Learning from errors

Morel-Lavallée syndrome of the tibia

Szabolcs Lajos Molnar,¹ Angel Recarte,¹ Oscar Villafañe,¹ Pedro Lecumberri,¹ Zoltán Csernátóny²¹Department of Orthopaedic Surgery, Mutua Navarra, Pamplona, Spain;²Department of Orthopaedic Surgery, Medical and Health Science Center, University of Debrecen, Debrecen, Hungary**Correspondence to** Dr Szabolcs Lajos Molnar MD, szabolcsmolnadr@gmail.com**Summary**

Morel-Lavallée syndrome of the tibia is a rarely published entity which needs special attention in the treatment of the degloving injury conjoined with tibial fracture. The authors present the case of a radiologically easily manageable tibial fracture complicated by soft tissue damage. The authors discuss the pertinent literature, the pitfalls and controversies of the treatment and the authors would like to offer our suggestions for minimising the complications.

BACKGROUND

There are well-established fracture classifications which serve to determine the mechanism of injury, the absorbed energy, the treatment options and the follow-up.¹ In case of open fractures, the Gustilo–Anderson classification is the most widely used attention to the soft tissues.² In case of closed fractures, the paying evaluation of vasculo-nervous bundles of the extremity and of skin condition must never be mistaken. Östern and Tschern established an approach for this damage³ which advises regular revision (preferably daily) in case where there is a deterioration of the local conditions. The possibility for the attributes and the time of recovery is influenced by the host as described by Cierny.⁴ All these aspects must be evaluated prior to the admission and decisions taken for the treatment of a tibial fracture.

CASE PRESENTATION

A 49-year-old female labourer suffered a closed tibial and fibular fracture. A Tschern II soft tissue injury was found during the first inspection. The Cierny risk classification level was B due to smoking.

INVESTIGATIONS

The tibial and fibular fracture were confirmed with two-plane x-rays. Physical examination demonstrated excellent capillary and arterial flow distal to the fracture side. There were no motor or sensory deficits. Passive movements of the muscles did not suggest pain originated from compartment syndrome.

DIFFERENTIAL DIAGNOSIS

The first lesion to rule out in case of any doubt is vasculo-nervous injury. The best modality to disclose arterial alteration is with angiography. It can demonstrate the rupture, closure or compression of the tibial artery. The nerves can be compressed also in compartment syndrome which is a diagnosis of the intracompartmental pressure. Venous insufficiency can be diagnosed by ultrasound which also can be helpful in case of lymphangitis or lymphocele. Never overlook the signs of acute or chronic infection.

TREATMENT

She was admitted and operated with intramedullar nailing the day after admission. During operation there was diffuse leakage from the incisions without apparent bleeding, degloving or alert of a compartment syndrome. We left drainage for 48 h in the proximal incision and elevated the leg and prolonged her antibiotic dose.

OUTCOME AND FOLLOW-UP

In spite of an excellent vascularity of the extremity and the correct rehabilitation protocol, at the end of the first week, skin necrosis was detected in the distal part (figure 1) so we decided to carry out an open debridement. During the procedure we had to proceed with an extended excision and free graft transplantation. We had to remove one distal screw (figure 2) which later prevented us from performing a rehabilitation protocol fitted to the applied fracture treatment and we also had to discharge the patient much later than anticipated.

DISCUSSION

Morel-Lavallée syndrome was first described in 1848.⁵ It is a closed soft-tissue injury, in which the skin and subcutaneous tissue are separated from the underlying fascia. There are three important details in the deterioration of the skin lesion in case of fracture. First, that the lesion is often not obvious at the beginning; the only clinical sign is leakage or bruising – so there can be a delay to diagnose and manage it.⁶ The diagnostic method can include close inspection for soft fluctuance and skin hypermobility.⁷ The second important detail is the room due to the separation filled with blood and necrotic tissue and can complicate the treatment of the underlying fracture as well. Third, there is the latent possibility of bacterial colonisation.⁸ These three important points emphasise the importance of the performance of the surgeon, because controversy exists about the method of rectification of the fracture, the risk of infection (either osteomyelitis or soft tissue) and devitalising the already-injured skin over the bone lesion.

The general principle of the treatment of Morel-Lavallée syndrome is open debridement with packing or delayed

Figure 1 Soft tissue damage 1 week after the fracture.

closure. However, there is a tendency to use a percutaneous drainage in the first 3 days after the injury as a first trial.⁹ In spite of the seriousness of the damage, the risk of infection is not proportional, as it is a closed injury and the colonisation takes place some time after the haematoma is created, probably as a result of circulating bacteria that are present after major trauma.¹⁰

Due to these controversies, the treatment algorithm is very important. As the risk of infection elevates only with the haematoma formation, we have a 'window' period (presumably some days but not a week) to observe, to revise and to treat the primarily lesion not yet obvious. There is an option for the rapid synthesis of underlying fracture and observation (not more than 3 days) of the soft tissue damage. As the Morel-Lavallée syndrome of the leg is uncommon but is, at the same time, a major soft tissue injury and can leave further complications, we

Figure 2 X-ray of the middle third tibia and fibula fracture (AO 42 A2) – anteroposterior viewed 1 week after the initial fixation (the place of the extracted distal screw which was in the area of skin damage can be seen).

advise (in case of underlying fracture): reducing and fixing the bone, observing the soft tissue damage and treating it within three days if it is necessary = 'fix, wait and see'.

Learning points

- In case of any fracture, the ministering physician must evaluate not only the radiological classification, but the soft tissue injury, the host type and should only then determine the treatment after taking these other details into account.
- If there is a tibial fracture with the possibility of no apparent soft tissue damage, we would advise managing the fracture with the least invasive correction method, prolonging the antibiotic prophylaxis and performing a percutaneous drainage over the first 3 days after the injury.
- Fix, wait and see.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. **Müller ME**, Nazarian S, Koch P, *et al*. The Comprehensive Classification of Fractures of Long Bones. Berlin, Germany: Springer-Verlag 1990.
2. **Gustilo RB**, Anderson JT. Prevention of infection in the treatment of one thousand and twenty-five open fractures of long bones: retrospective and prospective analyses. *J Bone Joint Surg Am* 1976;**58**:453–8.
3. **Östern HJ**, Tschern H. Pathophysiology and classification of soft tissue injuries with fractures. In: Tschern H, Gotzen L, eds. *Fractures with Soft Tissue Injuries (German)*. Telger TC (trans.). Berlin, Germany: Springer-Verlag 1984:1–9.
4. **Cierny G**, Mader JT. Adult chronic osteomyelitis – an overview. *Orthopedics* 1984;**7**:1557–64.
5. **Morel-Lavallée M**. Traumatismes fermes aux membres inférieurs (Tesis). Paris, France: Hauquelin 1848.
6. **Hudson DA**, Knottenbelt JD, Krige JE. Closed degloving injuries: results following conservative surgery. *Plast Reconstr Surg* 1992;**89**:853–5.
7. **Hak DJ**, Olson SA, Matta JM. Diagnosis and management of closed internal degloving injuries associated with pelvic and acetabular fractures: the Morel-Lavallée lesion. *J Trauma* 1997;**42**:1046–51.
8. **Kudsk KA**, Sheldon GF, Walton RL. Degloving injuries of the extremities and torso. *J Trauma* 1981;**21**:835–9.
9. **Tseng S**, Tornetta P3rd. Percutaneous management of Morel-Lavallee lesions. *J Bone Joint Surg Am* 2006;**88**:92–6.
10. **Allgöwer M**, Dürig M, Wolff G. Infection and trauma. *Surg Clin North Am* 1980;**60**:133–44.

This pdf has been created automatically from the final edited text and images.

Copyright 2011 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit

<http://group.bmj.com/group/rights-licensing/permissions>.

BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Please cite this article as follows (you will need to access the article online to obtain the date of publication).

Molnar SL, Recarte A, Villafañe O, Lecumberri P, Csernátóy Z. Morel-Lavallée syndrome of the tibia. *BMJ Case Reports* 2011;10.1136/bcr.05.2011.4227, date of publication

Become a Fellow of BMJ Case Reports today and you can:

- Submit as many cases as you like
- Enjoy fast sympathetic peer review and rapid publication of accepted articles
- Access all the published articles
- Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow