

Morel-Lavallée Lesion of the Elbow Region in a Young Male: Case Report and Literature Review

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Abstract

The Morel-Lavallée lesion is a fluid collection resulting from the traumatic separation of the subcutaneous tissue from the underlying fascia. It frequently occurs over the trochanteric region but may also occur in the flank, lumbosacral region, and buttock. Morel-Lavallée lesions in the upper limb are rarely reported in the literature.

In this report, we present a case of a 42-year-old male, not known to have any medical diseases, who suffered from a post-traumatic left elbow mass that had existed for seven months before his presentation to our clinic. It is worth reporting this case to increase the awareness of this little-known pathology among orthopedic surgeons. In addition, most of the Morel-Lavallée lesions mentioned in the literature are located in the lower limb.

Categories: Orthopedics

Keywords: upper limb, post-traumatic pseudocyst, post-traumatic extravasations, morel-lavallee lesion, degloving injury

Introduction

Morel-Lavallée lesions (MLLs) are also referred to as post-traumatic soft tissue cysts, post-traumatic extravasations, Morel-Lavallée effusions, or Morel-Lavallée seromas [1-3]. MLLs are closed degloving injuries combined with high-velocity trauma, crush injuries, and blunt trauma, resulting in separation of the subcutaneous fat from the underlying fascia leading to cavity formation associated with injury to the lymphatics and the blood capillaries in the vicinity [1-3]. Eventually, the hematoma is resorbed, and serosanguineous fluid appears [3]. Next, the serosanguineous collection resolves spontaneously or is subjected to an inflammatory reaction with a consequent fibrous capsule formation filled with necrotic fatty tissue blood products and fibrin debris [1-3]. In general, MLLs present as gradually enlarged swelling associated with tautness, pain, and cutaneous hypoesthesia or anesthesia because of the subdermal afferent nerve damage [1,3]. Moreover, the fluctuance on palpation is an important clinical feature that helps in accurate diagnosis and correlation with the history [1,3]. Unfortunately, no typical histopathologic findings of MLLs were reported in the literature [2]. Therefore, the diagnosis is based on a physical examination and radiological investigations, mainly magnetic resonance imaging (MRI), the investigation of choice for this lesion [2-4]. A small number of MLLs in the upper limb are reported in the literature reviews in PubMed and Google Scholar.

Case Presentation

A 42-year-old man was referred to our orthopedic oncology surgery clinic for a left elbow mass. He sustained blunt trauma to his elbow after he slipped and fell down on the ground seven months before the visit. Subsequently, two days after the trauma, he noted a feeling of fullness in the elbow that had since persisted. The patient was later followed up at the fracture clinic and was diagnosed clinically with traumatic bursitis, which was managed with a compressive bandage. Later he began noting a progressive enlargement of the mass at the posteromedial aspect of the elbow over the next two weeks, which interfered with his day-to-day activities during elbow flexion or extension. The area was otherwise asymptomatic. There was no medical history of malignancy, and no fevers, chills, or night sweats.

On the clinical examination, he looked overall healthy in appearance. The mass was centered over the humerus's medial condyle. The overlying skin was normal. On palpation, the mass was non-tender and mobile, with a soft consistency and with no areas of induration. The elbow range of motion was full, and the vascular, motor, and sensory examinations distally were normal. The blood tests (complete blood count, biochemistry, C-reactive protein, and erythrocyte sedimentation rate) were unremarkable. Plain radiograph demonstrated a ring-like soft tissue mass (Figure 1). We did not feel that the US study was enough for the

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diagnosis; therefore, MRI was requested. The MRI study with intravenous (IV) gadolinium of the left elbow showed a well-defined, large, cystic lesion overlying the fascia (Figure 2). The lesion measures approximately 45x75x25 millimeters (longitudinal x anterior-posterior x transverse).

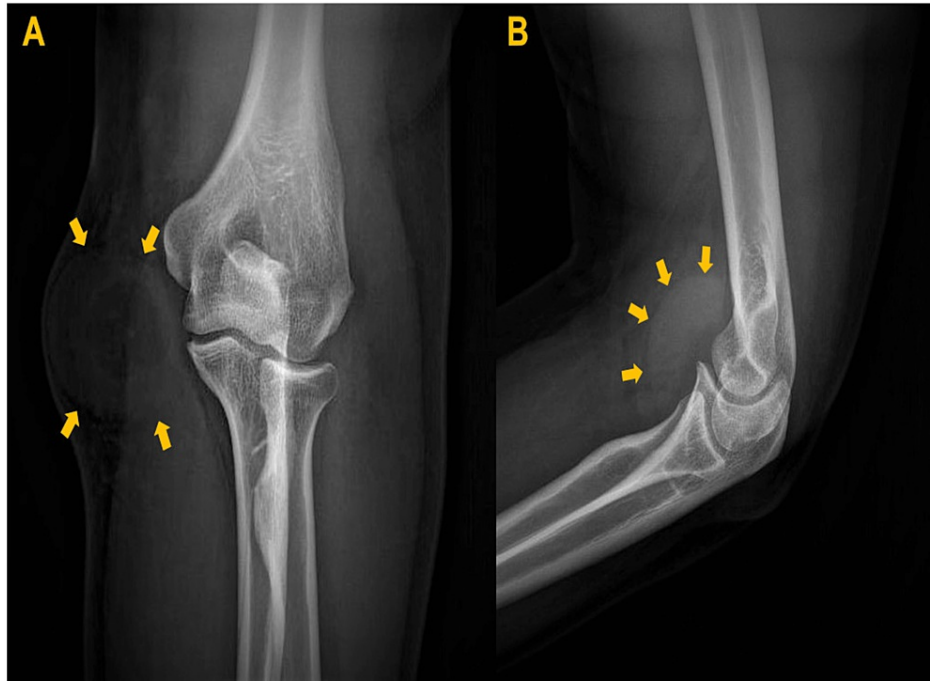


FIGURE 1: (A) An elbow radiograph (anterior-posterior view) shows a ring-like soft tissue mass at the medial aspect of the elbow (yellow arrows). (B). An elbow radiograph (lateral view) shows a soft tissue mass (yellow arrows).

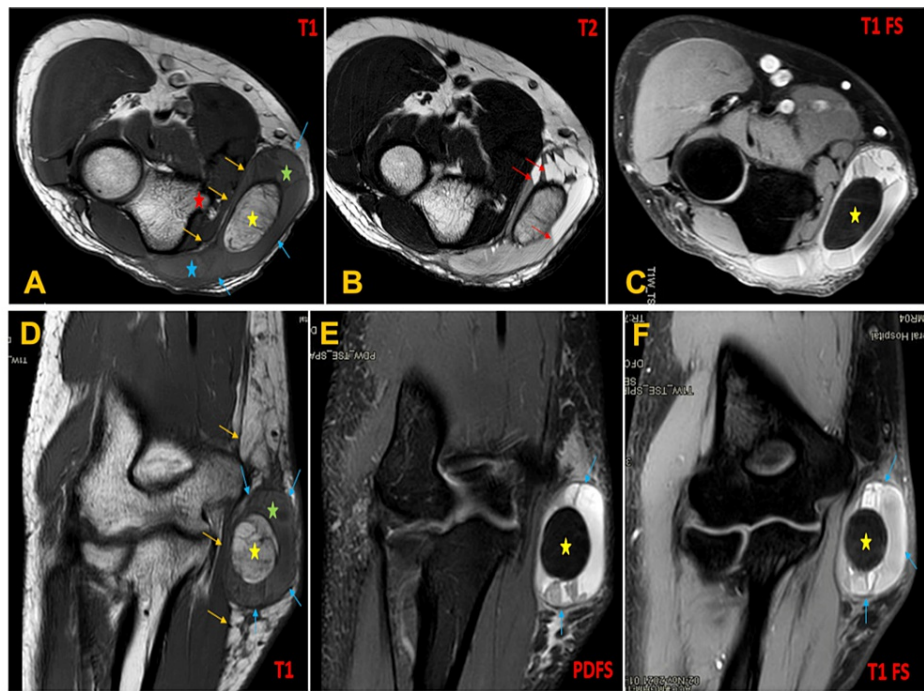


FIGURE 2: Selected multiplanar, multisequence MRI of the left elbow using intravenous gadolinium.

(A, D) Axial T1-weighted and coronal T1-weighted images at the same level as Figure A show a left elbow mass that overlies the fascia (yellow arrows) in the medial epicondyle region (red star) with a tail-like expansion (blue star) extended posteriorly and fusing with the surrounding fascia. The mass appeared with two zones: a high-intensity central oval shape zone, which represents a fatty mass (yellow star), and a hematoma, which displays a homogeneous hyperintense signal to skeletal muscle (green and blue stars), surrounded by low-intensity peripheral pseudocapsule (blue arrows). (B) Axial T2-WI at the same level as Figure A reveals multiple fluid-fluid levels indicating the chronicity of the lesion (red arrows) with no evidence of internal enhancement. (C) Axial T1-weighted fat-saturated image at the same level as Figure A displays the suppression of the central fatty mass (yellow star) with heterogeneous hyperintense signal outer to the central mass. (E, F) Coronal proton density (PD) fat saturation (FS) and coronal T1-weighted fat-saturated image sequences at the same level as Figure A show the signal suppressed central fatty mass (yellow star) with heterogeneous intermediate to hyperintense signal outer to it, surrounded with low-intensity peripheral pseudocapsule (blue arrows).

The history, physical examination, and imaging findings were consistent with a left elbow region MLL. As the lesion was disrupting the patient's activities of daily living, he requested treatment.

A pneumatic tourniquet was applied to the upper arm with the patient under general anesthesia. The lesion was removed through a medial approach (Figure 3). The assessment of the excised specimen revealed a cystic mass with tail-like expansion surrounded by a fibrous capsule (Figure 4). The histopathology result demonstrated an organized hematoma with bleeding, dilated vessels, fibrin exudate, fibrosis hyalinization, focal endothelial proliferation, and neovascularization (Figure 5). The findings were consistent with MLL. The postoperative course went smooth without wound complications or recurrence of the collection in the follow-up period, which extended up to eight months.

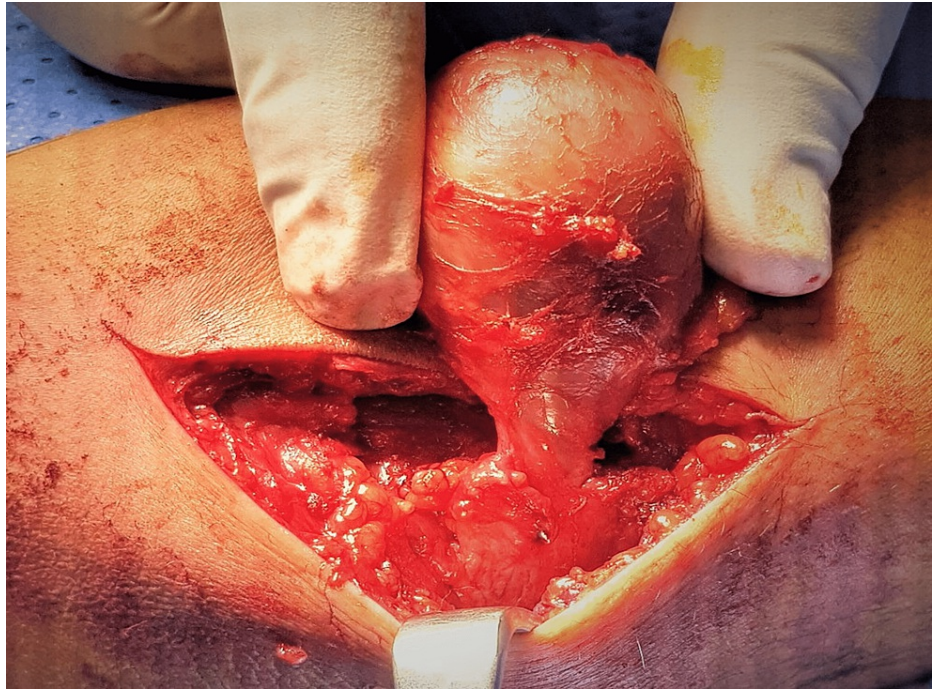


FIGURE 3: Photograph showing the surgical approach to removing the mass.



FIGURE 4: Gross pathology image showing the cystic lesion encapsulated and has a tail-like expansion.

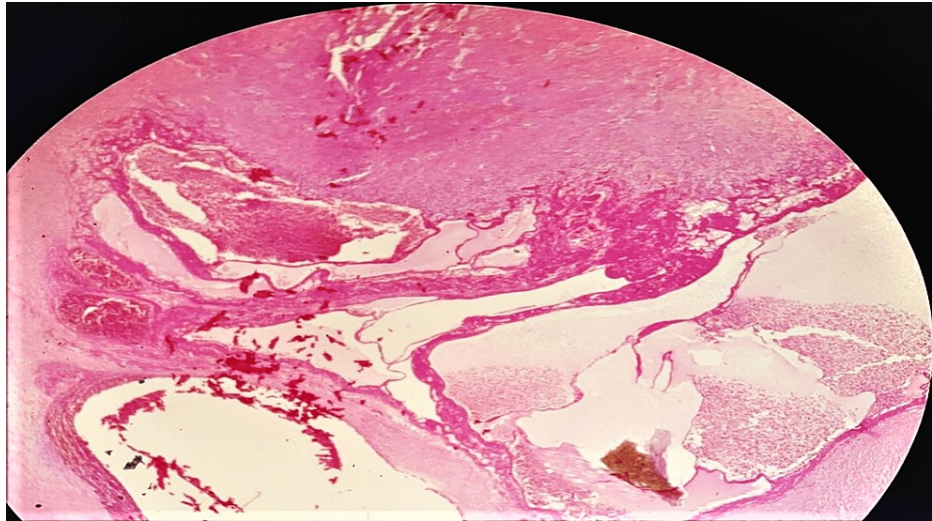


FIGURE 5: Histopathology photograph demonstrating an organized hematoma with bleeding, dilated vessels, fibrin exudate, fibrosis hyalinization, focal endothelial proliferation, and neovascularization.

Discussion

Most reported anatomical locations for MLLs are the thigh and the knee regions [1,3,5,6]. The commonest location is in the knee (32%), the greater trochanter (29%), and the anterolateral compartment of the leg (23%) [3,6]. Furthermore, less frequently reported sites include the scalp, scapular region, arm, hand, abdominal wall, lumbosacral region, and the calf [1,3,5,6]. For the MLLs, MRI has been considered the modality of choice due to its multiplanar acquirement, high contrast resolution, the ability to determine hematoma chronicity, and the demonstration of detailed anatomical features [2-4,6,7]. However, MRI assessment yields a variable degree of appearance that depends on age and blood product breakdown [2-4]. Currently, there is no traditional classification system for MLLs [8]. Several investigators classified MLLs according to the time of injury or the presence or absence of the capsule [8,9]. Additionally, MLLs were classified into six types depending on the MRI appearance [2-4,6,7]. Nevertheless, these classifications have limitations in guiding the treatment [1,2,6,8-10]. Type I lesions are most frequently not encapsulated, representing a seroma with fluid-like signal intensity (SI) [3,4,7,11]. Type II lesion resembles a subacute hemorrhage and displays a homogeneous hyperintense SI on both T1-weighted image (WI) and T2-WI [3,4,7,11]. Moreover, a hemosiderin-rich hypointense capsule often appears on T1-WI and T2-WI [3,4,7]. Occasionally, an internal homogeneity is detected and attributed to fluid-fluid levels, fat globules entrapment, or internal septations [3,4,7]. Type III lesions indicate chronicity and hematoma organization, demonstrating hypo- or intermediate SI on T1-WI and heterogeneous intermediate to hyperintense SI on T2-WI [3,4,7]. Finally, the next three types are long-standing lesions, which may display more atypical MRI features [3,4]. In type IV MLLs, a closed laceration to the fatty tissue is associated with a peri-fascial separation, with or without a seroma or hematoma. [4,7]. Those lesions are not encapsulated [6,7] and exhibit a low SI on T1-WI and high SI on T2-WI [3,4,7]. Type V MLLs are usually adjacent to the fascia and exhibit a tiny, round pseudo-nodular appearance. Infrequently, they demonstrate irregular enhancement peripherally with skin retraction [3,4,7]. Type VI is considered when an infection occurs, leading to internal septations, capsular thickening, and edema in the fascia and the nearby fatty tissue [3,4,7]. Unfortunately, the diagnosis of MLL is often missed or delayed because MLL is relatively infrequently encountered [2,8]. Therefore, MLLs represent a diagnostic challenge, especially in an atypical location [2-4,7,8]. Fortunately, the clinical history, physical examination, and MRI are essential to differentiating most confounding pathologies [2,4,8]. The common differential diagnoses are hematoma, abscess, and fat necrosis [2,6,8]. The imaging overlap between MLLs and hematoma is understandable, but the lesion's chronicity and location should lead to the diagnosis of MLLs [2]. Moreover, an abscess usually exhibits peripheral enhancement and contains air locules, which are not features of MLLs [2]. Of note, fat necrosis is a small component of MLLs; however, MRI should be easily distinguished between solitary fat necrosis and MLLs [2,6,7,12,13]. Additionally, soft tissue sarcoma should be excluded in slow-growing soft tissue masses, especially with solid enhancing components [2,4,6-8,14]. Consequently, a biopsy should be performed in case of questionable or aggressive MRI features [2].

Currently, there are no treatment guidelines for MLLs [1,2]. Compressive dressings are applied to prevent fluid aggregation and seal off the dead space in conjunction with percutaneous fluid aspiration [2,10]. Compressive bandaging has been recommended in non-encapsulated acute, small lesions [1,2,4,10,15]. On the other hand, percutaneous aspiration for lesions with a volume of more than 50 ml is vulnerable to recurrence; thus, multiple aspirations are usually required [1,15]. Moreover, sclerotherapy is recommended

after failure of the percutaneous aspiration and has a success rate of 95.7% [1,10,15]. Sclerotherapy effectively induces fibrosis, leading to obliteration of the pathological cavity in the lesions with volumes up to 700 ml [1,10,16]. In persistent and long-standing lesions, surgical debridement with pseudocapsule resection is a suitable option [2,4,6]. Moreover, an absolute indication of surgery is in lesions associated with an open fracture, skin necrosis, and deep infection [2,4,8,10].

Conclusions

MLL represents a serious and infrequent soft tissue injury, which is often delayed or misdiagnosed. Therefore, MRI is the modality of choice for the diagnosis. It is essential to differentiate the lesion from the other pathologies, especially soft tissue sarcoma in the slowly growing masses. Consequently, radiologists should be aware of the different radiological findings of the lesion. Furthermore, orthopedic surgeons should have suspicion when managing patients after blunt or shearing injuries. Treatment is different; compressive bandage is preferred for acute lesions, while percutaneous aspiration, sclerotherapy, and debridement are preferred for chronic lesions.

Additional Information

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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