

# Diagnosis and treatment of Martorell's hypertensive ulcer: review article

**RESUMO** | Introdução: A úlcera hipertensiva de Martorell é uma ferida crônica, associada a hipertensão arterial sistêmica, de difícil manejo clínico e subdiagnosticada. Objetivo: Investigar os métodos de diagnóstico e os tratamentos existentes para a UHM. Método: Estudo descritivo e qualitativo de revisão integrativa com a análise sistemática de referências bibliográficas nas bases de dados PubMed, SciELO, MEDLINE e LILACS no período de 2016 e 2021, e periódicos da CAPES. Resultados: Clinicamente o paciente apresenta uma ferida pequena, de forma arredondada, superficial, com margens necróticas e cianóticas e eritema perilesional eventual. Os pulsos distais usualmente estão presentes e há ausência de edema e varizes locais. De todos os sinais e sintomas relatados, destaca-se a dor, descrita como intensa e desproporcional à sua dimensão. Conclusão: O cerne ao diagnóstico é avaliação clínica e o tratamento é a normalização da pressão arterial sistêmica e curativos regulares e, uso de analgésicos, antibióticos e vasodilatadores periféricos.

**Descritores:** Ferimentos e Lesões; Úlcera Cutânea; Hipertensão; Úlcera de perna.

**ABSTRACT** | Introduction: Martorell's hypertensive ulcer is a chronic wound, associated with systemic hypertension with difficult clinical management and it is often underdiagnosed. Goal: To investigate the diagnostic method and current treatments for Martorell's hypertensive ulcer disease. Method: A descriptive and qualitative study of integrative literature review with a systematic analysis of bibliographic references from PubMed, SciELO, MEDLINE and LILACS databases, ranging from 2016 to 2021, as well as selected articles from CAPES journals. Results: patients usually present with a small, rounded and superficial wound with cyanotic and necrotic edges and occasional perilesional erythema. Distal pulses are usually present and there is an absence of edema and local varicose veins. From all the signs and symptoms reported by patients with this type of injury, it is possible to point out that the pain is intense and disproportionate to its dimension. Conclusion: The core of diagnosis is the clinical evaluation and the treatment is controlled systemic blood pressure, regular bandages and, if needed, analgesics, antibiotics and peripheral vasodilators.

**Keywords:** Wounds and Injuries; Cutaneous Ulcer; Hypertension; Leg Ulcer

**RESUMEN** | Introducción: La úlcera hipertensiva de Martorell es una herida crónica, asociada a la hipertensión arterial sistémica, de difícil manejo clínico y muchas veces subdiagnosticada. Objetivo: Investigar los métodos de diagnóstico y tratamientos existentes para este tipo de lesión. Método: Se realizó un análisis sistemático de referencias bibliográficas en las bases de datos PubMed, SciELO, MEDLINE y LILACS en el período de publicación entre 2016 y 2021, además de artículos seleccionados de revistas CAPES. Resultados: Clinicamente el paciente suele presentarse con una pequeña herida, redondeada, superficial, con márgenes necróticos y cianóticos con eritema perilesional ocasional. Los pulsos distales suelen estar presentes y hay ausencia de edema y venas varicosas locales. De todos los signos y síntomas reportados por los pacientes con este tipo de lesiones, se destaca el dolor, que se describe como intenso y desproporcionado con la zona de la herida y su tamaño. Conclusión: La base del tratamiento es la normalización de la presión arterial sistémica y los apósitos regulares y, si necesario, analgésicos, antibióticos y vaso dilatadores periféricos.

**Palabras claves:** Heridas y Traumatismos; Úlcera de piel; Hipertensión; úlcera de pierna

## Hélio Martins do Nascimento Filho

Nurse. Master in Science, Technology and Management Applied to Tissue Regeneration by Unifesp. Nurse at the Family Health Unit / USF in Conselheiro Lafaiete – MG. Professor at the Postgraduate Course in Dermatological Nursing with Emphasis on Wound Treatment at FAIPE Faculty (Cuiabá-MT).

ORCID-ID: 0000-0003-3700-3910.

## Fabiola Arantes Ferreira

Nurse. Master in Nursing in Intensive Care, graduated in Nursing from UEMG. ORCID: 0000-0001-7360-820X.

## Elisângela Soares da Silva Reis

Nurse. Specialist in Medium High Complexity Nursing - Stomatherapy by UFMG and in Emergency Urgency and Trauma Nursing by PUC de Minas Gerais (2011). She is currently a Nurse at Hospital Sofia Feldman.

ORCID: 0000-0001-9753-062X.

## Daniela Tinti Moreira Borges

Nurse. Professional Master in Science from UNIFESP/SP; Stomal therapist, by FAMERP/SP (2019). Professor of Undergraduate Nursing at AEMS (Integrated Faculties of Três Lagoas/MS).

ORCID: 0000-0001-8890-8918.

## Flávia Carla Takaki Cavichioli

Nurse. Master in Science, Technology and Management Applied to Tissue Regeneration by UNIFESP.

ORCID-ID: 0000-0003-2277-9548.

## Lara Mendes Chaer Rezende Costa

Specialist in General Surgery and Angiology and Vascular Surgery, graduated in: Medicine from the Faculty of Medical Sciences and Health of Juiz de Fora.

ORCID: 0000-0001-7131-0960.

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## INTRODUCTION

**S**kin wound or injury can be defined as the rupture of one or more layers of human skin with changes in the anatomy and physiology of the integument that lead to failures in the tissue regeneration process and can become a chronic condition and in this case described as a problem of public health in Brazil and in the world with high treatment costs, social and emotional impacts. <sup>(1)</sup>

Leg ulcers are responsible for the vast majority of skin lesions and are more prevalent in women. Diseases such as Diabetes Mellitus (DM), Systemic Arterial Hypertension (SAH), Peripheral Arterial Obstructive Disease (PAOD), dyslipidemia, anemia and other factors such as age, gender, smoking, alcohol consumption and overweight can favor its development. <sup>(1,2,4,5)</sup>

In the United States of America (USA), the incidence of patients with complex wounds varies between 1 and 4% and in the elderly this rate reaches 6% of Americans. Wounds have different etiologies, especially the so-called vasculogenic ulcers, which are responsible for about 80% of the total cases, especially venous etiologies (up to 90%), arterial ulcers (from 5 to 25%), mixed ulcers (from 3 to 8%) and those related to vasculitis (from 1 to 3%). <sup>(2,3,6)</sup>

Martorell Hypertensive Ulcer (MHU) is related to ischemia of arterioles resulting from systemic arterial hypertension without adequate control for long periods and was first described in 1945 by the cardiologist Otzet Fernando Martorell, in Barcelona, Spain. Martorell identified the lesion in four obese and hypertensive women. <sup>(7-9)</sup>

The clinical presentation of MHU is solitary lesions that are often symmetrically present on the extremities and external face of the lower limbs, presenting as a single painful wound with an irregular appearance and is superficial. These lesions show rapid

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growth and changes in arterial hypertension, making it difficult to control pain. MHU is more prevalent in female patients aged between 55 and 65 years, but it is underdiagnosed, which may even corroborate the low availability of research on the lesion. <sup>(7,8,10)</sup>

The aim of the study was to discuss and investigate the ways of diagnosing and treating patients with Martorell Hypertensive Ulcer (MHU).

## METHOD

This is a descriptive and qualitative study, carried out through an integrative literature review on the approach to the topic of Hypertensive Ulcer of Martorell, seeking to answer the following guiding question: "What are the diagnostic methods and treatments for Martorell's Hypertensive Ulcers (MHU)?"

For the bibliographical survey, search strategies were carried out using the descriptors and their combinations in Portuguese and English: "Leg ulcer" and "Skin ulcer". The selection of studies followed the following inclusion criteria: indexed or electronically cataloged publications available in full in the Pubmed and BVS databases, in the period from 2016 to 2021 that addressed the proposed theme. A total of 566 works were found, repeated works were excluded, and after reading the abstracts, 44 (forty-four) articles were selected, which were relevant to the topic addressed. In the literature search, articles from the journal Nursing do not return. After reading the works in full, twenty-five works were excluded for not framing the thematic approach. The search strategy is shown in Figure 1.

As shown in Figure 1, nineteen articles were selected that addressed the Martorell Hypertensive Ulcer (MHU) approach.

## RESULTS

**Table 1 - Summary of selected articles**

Authors and Year of Publication	Title	Main results
Chicote-Álvarez et al. (2019) <sup>(11)</sup>	Martorell hypertensive ulcers. A rare complication of high blood pressure	Case study of a 51-year-old male patient, with uncontrolled hypertension, DM 2 and rehabilitation after suffering an ischemic stroke after an embolism and presenting with Martorell's ulcer. It was found that the fastest treatment is surgery, for adequate pain control, with debridement of the necrotic tissue.
Malphrus (2019) <sup>(12)</sup>	A Novel Association of Martorell Ulcer With Liddle Syndrome	Case study of surgical treatment of a Martorell's ulcer in a 69-year-old woman with Liddle's syndrome. It is the first case reported in the literature of this ulcer. More studies are needed to facilitate diagnosis and treatment.
Munoz et al. (2019) <sup>(7)</sup>	Treatment of Martorell's hypertensive ischemic ulcer with autologous stamp micrografts	In the 3 cases of UIHM presented, autologous micrograft therapy (MAS) allowed healing periods of less than 2 months, with associated pain control. It is a safe and effective therapeutic option, with simple outpatient application and low morbidity for the patient.
Kolius et al. (2018) <sup>(13)</sup>	Comparison of pyoderma gangrenosum and Martorell hypertensive ischaemic leg ulcer in a Swiss cohort	Pyoderma gangrenosum (PG) is a rare neutrophilic dermatosis with painful and sterile skin ulcerations of unknown etiology. Larger prospective studies or international registries of these rare ulcerative skin diseases are needed to confirm these findings and facilitate diagnosis and treatment.
Wirsing et al. (2019) <sup>(14)</sup>	Martorell's Ulcer Successfully Treated by Wireless Microcurrent Stimulation Technology	Case study on the use of wireless microcurrent stimulation for the healing of Martorell's Ulcer. Wireless microcurrent stimulation reduced the size of a large Martorell's ulcer by 90% in 8 weeks. Comparison with traditional methods of ulcer healing with wireless microcurrent stimulation demonstrated the effectiveness of the use of this technology.
Serpa et al. (2018) <sup>(15)</sup>	A Challenging Diagnosis of Leg Ulcer	Martorell's hypertensive ulcer is largely ignored and underdiagnosed. African-American patient with long-term hypertension who presented with a very painful leg ulcer. Diagnosis was complicated by the coexistence of the most common causes of ulcer but was made possible by biopsy. Standard treatment is adequate blood pressure control.
Hafner (2016) <sup>(9)</sup>	Calciphylaxis and Martorell Hypertensive Ischemic Leg Ulcer: Same Pattern – One Pathophysiology	Study presents the comparison of: calciphylaxis (distal pattern); calciphylaxis; Martorell's hypertensive ischemic leg ulcer and calciphylaxis with normal renal and parathyroid function. The four diagnoses are little known in the medical field in most countries, a fact that makes the differential diagnosis and treatment of these diseases difficult.

Source: Authors, 2021

07 (seven) articles corresponding to the inclusion criteria were selected for this study. Among them, five (71,4%) portray case studies, describing the difficulty of differential diagnosis and treatment, and conclude that there are few studies on Martorell's Ulcer; and only two (28,6%) studies discuss Martorell's Ulcer by comparing it with other diseases, emphasizing the difficulty in diagnosing it for proper treatment. The main results of the selected studies can be seen in Table 1.

Although the etiology of MHU is not fully understood, several factors are related to its development. Among the reasons are increased vascular resistance in the wound region responsible for infarction in arterioles and tissue necro-

sis, atypical arteriolar response to vasoactive component, changes in sympathetic innervation, constant arteriolar hypertonia and trauma that interferes with terminal circulation. The pathophysiology of the wound is related to arteriosclerotic alterations due to poor control of arterial hypertension that can lead to the development of hyalinosis responsible for the increase in local vascular resistance and reduction in the perfusion pressure in the tegument. <sup>(7,11)</sup>

The prevalence of Martorell Hypertensive Ulcer (HMU) is in individuals over 60 years of age and with long-term systemic arterial hypertension without adequate disease control. There is an association with underlying pathologies such as obesity, chronic venous in-

sufficiency and peripheral arterial disease. In addition, about 60% of patients with MHU are diabetic (type 2) and have ankle pressure  $\geq 60$ mmHg. <sup>(6,7,9)</sup>

The main form of diagnosis of MHU is fundamentally clinical, by excluding other causes. The definitive diagnosis is determined by biopsy through histopathological analysis. The specimen should be taken through healthy and affected tissues and be of sufficient length and depth, measuring 6 cm in length, 6 mm in width and 6–40 mm in width in depth and extending to the leg fascia or other deep sites of the subcutaneous. The histopathological findings found are obstructive lesions in subcutaneous arterioles due to thickening of the endothelium, medial layer and arte-

riolar hyalinosis. (7,9,12-15)

MHU initially presents with skin infarction of a livid and painful area, usually characterized by racemose livedo, which quickly becomes necrotic and margin with subcutaneous stenosis related to arteriolosclerosis, accompanied by medial calcinosis. The wound has a rounded, superficial appearance, usually small with necrotic and cyanotic margins, associated with perilesional skin erythema. Distal pulses are present and there is no edema and local varicose veins. (9,12,15-19)

Patients with MHU, in 90% of the cases, present a lesion most commonly in the lateral malleolar region (anterior lateral or supramalleolar), with progressive evolution of skin necrosis and extremely painful, with a marked predisposition to the lower laterodorsal part of the leg or above the Achilles tendon. It can arise spontaneously (44,4% of cases) or secondary to local trauma (55,6% of cases). (6,9,12,14,15,18,19)

Among the signs and symptoms reported by patients with MHU, pain stands out. The gradation of pain is intense and disproportionate to the wound area. The cause is related to the stimulation of nerve endings that generate pain and local instability of electrolytes and pH, in addition to the presence of necrotic and/or non-viable tissue. Controlling the patient's pain is a fundamental part of the therapeutic plan and, in most cases, it is necessary to prescribe potent analgesics based on codeine, tramadol and pregabalin, in addition to peripheral vasodilators such as cilostazol, respecting any contraindications. Surgical treatments such as debridement and grafting may be needed to aid wound healing. (5,6,9,11,12,18,19)

Patient care with MHU should preferably take place by a multidisciplinary team of health professionals and with a transdisciplinary approach formed by nurses, physiotherapists, physicians, nutritionists, among others. (9)

Some authors suggest the control

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of systemic blood pressure levels in accordance with those recommended by the Brazilian Societies of Cardiology with the use of antihypertensive drugs as first-line treatment for patients with Martorell's Hypertensive Ulcer, to contribute to the healing process of the lesion. Studies also suggest the combination with selective anti-hypertensive agents, such as calcium channel blockers and angiotensin-converting enzyme inhibitors, or with other selective anti-hypertensive A1 blockers that reduce local vasoconstriction, including highly selective blockers such as bisoprolol or nebivolol. Due to the extreme pain caused by the wound, even with adequate antihypertensive treatment, most patients develop high blood pressure peaks that may require medication adjustments. (7,9,20,21)

Some studies recommend early debridement and skin grafting to improve wound healing and pain relief. Most patients require an adjustment of resistance to systemic antibiotic therapy in this acute surgical treatment. When the skin graft procedure is successful, the severe wound pain usually disappears surprisingly quickly to a bearable level in approximately 1-2 days.

It is usually possible to heal the remaining wound over weeks and months of conservative treatment and with good quality of life. About 30-40% of patients require 2 and sometimes even 3 skin grafts to stop the onset of necrosis and favor the tissue regeneration process. (9)

Nurses play a key role in the assessment and management of patients with MHU, providing a variety of care such as dressings, guidance on prescribed medications and coordinating the involvement of other healthcare professionals. For dressings, interactive dressings are recommended, capable of favoring the regeneration of the injured tissue with ideal maintenance of humidity, temperature and neoangiogenesis. (6,11)

## DISCUSSION

Martorell Hypertensive Ulcer (HMU) is a rare syndrome, widely ignored and underdiagnosed. In cases of confirmed Martorell Hypertensive Ulcer, these patients have hypertension and diabetes and present the typical ulcer is in the lower leg, it is extremely painful and presents in female patients over 60 years of age, with cardiovascular risk factors, especially severe systemic arterial hypertension, in addition to excruciating pain disproportionate to the ulceration area. <sup>(13,16,18-20)</sup>

It is a challenge to characterize the MHU, given the identification of few studies on the subject. <sup>(13,18,19)</sup>

Among the challenges encountered is the differential diagnosis among chronic wounds. The clinical presentations, underlying etiology, and patho-

logical manifestations of ulcers are the main clues to diagnosis. Studies have shown that 50% of 31 cases of patients with Martorell Hypertensive Ulcer were misdiagnosed as gangrenous aspyoderma and 20% as necrotizing vasculitis. <sup>(17,19,20)</sup>

Treatment is aimed at controlling SAH and pain control with oral analgesics or lumbar sympathectomy (to block vasospasm and reduce vascular resistance) may be considered. Narcotic analgesics should be administered in conjunction with pregabalin or tricyclic antidepressants due to neuropathic pain, which is a common complaint presented among patients affected with MHU. <sup>(19-21)</sup>

## CONCLUSION

Studies on MHU are scarce, which may corroborate the underdiagnosis of

the disease. The difficulty in diagnosing and treating patients was highlighted due to the professionals' lack of knowledge about this disease. MHU diagnosis is clinical and confirmed by histopathological analysis through wound biopsy. Treatment includes control of SAH, medications, dressings, and surgical procedures and pain control with the prescription of analgesic medications for the comfort of the patient. Treatment is complex and challenges health professionals during patient care. Multidisciplinary treatment can optimize wound healing, reducing treatment time and, therefore, the patient's suffering. It is necessary to discuss the clinical cases and carry out new studies to expand the possibilities of early diagnosis and treatment, allowing for a reduction in new occurrences and time of treatment and healing of MHUs. 🐦

## References

- Cortez DN, Moraes JT, Ferreira IR, Silva EL, Lanza FM. Custos do tratamento de lesões cutâneas na Atenção Primária à Saúde. *Estima*. 2019;17:1-7.
- Borges EL, Nascimento Filho HM, Pires Junior JF. Prevalência de lesões crônicas de município da Zona da Mata Mineira (Brasil). *Rev Min Enferm*. 2018;22:1-7.
- Martínez-Santos AE, Bouza ET, Cartelle JAP. Conocimiento enfermero sobre prevención, diagnóstico y cuidados de las úlceras de extremidad inferior en un área sanitaria. *Gerokomos*. 2019;30(1):34-41.
- Barber GA, Weller CD, Gibson SJ. Effects and associations of nutrition in patients with venous leg ulcers: a systematic review. *J Adv Nurs*. 2017;74(4):774-87.
- Loos M, Coringrato M, Liliana O. Úlcera hipertensiva de Martorell. *Dermatol Argent*. 2017;23(2):58-65.
- Calle JFJ, Marín SGY, Carvajal CAS, Mena VPC. Úlcera de Martorell: diagnóstico. *Recimundo*. 2020;4(1):54-62.
- Munoz SG, Montero EC, Dobao PC. Tratamiento de la úlcera isquémica hipertensiva de Martorell con microinjertos autólogos ensello. *Rev Actas Dermosifiliogr*. 2019;110(8):689-90.
- Malaspina PSB, Gorosito SE, Petovello F, Márquez M, Trila C, Miravalle D. Diagnóstico y tratamiento de la úlcera de Martorell. *Rev Flebología*. 2016;42(3):37-40.
- Hafner J. Calciphylaxis and Martorell Hypertensive Ischemic Leg Ulcer: same pattern – One pathophysiology. *Dermatology* 2016;232(5):523-33.
- Bachero JG, Baldrich YG, Palasí CR. Caso de una úlcera hipertensiva de Martorell: importancia de una buena anamnesis y diagnóstico para su resolución. *Enferm Dermatol*. 2017;11(30):57-63.
- Chicote-Álvarez E, Santos-Méndez N, Lizama-Gómez NG, Ortiz-Flores F. Úlceras hipertensivas de Martorell: una complicación infrecuente de la hipertensión arterial. *Soc Esp Med Rural Gen*. 2019;45(8):49-50.
- Malphrus E, Couch K, Chao JW. A Novel Association of Martorell ulcer with liddle syndrome. *Adv Skin Wound Care*. 2019;32(11):1-2.
- Kolius AGA, Hafner J, Luder C, Guenova E, Kerl K, Kemp W, et al. Comparison of pyoderma gangrenosum and Martorell hypertensive ischaemic leg ulcer in a Swiss cohort. *Br J Dermatol*. 2018;178(2):125-6.
- Wirsing PG, Konstantakaki M, Poulas AK. Martorell's Ulcer Successfully treated by wireless microcurrent stimulation technology. *Adv Skin Wound Care*. 2019;32(2):81-4.
- Serpa MJ, Franco S, Repolho D, Araújo I, Mateus S, Baptista AM, et al. A challenging diagnosis of leg ulcer. *Eur J Case Rep Intern Med*. 2018 24;5(10):1-4.
- Pinto APFL, Silva-Júnior NA, Osório CT, Rivera LM, Carneiro S, Ramos-e-Silva M, et al. Martorell's ulcer: diagnostic and therapeutic challenge. *Case Rep Dermatol*. 2015;7(2):199-206.
- Pontes AAN, Macieira NFZ, Sousa RJ. Úlcera de Martorell: análise epidemiológica e clínica em pacientes portadores de diabetes mellitus tipo 2. *Rev Saúde Ciênc*. 2017;6(2):5-11.
- Malhi HK, Didan A, Ponosh S, Kumarasinghe SP. Painful leg ulceration in a poorly controlled hypertensive patient: a case report of Martorell ulcer. *Case Rep Dermatol*. 2017;9(1):95-102.
- Estrela FM, Soares VA, Moreira BSG, Gomes NP, Santana LC, Lima CCOJ. Úlcera hipertensiva: uso da cobertura de espuma de poliuretano com ibuprofeno. *Rev Pelle Sana*. 2016;3:54-61.
- Fiçrioğlu S, Can N, Tutu B. A case of chronic ulcer due to subcutaneous arteriosclerosis in an obese patient mimicking pyoderma gangrenosum. *Dermatol Reports*. 2018;10(1):7445.
- Malhi HK, Didan A, Ponosh S, Kumarasinghe SP. Painful leg ulceration in a poorly controlled hypertensive patient: a case report of Martorell ulcer. *Case Rep Dermatol*. 2017;9(1):95-102.