Case Report
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The importance of collaterality for the advanced healing of neuroischemic diabetic foot injuries

Abstract

We present a case of a non resvacularizable patient in a neuroischemic diabetic foot. Where multidisciplinary treatment is proposed i.e., infectology, vascular surgery, endocrinology and physical-therapy. TIME (acronym: tissue, infection, moisture, edge); utilization for advanced and adjuvant care. Culminating in its healing and rehabilitation.

Keywords: non revascularizable, neuroischemic diabetic foot, advanced cure

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Paola S Belsito Malaspina, Silvia E Gorosito
Cardiovascular surgeon, Argentina

Correspondence: Paola S Belsito Malaspina, General Acute Hospital Dr Cosme Argerich, Cardiovascular Surgeon Department, Vascular Periferic Unit, Healing and Care of Chronic Wounds Interdisciplinary Group, Bulnes, 1051 floor 1 Department A CP(1178), Ciudad Autónoma de Buenos Aires, Argentina, Tel +5491164927806, Email paobelsito@gmail.com

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Introduction

Peripheral arterial disease (PAD) has 2 to 4 higer incidence in diabetic patients. It's the most frequent cause of non-traumatic amputation in the world. Intermittent claudication is 3.8 and 6.5 times more frequent in diabetic men and women, respectively, than in non-diabetic patients.[1] The 28% to 32% of the diabetic population older than 10 years of evolution of the disease present macroangiopathy below the knee.[2] The absence of just one pulse increases 6.3 times the incidence of diabetic foot ulcer,[3] so it's must be detected in the physical examination. Its appearance is closely related to advanced age, the time of evolution of diabetes mellitus and the presence of diabetic neuropathy. The presentation of the PAD in diabetic patients has the peculiarity of being located in more distal territories and it's characterized by calcification of the middle layer of the vessels (Monckeberg's sclerosis). On the other hand, we define diabetic foot to any infection, ulcer or tissue destruction, associated with neuropathy and / or PAD of lower limbs in people with Diabetes.[4,5] In order to promote wound healing, a wet cure is recommended because to increase the growth of granulation tissue. Also we have to generate a protecting barrier from external aggressions and infectious agents. The moist environment in the wound also maintains the proper temperature to stimulate fibrinolysis. The mechanism of action in this type of cure is based on the absorption and retention of the exudate. It's called a cure in a wet environment to one that maintains physiological and environmental conditions on the bed of an ulcer or chronic wound similar to tissues inferior to the epidermis. In the epithelialization phase we continue with the wet cures dressings that protect from injuries and infections. It's also allowed to delay the time between the cures and prevent damage the newly formed tissues too much. Actually, there are many products and dressings that promote wet healing, reducing the possibility of infection. The wide variety of products offered demands the professional to know their main characteristics and indications. The clinical knowledge of the professional and his experience are fundamental to choosing the better treatment of the ulcer.[6]

Development

We present a 68 year old female with a history of insulin-dependent type II Diabetes, arterial hypertension, dyslipidemia, and former tobacco addiction. She entered the Vascular Surgery Service presenting diabetic neuroischemic foot. At the physical examination: bilateral tibialis occlusion, sensory neuropathy 5/5 (assessed with monofilament test and diapason test), motor neuropathy (muscle atrophy and claw toes). Dry necrotic lesion covered the entire the left foot sole. Arterial Doppler ultrasonography of the lower limb was performed: common and deep femoral artery with diffuse atheromatous disease, superficial femoral artery with diffuse atheromatosis and fibrocalcic plaque less than 50%, popliteal artery with diffuse atheromatosis and triphasic flow. Occlusive lesion at the level of anterior, posterior and peroneal tibial artery with distal monophasic flow. Ankle brachial index >1, with incompressible posterior tibial absolute pressure. Arteriography: Confirms these lesions and distal collateral circulation depend on posterior and peroneal tibial artery. It's no revascularizable disease. It was treated with vasodilators: sildenafil, pentoxifylline, cilostazol, acetylsalicylic acid, clopidogrel and atorvastatin. Advanced wound healing was started, with surgical debridement, removing the dry necrotic plaque, leaving a bed 100% fibrin free. Injury area covers the whole foot sole (Figures 1&2). In a second time, it's converted by fibrin that it's treat with hydrocolloid gel. Multiple toilettes and biopsy samples of soft tissue and bone culture ruled out osteomyelitis. Once the bed is debrided, it's placed as a acellular xenogenic isomorphic matrices porcine (dermis skin substitute) obtaining 100% integration.[5,7] The lesion area was extensive so we added adjuvant treatments: human recombinant epidermal growth factors, intralesional and perilesional form 3 times a week (a total of 18 ampoules provided by their social coverage)[8] (Figures 3–8). After 2 months of healing, the wound was closed, without the need of a skin graft and with good scar quality (Figures 9&10). It's derived to kinesiology for motor rehabilitation and physiatry for orthosis equipment and custom-made orthopedic shoes, with very good evolution.

Figure 1 Trophic injury in heel Ulcer by pressure.

Figure 2 Trophic injury covers the entire sole.

Figure 3 Surgical toilette of the lesion.

Figure 4 Advanced cure with silver dressings.

Figure 5 Calcaneal necrosis.

Figure 6 Dermal inclusion 5th day postoperatively.

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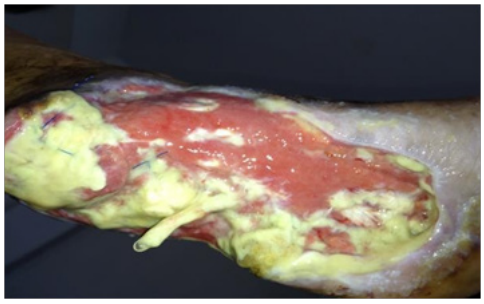

Figure 7 Dermal inclusion 7th postoperative day.

Figure 8 Dermal inclusion after 10 days.

Figure 9 Decrease in the size of the lesion.

Figure 10 Decrease 90% of the lesion.

Conclusion

Several international publications reflect a drastic reduction of major amputations of the diabetic foot since the implementation of multidisciplinary units. Added to the skills of the team and their constant training in the subject.[9] The diabetic foot is conditioned by endothelial damage in the field of atherosclerosis and microthrombi, as well as ischemia, due to neurological damage in addition to wrong foot support. It's mostly secondary to a mixed neuropathic and vascular problem. Just 15% is only vascular, macro and microangiopathy. There are many compensation mechanisms. One of the most common is by peroneal artery when anterior and posterior tibial arteries are concluded. The more frequent pattern in diabetics with critical isquemia is the femoropopliteal conclusion combinated with tibial disease. There are also combined patterns, this finding being the most common in patients with severe ischemia. Finally, at the level of the vessels of the foot, the arterial network of the foot or plantar arch forms a continuous circuit that supplies blood to all segments, even in the presence of arterial occlusion.[10] We believe that multidiscipline is important to apply advanced and adjuvant treatments as well we have to take advantage of medical treatment to stimulate arterial collaterality.

Ethical principles

No human or animal experiments.

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None.

Conflicts of interest

The author declares that there are no conflicts of interest.

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