



Morel-Lavallée lesion associated with atypical skin damage: a case report

Matteo LUISETTO, Anaïs LEGRAND, Emile VANDROMME, Sofiane BOULARES, Olivier DELAHAUT

Orthopaedics and Traumatology Service ISPPC Charleroi, Université Libre de Bruxelles, Belgium

A Morel-Lavallée lesion is a post-traumatic, soft tissue lesion that is little known and for which there is no standard treatment.

This report describes the case of a 51-year-old man who presented with a large Morel-Lavallée lesion on the left calf that was not diagnosed on two visits to the emergency department. Given the deteriorating condition of the skin, we performed surgical drainage of the effusion because the skin was showing signs of major damage. Complications occurred following surgery, with cellulitis in the lower limb caused by *Citrobacter Koseri*, a gram-negative bacillus that is rarely implicated in soft tissue infections, and wound dehiscence.

The purpose of our article is to present the difficulty involved in choosing the right treatment from among the many proposed in the literature, and to inform any practitioner working in an emergency setting about the existence of this often overlooked condition.

Keywords: Morel-Lavallée lesion; skin damage; treatment; infection.

INTRODUCTION

First described in 1853 by the French surgeon of the same name, a Morel-Lavallée lesion (MLL) is an uncommon post-traumatic degloving injury in which the skin and subcutaneous tissue become separated from the underlying deep fascia. It is caused by a tangential shear force to the skin that tears the lymphatic and blood vessels, creating a subcutaneous effusion (1). These lesions most often

occur in the pelvic area and the trochanteric region as a result of high speed accidents (2) Morel-Lavallée lesions (also called closed degloving injuries). Female gender and obesity ($BMI > 25 \text{ kg/m}^2$) can be risk factors due to the presence of higher volumes of adipose tissue in the areas most often affected (1). However, the prevalence is higher in men when these lesions are associated with polytrauma (3). Given the significant skin vascularisation by the dermal vascular system, excessive skin pressure caused by the MLL effusion can cause skin necrosis (4). Ultrasound is useful in the radiological diagnosis of such lesions, but MRI is the preferred method for determining the nature of the fluids in the lesion, its shape and its acuity or chronicity (5). MRI also makes it possible to classify these lesions into 6 subcategories which are useful in making a therapeutic decision (5). Therapeutic options include conservative treatment with compression

- Matteo Luisetto,
- Anaïs Legrand,
- Emile Vandromme,
- Sofiane Boulares,
- Olivier Delahaut

Orthopaedics and Traumatology Service ISPPC Charleroi, Université Libre de Bruxelles, Belgium.

Correspondence : Matteo Luisetto, Resident, Orthopaedics and Traumatology Service ISPPC Charleroi, Université Libre de Bruxelles, Belgium. Hôpital Civil Marie Curie, Chaussée de Bruxelles 140, 6042 Charleroi. Phone: 003271/ 92 23 85, Fax: 003271/92 23 86.

Email : matteo.luisetto@ulb.be

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No benefits or funds were received in support of this study.
None of the authors have a conflict of interest.

bandages, percutaneous aspirations with or without the injection of sclerosing agents, and surgical drainage or debridement. Low incidence, limited clinical experience and the variability of the symptoms of this condition make it very difficult to establish standard treatments. Recurrence is the most common complication and often poses a problem in therapeutic management.

This report describes the case of a patient presenting with a large MLL causing skin damage across the entire sural region. Surgical drainage in the presence of inflammation was ultimately chosen given the condition of the skin and the size of the lesion. Complications occurred following the surgery, with cellulitis in the lower limb and wound dehiscence.

PRESENTATION OF THE CASE

This report describes the case of a 51-year-old man who works as a signage technician. A heavy sign weighing 300 kg fell on the medial side of his left knee and then slid down his leg before falling to the ground. The patient's medical history includes a gastric bypass in 2016 complicated by an iron deficiency that was treated with supplements, and idiopathic Parkinson's disease diagnosed in 2018. The patient does not use alcohol or tobacco.

The patient visited the emergency department on the same day, complaining of medial malleolar pain. The radiological exam focused on the foot and ankle and came back negative, so the patient was discharged with the diagnosis of an ankle strain injury treated with supportive taping. Three days later, the patient returned to the emergency department with a serious skin condition on his leg. His left calf was covered with a large haematoma chequered with a number of blisters suggestive of skin damage. The radiological exam was complemented with X-rays of the entire leg and knee but also came back negative. It was only a week later that Morel-Lavallée lesion was diagnosed after consultation with an orthopaedic surgeon and based on clinical examination and the lesional mechanism concerned.

Figure 1 shows the patient's calf 12 hours and 7 days post-trauma respectively.

Additional information was acquired using MRI (Figure 2), which showed a large mass measuring



12 hours post-trauma.



1 week post-trauma.

Figure 1.

11.5 x 4 x 19 cm (volume = 874 cc), with an intermediate T1 and T2 signal consistent with a Morel-Lavallée effusion.

Given the size of the lesion (3) and the state of the skin damage, surgical drainage of the effusion was performed from the medial side of the calf, removing a large haematoma (Figure 3). Pre-operative bacteriological sampling revealed the presence of *Citrobacter koseri*, a gram-negative bacillus.

During post-operative follow-up, the skin was free of blisters, but was erythematous and the wound was dehiscent at the upper 4 centimetres (Figure 4). Oral antibiotic treatment with amoxicillin and clavulanic

**Figure 2.**

acid (875 mg, 3x/day) was started. Later, due to lack of improvement, further hospitalisation was needed to start IV antibiotic treatment with ceftriaxone (2g, 1x/day, followed by oral moxifloxacin after 5 days) and to irrigate the wound because pus was seeping from the scar.

The final outcome shows optimal cicatrification after second-line treatment.

DISCUSSION

Before discussing the different treatment options, it should be noted that our case was relatively unique for three reasons. Firstly, the MLL was on the medial side of the calf which is an area that has a low volume of adipose tissue and is rarely affected by this type of lesion in the absence of a concurrent tibia fracture. Vanhegan et al. describe a prevalence of 1.5 % for an MLL on the calf in a series of 200 cases (6). To our knowledge, there is only one other case of an MLL on the calf with no associated fracture (7), and there is nothing in the literature describing a superinfection of an MLL lesion in this area of the body. Secondly, the MLL is not usually associated with such a bad skin condition. Frequently, the skin does not change in appearance. If signs of necrosis

**Figure 3.** — Surgical drainage.**Figure 4.** — 15 days post-operative: secondary infection and wound dehiscence.

do appear, they are more common, manifesting as black colouring to the skin, as reported by Nakajima et al. (8) in two case presentations, and rarely as such a symmetrical chequered pattern of blisters.

Lastly, the superinfection in our patient was fairly exceptional. According to Shen et al., in a series of 153 MLL, the rate of superinfection was 19% (29/153 cases) (9)). There is no bacterium specifically associated with the MLL. When there is superinfection, it involves bacteria commonly found in soft tissue infections, particularly *Staph aureus*. Our complication of cellulitis caused by *Citrobacter koseri* has never been described in the literature. This is logical given that this gram-negative bacillus is very rare in soft tissue infections, with a prevalence of just 0.9% to 1.7%, and is, in France, the fourteenth microbe implicated in cellulitis(10).

On a therapeutic level, there are two approaches to these lesions based on their acuity or chronicity.

According to our review of the literature, it appears that small lesions (with an estimated volume of less than 50 ml) in asymptomatic patients can be treated conservatively with compression bandages and close clinical monitoring (2). Morel-Lavallée lesions (also called closed degloving injuries). For lesions that have a volume of more than 400 ml (3), percutaneous aspiration seems to be the treatment of choice, but may, however, increase their rate of recurrence (9). For recurring lesions, the addition of sclerosing agents (most commonly doxycycline) shows, according to Shen et al., an efficacy rate of 95.7% for cases without associated fractures (9). Surgery is therefore the treatment of choice for large lesions (> 400 ml) (3) or for chronic lesions with the formation of a fibrous capsule requiring debridement. Morel-Lavallée lesions (also called closed degloving injuries) (1,2,3).

Beyond these considerations, skin damage and necrosis are absolute indications for surgical intervention with a possible skin graft or flap reconstruction (1,2). In addition to recurrence and skin necrosis, the third complication of MLL is infection. This complication seems frequent and can have serious consequences when the MLL is associated with a fracture. Hak et al. described a positive culture rate of 46% in MLL associated with pelvic fractures, and 12.5% of patients developed a bone infection after osteosynthesis (11). It would appear that infection is 8.4 times more likely for a pelvic fracture and an MLL than for a fracture only (12), and it would seem that suction drainage performed as early as possible along with percutaneous osteosynthesis would be the best therapeutic choice (13).

The infection in our patient may therefore seem benign, even if it delayed healing. An orthopaedic surgeon must, however, take into consideration this risk in their therapeutic strategy.

CONCLUSION

Through this article, we want to highlight the atypical presentation of this lesion and the absence of standard therapeutic decisions in managing these lesions given their clinical heterogeneity. Nevertheless, it seems clear that widespread knowledge of this condition, although rare, but with a high

risk of superinfection, can lead to faster treatment and therefore prognosis.

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