Case Report

A sinister below the skin: A case report on Morel-Lavallée lesion

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ABSTRACT

This case report is to highlight the masquerade presentation of Morel-Lavallée lesions (MLLs) in a young male patient following a road traffic accident. A 38-year-old male, involved in a road traffic accident, was brought to the trauma center in hypotensive shock. Following Advanced Trauma Life Support guidelines, the initial management includes conducting a primary survey to identify any life-threatening injuries and administering intravenous fluids and blood products to stabilize the patient's hemodynamic status. He has undergone computed tomography scans to confirm the diagnosis of MLLs and evaluate associated injuries. The patient was managed according to the severity of the lesion and associated injuries. MLLs are significant soft-tissue injuries that can occur in the context of high-energy trauma, such as road traffic accidents. This case underscores the necessity of maintaining a high index of suspicion for MLLs in polytrauma patients. Prompt diagnosis using appropriate imaging techniques, coupled with a management flowchart, to prevent complications and optimize patient outcomes.

Key words: High-intensity trauma, Morel-Lavallée lesions, Road traffic incident, split skin graft, polytrauma

The French physician Maurice Morel-Lavallée first described the Morel-Lavallée lesion (MLL) in 1983. It is a painful fluctuant swelling that is formed after a deep and closed degloving injury as a result of a high-intensity trauma [1]. This rare entity is often confused and misdiagnosed as a soft-tissue tumor. Approximately 25% of MLLs are seen in road traffic accidents, and more than 60% of MLLs predominantly occur in the greater trochanter areas [2,3]. The greater trochanter area is covered with tensor fascia latae and subcutaneous fat, which creates a severe shearing force that leads to a potential space in the subcutaneous space due to high velocity shearing forces between the fascia and the subcutaneous tissue, which gets filled with necrotic tissue, fat, blood, and lymph. Early diagnosis and prompt treatment are paramount because if these lesions become chronic, they usually develop a pseudo-capsule that prevents the resorption of their contents, leading to masquerade [4]. The MLL cases present as acute or chronic in nature, each time it has given the surgeon to think of multiple differential diagnoses and end up diagnosing with the radiology findings.

Here, we discuss a case of a road traffic accident in which the initial masquerade of MLL, and subsequent management and follow-up.

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CASE REPORT

A 38-year-old male patient was first brought to the trauma bay after having met with a road traffic incident (RTI). He had sustained injuries on the right side lower abdomen, right leg, and anal region. He was managed with isotonic intravenous fluids and a compression dressing over the right thigh at pre-hospital management by a paramedic.

On arrival at our trauma center, his general outlook was drowsy, so as per the Advanced Trauma Life Support protocol, a primary survey was performed, which was suggestive of hemorrhagic shock with a blood pressure of 70/30 mmHg and a pulse rate of 126 beats/min. As per our trauma protocol, damage control resuscitation (DCR) was initiated with IV fluids and blood products. A secondary survey revealed a diffuse swelling over the right thigh and a large abrasion over the anterolateral aspect of the right thigh (Fig. 1) with a tense swelling and a 4×3 cm laceration was noted in the perineal region, which was bleeding actively. Any spinal injury was ruled out in the patient. After DCR, he responded well and then shifted to the computed tomography (CT) scan center.

He had undergone CT angiography of the right lower limb and contrast-enhanced CT chest and abdomen (Fig. 2) which revealed fractures of the right pubic bone and its rami and also

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Figure 1: Pre-operative picture of the patient

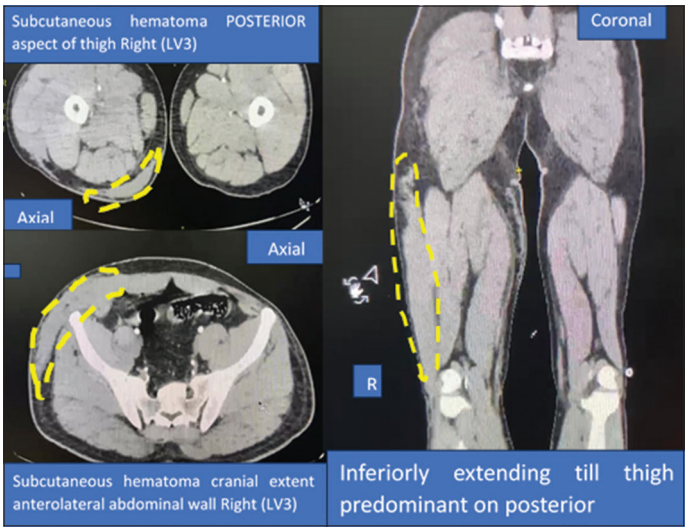

Figure 2: Computed tomography angiography of the right lower limb

a subcutaneous soft-tissue hematoma, with superior extent from the right anterolateral abdominal wall at the level of lumbar vertebra three. It extended inferiorly into the proximal right thigh. In the proximal thigh, this hematoma was noted predominantly in the posterior aspect of the thigh; however, distally, it involved the anteromedial aspect of the thigh, with a tear of the quadriceps muscle in the anterior compartment of the thigh. However, no extravasation of contrast was noticed in the right lower limb.

He was diagnosed with a case of MLL of the right thigh as per radiological images and the background of a high-velocity trauma. Given the hemorrhagic shock, the patient was admitted to the intensive care unit, where he was managed till a good physiological response. Later, he underwent drainage of the hematoma of approximately 1500–1800 mL (Fig. 3). The patient also underwent repair of the quadriceps tear and suture of the perineal tear under general anesthesia. However, postoperatively, the patient developed skin necrosis over the anterior and posterior aspects of the thigh (Fig. 3). He was further managed with serial debridement and a split skin graft cover (Fig. 3) over the debrided wound. The graft uptake was satisfactory, and under

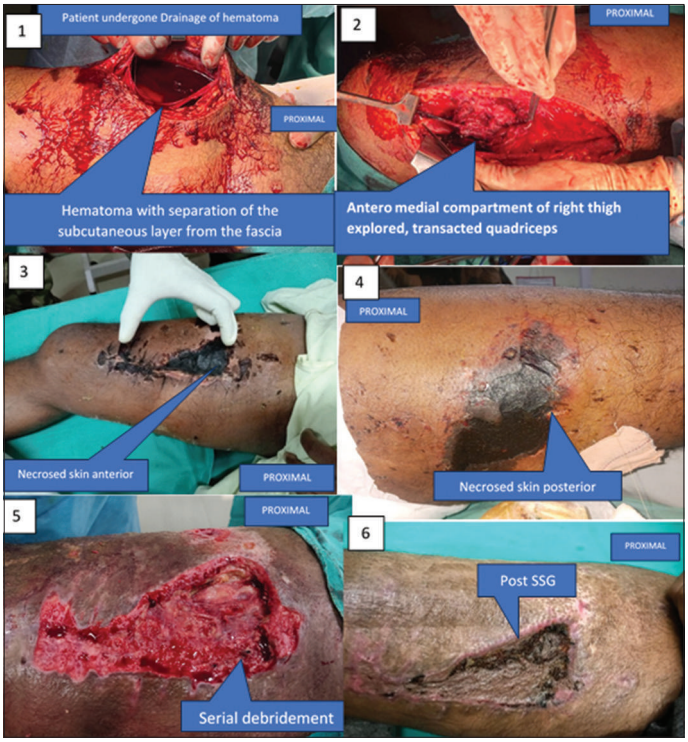

Figure 3: Intraoperative and post-operative management

suitable analgesic cover, ambulation was achieved. On follow-up after 8 weeks, the lesion had healed well, and the patient had an uneventful recovery.

DISCUSSION

The most common predisposing factors for MLL are high-velocity trauma injuries, crush injuries, or blunt trauma, usually in the form of RTI [5]. The most common sites for these lesions include the region around the greater trochanter (up to 60% of the cases), buttocks, sacrum, scapular region, and trunk [6]. These lesions are commonly associated with fractures, especially of the acetabulum or the pelvis [7]. Rarely have these lesions also been found to have developed post-surgical procedures such as abdominoplasty or liposuction [8]. These lesions occur most frequently where there is mobile skin overlying a tough fascia, such as the tensor fascia lata in the proximal thigh [5]. As a result of the high-intensity shearing forces, these layers separate, disrupting trans-aponeurotic blood and lymphatic vessels. These damaged vessels cause leakage of blood and lymph into the freshly formed cavity, leading to the formation of a hemo-lymphatic collection [9]. The blood in this cavity gets resorbed slowly, leaving behind serosanguinous fluid lined by a hemosiderin layer. This collection of blood, lymph, and necrotic tissue slowly evolves to develop a fibrous capsule that may create a permanent fluid mass, which increases in size due to increased osmotic pressure, repeated trauma, and chronic inflammatory processes [10].

This lesion usually presents as a unilateral swelling over the thigh, trunk, buttock, scapula, or lumbar region. The patients present with a soft-tissue lesion associated with pain, with

a background of high-intensity trauma [11]. Up to one-third of the lesions can masquerade [12]. The key pointers toward the diagnosis of this lesion are the presence of fluctuation and compression within the lesion [1]. The patient may also present with hypoesthesia or anesthesia and increased skin mobility [13]. The signs of trauma in the form of ecchymosis, abrasions, lacerations, or even frank necrosis may be present [7]. If not diagnosed on time, MLL can cause pressure necrosis of the overlying skin, leading to the breakdown of large areas of skin [14]. These lesions may also develop superadded bacterial contamination either by direct extension during primary trauma or as an inadvertent entry of microbes during the management of underlying fracture or the lesion itself [15].

The investigation of choice for MLL is magnetic resonance imaging when a more global overview of the lesion is required, as it can help define the shape, size, contents, and chronicity of the lesion. A long-standing MLL will appear homogenously hypointense on the T1-weighted sequence and hyperintense on the T2-weighted sequence [16]. Ultrasonography is the primary imaging guide for a patient with soft-tissue lesions. It appears as a fluid collection with different echogenicity depending on the chronicity of the lesion [16]. Differential diagnoses of MLL include post-operative seroma, bursitis, soft-tissue sarcoma, hematoma, fat necrosis, and sometimes early myositis ossificans [17]. It can be classified based on shape, signal, enhancement, and the presence of the capsule, which is known as the Mellado-Bencardino Classification (Table 1) [1].

Table 1: Mellado-Bencardino classification of Morel-Lavallée lesion

Type	MRI characteristics
Type I	Laminar shaped and seroma-like with increased T2 signal
Type II	Subacute hematoma resembling an oval-shaped lesion with increased T1 and T2 signal, thick capsule +, and variable enhancement
Type III	Oval-shaped, chronic organising hematoma resembling a lesion, thick capsule +, internal or peripheral enhancement
Type IV	Linear, closed laceration resembling, hypointense T1 and hyperintense T2, no capsule, variable enhancement
Type V	Pseudo nodular, round, variable T1 and T2 signal, thin or thick capsule, internal or peripheral enhancement
Type VI	Infected, variable T1 and T2 signal, sinus tract +, thick capsule +, internal or peripheral enhancement

MRI: Magnetic resonance imaging

Treatment for MLL includes multiple modalities. It can be managed based on the chronicity of the lesion. The treatment of an MLL depends on whether the lesion is acute or chronic. In acute cases, the approach varies based on the viability of the overlying tissue. If the overlying tissue is viable, image-guided percutaneous drainage can be attempted. However, if the overlying tissue is non-viable, the recommended treatment involves operative debridement and open drainage. For chronic lesions, the treatment is guided by the volume of fluid accumulation. If the fluid volume exceeds 400 mL, open drainage or mass resection with a pseudo-capsule. In cases where the fluid volume is <400 mL, sclerodesis (doxycycline, erythromycin, bleomycin, tetracycline, ethanol, or talc) [15] or drain placement is advised. Following this, cavity closure is achieved using advanced sutures, fibrin, or by leaving a drain in place to ensure proper healing and prevent recurrence. Percutaneous drainage is an effective option, but the recurrence rate is quite high, especially in lesions with volume >50 mL [17]. Our aim in the management of MLL is the closure of the dead space within the lesion, which can be achieved using a fibrin sealant, quilting sutures, or low suction drains [1]. A schematic flowchart of the management is shown in Fig. 4 [7,18].

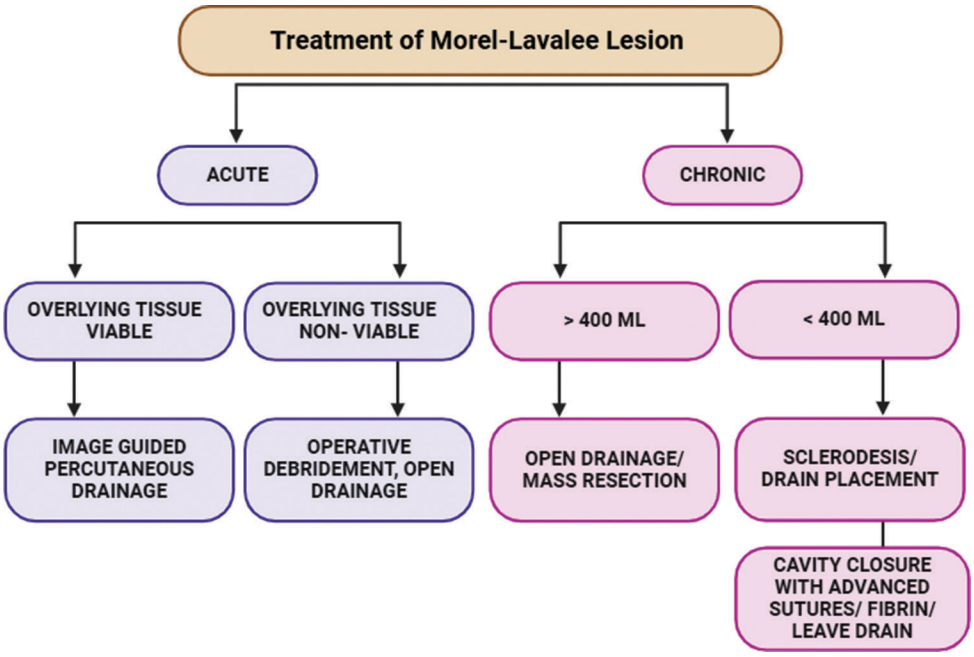

Figure 4: Treatment of Morel-Lavallée Lesion

CONCLUSION

MLSs are significant soft-tissue injuries that can occur after a high-velocity trauma, usually after an RTA. The diagnosis of these cases is reliant on a very high index of suspicion, as delays in the diagnosis of MLL are not infrequent. This case highlights that prompt diagnosis and appropriate management can be achieved if we analyze and investigate the patient extensively, keeping the possibility of MLL in mind. Choosing the most suitable treatment option and providing effective management are essential to reduce complications and optimize patient outcomes.

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