

## CASE REPORT

# Morel-Lavallée lesion of the proximal tibia in an obese patient after low-energy trauma

Dirk Pieter Hogerzeil, Joris Jansen

Orthopaedic Surgery, Alrijne Zorggroep, Leiderdorp, The Netherlands

**Correspondence to**  
Mr Dirk Pieter Hogerzeil,  
dphogerzeil@alrijne.nl

Accepted 16 May 2017

**SUMMARY**

Morel-Lavallée lesions (MLL) are usually localised in the hip or gluteal region, but have rarely been reported at the proximal tibia. We present a case of an overweight patient, aged 59, with a MLL of the left proximal tibia after a low-energy fall in his backyard. MLL pathogenesis, history, radiographic imaging, applied treatment and relevant literature to this specific case and MLL in general are discussed. Initially the patient's MLL was managed conservatively until he presented with persisting pain and swelling. The lesion was subsequently treated by needle aspiration and stabilising knee brace.

**BACKGROUND**

The Morel-Lavallée lesion (MLL), also known as a post-traumatic pseudocyst, is a rare condition often following trauma in which the skin is exposed to shearing forces. MLL is usually presenting in the hip or gluteal region. With regard to the pathogenesis shearing forces can result in internal degloving of skin and subcutaneous fatty tissue from the underlying deep fascia. This specific type of injury can, on occasion, be diagnosed following high-energy traumas, which usually are car accidents, in which shearing forces are applied. Although MLL of the hip or gluteal region has been reasonably well reported in the literature, MLL of the proximal tibia has yet only been scarcely reported in literature, and specifically not following low-energy trauma.<sup>1</sup> We report the case of a 59-year-old male, overweight patient with a MLL of the proximal tibia following low-energy trauma, presenting to our clinic 2 months after the initial trauma.

**CASE PRESENTATION**

A 59-year-old male patient weighing 130 kg (body mass index 40.1), who was on anticoagulation medication (acetylsalicylic acid and clopidogrel) because of a history of a cardiac stenting, presented at our outpatient clinic complaining of a painful swelling inferomedial of the left knee 2 months after he had tripped and fallen in his own backyard. After the fall the patient had experienced swelling and haematoma of the proximal tibia which dissolved gradually over time. However, the swelling did not fully recover, the discoloration of the skin over the affected area persisted (figure 1) and the patient experienced decreased sensation over the affected area. Because the lesion had been progressively painful and unresponsive to analgesics the patient



**Figure 1** Discoloration of the skin over the affected area.

presented to our orthopaedic outpatient clinic for further investigation and treatment.

**INVESTIGATIONS**

Physical examination showed a fluctuant swelling with focal discoloration and decreased sensation at the medial proximal tibia (figure 1).

Radiography was performed which showed no fractures of the underlying tibia but a large subcutaneous swelling was seen instead (figure 2). In order to further specify the origin of this subcutaneous swelling, a MRI of the knee was performed,



**Figure 2** Plain X-ray showing no fractures but subcutaneous swelling.



CrossMark

**To cite:** Hogerzeil DP, Jansen J. *BMJ Case Rep* Published Online First: [please include Day Month Year]. doi:10.1136/bcr-2017-220048



**Figure 3** Coronal plane T1-weighted MRI image at 2 months after initial trauma showing a large subcutaneous fluid collection formed by a subcutaneous haematoma.

2 months after the initial trauma. The MRI showed that cruciate and collateral ligaments and menisci were intact; however, at the proximal tibia a large subcutaneous fluid collection was seen (figures 3 and 4). At 6 months of follow-up MRI was repeated which showed a now encapsulated, subcutaneous fluid collection (figures 5, 6 and 7). At 14 months of follow-up, again MRI was performed which showed no effusion of the knee joint but a small persisting MLL of the medial proximal tibia (figures 8 and 9). Finally, after the last outpatient follow-up the patient was referred for ultrasound-guided aspiration of the lesion (figure 10).

#### TREATMENT

Because of oral anticoagulation medication use and because at first the subcutaneous fluid collection was believed to be a large haematoma aspiration of the fluid collection was not initially performed but conservative treatment using stabilising knee brace was initiated. Anticoagulation medication was temporarily stopped though, since there had only been low-energy trauma and because anticoagulation medication may have contributed to the aetiology of the lesion. At 6 months of follow-up, the swelling had not dissipated and MRI was repeated, showing a now encapsulated, subcutaneous swelling at which point MLL was diagnosed. After discontinuation of the anticoagulation therapy aspiration was performed during which 5 mL of serosanguineous fluid was aspirated after which the painful sensation subsided for the patient. Anticoagulation therapy was resumed a few weeks later.



**Figure 4** Coronal plane T2-weighted MRI image at 2 months after initial trauma showing a large subcutaneous fluid collection with signs of partial haematoma reabsorption.



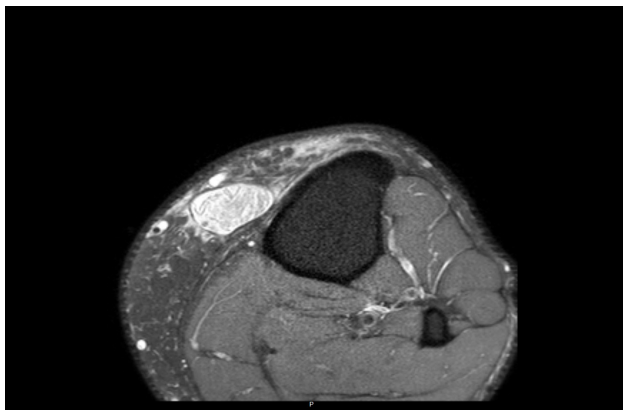
**Figure 5** Coronal plane T1-weighted MRI image at 6 months after initial trauma showing a now encapsulated subcutaneous fluid collection confirming the diagnosis of a Morel-Lavallée lesion (partial lysis of the haematoma).

#### Outcome and follow-up

At 16 months of follow-up, 10 months after needle aspiration of the MLL the patient showed a small recurrence of the subcutaneous fluid collection, focal discoloration and decreased sensation of the affected area for which, after another MRI confirmed the recurrence of the MLL, again a needle aspiration was performed during which only 3 mL of serosanguineous fluid was aspirated. After this aspiration, the patient reported tremendous effect, most of the previous complaints had subsided. However, a week before his next outpatient follow-up appointment (18 months after the initial trauma), he had had a minor distortion of the knee which again resulted in swelling, pain and decreased sensation over the affected area of the medial proximal tibia. Because of the chronic nature of the patients' MLL he was referred for ultrasound-guided aspiration of the lesion (figure 10), a second opinion and a surgical consultation for incision and debridement.



**Figure 6** Coronal plane T1-weighted MRI image at 6 months after initial trauma showing a now encapsulated subcutaneous fluid collection confirming the diagnosis of a Morel-Lavallée lesion (partial lysis of the haematoma).



**Figure 7** Transverse plane T2-weighted MRI image at 6 months after initial trauma showing a now encapsulated subcutaneous fluid collection confirming the diagnosis of a Morel-Lavallée lesion (partial lysis of the haematoma).

## DISCUSSION

The MLL, also known as a post-traumatic pseudocyst, is an internal degloving injury resulting in shearing of the subcutaneous tissue and underlying deep fascia.

MLL has first been described by Victor-Auguste-François Morel-Lavallée in 1863 as haemolympathic or serohaematic fluid collections caused by trauma to the proximal thigh. These 'internal degloving injuries' have since then been reported in numerous other anatomical locations.<sup>2-5</sup>

In most case reports regarding MLL, no information is given about patient's use of anticoagulants. Use of anticoagulants in this case may have contributed to the formation of the MLL.

Bonilla-Yoon *et al* have described four steps in the development of the MLL. The trauma results in subcutaneous fluid collections ranging from seroma to haematoma. As time passes, the blood is lysed and reabsorbed, developing into and replaced by serosanguineous fluid. Then, an inflammatory response to this serosanguineous fluid collection occurs which then leads to the formation of a fibrous capsule. It is at this chronic stage that aspiration, as performed by the authors, may not be sufficient as the definitive treatment. Because of its mere presence and mass effect, and subsequent interruption of the fasciocutaneous perforating arteries MLL may compromise overlying skin and



**Figure 8** Coronal plane T1-weighted MRI image at 14 months of follow-up showing a small recurrence of the Morel-Lavallée lesion (mainly consisting of seroma and partially lysed haematoma).



**Figure 9** Coronal plane T2-weighted MRI image at 14 months of follow-up showing a small recurrence of the Morel-Lavallée lesion (mainly consisting of seroma and partially lysed haematoma).

surgical consultation for incision and debridement should be considered.<sup>5,6</sup>

Clinical examination and radiographic imaging (X-ray, CT scan) of a MLL are often used modalities, which will show soft tissue swelling and fluid collection underneath the subcutaneous soft tissue.<sup>5,7-9</sup> Also, as described by Neal *et al*, ultrasonography is a helpful tool in diagnosing MLL. This study demonstrated that on ultrasonography MLL are hypoechoic or anechoic, compressible, and located between the deep fat and overlying fascia, and no relationship was found between the age of the lesions and their echogenicity.<sup>10</sup> Other studies show comparable results.<sup>11-15</sup> MRI imaging has shown to be the diagnostic tool of choice in diagnosing MLL, as the stage of the trauma can be predicted by the appearance of the MLL on MRI imaging.<sup>6,16</sup> Mellado and Bencardino have published an MR imaging-based classification subcategorising MLL into six types.<sup>17</sup>

A large variety of possible treatments have been suggested in literature varying from percutaneous aspiration, incision and debridement, compression banding and injection with sclerosing agents.<sup>5,18-22</sup> However, no definitive consensus has been reached on the optimal treatment of MLL.



**Figure 10** Ultrasound of a recurrence of the MLL at 18 months of follow-up, clearly showing a fibrous capsule.

## Learning points

- ▶ A Morel-Lavallée lesion (MLL) is a post-traumatic internal degloving injury usually presenting in hip or gluteal region; however, in rare cases MLL can be diagnosed in other anatomic regions such as the proximal tibia.
- ▶ MRI is the imaging modality of choice secondary to the superior soft tissue characterisation.
- ▶ Suggested treatment may vary from compression, aspiration, injection with sclerosing agents, and incision and debridement.
- ▶ Chronic MLL with a fibrous capsule have a tendency to recur. Therefore, if initial treatment fails, surgical consultation for incision and debridement should be considered.

**Contributors** DPH wrote the article, did literature research and revised the manuscript. JJ treated the patient in outpatient clinic and initiated the writing of this case report.

**Competing interests** None declared.

**Patient consent** Obtained.

**Provenance and peer review** Not commissioned; externally peer reviewed.

© BMJ Publishing Group Ltd (unless otherwise stated in the text of the article) 2017. All rights reserved. No commercial use is permitted unless otherwise expressly granted.

## REFERENCES

- 1 Molnar SL, Recarte A, Villafañe O, *et al*. Morel-Lavallée syndrome of the tibia. *BMJ Case Rep* 2011;2011:bcr0520114227.
- 2 Morel-Lavallee M. Decollements traumatiques de la peau et des couches sous-jacents. *Arch Gen Med* 1863;1: 20-38, 172-200, 300-332.
- 3 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.
- 4 Singh A, Anand A, Mittal S, *et al*. Morel-Lavallee seroma (post-traumatic pseudocyst) of back: a rarity with management conundrum. *BMJ Case Rep* 2016;2016:bcr2016216122.
- 5 Bonilla-Yoon I, Masih S, Patel DB, *et al*. The Morel-Lavallée lesion: pathophysiology, clinical presentation, imaging features, and treatment options. *Emerg Radiol* 2014;21:35-43.
- 6 Moriarty JM, Borrero CG, Kavanagh EC. A rare cause of calf swelling: the Morel-Lavallee lesion. *Ir J Med Sci* 2011;136:127-82.
- 7 Yahyavi-Firouz-Abadi N, Demertzis JL. Prepatellar Morel-Lavallée effusion. *Skeletal Radiol* 2013;42:127-82.
- 8 Sawkar AA, Swischuk LE, Jadhav SP. Morel-Lavallee seroma: a review of two cases in the lumbar region in the adolescent. *Emerg Radiol* 2011;18:495-8.
- 9 McKenzie GA, Niederhauser BD, Collins MS, *et al*. CT characteristics of Morel-Lavallée lesions: an under-recognized but significant finding in acute trauma imaging. *Skeletal Radiol* 2016;45:1053-60.
- 10 Neal C, Jacobson JA, Brandon C, *et al*. Sonography of Morel-Lavallee lesions. *J Ultrasound Med* 2008;27:1077-81.
- 11 Mukherjee K, Perrin SM, Hughes PM. Morel-Lavallee lesion in an adolescent with ultrasound and MRI correlation. *Skeletal Radiol* 2007;36(Suppl 1):43-5.
- 12 Choudhary AK, Methratta S. Morel-Lavallée lesion of the thigh: characteristic findings on US. *Pediatr Radiol* 2010;40(Suppl 1):49.
- 13 Goodman BS, Smith MT, Mallempati S, *et al*. A comparison of ultrasound and magnetic resonance imaging findings of a Morel-Lavallée lesion of the knee. *Pm R* 2013;5:70-3.
- 14 Puig J, Pelaez I, Baños J, *et al*. Long-standing Morel-Lavallée lesion in the proximal thigh: ultrasound and MR findings with surgical and histopathological correlation. *Australas Radiol* 2006;50:594-7.
- 15 Chokshi FH, Jose J, Clifford PD, *et al*. Morel-Lavallée lesion. *Am J Orthop* 2010;39:252-3.
- 16 Borrero CG, Maxwell N, Kavanagh E. MRI findings of prepatellar Morel-Lavallée effusions. *Skeletal Radiol* 2008;37:451-5.
- 17 Mellado JM, Bencardino JT. Morel-Lavallée lesion: review with emphasis on MR imaging. *Magn Reson Imaging Clin N Am* 2005;13:775-82.
- 18 Nickerson TP, Zielinski MD, Jenkins DH, *et al*. The Mayo Clinic experience with Morel-Lavallée lesions: establishment of a practice management guideline. *J Trauma Acute Care Surg* 2014;76:493-7.
- 19 Tseng S, Tornetta P. Percutaneous management of Morel-Lavallee lesions. *J Bone Joint Surg Am* 2006;88:92-6.
- 20 Tejwani SG, Cohen SB, Bradley JP. Management of Morel-Lavallee lesion of the knee: twenty-seven cases in the national football league. *Am J Sports Med* 2007;35:1162-7.
- 21 Dawre S, Lamba S, H S, *et al*. The Morel-Lavallee lesion: a review and a proposed algorithmic approach. *Eur J Plast Surg* 2012;35:489-94.
- 22 Scolaro JA, Chao T, Zamorano DP. The Morel-Lavallée Lesion: diagnosis and management. *J Am Acad Orthop Surg* 2016;24:667-72.

Copyright 2017 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.

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](mailto:consortiasales@bmjgroup.com)

Visit [casereports.bmj.com](http://casereports.bmj.com) for more articles like this and to become a Fellow