



Summary

Objective: Morel-Lavallée lesions are posttraumatic soft tissue closed degloving injuries in which the subcutaneous tissue is torn away from the underlying fascia, creating a cavity filled with a hematoma and liquefied fat. The lesion goes undetected unless high index of suspicion and MRI is the gold standard for diagnosis. We present our experiences while managing 10 cases.

Methods: Study includes ten cases of Morel-Lavallée lesions involving knee, hip and thigh. After confirming on MRI each patient was managed by incision and drainage of hematomas.

Results: Nine patients were improved without any morbidity; one patient who presented late because of late diagnosis developed fever and skin necrosis and managed by debridement and flap cover.

Conclusion: Morel-Lavallée lesions are post-traumatic usually following contact sports, closed degloving injuries occurring in the subcutaneous plane due to disruption of capillaries resulting in an effusion containing hemolymph and necrotic fat. There should be high index of suspicion in order to diagnose such cases and MRI is the modality of choice. Early diagnosis and management is vital. Involvement of joint capsule indicates surgery intervention over conservative management of such lesion.

Keywords

Morel-Lavallée lesions – Sports injury – Post-traumatic extravasations – Post-traumatic soft tissue cyst formation – Hematoma

S.K. Rai et al.

Morel-Lavallée Läsion: Eine seltene Ablederungsverletzung – daran denken und zügig handeln. Die Erfahrung von 10 Fällen

Zusammenfassung

Objective: Morel-Lavallée Läsionen sind posttraumatische, geschlossene

CASE REPORT

Morel-Lavallée lesion: An uncommon closed degloving injury that requires high index of suspicion and urgent attention. An experience of ten cases

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Introduction

The entity Morel-Lavallée lesion was first described by a French surgeon, Victor Morel Lavallée, in 1863. It is also known as Morel-Lavallée seroma, post-traumatic extravasations, post-traumatic soft tissue cyst formation, or Morel-Lavallée effusion.

Morel-Lavallée lesions (ML lesion) are uncommon and eventually a rare injury that occurs due to a traumatic shearing force or crush injury acting on the skin surface that causes a separation of the skin and subcutaneous tissue from the underlying fascia. This mechanism of the injury is sometimes referred to as internal degloving injury. The traditional and most common location of these injuries is the Greater trochanter/lateral aspect of hip and thigh. Other frequent areas include the knee and pelvic, arm [1]. Swelling and effusions in the knee region are commonest presenting complaints among athletes and nonathletes. With a thorough history and physical examination, particularly

with a history of trauma, infectious and inflammatory causes should be ruled out before labeling as ML lesion. The ML lesion involves a separation of the subcutaneous tissue from the fascia in MLLs causes a disruption of the lymphatics and blood vessels in the affected region. This precipitates the accumulation of fluid in this newly formed potential space. Subsequently, the formation of a hematoma or seromas occur [4,16,21]. The inflammatory reaction that ensues if these injuries are not treated in the acute phase can organize granulation tissue into a fibrous capsule [2,7]. This capsule impedes the absorption of the fluid and is thought to be the cause of recurrent fluid collection even after drainage, MLLs are often not diagnosed initially. Unless there is a high index of suspicion it is quite frequent to miss this entity as Kottmeier et al. reported that they are missed up to 44% of the time [10]. Early detection and treatment of MLLs is vital to avoid complications such as chronic pain and swelling, re-accumulation of fluid,

weichteilige Ablederungsverletzungen, bei denen das subkutane Gewebe von der darunterliegenden Faszie abgerissen ist. Dadurch entsteht eine Höhle, die mit Hämatom und verflüssigtem Fett gefüllt ist. Die Verletzung wird oft übersehen, wenn nicht daran gedacht wird, wobei das MRT den Goldstandard für die Diagnose darstellt. Wir präsentieren unsere Erfahrungen im Management von 10 Fällen.

Methoden: Die Studie beinhaltet 10 Fälle mit Morel-Lavallée Läsion in Knie-, Hüft- und Oberschenkelregion. Nach Diagnosebestätigung mittels MRT wurde jeder Patient mittels Inzision und Drainage des Hämatoms behandelt.

Ergebnisse: Neun Patienten verbesserten sich ohne bleibende Beschwerden. Ein Patient, der sich nach verspäteter Diagnosestellung vorstellte, entwickelte Fieber und Hautnekrosen und wurde mittels Debridement und Lappenplastik behandelt.

Zusammenfassung: Morel-Lavallée Läsionen kommen posttraumatisch im Kontaktsport vor. Dabei handelt es sich um geschlossene Ablederungsverletzungen in der subkutanen Schicht, die zu Zerreißen der Kapillaren mit Ergussbildung durch Hämatom und nekrotischem Fett führt. Ein hohes Verdachtsmoment ist wichtig, um solche Fälle zu diagnostizieren, wobei das MRT die Diagnostik der Wahl ist. Eine frühe Diagnose und Behandlung ist sehr wichtig. Eine Beteiligung der Gelenkkapsel indiziert eine chirurgische Intervention gegenüber einer konservativen Behandlung.

Schlüsselwörter

Morel-Lavallée Läsion – Sportverletzung – posttraumatischer Erguss – posttraumatische Zystenformation – Hämatom

infection, skin necrosis [5,8,14,15]. In the literature many recent studies advocate for early detection and treatment by drainage and possible debridement of acute and subacute lesions [3,6,17,19].

Material and methods

This is a prospective cohort study in which 89 patients who sustained injury in sports and presented with pain and swelling in knee, thigh, and hip region. Initially plain X-ray was taken to rule out any fracture and later on MRI was done to confirm the diagnosis. Among 10 patients who had ML lesion were included in the study. All patients were male young between the age group of 19 to 45. Four patients have a ML lesion in knee, three patients, in the thigh and three have ML lesion at the lateral aspect of the hip (Figs. 1–6).

The study was conducted in the Department of Orthopaedics, in a tertiary care Hospital, Guwahati, Assam, India between Mar 2013 and Dec 2016 and they were followed up for one year. ML lesion was diagnosed on MRI showed a large subcutaneous collection that was slightly hyper intense on T1-weighted and hyper intense on T2W sequences and which was seen to extend from the upper thigh to the knee on the lateral aspect. Non-enhancing fat lobules and debris were seen within the collection. We used Mellado and Bencardino to classify the shape of lesion in our study [13]. Six types of lesion have been described, however, in our study only four types of lesion were detected (Table 1).

ML lesion was managed by incision and drainage under anesthesia and suction drain was placed till the drain reduced to 10 ml or less. Each patient was given prophylactic

preoperative IV antibiotic Tieceoplanin.

The most common mechanism of injury was a shearing blow and active flexion (73%) and (38%) respectively. After treatment the mean time for resolution of the fluid collection and attainment of full motion was 21.6 days. The average number of missed cases was 1.5 in few studies in the literature. Eight cases in our study need surgical debridement and evacuation of hematoma and two cases were treated successfully with compression bandage, cryotherapy, and motion exercises.

Results

Nine out of ten patients improved in the form of pain, swelling and range of motion in three months duration. However, one patient developed fever while he was admitted as he was diagnosed earlier as hematoma thigh by peripheral hospital. After evaluation with MRI ML lesion was detected and was treated with an appropriate antibiotics and open surgical debridement. He was improved with good range of knee motion in seven months time.

Discussion

Morel-Lavallee lesions usually present within a few hours to weeks and sometime months post injury. They may or may not be associated with underlying fractures. These lesions are most often unilateral [9]. The initial injury represents a shearing of subcutaneous tissues away from the underlying fascia. The disrupted and torn capillaries continuously drain into the perifascial plane, filling up the virtual cavity with blood, debris and lymph, and subsequent inflammatory reaction sets. Development of

CASE REPORT

Sports Orthop. Traumatol. 35, 56–62 (2019)



Figure 1
Clinical preoperative photograph – knee lesion showing swelling.



Figure 2
Ultrasonographic picture of knee lesion showing ML lesion.

inflammatory reaction may lead to a peripheral capsule formation, which may account for the self-perpetuation and occasional slow growth of the process which leads to persistent swelling and pain [1,8,18]. The collection may then spontaneously resolve, or become persistent with encapsulation. Patients usually present with

complaints of pain, swelling, and stiffness persistent for quite long periods. On clinical examination, patients often have a soft fluctuant area of swelling, underlying soft tissue thickening with or without skin discoloration [12]. While treating such cases the differential diagnosis for MLL should include subcutaneous hematoma, fat necrosis,

hemangioma, and soft tissue sarcoma. The history of trauma, clinical examination, characteristic location, and MRI evaluation may contribute to a correct diagnosis [16]. The treatment depends on the symptoms, size of lesion, duration, and presence of a capsule in the lesion. Small acute lesions and without much symptoms

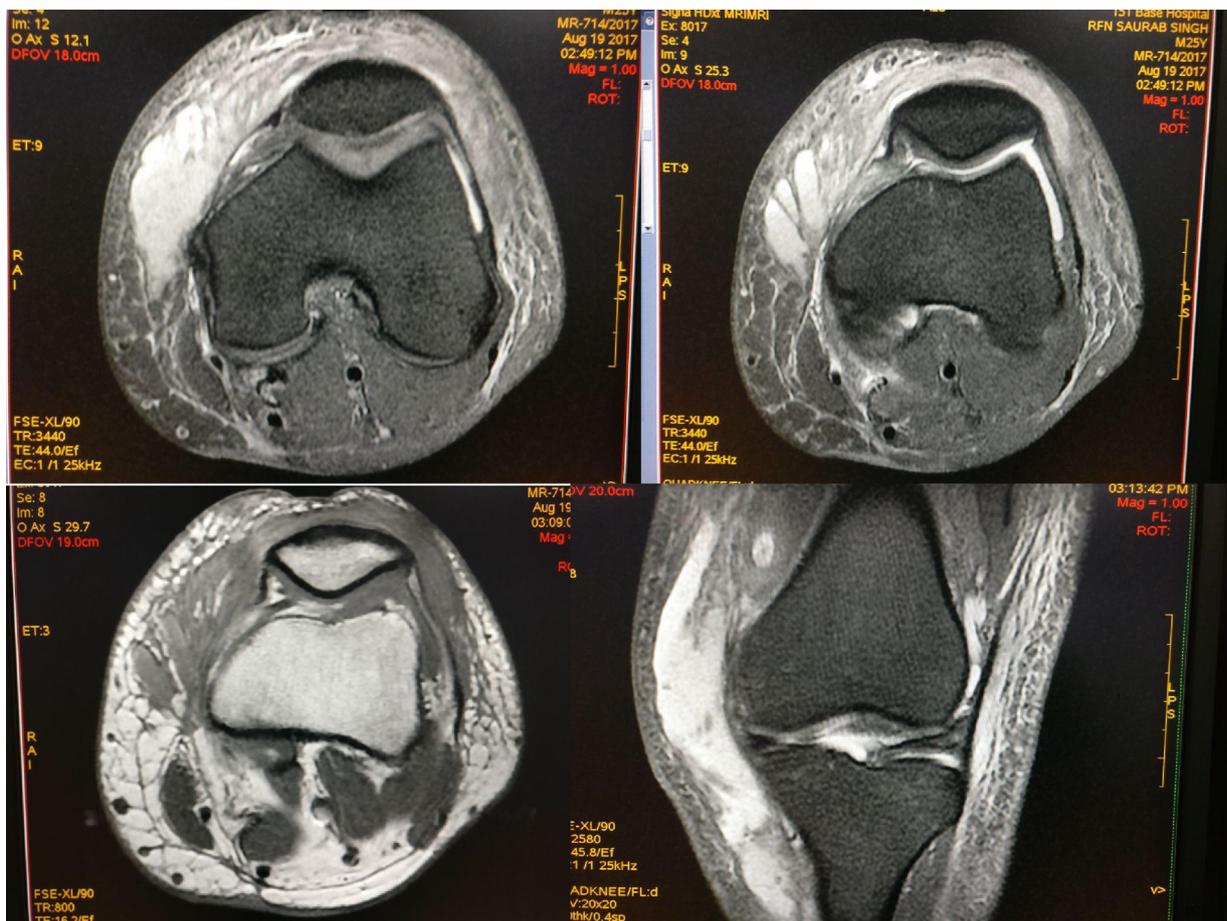


Figure 3
MRI picture of knee lesion showing ML lesion.

which may not develop capsule can be treated conservatively by application of compression bandage, ice, nonsteroidal anti-inflammatory medication and rest for few days or weeks. However, those that persist and have capsule formation may require more aggressive treatment. These lesions can be managed with early percutaneous drainage, debridement, irrigation, and suction drainage [1,2,4,16]. Such lesions may also resolve completely may needed surgical intervention and prolonged period of application of

compression bandage. Some time graduated compression stockings may required for prevention of thromboembolism [8,10,11,17]. Complications including recurrence, infection, and chronic pain arise when MLLs are not treated in the acute or subacute period or missed diagnosed as contusion. However ample evidence present in the history, physical exam, ultrasound or MRI to diagnose a ML lesion. But frequently due to its rarity the diagnosis was not made at first presentation. However the traumatic

shear injury to the soft tissue, diffuse ecchymosis, a palpable, soft, fluctuant swelling and the hallmark finding of MLLs, may clinch the diagnosis. On ultrasound exam the fluid collection was compressible, anechoic and located subcutaneously. In a retrospective study by Neal et al. [15] including 21 MLLs of the hip and thigh demonstrated that all hypoechoic or anechoic echogenicity, were compressible and were located in between the deep subcutaneous fat and the fascia [15].



Figure 4
Surgical debridement is being done 150 ml of blood was evacuated out.

Once a fluid collection has been identified as a ML lesion, research demonstrates that timely intervention via drainage with or without debridement is essential to avoid potential complications. In a 2013 Nickerson et al. [16] in his retrospective study of 87 ML lesion demonstrated that lesions with volumes exceeding 50 ml on aspiration were especially prone to reoccur, even after percutaneous aspiration. Specifically, 83% of lesions that

drained more than 50 ml recurred. Based on their study they recommends that lesions with >50 ml aspirated require operative drainage via incision and insertion of suction drain. In a different study by Tseng et al. [20] of 19 patients with ML lesion, they used operative percutaneous drainage, irrigation and debridement with drain placement to treat large lesions averaging 30 × 12 cm. In their study they demonstrated prevention of

recurrence in all patients treated, and recommended treatment within 3 days post injury. A similar study by Zhong B et al, they used operative percutaneous drainage, debridement, catheter placement and suction of ML lesions at a mean time of 11.9 days from time of injury to intervention. They showed that placement of suction drainage may prevent recurrence in all patients [22].

Through early diagnosis and following the recommendations to operatively drain with or without debridement may prevent recurrence and would have healed faster. Although ML lesions are quite a rare diagnosis, a persistent subcutaneous fluid collection in the setting of trauma should raise clinical suspicion of an underlying ML lesion.

Conclusion

Based on our study, we can conclude that a high index of suspicion will lead to early diagnosis in Morel-Lavallée lesion in the absence of underlying fracture. It is invariably diagnosed as contusion and unless evaluated by MRI it will go undiagnosed and may result fascial necrosis and infection and loss of motion. An arthroscopy lavage and debridement can facilitate minimally invasive surgery of the chronic lesion by effectively debriding pseudocapsule. Recalcitrant fluid collections can be safely treated with doxycycline sclerodesis.

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Figure 5
After three month follow up knee lesion.



Figure 6
After three month follow up thigh lesion.

Table 1. Classification of lesion based on its shape in our study population.

Type of lesion	Shape of lesion	Number of patients	description	MRI – T1W	MRI – T2W	Status of capsule	Enhancement
1	Laminar	03	Seroma like	Decreased	Increased	Occasional	Absent
2	oval	01	Hematoma like	Increased	Decreased	Thick	variable
4	Linear	02	Closed laceration	Hypointence	Hyperintence	Absent	Variable
5	Round	04	pseudonodular	variable	variable	Thick or thin	Internal and peripheral

Conflict of interest

None.

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