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Case Report

Morel-Lavallee lesion in distal thigh: A case report

Suresh Kumar MS (Ortho)^{a,*}, Saurabh Kumar MS (Surg)^b^a Specialist Grade II, Department of Orthopedics, Maharishi Balmiki Hospital, Pooth Khurd, Delhi, 110039, India^b Specialist Grade II, Department of Surgery, Maharishi Balmiki Hospital, Pooth Khurd, Delhi, 110039, India

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ABSTRACT

It is a relatively rare condition involving a close degloving injury due to direct trauma with tangential force followed by the separation of the subcutaneous tissue from the underlying fascia. The rupture of small perforating vessels in this area, resulting in the formation of a cavity that filled with blood, lymph and fat foci, the latter being sometimes necrotic. Morel-Lavallée lesion was originally described in the lateral aspect of the proximal thigh, which is the most common site of this lesion; however other anatomic sites such as periscapular, lumbar and gluteal regions, ankles and knees have been described in the literature. Various methods of treatment has been described, but open debridement can result in a successful functional outcome.

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1. Introduction

Morel-Lavallee lesion is a common but rarely described post-traumatic closed soft tissue injury sequel.¹ MLL in distal thigh is a relatively rare condition involving a close degloving injury due to direct trauma with tangential force followed by the separation of the subcutaneous tissue from the underlying fascia. Because of it, the rupture of small perforating vessels in this area, resulting in the formation of a cavity filled with blood, lymph and fat foci, the latter being sometimes necrotic.^{2,3} Morel-Lavallée lesion was originally described in the lateral aspect of the proximal thigh, which is the most common site of this lesion; however other anatomic sites such as periscapular, lumbar and gluteal regions, ankles and knees have been described in the literature.^{4,5}

The case is reported to us with swelling over the antero-medial aspect of distal left thigh with ipsilateral united

fracture of medial tibial condyle and partial ACL tear. This type of combination of injuries has not been described previously. Surgical intervention in the form of open debridement was done and resulting in the dramatic improvement.

2. Case report

A 45 years old male presented with swelling over antero-medial aspect of distal left thigh (Fig. 1A + B). He complained pain left knee during walking and also, weakness left lower limb following trauma. He met with an accident one and half year back, while driving a motorcycle and he was hit by a car from back. He sustained fracture left clavicle, ipsilateral medial tibial condyle and bruises over the anterior aspect of left distal thigh managed conservatively. On follow-up of after one month POP slab was removed and found huge swelling

* Corresponding author. C-5/109 First Floor, Sector-11, Near Shankar Chowk, Rohini, Delhi, 110085, India. Tel.: +91 011 27571916, +91 9718502011 (mobile).

E-mail address: suresh.kumar1956@rediffmail.com (S. Kumar).
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Fig. 1 – (A + B) – Clinical photograph shows swelling over antero-medial aspect of left distal thigh.

over the antero-medial aspects of left thigh. There was a history of aspiration two times and about 150 ml & 200 ml sero-sanguinous fluids aspirated respectively from the swelling and crepe bandage was applied, but no relief.

On examination diffuse flabby mass extended from superior pole of patella to the junction of middle and distal thigh over antero-medial aspects of left thigh and healed bruises scar marks over anterior aspect of left distal thigh (Fig. 2). Clinically, there were no sign of inflammation and no patellar tap present but anterior drawer test was positive.

MRI left knee joint study shows large collection measuring approximately 56(AM) × 105(TR) × 27(CC) mm in the thigh showing multiple septations within it. Altered marrow signals in lateral tibial condyle appearing hyper intense as PD/STIR image is described as likely marrow edema. Mild altered signals intensify in anterior cruciate ligament-likely low grade partial tear and mild joint effusion (Fig. 3A + B + C). X-ray left knee with thigh and leg AP/Lat. view shows healed medial tibial condyle fracture and healed ipsilateral fracture of fibula at the junction of upper one third and middle one third and also soft tissue swelling over antero-lateral aspect of distal thigh (Fig. 4(A + B)).

Fig. 2 – Clinical photograph shows healed bruises scar marks over anterior aspect of left distal thigh.

Open debridement was carried out under spinal anesthesia. Medial incision was given centering over the swelling after separating the soft tissue the encapsulated Cystic mass was found (Fig. 5); cavity was filled approxi.250 ml of sero-sanguinous fluid with fat globules. After excision of the encapsulated cystic mass, the dead space was obliterated with vicryl suture and wound closed in layers. Stitches were removed after 12 days and healed surgical scar mark (Fig. 6).

On follow-up after one month, there was no pain on walking and no swelling. The patient was comfortable and returned to his work after eight weeks without any discomfort.

3. Discussion

Morel-Lavallée lesion were given various name like-Morel-Lavallée effusion, Morel-Lavallée hematoma, Morel-Lavallée extravasation, pseudo-lipoma, pseudo-cyst, ancient hematoma, organizing hematoma, chronic expanding hematoma and posttraumatic soft tissue cyst.⁴ MLL is the sequela of a closed degloving injury involving separation of the skin and subcutaneous fat from the underlying fascia.¹ The acute trauma, typically due to a blunt shearing force applied across the surface of the skin, creates a potential space between the subcutaneous fat and fascia that fills with a combination of hemorrhage, fat, and lymphatic fluid due to disruption of bridging vessels and lymphatic channels.^{2,6} In some instances, surrounding granulation tissue may eventually organize into a pseudo capsule, preventing reabsorption of the contents of the lesion and leading to a chronic fluid collection.³ The entity was first described in the hip and pelvis by French physician Maurice Morel Lavallée in 1853.² It has since been well described by numerous authors as occurring in the lower back, buttocks, greater trochanter, and lateral thigh, but has only recently been described in the prepatellar region in professional football players and amateur competitive wrestlers.^{3,4,6} These injuries are most commonly found adjacent to osseous protuberance.^{2,7}

Extent of the lesion appears to be the most reliable characteristic by which to differentiate the two entities. For example, extension of the fluid collection into the

Fig. 3 – (A + B + C) – Report of MRI left knee shows mild altered signals intensify in anterior cruciate ligament-likely low grade partial tear and mild joint effusion.

suprapatellar region is virtually diagnostic of MLL, as the prepatellar bursa should not extend into this area.⁴ Likewise, as demonstrated in a cadaveric study the normal prepatellar bursa should not extend along the medial or lateral knee posterior to the mid-coronal plane; extension of the fluid collection posteriorly beyond that plane highly suggests MLL.⁵

The lesion can be either painful or asymptomatic and up to one third of the patients do not recall any significant trauma.³ According to some author, this lesion is generally misdiagnosed or diagnosed late when the swelling is missed in initial presentation or mistaken for local edema.⁶ Delay in the diagnosis results in the development of collections with bulging and deformity of the subcutaneous cellular tissue.⁸ Missed diagnosis can lead to delayed presentation as a

contour deformity due to local tissue necrosis. Morel-Lavallee lesions though uncommon are often missed injuries especially in polytraumatized patients seen at the emergency services in the presence of other severe injuries.⁹ In cases of delayed diagnosis, an insidious progression of fluid accumulation resulted in progressive swelling, ecchymosis and thigh tightness with knee flexion, prompting the player to seek evaluation.⁷ In one of the series reviewed 16 MLL cases and reported that the diagnosis of MLL was initially missed in 44% (7 of 16) of the cases.¹⁰ Hudson et al. also reviewed 16 MLL cases and missed the diagnosis in one third of the cases.⁹

Considering that Morel-Lavallee lesions may remain undiagnosed for long periods, it is important for the radiologist to know the characteristics of acute and chronic lesions, as

Fig. 4 – (A + B) – X-ray left knee with thigh and leg AP/Lat. view shows healed medial tibial condyle fracture and healed ipsilateral fracture of fibula at the junction of upper one third and middle one third and also soft tissue swelling over antero-lateral aspect of distal thigh.

well as their therapeutic implications. The appearance of the lesions depends on the amount of blood, lymph and fat present, as well as the time elapsed from the trauma.³ Morel-Lavallée lesions are rare complications that are often missed or under diagnosed at the time of initial injury. In many cases these lesions can persist for months before they are recognized.⁴ If not treated adequately, these lesions may give rise to significant morbidity.^{2,4} Diagnostic delay of up to 34 years has been described.^{11,12}

It was reported on severe quadriceps muscle contusions in three athletes, two of which were professional football players. In all the three cases MRI demonstrated hematoma and edema within one single muscle belly of the vastus musculature. This presentation clearly differs from MRI

findings in MLL of the knee, where the fluid collection is superficial to the vastus fascia and underlying quadriceps musculature is normal.¹³

MLL is usually diagnosed by clinical examination, history of trauma, roentgenogram shows any sign of fresh or old fracture and MRI demonstrate a subcutaneous fluid collection at the site of blunt trauma and also, as reported by other authors.⁷ Mellado and Bencardino proposed an MRI classification system of Morel Lavallee Lesion based on lesion shape, signal and enhancement characteristics and presence or absence of a capsule. Six types lesion were described. **Type 1** – lesion was laminar shaped, seroma like with decreased T1 and increased T2 signal. They occasionally had a capsule and did not enhance. **Type 2** – lesion was oval shaped and looked a sub-acute hematoma with increased T1 and T2 signal. They had a thick capsule and variable enhancement. **Type 3** – lesion were also oval shaped and had a chronic organizing hematoma with intermediate T1 and heterogeneous T2 signal. They also had a thick capsule and internal/peripheral enhancement. **Type 4** – lesion were linear shaped and looked like a closed laceration with hypo intense T1 signal and hyper intense T2 signal. These lesion had no capsule and variable enhancement. **Type 5** – lesion were described as pseudo nodular with a round shape, variable T1 and T2 signal, a thin or thick capsule and internal | peripheral enhancement. **Type 6** – lesion were considered infected with variable T1 and T2 signal and had variable sinus tract infection, a thick capsule and internal/peripheral enhancement.⁴

MLL are generally treated by open debridement with subsequent healing by secondary intention.⁷ They suggested that open debridement should be considered over techniques involving percutaneous drainage because open debridement allows for the complete removal of necrotic fat, which can serve as a nidus for infection.⁴ Morel-Lavallée lesions could be

Fig. 5 – Clinical photograph shows encapsulated cystic mass.

Fig. 6 – Clinical photograph shows healed surgical scar mark.

treated safely with debridement and meticulous dead-space closure in layers.¹⁴ Accurate diagnosis is delayed in up to one third of patients due to an inconstant presentation and initial bruising which may mask the significance of the underlying soft tissue injury.⁵

Sclerodesis is a treatment also commonly employed in the treatment of malignant pleural effusions. Instillations of compounds including bleomycin, tetracycline, doxycycline, or talc have been used to cause pleural scarring.^{15,16} Both tetracycline and doxycycline have also been safe and highly effective in sclerosis of malignant pericardial effusion and benign lymphoepithelial cysts of parotid gland, suggesting that application to a MLL could yield similar results.¹⁷ The MLL typically contains serosanguinous fluid comprised of blood, lymph and necrotic fat. These characteristics are similar to those of lymphoceles which have been successfully treated with percutaneous sclerotherapy; bleomycin, tetracycline, doxycycline, talc, povidine-iodine, ethanol and fibrin glue have all been safe and effective.^{18,19} Recalcitrant fluid collections can be safely and expeditiously treated with Doxycycline sclerodesis in MLL.^{7,20} Closed degloving injuries can be managed satisfactorily with doxycycline induced obliteration of the cavity with early healing time without recurrences.²¹ Regarding the mechanism by which doxycycline induces sclerotherapy, various hypotheses have been proposed like destruction of lining mesothelial cells, inhibition of fibrinolysis and induction of fibroblast growth factors.^{22,23} Hence, the resulting fibrosis obliterates the space and prevents recurrence of fluid collection. Average duration for obliteration of these lesions is 5 weeks.²¹

Talc sclerotherapy was effective in managing large post-traumatic Morel-Lavallée lesions. This technique has the advantage of avoiding the need for an open procedure. The authors note that the above method is contraindicated if infection is suspected.²⁴ When conservative treatments failed, sarcoma was excluded, and the diagnosis confirmed, by MR imaging and cytology. Some surgeons prefer to excise the lesion and blue dye lymphatic mapping to identify and ligate feeding lymphatic vessels. The cavity was then closed using

fibrin sealants spray and reabsorbable quilting sutures. A pressure garment was fitted.²⁵

4. Conclusion

In our case injury occurred over the distal part of femur on medial side which is usually an osseous protuberance. Whenever, traumatic forces act over the bony prominence this result into a close degloving injury as well as contusion of the vasti muscle. This leads to the formation of encapsulated collection of blood, lymph and fat foci which may extend deep into the vasti muscle through the weakest or contused part of the muscle. This type of lesion should be considered as extravasation of encapsulated sero-sanguinous fluid with fat globules deep to the muscle and it is called as Morel-Lavallée extravasations' or MLL.

Surgical interventions in the form of open debridement result in the dramatic improvement of the MLL. Proper, adequate and repeated examination is essential key factors to avoid the delayed or missed diagnosis and it may provide the satisfactory results.

Conflicts of interest

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

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