

# Martorell hypertensive ischaemic leg ulcer

## *The ulcer nobody is talking about.....but should*

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Wound healing refers to a person's ability to restore tissue that has been compromised. In chronic wounds, there is a significant delay in this restoration process and this delay can be due to various intrinsic (underlying comorbidities) or extrinsic (environment, positioning) factors found in a patient. The first step in the assessment of a clinical wound is to distinguish between chronic and acute wounds; this is easily done by taking a comprehensive history during consultation. A comprehensive medical history will include:

- *current wound history* (onset, causal factors, pain, size, drainage, current wound care),
- *prior wound history* (similar wounds in the past, how long did they take to heal),
- *medical history* (comorbidities such as hypertension, diabetes, kidney disease, nerve involvement),
- *social history* (cigarette smoking, alcohol use, nutritional status, obesity, age), and
- *surgical history* (previous wounds with delayed healing, surgery to manage non-healing, grafting, ablation of veins, vascular surgery).

Acute wounds are usually caused by surgical interventions and/or trauma, with a certain expectation of healing in terms of the time trajectory. Healing will occur if all physiological processes are intact, leading to initial inflammation, proliferation and finally maturation. An acute wound caused by trauma or surgical incision can develop into a chronic wound if the intrinsic and extrinsic factors are not managed effectively. Chronic wounds are complicated and need a multi-faceted approach. What is of utmost importance, is to make the right diagnosis based on the aetiology.

In this article, the focus will be on the Martorell hypertensive ischaemic leg ulcer (HYTILU). The HYTILU was first described in 1945 by Fernandes

Martorell in Barcelona, Spain.<sup>1</sup> These ulcers were seen in four of his patients, all were obese and had painful ulcers on the lateral aspect of the lower limbs. In 1946, Hines, Faber and coworkers reported an association of similar, clinically described ulcers with a histological appearance of *hypertrophic stenotic subcutaneous arterioles* and the term Hypertensive Ischaemic ulcer was coined.<sup>2</sup> Schnier et al. studied a series of 40 patients, all of whom had an ulcer on the latero-dorsal aspect of the lower leg. It was found that HYTILU had clinical and histopathological similarities with calciphylaxis, also known as calcific uraemic arteriolopathy as well as eutrophication in morbidly obese patients.<sup>3</sup> Eutrophication refers to spontaneous and often progressive dermatoliponecrosis and panniculitis seen in morbidly obese patients and is often referred to as non-uraemic calciphylaxis.<sup>4</sup> The pathophysiology is thought to be a result of medial calcification obliterating the small arterioles in the lower limb.

We can therefore distinguish between four manifestations of ischaemic arteriosclerosis namely HYTILU, calciphylaxis (proximal pattern), calciphylaxis (distal pattern) and non-uraemic calciphylaxis (eutrophication). The differences are listed in Table I.

HYTILUs are less common and therefore can easily be confused with venous ulcers, pressure injuries, diabetic foot ulcers, ischaemic ulcers and ulcers caused by malignancies. Table I compares the four disease entities' characteristics.

The common symptoms or characteristics found in patients presenting with HYTILU are:<sup>1</sup>

1. Longstanding history of hypertension, typically well controlled.
2. Location of an ulcer in the supra-malleolar region of the anterolateral leg or the Achilles tendon region, often bilateral involvement, in some cases satellite lesions.

**Table I:** Differences between these four disease entities

Disease/Synonym	Wound location	Kidney function	Mortality
Calciphylaxis, distal (calcific uraemic arteriolopathy)	Legs and forearms, penis, toes, fingers	End stage renal disease	± 10%
Calciphylaxis, proximal (calcific uraemic arteriolopathy)	Trunk, upper arms, thighs	End stage renal disease	50–70%
Martorell HYTILU (angiodermite necrotique)	Latero-dorsal lower leg, Achilles tendon	Typically, normal renal function	± 10%
Nonuraemic calciphylaxis (calciphylaxis in normal renal and PTH function/eutrophication in morbid obesity)	Trunk, thighs, upper arms	Normal renal and PTH function	50–70%

3. More prevalent in overweight, female patients.
4. Ulcer starts as a red patch that becomes cyanotic resulting in significant pain (pain out of proportion to the size and appearance of the ulcer).
5. Palpable foot pulses but often signs of arterial insufficiency such as hair loss over the affected area and the skin being pale or cold to touch.
6. Diabetes is present in approximately 60% of these patients.
7. Normal kidney function.

A clinical work-up will assist in making the diagnosis. A comprehensive history as previously mentioned, followed by a clinical examination should precede a vascular assessment. An ankle brachial index (ABI), segmental oscilligraphy and catheter-directed angiography (latter performed after duplex doppler) are options to determine local vascular resistance and the inverse "wall to lumen" ratio found in longstanding arterial vasoconstriction. The latter finding is, in some cases, also referred to as "athletic arterioles". If the diagnosis is still questionable after history, examination and vascular assessment, a biopsy will be final confirmation.

A punch biopsy does not extend deep enough to assess the subcutaneous fat that will demonstrate thickening of the arteriolar wall therefore a deep narrow elliptical incisional skin biopsy is more successful in these circumstances.<sup>5</sup>

### Treatment of the HYTLU

Control of hypertension is always important, although in most case studies reported, these chronic hypertensives had well-controlled blood pressure. The use of calcium channel blockers, cardiac-specific beta blockers and angiotensin converting enzyme inhibitors (ACEI) were found to be more efficient due to them not causing vasoconstriction.

The use of anticoagulants is debated but could have a positive impact if the patient has thrombi in already compromised arterioles.

Hyperbaric oxygen therapy could potentially be beneficial but evidence in this particular patient population is not readily available and should be weighed against the side-effects (barotrauma, reversible myopia and seizures).

If the patient is diabetic, stringent blood glucose management is of paramount importance.

Lifestyle modifications such as cessation of smoking, compression stockings (25 to 30 mmHg), weight loss and avoiding trauma will positively contribute to wound healing.<sup>5</sup>

Most HYTLU's need surgical debridement (necrosectomy) with compression therapy and in some cases vacuum-assisted therapy (vac therapy). Large ulcers do better with skin grafting as it was found that it led to a more abrupt improvement of pain.

Some literature promotes a lumbar sympathectomy to promote vasodilatation which in turn improves perfusion; the results though are variable.<sup>6</sup>

In case of a bacterial infection, appropriate antibiotic treatment should commence following a microscopy and sensitivity (MC&S) result.

### Case study

A 70-year-old patient with hypertension, on antihypertensives for many years and on anti-coagulants (following TIs five years earlier), developed an ulcer on her lower leg over the Achilles tendon region. There were no signs that she was immunocompromised and the patient never took corticosteroids. The patient was neither diabetic nor nutritionally deficient and had intact, foot pulses (graded 3+). The ulcer was small (1 cm by 2 cm) and no injury was reported in relation to the onset of the wound, although the patient had sprained her ankle and injured her ligaments. The ulcer was violaceous and extremely painful, and thus treated with wound care and analgesics.

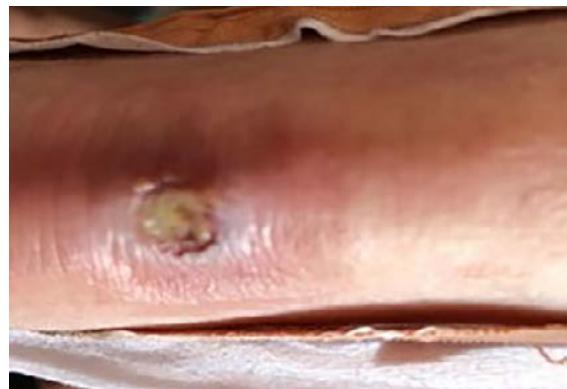


Figure 1: Wound on Achilles region

After two months of wound care, no results were seen, and the patient was still complaining of pain which was considered disproportionate to the size of the ulcer. A consultation with a plastic surgeon followed and it was decided to do a debridement and skin graft instead of wound care only. Unfortunately, the skin graft did not prove to be successful and the follow-up swab taken cultured a *Pseudomonas aeruginosa* infection (possibly nosocomial) with sensitivity to most antibiotics. The patient was admitted to hospital for intravenous antibiotics and to continue wound care. Due to the poor blood supply in the Achilles region, it was decided to perform free flap reconstructive surgery, a pedicle flap from the wrist and the radial artery were transplanted and a micro-anastomosis was established with a vein in the Achilles region under loupe magnification. During the patient's hospital stay, she received intravenous antibiotics as the *Pseudomonas* infection was still unresolved according to follow-up MC&S. Over time various wound dressings were used, depending on careful observation and evaluation. Iodine was frequently used due to its dual function as anti-infective and stimulator of granulation tissue.

The surgery was considered successful as the transplanted flap proved viable with blanching of the skin, confirming that the arterial



Figure 2: Transplanted flap with ex-fixator to protect the surgical site, three weeks postop



Figure 3: Free flap donor area with skin graft, three weeks postoperative

anastomosis was patent. The patient had skin grafted to the donor area on her wrist, which healed as expected (Figure 3). An ex-fixator (Figure 2) was applied to protect the transplanted flap and was removed five weeks post-surgery.

Six weeks after this major surgical intervention, the transplanted free flap and skin graft sites deteriorated unexpectedly. A corynebacterium and *Klebsiella Pneumonia* infection were cultured, pyoderma granulosum was not demonstrated on histology. The patient was admitted to hospital a third time for a debridement and intravenous antibiotics. The Achilles tendon was now exposed, and the transplanted flap size decreased as a result of the procedure. Vacuum assisted therapy (vac therapy) was started whilst the patient was in hospital.

After five weeks of vac therapy, no marked improvement was noted, in fact the wound deteriorated considerably. Clinically, the tendon was compromised and thought to be the source of continuous unresolved infection. It was decided to remove the Achilles tendon and debride the non-viable tissue in an attempt to control the infection and prevent further tissue loss. A mixed infection was cultured during MC&S, a *Peptostreptococcus* infection, as well as a *Staphylococcus aureus*, *Leclercia adecarboxylata* and *Klebsiella pneumoniae* were reported.

The Achilles tendon was removed after intravenous antibiotics were administered to treat the mixed infection (12 weeks after the free flap transplant), and a skin graft was done when a deep tissue biopsy confirmed an infection-free wound bed.

Wound dressings changed over time since the wound onset, depending on clinical assessment. *Promogran* was effective in replacing proteases, important for effective wound healing. *Sorbalgon* stimulated gran-



**Figure 4:** Post debridement and 48-hour vacuum assisted therapy; Achilles tendon exposed.

**Figure 5:** Wound deterioration despite vac therapy



**Figure 6:** Five day post removal of the Achilles tendon and skin grafts

ulation when the wound bed was suitable and wound bed infection was under control. In case of concern about infection, *Cutimed Sorbact* dressings gave acceptable results.

## Conclusion

Despite the unfortunate progression of this wound, diligent wound care, treatment of the appropriate infection and optimal blood pressure control resulted in the aversion of septicaemia and limb loss in this particular patient.

## Conflict of interest

The author declares that there is no conflict of interest.

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## Ethical approval

The patient to whom this case report refers to, is aware of the publishing of this article and agreed to information and photographs being shared in this article and any other publications.

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