

## Morel-Lavallée Lesion of the Knee: A Case Report

Dizde Morel-Lavallée Lezyonu: Bir Olgu Sunumu

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**Abstract:** Morel-Lavallée lesions are closed soft tissue injuries caused by a shearing force that separates the skin and superficial fascia from the deep fascia, creating a potential space where hemolymphatic fluid accumulates. These lesions are often misdiagnosed due to their variable clinical presentation and heterogeneous morphology, which can lead to confusion with conditions such as hematoma, fat necrosis, and sarcoma. The typical localization of the lesion is the trochanteric region. This case report presents the clinical and radiological findings, along with the diagnosis and treatment process, of a 56-year-old female patient who developed a Morel-Lavallée lesion in the prepatellar region following a fall. In the first stage, no bone abnormality was seen in computed tomography (CT) imaging. Magnetic resonance imaging (MRI) and ultrasonography (USG) performed as a result of her ongoing complaints revealed a well-defined fluid accumulation in the prepatellar region, consistent with a Morel Lavallée lesion. Clinical examination and patient history are essential for diagnosis. However, MRI and USG play an important role in confirming the diagnosis and monitoring the course of the disease. A classification has been proposed for Morel-Lavallée lesions, which are divided into six subtypes based on MRI features. USG is particularly practical and useful modality both for initial diagnosis and follow-up evaluation. Some lesions may resolve spontaneously. If not recognized and treated appropriately, they may become chronic or complicated, requiring more invasive interventions. Recognizing the lesion's characteristics and implementing a personalized treatment strategy are essential for achieving optimal patient outcomes.

**Keywords:** Morel-Lavallée lesion, knee, degloving injury, ultrasound

**Özet:** Morel-Lavallée lezyonları, deri ve yüzeysel fasya ile derin fasyayı ayıran ve hemolenfatik sıvının biriktiği potansiyel bir boşluk yaratan bir kesme kuvvetinin neden olduğu kapalı yumuşak doku yaralanmalarıdır. Bu lezyonlar, değişken klinik sunumları ve hematom, yağ nekrozu ve sarkom gibi durumlarla karıştırılmasına yol açabilen heterojen morfolojileri nedeniyle sıklıkla yanlış teşhis edilir. Lezyonun tipik lokalizasyonu trokanterik bölgedir. Bu olgu sunumunda ise, düşme sonrası prepatellar bölgede Morel-Lavallée lezyonu gelişen 56 yaşında bir kadın hastanın klinik ve radyolojik bulguları ile beraber tanı ve tedavi süreci sunulmaktadır. İlk aşamada, bilgisayarlı tomografi (BT) görüntülemesinde kemik anormalliği görülmemiştir. Devam eden şikayetleri sonucunda yapılan manyetik rezonans görüntüleme (MRG) ve ultrasonografi (USG), Morel Lavallée lezyonuyla uyumlu, prepatellar bölgede iyi tanımlanmış bir sıvı birikimi ortaya koymuştur. Tanı için klinik muayene ve hastanın öyküsü esastır. Ancak tanıyı doğrulamak ve hastalığın seyrini izlemek için MR ve USG önemli rol oynar. Morel Lavallée lezyonları için MRI özelliklerine dayanan altı alt tipe ayrıldığı bir sınıflandırma önerilmiştir. USG de hem ilk tanı aşamasında hem de takip değerlendirmesi için oldukça pratik ve kullanışlı bir yöntemdir. Bazı lezyonlar kendiliğinden çözülebilir. Uygun şekilde tanınmaz ve tedavi edilmezse kronikleşebilir veya komplike hale gelebilir ve daha invaziv müdahaleler gerektirebilir. Lezyonun özelliklerini tanımak ve kişiselleştirilmiş bir tedavi stratejisi uygulamak, optimum hasta sonuçlarına ulaşmak için esastır.

**Anahtar Kelimeler:** Morel-Lavallée lezyonu, diz, soyulma yaralanması, ultrason

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## 1. Introduction

The Morel-Lavallée lesion was first described by Maurice Morel-Lavallée and is characterized by the sudden separation of soft tissue from the deep fascial layer (1). This shearing force leads to damage of perforating vessels and lymphatics, resulting in the accumulation of hemolymphatic fluid and necrotic fat within a potential space (2). While Morel-Lavallée lesions are commonly associated with high-energy trauma such as motor vehicle accidents and sports injuries, they may also result from low-energy trauma and iatrogenic causes (3,4). While they are most frequently observed in the pelvic region, thigh, and hip, they can also develop in other parts of the body (5,6).

Untreated or overlooked lesions may become chronic, making their management more complex. In chronic cases, surgical interventions such as debridement, sclerotherapy, percutaneous drainage, and skin grafting may be required (6-8). Early diagnosis and appropriate treatment are crucial in preventing such complications. This case report presents an example of a Morel-Lavallée lesion and outlines the diagnostic process and clinical approach. The importance of early diagnosis and proper management in such lesions is emphasized.

## 2. Case Report

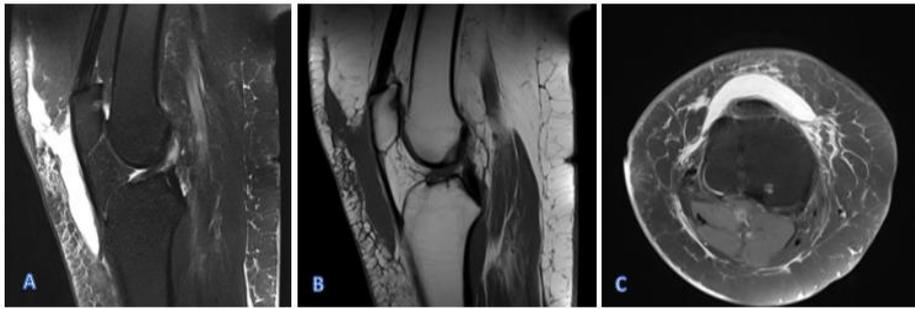
A 56-year-old female patient with no significant medical history presented with right knee pain. The pain began after she fell onto her knee on a slippery surface, and she subsequently noticed swelling in the affected area. The patient initially visited the emergency department, where a computed tomography (CT) scan was performed, revealing normal bone contours and structures. Due to persistent symptoms, she later consulted the orthopedics and traumatology department, where the orthopedic specialist ordered a magnetic resonance imaging (MRI) scan (Fig. 1). The patient was prescribed nonsteroidal anti-inflammatory drugs (NSAIDs), rest, and cold therapy.

However, the patient, whose complaints persisted, presented to the physical medicine and

rehabilitation clinic 14 days after the injury for additional opinions. The patient walked with an antalgic gait, keeping the right knee slightly flexed. Physical examination revealed swelling in the right knee without warmth or erythema. On palpation, there was significant tenderness and a fluctuant swelling extending across the anterior knee. The patient reported intense pain with quadriceps contraction and stretching.

An ultrasonographic (USG) evaluation was performed, revealing a well-defined anechoic fluid collection localized between the subcutaneous tissue and deep fascial planes, extending superiorly and inferiorly from the prepatellar region. The lesion was compatible with fascial separation, had an internal structure containing minimal echogenic residue. No intra-articular effusion was detected, and the muscle anatomy was intact (Fig. 2A).

Aspiration of the lesion yielded serohemorrhagic, low-viscosity fluid without clot formation. Based on clinical findings and imaging, and in conjunction with the radiologist's evaluation, the diagnosis of a Morel-Lavallée lesion was confirmed. The patient was prescribed cold therapy, compression bandaging, and a combination of codeine-paracetamol for symptomatic relief. One week later, the swelling recurred, prompting the patient to return for evaluation. A repeat USG showed a fluid collection similar in volume to the previous aspiration. A second aspiration was performed, and the aspirated fluid had the same characteristics as before (Fig. 2B). Due to recurrent fluid accumulation, the patient was referred to the orthopedic clinic for further intervention evaluation. After evaluation by the orthopedic specialist, non-surgical management was recommended, with ongoing clinical and radiological follow-up planned. The patient's follow-up care included the addition of range of motion exercises to her existing treatment plan. After two weeks of follow-up, the patient's pain decreased, and an improvement in range of motion was observed, so conservative management was continued.



**Fig 1.** In the sagittal plane (A, B), a 14x3 cm fusiform/ovoid-shaped fluid collection is observed in the prepatellar region, located within the deep subcutaneous fat tissue with an epifascial distribution. The lesion appears hyperintense on T2-weighted sequences (A), hypointense on T1-weighted sequences (B), and hyperintense on PD-weighted images (C). No effusion is detected in the adjacent knee joint. Musculo-tendinous structures were intact.



**Fig 2.** (A) High-frequency ultrasound shows a hypoechoic fluid collection with septations in the distal upper leg. (B) Sero-hemorrhagic aspirated fluid from the prepatellar fluid collection.

**Table 1.** Mellado & Bencardino's MRI classification of Morel-Lavallee lesions.

Lesion Type	Morphology	T1W	T2W	Capsule
Type 1 <i>Seroma</i>	Laminar	Hypointense	Hyperintense	Occasional
Type 2 <i>Subacute hematoma</i>	Oval	Hyperintense	Hyperintense	Thin
Type 3 <i>Chronic organizing hematoma</i>	Oval	Intermediate	Heterogeneous	Thick
Type 4 <i>Closed laceration</i>	Linear	Hypointense	Hyperintense	Absent
Type 5 <i>Pseudonodular</i>	Round	Variable	Variable	Thin/thick
Type 6 <i>Infected</i>	Variable sinus tract	Variable	Variable	Thick

### 3. Discussion

Morel-Lavallée lesion is a soft tissue injury that can be easily overlooked in the early period and may be misdiagnosed. However, a history of trauma, typical localization, and MRI characteristics can aid in confirming the diagnosis. In the literature, the most common

localization has been reported as the lateral aspect of the greater trochanter (2). However, in one case series, 64.3% of cases were detected in the knee region (9). Tejwani et al. identified the most common mechanism of Morel-Lavallée lesion in football players as a shearing blow to the playing

surface, with the most frequent movement restriction being a loss of active flexion (10). Similarly, in our case, the patient developed a lesion in the prepatellar region following a shearing injury caused by a slip and fall. In our case, there was also a restriction in active flexion; however, at the time of the initial presentation, the patient had difficulty achieving full knee extension. In another study, four cases of prepatellar MLL, similar to our case, showed cranio-caudal lengths of the lesions ranging from 10.5 cm to 13.6 cm (11).

MRI plays a crucial role in the diagnosis and classification of Morel-Lavallée lesions. Mellado and Bencardino, after a comprehensive evaluation, classified Morel-Lavallée lesion into six subtypes based on MRI patterns (Table 1) (12). Although CT is considered the first-line imaging modality in acute trauma cases, Morel-Lavallée lesions are not well-defined in the acute phase. Three-dimensional reconstructions may assist in detecting the lesion in the interfascial plane. In Morel-Lavallée lesions, while USG is helpful in confirming the location of the lesion and detecting anechoic or hypoechoic, non-specific fluid collections, MRI is the preferred method for characterizing the lesion and determining its type and chronicity (2, 8). In MRI, chronic lesions typically exhibit a fibrotic capsule formed by hemosiderin accumulation. Additionally, the detection of features such as fluid-fluid levels, fatty globule, internal debris, and septations provides a more detailed insight into the lesion's content and structure. The presence of blood products within the fluid can create a heterogeneous appearance depending on whether the lesion is in the acute, subacute, or chronic phase (13-16). The additional contribution of USG is providing imaging guidance for interventional procedures.

Morel-Lavallée lesions can be mistaken for various other clinical conditions (2,17). The primary differential diagnoses include sarcomas, subcutaneous hematomas, bursitis, and fat necrosis. Hematomas typically resolve spontaneously within a few weeks and exhibit clot organization, whereas Morel-Lavallée lesions often contain serosanguinous fluid, present with a fluctuant mass, and tend to become chronic. In rare cases, chronic, slowly expanding hematomas may also be observed. These lesions can also mimic hemorrhagic neoplasms, in which case contrast-enhanced MRI or biopsy may be required for differentiation (18,19). Bursitis may

sometimes be confused with Morel-Lavallée lesions, but bursitis remains confined within bursa boundaries, presents as a well-localized fluid collection, and may demonstrate synovial hypertrophy. Chronic hemorrhagic bursitis can resemble Type 3 Morel-Lavallée lesions, although management of both conditions is often similar (9,20).

If Morel-Lavallée lesions are not adequately treated in the early stage, they may become encapsulated and firm due to repeated bleeding and inflammation (2). This can create an atypical soft tissue mass appearance, leading to diagnostic confusion with malignant soft tissue tumors, particularly sarcomas. Internal contrast enhancement of the lesion and a history of previous trauma can serve as important clues in the differential diagnosis. However, biopsy is required for definitive diagnosis, and histopathological examination is necessary to rule out malignancy (21,22).

The management of Morel-Lavallée lesions should be individualized based on the lesion's phase, size, and risk of complications (8). Compression bandages and symptomatic treatment may suffice for acute and small lesions, whereas ultrasound-guided drainage is recommended for larger fluid collections (12). In our case, which was evaluated in the subacute phase, two sessions of aspiration were performed. Follow-up with compression bandaging and symptomatic treatment revealed a marked reduction in the fluid collection. Although corticosteroid injections have been attempted as part of conservative treatment in some cases of Morel-Lavallée lesions, they have generally resulted in recurrence and demonstrated lower success rates compared to sclerotherapy (23). The most commonly used sclerosing agents reported in studies include doxycycline, talc, ethanol, and bleomycin (2,23-25). According to the Mayo Clinic experience, lesions requiring fluid aspiration exceeding 50 mL carry a high risk of recurrence and are more likely to necessitate surgical intervention (26). Surgical intervention is considered an effective treatment option for Morel-Lavallée lesions that are large, recurrent, infected, associated with overlying skin necrosis, significant soft tissue loss, or chronic encapsulation (8). In such cases, open surgical debridement, along with skin grafting or flap reconstruction when necessary, may be performed to remove necrotic tissue and minimize the risk of reinfection and fluid reaccumulation (8,27).

However, in cases where skin viability is preserved, less invasive approaches may be preferred. Li et al. reported favorable clinical outcomes and low recurrence rates using a minimally invasive incision and loop drainage technique (28). Additionally, in cases with compromised skin viability or infection, negative pressure wound therapy can be applied either as a preparatory step prior to surgery or as an adjunct to surgical intervention (26).

In conclusion, Morel-Lavallée lesions require careful evaluation in the diagnostic and treatment

process due to their evolving morphological characteristics over time. While these lesions can be managed with conservative methods in the early stage, they may become encapsulated and chronic, eventually necessitating surgical intervention. Therefore, in cases of large and recurrent fluid collections, determining the appropriate treatment approach early on is crucial for the patient's prognosis. The treatment strategy should be individualized based on the lesion's stage and the patient's clinical condition.

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