 4 weeks of treatment, the patient showed an excellent and rapid improvement with a reduction of the PASI score to 5. After 12 weeks of therapy, the patient showed complete resolution of the clinical picture with the presence of only mild erythema and a PASI score of 1 (Fig. 1).

Following eight months of ustekinumab treatment, the patient presented with a two-week history of an asymptomatic linear skin lesion, localized exclusively along the left lower extremity.

Physical examination revealed erythematous scaly plaques, which were observed to be along the distribution of the sciatic nerve, with a positive Auspitz's sign. These findings are compatible with psoriasis that radiates along the sciatic nerve and it runs down the back thigh, calf, and the dorsal region of the foot (Fig. 2).

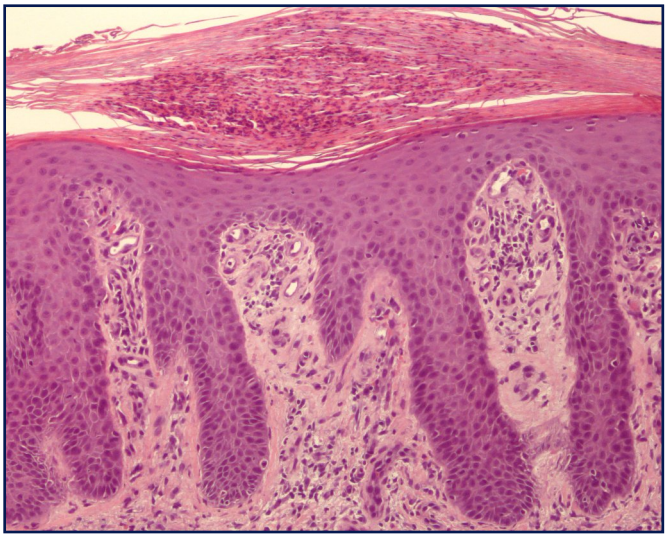

Figure 3
Histopathology of skin lesions was consistent with psoriasis.

The patient denied trauma, episodes of infection, or physical or mental stress preceding the onset of the lesion. Thus we decided to continue ustekinumab and added topical treatment [clobetasol propionate 0.05% cream] twice daily for two weeks and then once daily for two weeks. After 12 weeks of the eruption, the lesions persisted and no other lesions had appeared elsewhere on the body during this time. Routine blood tests, including full blood count and serum biochemistry, were unremarkable. A test for antinuclear antibody were negative.

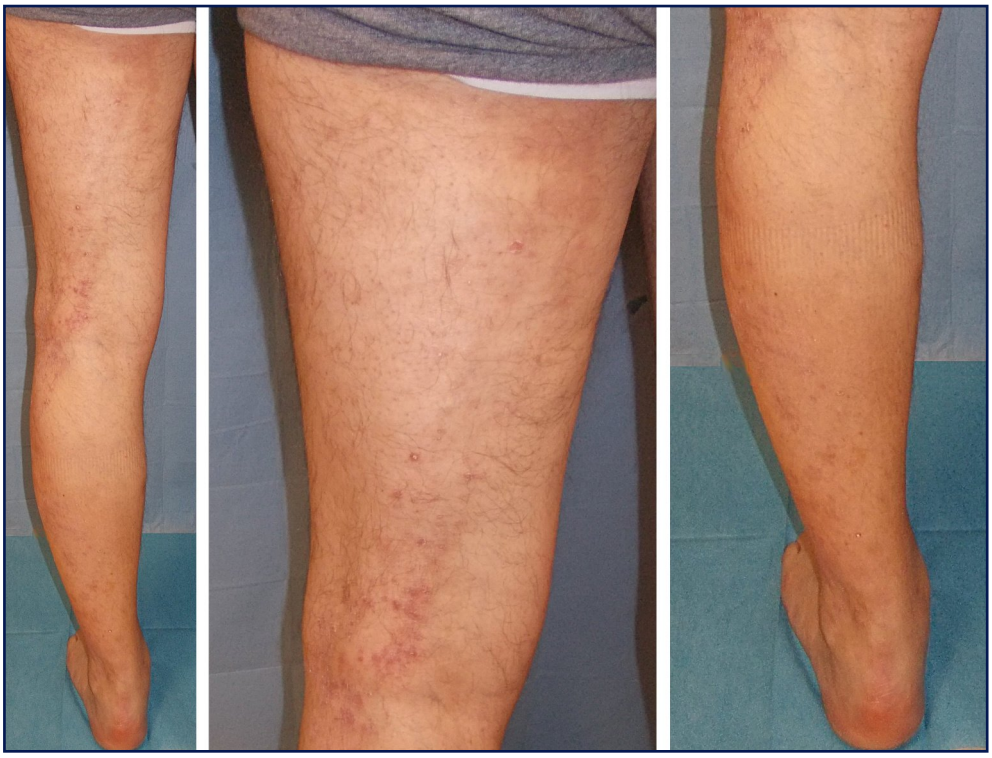

Figure 4
Residual lesions 12 weeks following jogging cessation.

The patient reported a pain that radiates down the left leg during jogging on roads. The pain started in the lower back, running down behind the buttock and leg, then down the lateral side of the leg and reaching around the ankle to the foot. We suspected the pain was caused by a nerve root compression and we performed testing for sciatic nerve root tension. Straight leg raising (SLR) and reverse SLR tests on affected side reproduced leg pain.

Due to the strong suspicion of disc herniation, MRI imaging of the spine was performed, and the patient was prescribed 150 mg/day of diclofenac sodium and 300 mg/day of vitamin B6 for eight weeks. A skin biopsy was also performed to obtain a histological confirmation of the diagnosis of psoriasis. Indeed microscopic examination revealed the presence of regular epidermal hyperplasia, parakeratosis with intracorneal microabscesses, minimal spongiosis and a mild perivascular inflammatory infiltrate around papillary ectatic and convoluted vessels, features consistent with psoriasis (Fig. 3).

MRI showed lumbar disc herniation with compression of the lower spinal nerve roots (L5 and S1).

The patient refused to go to a neurologist and decided to discontinue jogging. After 24 weeks of eruption the patient presented with residual lesions (Fig. 4).

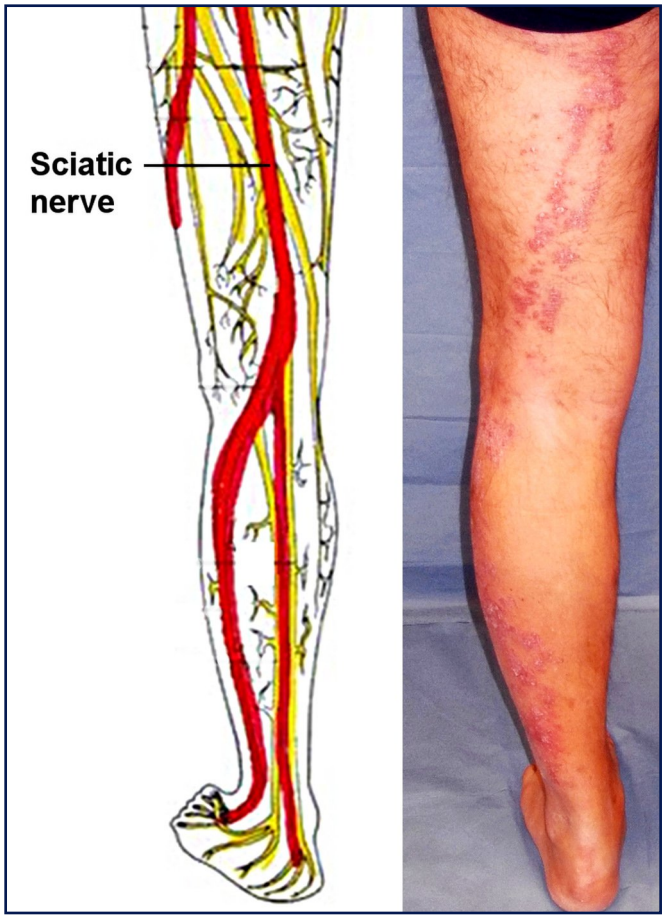

Figure 5
The course of the sciatic nerve.

Discussion

Our patient experienced linear psoriasis on the left lower extremity along the distribution of the sciatic nerve, prior to the onset of sciatica pain. The sciatic nerve, a mixed nerve that originates from the sacral plexus, formed by fibers from

all the nerves of the plexus (L4, L5, S1, S2, S3), supplies nearly the whole of the skin of the leg, the muscles of the back of the thigh, and those of the leg and foot. The sensory component supplies the skin of the posterior and anterolateral leg and almost whole skin of the foot, with the exception of dorsomedial portion (Fig. 5).

The most common site of Lumbar Disc Herniation (LDH) is toward the bottom of the spine at L4—L5 and/or L5—S1. Abnormal activities, such as repetitive bending, twisting, and lifting, can increase abnormal pressure on the nucleus of the disc and injure the annulus, leading to herniation.

The nucleus presses against the annulus, causing the disc to bulge outward. With further progress, the nucleus herniates completely through the annulus and squeezes out of the disc, placing pressure on the spinal canal or nerve roots.[18] In addition, the nucleus releases chemicals that can irritate the surrounding nerves causing inflammation and pain.[19]

The local inflammatory response and the anatomical features of the herniated disc and spinal canal determine the resultant clinical syndrome which may include low back pain, and sciatica with or without neurological deficit.[20]

Interestingly, the only first sign of nerve compression in this patient was the appearance of psoriatic lesions 'downstream' from the nerve compression itself. When we think of nerve root compression in the spine we expect pain, numbness and decreased muscle strength, but not the presence of psoriatic lesions.

This association between nerve root compression and psoriasis is difficult to explain but it may be that tumor necrosis factor-alpha (TNF), neuropeptides and nerve growth factor (NGF) have an aetiological role. Many authors have reported that following disc herniation, producing TNF-alpha plays a major role in neuropathic pain. Using the standard model of chronic constriction injury (CCI) of sciatic nerve in rats, TNF-α has been detected at the injury site and shows temporal up-regulation.[21] Similar results are found in humans, where nerve biopsies from patients with painful neuropathy show higher levels of TNF-α expression, especially in Schwann cell[22] and this is reversible with neutralizing antibodies to TNF receptors, in particular TNF receptor.[22]

Conclusion

There is substantial evidence that nerves play a key role in the pathogenesis of psoriasis.

We hypothesized that local TNF-alpha, produced by nerve root compression, played a critical role in this case of psoriasis onset in an area of pain from a bulging lumbar intervertebral disc. To our knowledge, a correlation of psoriasis and nerve root compression has not been described previously.

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