



ACTAS Derma-Sifiliográficas

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REVIEW

Skin Lesions in the Diabetic Foot[☆]

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Received 7 April 2011; accepted 10 August 2011
Available online 11 July 2012

KEYWORDS

Diabetic foot;
Diabetes;
Ulceration;
Neuropathy

PALABRAS CLAVE

Pie diabético;
Diabetes;
Úlcera;
Neuropatía

Abstract In diabetic foot syndrome, a series of complications of late-stage diabetes affect the foot. These complications, which culminate in foot amputation, include peripheral vascular disease and neuropathy, Charcot arthropathy, plantar ulceration, and osteomyelitis. In recent years, the medical community has paid greater attention to diabetic foot syndrome, and our understanding of its pathophysiology and management has advanced. Although the podiatrist is charged with caring for the diabetic foot, as dermatologists we occasionally act as consultants. This review therefore offers dermatologists an update on the causes and management of skin lesions in the diabetic foot.

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Lesiones cutáneas en el pie diabético

Resumen El síndrome del pie diabético engloba una serie de alteraciones que pueden presentar los pies de las personas con diabetes mellitus avanzada. Estas alteraciones incluyen la vasculopatía y la neuropatía periférica, la neuroartropatía de Charcot, las úlceras plantares, la osteomielitis y la complicación final de estos procesos: la amputación del miembro inferior.

En los últimos años ha existido una mayor atención por parte de la comunidad médica al síndrome del pie diabético. Se han realizado avances en el entendimiento de su fisiopatología, así como en su manejo. Aunque el pie diabético es un campo de trabajo de los podólogos, los dermatólogos ejercemos de forma ocasional de consultores en algunos de estos casos. Por este motivo el presente artículo pretende ofrecer a los dermatólogos una herramienta de actualización en las causas y el manejo de las lesiones del pie diabético.

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Introduction

Diabetes is undoubtedly one of our most significant health problems, not only because of its high prevalence but also because of its considerable socioeconomic impact. One of the most feared complications of diabetes mellitus is the

[☆] Please cite this article as: Boada A. Lesiones cutáneas en el pie diabético. Actas Dermosifiliogr. 2012;103:348-56.

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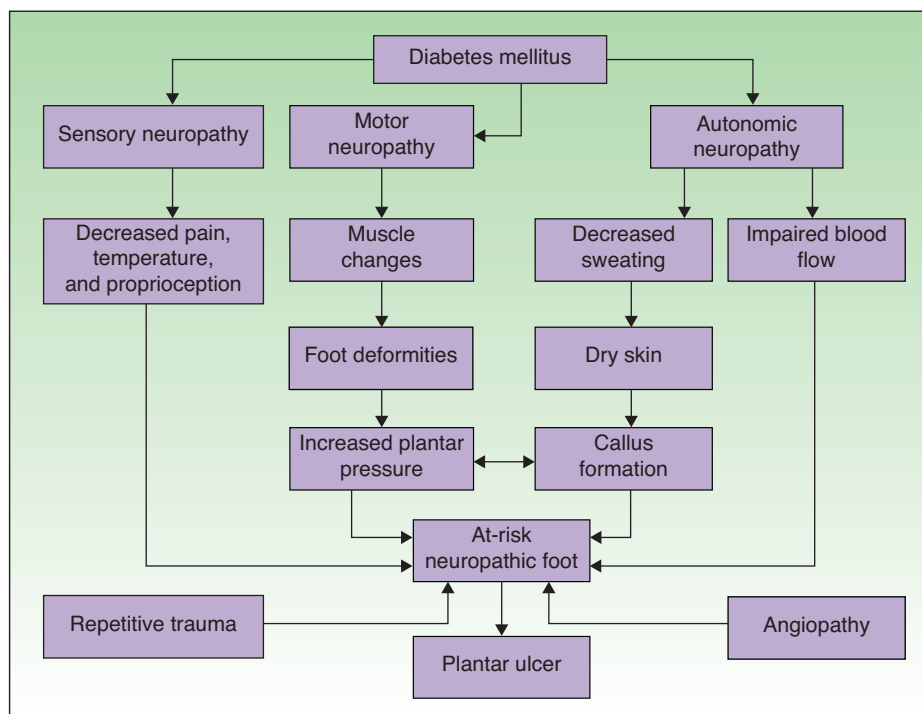


Figure 1 Pathophysiological mechanisms of ulceration in the diabetic foot. Adapted from Boulton.¹⁵ Neuropathy and vascular disease are the 2 most important factors in the development of diabetic foot ulcers.

so-called diabetic foot. This syndrome is not an entity in itself, but rather encompasses a series of complications that may develop in the feet of patients with advanced diabetes. These complications include peripheral vascular disease and neuropathy, Charcot arthropathy, plantar ulceration, and osteomyelitis. Also included within the syndrome would be the final complication of these processes: lower-limb amputation.¹

Greater attention has been focused on diabetic foot by the medical community in recent years, and there have been advances in our understanding of the pathophysiology and management of this condition. Although the podiatrist is generally charged with caring for the diabetic foot, as dermatologists we should also be able to recognize and manage it. The objective of this review, therefore, is to offer an update on everything the dermatologist needs to know when examining the feet of a diabetic patient.

Epidemiology

Diabetes mellitus affects approximately 7.8% of the Western population, although up to one quarter of the actual cases remain undiagnosed. Its prevalence increases with age and up to 23% of those over the age of 60 years are affected.² In Spain, 8% of women and 12% of men have diabetes.³ About 4% of patients with diabetes mellitus develop lower-limb ulcers,⁴ and the prevalence is higher (between 5% and 7%) in patients with associated neuropathy.^{5,6} Thus, for diabetic patients, the cumulative risk of developing foot ulcers at some time in their lives is as high as 15%.⁷ More than 60% of nontraumatic lower-limb amputations occur in diabetic patients, and the amputations are preceded by ulceration in

85% of these patients.^{8,9} The outcome for diabetic amputees is poor: 30% die during the year following the intervention, and by 5 years later, half of patients have undergone contralateral limb amputation.¹⁰ Efforts have therefore been made to reduce the incidence of plantar ulceration in order to reduce the number of amputations. However, the results of the most recent studies have been inconsistent in demonstrating real success in the reduction of plantar ulceration.¹¹⁻¹⁴

Pathophysiology

An understanding of the pathophysiology of so-called diabetic foot is essential for optimal management. There are numerous factors that may favor the development of a plantar ulcer in the diabetic patient (Fig. 1).¹⁵ Neuropathy and macroangiopathy are the 2 main causal mechanisms, while injuries are often the events that precipitate an acute lesion.¹⁶ If we can act on these factors, we can prevent the formation of a plantar ulcer or restore the skin once the ulcer has appeared.

Neuropathy

Between 60% and 70% of diabetic patients have some form of neuropathy. The most common forms are distal symmetric polyneuropathy, delayed esophageal transit, carpal tunnel syndrome, and erectile dysfunction. It appears that peripheral nerve damage in diabetic patients is due to the metabolic disorders caused by sustained hyperglycemia, while ischemia involving the vasa nervorum worsens this situation.¹⁷

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