



MEDICINA
UNIVERSITARIA

www.elsevier.es/rmuanl



ORIGINAL ARTICLE

Association between peripheral arterial disease and diabetic foot ulcers in patients with diabetes mellitus type 2

M.Á. Tresierra-Ayala*, A. García Rojas

School of Medicine, National University of Trujillo, Trujillo, Peru

Received 3 February 2017; accepted 10 July 2017

KEYWORDS

Diabetes mellitus
type 2;
Diabetic foot ulcer;
Peripheral arterial
disease

Abstract

Background: Diabetic foot ulcer (DFU) is a chronic complication of diabetes mellitus. It is reported that diabetes is associated with a two to four-fold increase in the incidence of peripheral arterial disease (PAD) compared to non-diabetic subjects. Peripheral arterial disease (PAD) may play a role in the etiology of foot ulceration in patients with diabetes mellitus.

Objective: To determine the association between peripheral arterial disease and diabetic foot ulcers in patients with type II diabetes mellitus.

Methods: A cross-sectional study was carried out at Hospital Belen of Trujillo, which all patients with type 2 diabetes mellitus ≥ 50 years were included. Presence or absence of both variables was measured in our study.

Results: Three hundred twenty-two patients were included in the study. We found that 129 patients had peripheral arterial disease and diabetic foot ulcers (OR 3, 95% IC 1.087–8.242 and $p < 0.001$).

Conclusions: In this study, peripheral arterial disease was associated with diabetic foot ulcer in patients with type 2 diabetes mellitus.

© 2017 Universidad Autónoma de Nuevo León. Published by Masson Doyma México S.A. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Background

Diabetic foot ulcer (DFU) is a chronic complication of diabetes mellitus (DM) of great importance from medical and social aspects, since it has significant effects on the patient's

quality of life and is related to higher healthcare costs.^{1,2} Prevalence of diabetic foot ulcer ranges from 4 to 10% in hospitalized patients.^{3–5} It is also a disabling complication, being the leading cause of non-traumatic amputations worldwide. The Global Lower Extremity Amputation Study Group estimated that between 14 and 24% of DFU patients require amputation.^{3,4,6}

Recent studies suggest that risk of diabetic patients developing a foot ulcer is approximately 25% throughout their lives.^{6–9} DFU risk factors include: male sex, diabetes

* Corresponding author at: Calle Sánchez Málaga N° 274, Manzana E, Lote 13, Urbanización Mochica, Trujillo, Peru.

E-mail address: mtresierra@medicos.com
(M.Á. Tresierra-Ayala).

<http://dx.doi.org/10.1016/j.rmu.2017.07.002>

1665-5796/© 2017 Universidad Autónoma de Nuevo León. Published by Masson Doyma México S.A. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

more than ten years, peripheral neuropathy, abnormal foot structure (bone alterations, calluses, nails thickening), peripheral arterial disease, smoking, history of ulcers or amputation and inadequate glycemic control.⁷⁻¹⁰ The reasons for rise in incidence of these disorders in DM involves the interaction of pathogenic processes like abnormal biomechanics of the foot, peripheral arterial disease, poor wound healing. Peripheral sensitive neuropathy disrupts normal protection mechanisms, allowing patients to suffer severe trauma or repeated mild ones, which often unnoticed. Proprioceptive sensory disorders cause abnormal weight support while walking, which results in the formation of calluses or ulcers. Motor and sensory neuropathy lead to an abnormal mechanics of the foot muscles and structural alterations (hammer toe, claw foot, prominence in the metatarsal, Charcot foot). Vegetative neuropathy (autonomic) causes anhidrosis and alters superficial blood flow of foot, which promote skin drying and fissure formation. Peripheral arterial disease (PAD) and poor wound healing impede resolution of small wounds of skin, allowing these to increase in size and become infected.⁹⁻¹²

PAD is defined as clinical disorder where there is stenosis or occlusion of lower limbs arteries. Atherosclerosis is the main cause of PAD in people over 40.^{13,14} The risk of atherosclerosis increases notably in diabetics, and epidemiological studies have confirmed a link between diabetes and rise in PAD prevalence.¹⁵⁻¹⁷ Diabetes is associated with a two to fourfold increase in PAD incidence compared to non-diabetic individuals. Among adult population ≥ 40 years of age, PAD prevalence is 9.5% in diabetic subjects, twice as much as the 4.5% prevalence in non-diabetics.¹⁸⁻²¹ In consequence, the American Diabetes Association (ADA) recommends through consensus that the ankle-brachial index (ABI) should be performed as a measure of detection in all diabetic individuals > 50 years of age or those who have suffered from the disease for more than ten years.^{10,12,21}

PAD is an important predictor of ulceration of the foot in diabetic patients. Therefore, the physician who examines a patient with diabetes and foot ulcer should always assess the vascular status of lower limbs and specifically search for signs of ischemia, since up to 50% of these patients have PAD. Nevertheless, PAD detection and the assessment of its severity is a clinical challenge in diabetic patients with foot disease, due to altered clinical presentation of PAD and limitations of the diagnostic procedures. Moreover, the healing of the wound in these patients is influenced not only by presence of PAD but also by factors like infection and presence of comorbidities.²²⁻²⁴

DFUs are frequent complication in patients with diabetes mellitus, which have significant effects on their quality of life and involve greater costs in health care. However, when examining a patient with a diabetic foot ulcer, a proper evaluation of the vascular status of said limb is not performed. Due to this significant problem, the present study intends to measure the link between peripheral arterial disease and diabetic foot ulcers.

Material and methods

We included patients diagnosed with type 2 diabetes mellitus, who were older than 50 years of age and who were

Table 1 Patients with type 2 diabetes mellitus. Characteristics of the study sample.

	Averages
Age (years)	63 \pm 7.4
Sex	
Male (n)	167
Female (n)	155
Time with diabetes (years)	17.51 \pm 2.22
Ulcer size (mm)	8.5 \pm 0.5
Time with ulcer (years)	1.22 \pm 3.7
Associated disease	
Infection (n)	7 (4.27%)
Gangrene (n)	1 (0.61%)
Treatment plan	
Glibenclamide (mg/day)	5-10
Metformin (mg/day)	850-1700
Dietary hygienic regime (n)	322
Adherence to the treatment	322 (100%)
HbA1c (%)	5.6 (4.97-5.71)

Source: data obtained by authors.

treated at the Hospital III-1 Belén de Trujillo throughout 2015. Patients were selected from the patients regularly controlled in the Program of Diabetes Control who showed good adherence to the treatment; those who had partial or total lower limb amputation were excluded. The sample was selected randomly. The variable, diabetic foot ulcer, was defined by the solution of skin continuity in any region below the ankle of any depth level with or without complications in people affected with diabetes. It also included gangrene and necrosis.^{12,25} Peripheral arterial disease was defined by an ankle-brachial index less than or equal to 0.91, using a portable vascular Doppler device. The ankle-brachial index is obtained by measuring the systolic blood pressure of both brachial arteries and both posterior tibial arteries using a portable vascular Doppler device. Brachial pressure is measured in both arms, and the highest pressure is used for the calculation of ABI; Ankle pressure of the posterior tibial artery is determined on each foot, and subsequently, the greater of these two measurements are used for the calculation of ABI. The index is obtained from the division of both arterial pressures.^{10,12,26}

The sample size was calculated for a confidence level of 95% and an accuracy of 0.05, then corrected for finite population, thus obtaining a sample size of 322 elements. The research was done with a transversal analytical model to measure the association between both variables.

Results

Data presented in this study determined PAD and its association with DFU in patients with type 2 diabetes mellitus. The characteristics of the studied patients are shown in Table 1.

Obtained results show frequencies found with their respective percentages in a contingency chart for PAD and DFU variables; the association between both variables was

Download English Version:

<https://daneshyari.com/en/article/8926006>

Download Persian Version:

<https://daneshyari.com/article/8926006>

[Daneshyari.com](https://daneshyari.com)