

A Case Coalition on Post-Traumatic Tumid: The Morel-Lavallee Lesion

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Abstract

Background: Morel-Lavallée lesion (MLL) is an uncommon closed degloving injury in which the subcutaneous tissue is sheared off the underlying fascia or muscle after blunt trauma. It is easily mistaken for a simple hematoma, which can delay diagnosis and lead to recurrence. The objective is to describe the clinical presentation, imaging features, management, and outcomes of six patients with MLL of the thigh and calf. **Material and Methods:** We retrospectively reviewed six patients (three men, three women; aged 37 to 60 years) who presented with pain and swelling of the calf (n = 3) or thigh (n = 3) after low-energy blunt trauma, including falls from two-wheelers, a slip and fall, a fall at home, and being hit by a two-wheeler. Clinical findings, imaging (ultrasonography or MRI), treatment, histopathology, and follow-up were recorded. **Results:** Presentation ranged from 15 days to 3 months after injury. Each patient had a solitary, smooth, soft, fluctuant swelling measuring 8 × 5 cm to 25 × 18 cm. Ultrasonography (n = 4) or MRI (n = 2) showed a fluid collection, anechoic or T2 hyperintense, between the deep subcutaneous tissue and the muscle, with septations in one case and mixed echogenicity in another. Four patients were managed conservatively with repeated aspiration or drainage and compression bandaging, and the swelling resolved or was recovering at follow-up. Two patients, one after failed outside aspiration, chose surgical excision with suction drain and compression dressing, and histopathology confirmed MLL. There were no complications. **Conclusion:** MLL should be suspected in any persistent fluctuant swelling of the thigh or calf after blunt trauma. Early imaging allows accurate diagnosis. Aspiration with compression is a reasonable first-line option for smaller lesions, while large, multiloculated, or aspiration-resistant lesions may require surgical excision.

Keywords: Morel-Lavallée lesion, Soft-tissue degloving injury, post-traumatic swelling, hematoma, blunt trauma, aspiration, compression.

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INTRODUCTION

Morel-Lavallée lesion is an uncommon closed soft-tissue degloving injury that typically results from high-energy blunt trauma, low-velocity crush incidents, first identified by the French surgeon Victor-Auguste-François Morel-Lavallée in 1863.^[1] These injuries occur due to tangential forces acting on the fascial planes, leading to the separation of the hypodermis from the underlying fascia. This separation disrupts the perforating vascular and lymphatic vessels, causing a collection of hemolymphatic fluid, potentially manifesting anywhere from a few days to several months post-injury. In later stages, this accumulation can provoke a chronic inflammatory response, ultimately leading to the development of a thick fibrous capsule surrounding the lesion.^[2]

Case 1: A 60-year-old lady presented with pain and swelling in her right calf for one month. Three months ago, she sustained a fall from a 2-wheeler onto her right leg. On examination, the right calf had a single ovoid swelling measuring 25 x 18 cm, with a smooth surface, well-defined borders, no dilated vessels, and a soft, fluctuant consistency [Figure 1].

Sonogram evinced an anechoic collection measuring 22.9 x 16.7 x 8.1 cm, along with internal septation noted between the deep subcutaneous and muscle planes, hinting at a diagnosis shift from simple hematoma to Morel-Lavallee

lesion (MLL).

Surgical excision was done on the patient's demand, and intraoperative findings showed a multiloculated cystic lesion found beneath the skin and above the muscle layer [Figure 2]. After excision, it was closed with a suction drain and a compressible dressing applied [Figure 3]. The excised cyst was sent for histopathology examination [Figure 4].

HPE betokens fibro collagenous and fibro-adipose tissue with granulation, composed of proliferating capillaries and mixed inflammatory infiltrate, areas of myxoid change, and fibrin deposits acclaimed [Figure 5]. The postoperative period was smooth without any complications. At the follow-up visit, it was noted that she is in good health and can resume her daily activities.

Case 2: A 48-year-old male reported pain and swelling over the lateral aspect of the left thigh following a slip and fall over a rock.

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On clinical examination, a solitary oval swelling measuring approximately 12 × 8 cm was present over the lateral aspect of the lower thigh [Figure 6].

The swelling had a smooth surface and was soft and fluctuant. Ultrasonography demonstrated an anechoic fluid collection measuring 13.5 × 7.3 × 5.0 cm situated between the subcutaneous tissue and underlying muscle layer, consistent with a post-traumatic closed soft-tissue collection suggestive of MLL. The lesion was managed conservatively with repeated aspiration of the collection combined with compression dressings [Figure 7]. The patient was reviewed at regular intervals, and progressive reduction in the swelling was observed, with complete clinical resolution on follow-up.

Case 3: A 37-year-old male complained of pain and swelling in the right upper thigh for 15 days, following a sustained injury from a self-fall from a bike; he approached a private clinic outside, where aspiration was performed, with no significant reduction in size [Figure 8].

On examination, a single swelling measuring 12 x 8cm, ovoid in shape, with a smooth surface and soft, fluctuant consistency, was noted in the right proximal thigh laterally; his MRI shows a T2 hyperintense collection in the right proximal thigh between the deep subcutaneous and muscular planes, hinting of MLL [Figure 9]. After explanation of the nature of MLL and given the option for re-aspiration, the patient wants the lesion to be excised. Surgical excision was done; the excised specimen was sent for HPE. On review, the diagnosis was confirmed by HPE; the patient is doing well on postoperative review, with satisfactory healing and recovery [Figure 10].

Case 4: A 52-year-old lady presented with painful swelling in the left leg calf for 3 weeks following an accidental hit by a 2-wheeler [Figure 11]. On palpation, a single swelling measuring 25 x 13 cm, ovoid in shape, with a smooth surface and soft and fluctuant consistency in the left leg calf; her MRI revealed a hyperintense collection in the left leg calf between the deep subcutaneous and muscular planes [Figure 12]. Signaling of MLL.

Conservative management was undertaken with repeated aspiration of the collection in conjunction with compression dressings [Figure 13]. During follow-up, the patient is recovering well with no significant concerns.

Case 5: A 47-year-old female attended with pain and swelling in the left leg calf following a self-fall in her residence. On evaluation, a single swelling of size 12 x 4 cm in the lateral upper left leg, soft and fluctuant [Figure 14]. Ultrasonic features a collection of size 11.5 x 3.6 cm in the lateral proximal and mid left leg, prompting MLL [Figure 15]. Aspiration was done at repeated intervals with a compression bandage; swelling reduced. At the subsequent visit, complete clinical resolution was demonstrated [Figure 16].

Case 6: A 38-year-old male came with swelling over the left upper thigh following a self-fall from a bike; on examination, a single swelling of size 8 x 5 cm in the medial upper left thigh, soft, cystic and fluctuant [Figure 17]. Sonogram gives ill-defined mixed echogenic lesion noted in the subcutaneous plane with thick internal echoes measuring 9 x 5 cm in the

medial upper left thigh, cluing MLL. Conservative treatment was implemented through repeated drainage of the fluid collection combined with compression bandaging [Figure 18]. At follow-up evaluation, the patient is doing well and is in good health with no notable complications.



Figure 1: Clinical image shows swelling in the right leg calf.

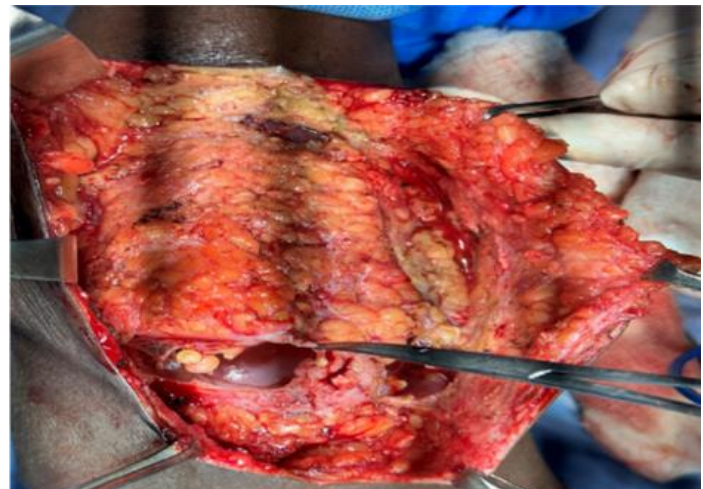


Figure 2: Intraoperative findings show a multiloculated cystic lesion.

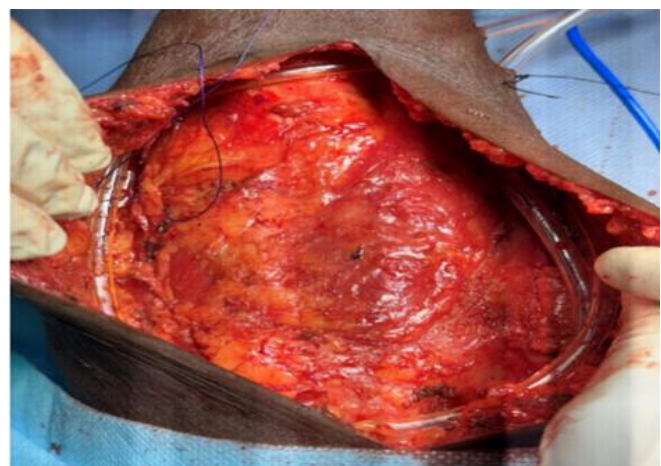


Figure 3: After excision, closed with suction drain.



Figure 4: Excised cyst specimen.

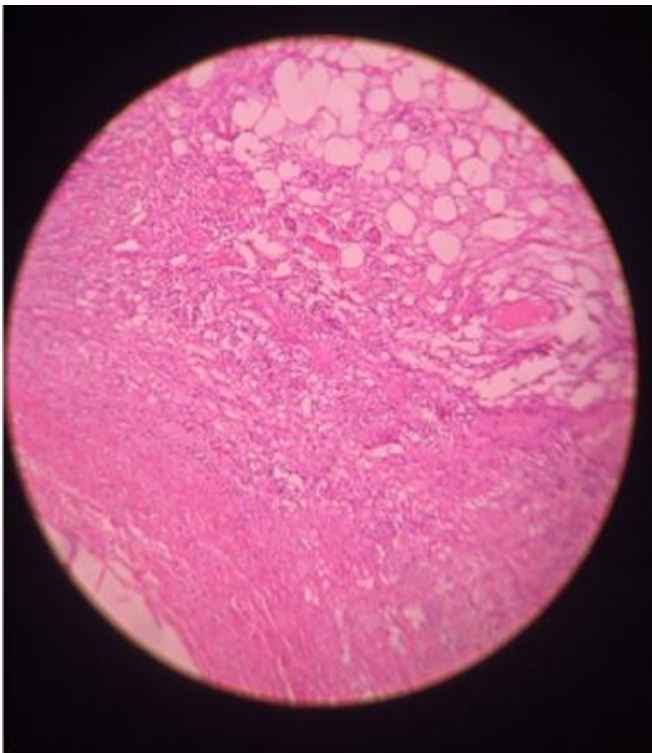


Figure 5: HPE signals fibro collagenous and fibro adipose tissue with granulations.



Figure 6: Clinical image shows swelling in lateral aspect of the left thigh.



Figure 7: aspiration of the collection.



Figure 8: Clinical image shows swelling in the right upper thigh.

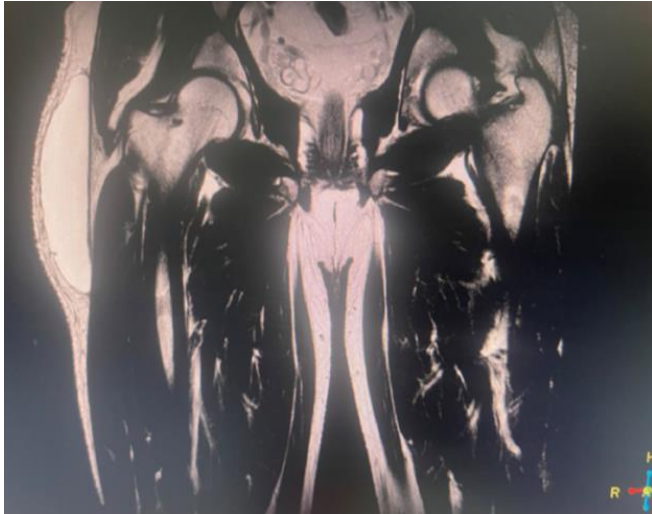


Figure 9: MRI shows a T2 hyperintense collection in the right proximal thigh.

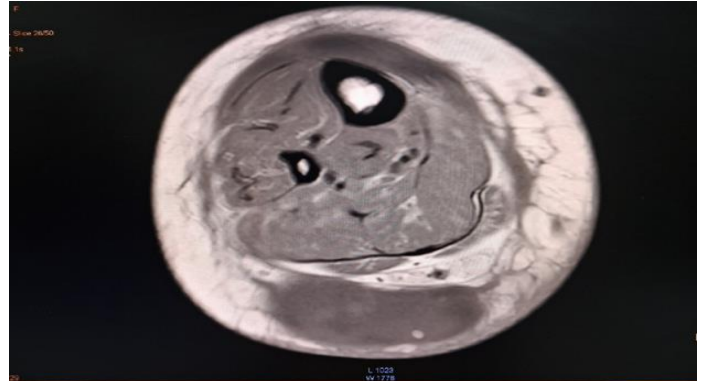


Figure 12: MRI revealed a hyperintense collection in the left leg calf.



Figure 10: Surgical excision was performed; the patient was well on postoperative review.



Figure 13: Repeated aspiration of the collection.



Figure 14: Clinical image shows swelling in the left leg calf.



Figure 11: Clinical image shows swelling in the left leg calf.

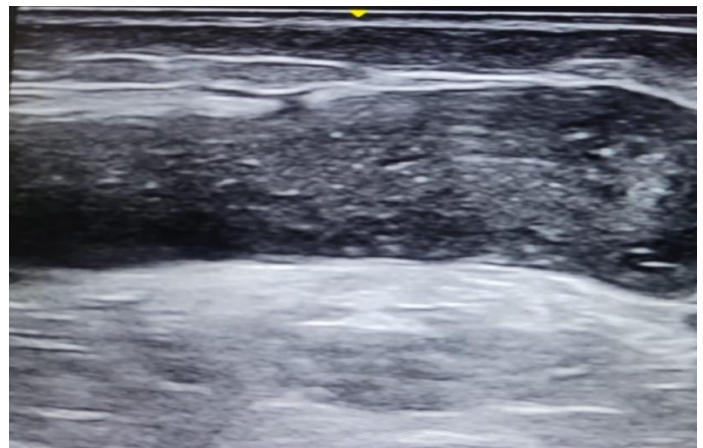


Figure 15: Ultrasonographic features a collection in the lateral proximal and mid left leg.



Figure 16: Aspiration was done at repeated intervals.



Figure 17: Clinical image shows swelling over the left upper thigh



Figure 18: Image after repeated drainage of the fluid collection.

DISCUSSION

Morel Lavallée Lesions (MLL) are rare injuries characterized by the separation of the skin and subcutaneous tissue from the underlying fascia, often described as closed internal degloving injuries. These lesions typically manifest in specific areas, with the greatest prevalence around the greater trochanter (30.4%), followed by the pelvis (18.6%), thigh (20.1%), knee joint (15.7%), gluteal region (6.4%), lumbosacral area (3.4%), abdominal area (1.4%), lower leg (1.5%), and occasionally on the head (0.5%). However, they can occur in other locations as well.^[3]

MLL typically occur as a result of high-velocity motor vehicle collisions or direct compressive forces applied to the affected region. The shearing forces at play cause a displacement of the bone, muscle, and deep fascia in one direction, while the superficial layers, such as the superficial fascia, subcutaneous fat, and skin are pushed in the opposite direction. This dynamic can result in the rupture of perforating arteries and lymphatic vessels.^[4] The separation of tissues creates a unique potential space that may fill with hemolymphatic and serous fluid, blood, necrotic fat and lymphatic tissue, ultimately leading to cavity formation. The metabolic and inflammatory byproducts found in this fluid can enhance cellular permeability, which may further facilitate leakage into the newly formed space. Over time, granulation tissue may form around the cavity, potentially leading to the development of a fibrotic pseudo capsule. This pseudo capsule can impede resorption, resulting in chronic fluid accumulation and increased risk of infection and tissue necrosis.^[5]

Given that the injury mechanism is often traumatic, individuals presenting with post-traumatic swelling of the extremities are often initially diagnosed with a simple hematoma. Persistent swelling requires a more extensive differential diagnosis, which could include conditions such as skin infections, especially in the presence of an open skin lesion, fat necrosis, abscesses, cellulitis, or osteomyelitis. Additionally, one should consider soft tissue sarcoma, early myositis ossificans, bursitis, and deep vein thrombosis (DVT). In such cases, further imaging and evaluation are essential.^[6]

MLLs are frequently subject to delays in diagnosis or misdiagnosis, often due to late presentation or the presence of other distracting injuries, particularly in cases of multi-trauma. Clinicians ought to maintain a heightened awareness in instances of localized swelling, especially if fluctuation is noted. Mellado and Bencardino suggested a classification system that divides MLLs into six distinct subtypes, taking into account the characteristics of the collections, the shape of the lesions, and their duration.^[7] Ultrasound (US) may be utilized as an initial step, typically revealing the lesion as an anechoic area. Doppler ultrasound can assist in excluding other conditions and assessing for potential vascular issues, such as DVT. CT is not the preferred method; it can show only fluid accumulation. Magnetic resonance imaging (MRI) is preferred as it provides excellent evaluation of soft tissues and high-resolution images. It is important to recognize that in cases of delayed diagnosis and imaging, results may be misinterpreted as a soft tissue mass or neoplasm, as chronic lesions when encapsulated.^[8]

Treatment options vary from conservative to surgical

approaches. Non-surgical management is advisable for lesions that are distant from skeletal injuries, exhibit no fluctuation upon palpation, and do not cause significant pain or discomfort. Conservative measures, including compression, cessation of activities, and rest, along with careful monitoring, are deemed appropriate in the acute phase for smaller lesions. For larger, chronic lesions that do not respond to conservative treatment, needle aspiration or drainage may be necessary. Needle aspiration is recommended for MLL with a volume of less than 50 mL, as lesions exceeding this volume have a higher likelihood of recurrence; indicating the need for surgical intervention.^[9]

Four of our patients responded to repeated aspiration with compression dressings, whereas the two who underwent excision had large or aspiration-resistant lesions, in keeping with reports that small acute lesions can be managed conservatively while chronic, multiloculated, or recurrent collections may need surgery. The small sample and short follow-up limit firm conclusions, but early recognition through imaging can prevent unnecessary delay and recurrence.

CONCLUSION

Morel-Lavallée lesion should be suspected in any persistent, soft, fluctuant swelling of the thigh or calf after even low-energy blunt trauma, and ultrasonography or MRI allows early diagnosis. In our series, smaller lesions resolved with repeated aspiration and compression dressings, while large or aspiration-resistant lesions were successfully treated by surgical excision. Early recognition and treatment matched to lesion size and chronicity can prevent delayed diagnosis, recurrence, and complications, although larger studies with longer follow-up are needed to define the optimal management.

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Conflicts of interest

There are no conflicts of interest.

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