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Case Report

Morel-Lavallée Lesion: Closed Degloving Injury, Less Known

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ABSTRACT

Morel-Lavallée lesion is a rare post traumatic soft tissue injury resulting from separation of the skin and subcutaneous tissue from the underlying fascia and creating an underlying blood filled cystic cavity. Several times the lesions are missed during initial examination and become evident after few weeks or months. They may be associated with fractures. Magnetic resonance imaging is the modality of choice for the evaluation of this lesion. It plays a significant role in its diagnosis. The imaging findings depend on the stage of lesion. We report three cases of the rare Morel-Lavallée lesion and its imaging characteristics.

Keywords: Moral-Lavallée, closed degloving injury, magnetic resonance imaging.

INTRODUCTION

Morel-Lavallée lesion is caused due to a soft tissue injury in which the subcutaneous tissue is separated from the underlying fascia which fills up with hematoma and liquefied fat. It is also known as a closed degloving injury. [1] MRI plays a useful role in the diagnosis and guidance of management. [2] This differential diagnosis must be considered in any soft tissue lesion with history of shearing trauma. [3]

CASE REPORT

We present three relevant cases of closed soft tissue injuries one in the knee and two in the thigh region diagnosed as Moral-Lavallée lesion.

Case1 (Figure1)

A 55 year old gentleman was referred to our institution with a 4month history of pre-patellar swelling. The swelling appeared 2 days after an injury sustained to the knee. He gave a past history of recurrent fall on knee. An MRI was carried out.

The imaging findings revealed a well circumscribed T1 weighted hypointense and T2 weighted hyperintense unilocular fluid collection in pre-patellar space, within the subcutaneous tissue.

Management: Conservative treatment was carried out. Under antibiotic coverage percutaneous aspiration with ultrasound guidance was performed with immediate post procedural compression bandaging to prevent refilling of the space. Immobilization was advised for 2 days.

Follow up: Symptoms subsided.

Case2 (Figure2)

A 48 year lady came with history of pain and swelling in the lateral aspect of the right thigh since 15 days. She does not recall of any injury. An MRI was advised.

The imaging findings revealed a well circumscribed multiloculated mixed signal intensity lesion on STIR images in lateral aspect of thigh within the subcutaneous tissues appearing hyperintense on T1 weighted images, suggestive of haemorrhage.

Management: Compression bandage was applied and patient was advised to bear weight as tolerated. Later as the symptoms persisted, aspiration followed by injection of sclerosing agent was performed.

Follow up: Symptoms subsided after intervention.

Case3 (Figure3)

A 32 year old man had sustained an injury by a ball in the region of thigh while playing cricket. He initially had pain but continued to play. Later, on examination there was swelling with ecchymosis in the thigh. Patient had pain on passive knee flexion and hip extension. An MRI was advised.

The imaging findings showed a well defined unilocular STIR hyperintense and T1 weighted hypointense lesion along the lateral aspect of thigh in subcutaneous tissues superficial to the muscles associated with diffuse subcutaneous and intermuscular edema. STIR hyperintense signal was noted in vastus lateralis muscle suggestive of contusion.

Management: Percutaneous irrigation and debridement of the hematoma cavity was carried out. Patient was discharged on day1 post procedure and was allowed to bear weight as tolerated. He used crutches for initial 2 days and could walk later without support.

Follow up: Post procedure he gradually started his routine activities and later resumed sports as well.

(**Case1) 55 year old male with a 4 month history of prepatellar swelling**

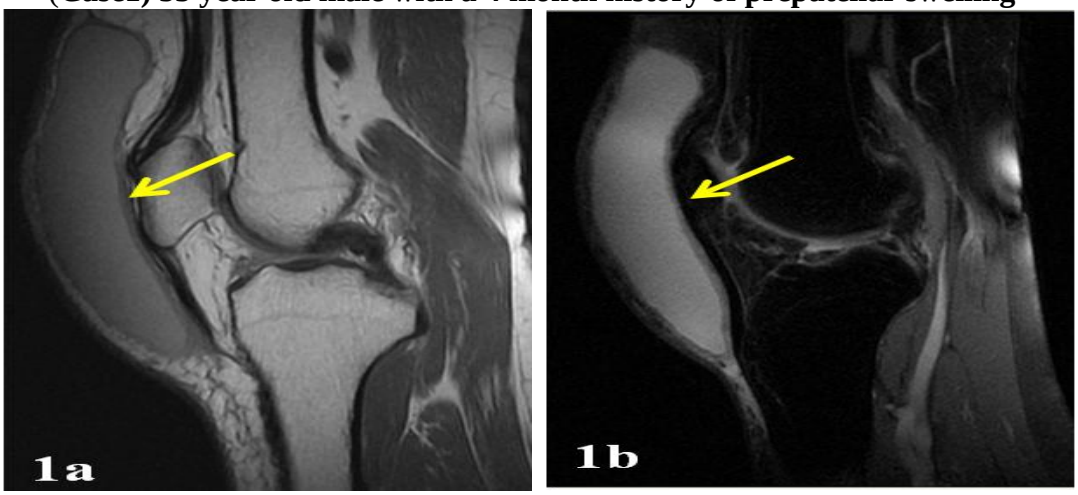
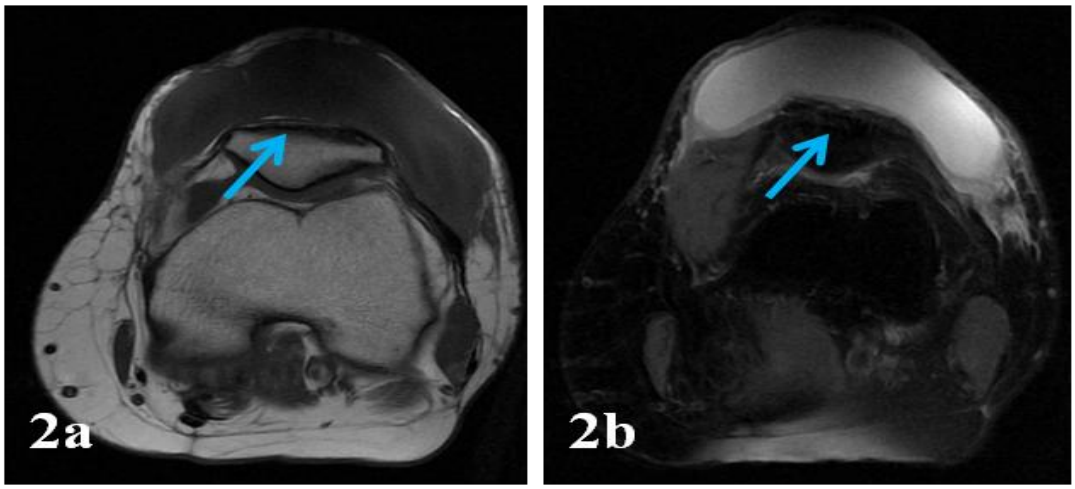


Figure 1

Figure 1a -T1w sagittal, 1b - PD fat saturated sagittal images reveal a well circumscribed T1 hypointense and T2 hyperintense unilocular fluid collection (yellow arrows) in prepatellar space in the subcutaneous tissues extending superiorly in suprapatellar region measuring 12 x 2.5 x 7.0 cm approximately.

Figure 2a -T1w axial, 2b - PD fat saturated axial images reveal a well circumscribed T1 hypointense and T2 hyperintense unilocular fluid collection (blue arrows) in prepatellar space in the subcutaneous tissues extending superiorly in suprapatellar region measuring 12 x 2.5 x 7.0 cm approximately.

MRI machine - 1.5 tesla seimens, Sagittal T 1 weighted -TE= 22.41, TR= 2760, ST= 3 mm, Sagittal PD fat saturated - TE= 26.4, TR= 2720, ST= 3 mm, Axial T1 weighted -TE= 14.45, TR= 560, ST=3mm, Axial PD fat saturated - TE= 22.03, TR= 2620, ST= 3 mm



Case2) 48 year lady with history of pain and swelling in the lateral aspect of right thigh since 15 days.

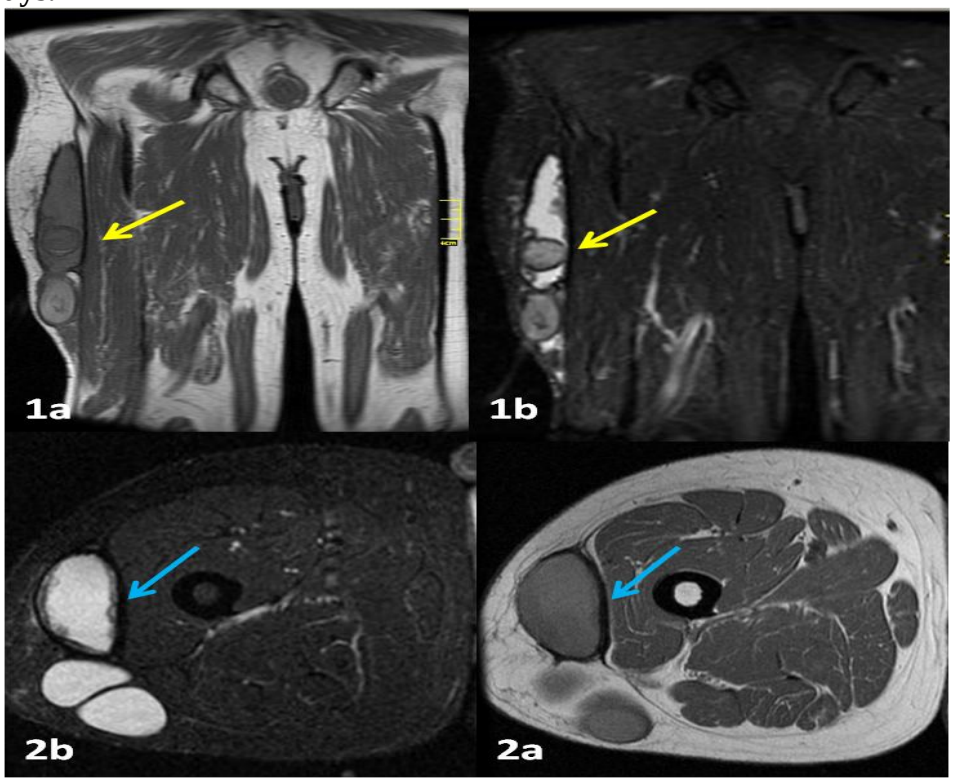


Figure 2

Figure 1a - T1w coronal, 1b STIR coronal images reveal a well circumscribed multiloculated mixed intensity lesion (yellow arrow) on STIR images in lateral aspect of thigh in the subcutaneous tissues superificial to tensor fascia lata and vastus lateralis muscle measuring21 x 9 x 3.2 cm approximately. The lesion appears hyperintense on T1 weighted images, suggestive of hemorrhage.

Figure 2a T1w axial, STIR axial coronal images reveal a well circumscribed multiloculated mixed intensity (blue arrow) lesion on STIR images in lateral aspect of thigh in the subcutaneous tissues superficial to tensor fascia lata and vastus lateralis muscle measuring 21 x 9 x 3.2 cm approximately.

The lesion appears hyperintense on T1 weighted images, suggestive of hemorrhage.

MRI machine - 1.5 tesla seimens, Coronal T1 weighted -TE= 10.23, TR=720, ST= 4mm, Coronal STIR -TE= 36.07, TR= 5360, ST= 4mm. STIR axial-TE=40.6, TR=3000, ST=4mm, T1 weighted axial-TE-9.5, TR=460, ST=4mm.

(Case3) A 32 year old man with history of injury by ball in the thigh region

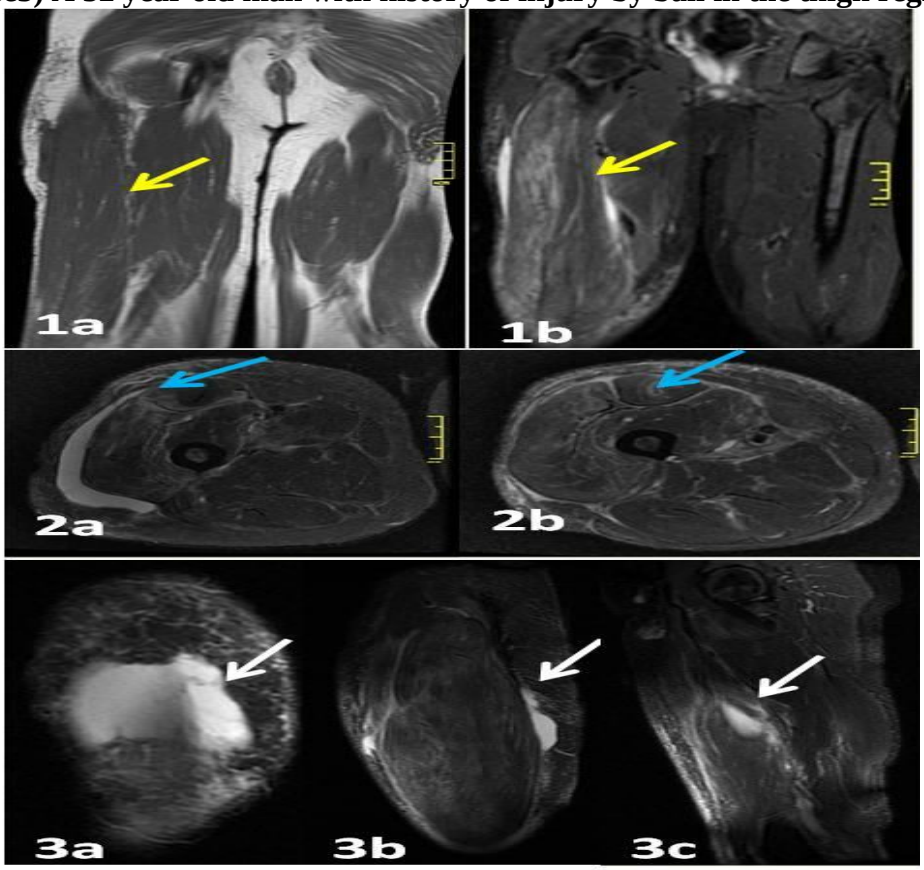


Figure 3

Figure 1a - T1w coronal, 1b STIR coronal images reveal a well defined unilocular STIR hyperintense and T1 hypointense lesion (yellow arrow) is noted in lateral aspect of thigh in the subcutaneous tissues superficial to tensor facia lata, rectus femoris and vastus lateralis muscles measuring 9.0x10.5x2.5cm approximately. There is associated diffuse subcutaneous and intermuscular edema in thigh. STIR hyperintense signal is noted in vastus lateralis muscle suggestive of contusion.

Figure 2a, b STIR axial images reveal a well defined unilocular STIR hyperintense lesion (blue arrow) is noted in lateral aspect of thigh in the subcutaneous tissues superficial to tensor facia lata, rectus femoris and vastus lateralis muscles associated with diffuse subcutaneous and intermuscular edema in thigh measuring 9.0x10.5x2.5cm approximately. STIR hyperintense signal is noted in vastus lateralis muscle suggestive of contusion.

Figure 3a,b,a reveal a well defined unilocular STIR hyperintense lesion (white arrow) is noted in lateral aspect of thigh in the subcutaneous tissues superficial to tensor fascia lata, rectus femoris and vastus lateralis muscles with associated diffuse subcutaneous and intermuscular edema in thigh measuring 9.0x10.5x2.5cm approximately. STIR hyperintense signal

is noted in vastus lateralis muscle suggestive of contusion.

MRI machine - 1.5 tesla seimens, Coronal T1 weighted - TE=11.7, TR=620, ST=4mm, Coronal STIR -TE=40.9, TR= 5000, ST=4mm, STIR axial – TE=41.3, TR=5540, ST=4mm, STIR sasittal- TE=36.07, TR=5360, ST= 4mm.

DISCUSSION

Incidence and Demographics: A higher incidence of Morel-Lavallée lesion may occur in women due to differences in the anatomic architecture and distribution of subcutaneous fat between the sexes. [1, 2]

Morel-Lavallée lesion was first described in 1853 by the French physician Maurice Morel-Lavallee as the closed degloving lesion.

Etiology: It is described as an uncommon but significant injury resulting from blunt shearing or tangential forces in which the skin and subcutaneous tissue are separated from the underlying fascia creating a space that may fill with blood, lymph and necrotic fat around which granulation tissue gets organised creating a pseudocapsule that restricts the absorption of the contents within and thus the lesion may delay in appearing from several months to years after injury. [3] Various other names for Morel-Lavallée lesion are posttraumatic soft tissue cyst, Morel-Lavallee effusion or extravasation, pseudocyst, chronic expanding hematoma. [4]

Location: This lesion can occur in various locations, the trochanteric region accounts 30%, thigh 20%, pelvis 18.6%, and knee 15.6% of the lesions reported. Abdominoplasty has been the cause in 3 cases and the most common cause is trauma. [2,5] The lesions around the pelvis usually occur in association with a pelvic or acetabular fracture. [6]

Clinical and Imaging Findings: As the lesion may take some time to appear it may be missed early during presentation by the clinician. In long standing situations the lesions may enlarge and may become painful which could lead to a misdiagnosis of a soft tissue tumor clinically. [4] Patient may or may not recollect history of trauma in some cases and may be asymptomatic. Clinically, it can appear as local loss of sensation, bruise or hematoma formation associated with or without fractures. [7]

On MRI, chronic lesions appear hypointense on T_1 weighted sequences and hyperintense on T_2 weighted sequences. When acute or subacute it may appear hyperintense on T1 weighted sequences. These lesions are surrounded by a peripheral hypointense capsule on all sequences. [8,9] The T1 weighted hyperintensity is due to the presence of methemoglobin. In chronic cases there maybe heterogenous hyperintensity in the T2 weighted images corresponding to hemosiderin, necrotic debris, fibrin, granulation tissue and blood clots. The peripheral hypointense rim is due to fibrous or hemosiderin laden capsule which is a sign of chronicity of the lesion. It can be complete, incomplete or uneven. There can be septae within the lesion. On contrast administration, the lesion may demonstrate patchy internal enhancement due to capillary invasion and mild peripheral enhancement. [4]

Treatment & Prognosis: Morel le Lavallée lesion can lead to infection and other wound complications. Treatment options include conservative and surgical. Under conservative management percutaneous aspiration of the intralesional contents is carried out several times under ultrasound guidance followed by compression band to prevent refilling. [4]

Thus, within first 3 days percutaneous debridement of necrotic material with irrigation is advised to avoid infection along with antibiotic coverage. If associated with fractures open treatment of the wound is carried out. After the drainage completely subsides the wound starts healing. If presented after first 3

days open debridement is performed and healing is by secondary intention. [10]

Surgical management consists of evacuation of the intralesional contents, excision of the capsule in chronic cases and debridement of the necrotic granulation tissue. Later, the space is filled by synthetic glue followed by compression bandage. [4]

In certain cases around the knee compression, aspiration, injection of sclerosing agents and cryotherapy treatment is followed. In cases involving the joint, immobilization is required for 2-3 weeks for satisfactory wound healing. Thus, management would vary according to the case, depending on the bony and soft tissue injuries, factors related to the patients and obviously the treating surgeon's experience. [10]

The prognosis of patients has been good leaving them pain free and returning to their routine activity. Patients associated with closed pelvic fractures have a good outcome but those with open pelvic injuries have high mortality and morbidity rates as per studies. [7] In an acute setting, lesions require surgical interventions to prevent infection. [11] Presence of a capsule indicates that conservative management would be unsuccessful leading to recurrence if not managed surgically. [12]

Differential Diagnosis: If lesion is in a classic location and has characteristic appearance then little differentials exists. In cases when the lesion is heterogeneous in morphology or fluid-fluid levels are present the possibilities include: fat necrosis, coagulopathy related hematoma, malignancy like sarcoma, [11-13] bursitis, and haemangioma. Sarcoma may appear as heterogenous soft tissue density mass lesion with heterogeneous enhancement on CT scan images and on MRI it may appear of intermediate signal intensity on T1W, hyperintense on T2W images, it may show a rapid and progressive enhancement on dynamic imaging. Bursitis appears as a fluid density on CT scan images and on MRI it shows T2W hyperintense fluid signal intensity around the bursa. Hemangioma appears of soft tissue density with calcified phleboliths on CT scan images and on MRI it is low to intermediate signal intensity on T1W and high signal intensity on T2W with low signal intensity septae, phleboliths may appear as signal voids and on post contrast study it shows marked heterogeneous enhancement. Coagulopathy related hematoma mat appear hyperdense on CT scan and may show varying signal intensities on MRI depending on its stage. Post traumatic fat necrosis may appear of variable appearance on MRI and CT depending on edema, haemorrhage and fibrosis.

Other Imaging modalities: Besides MRI other imaging modalities include X-ray, Ultrasound and CT scan. On X-ray fractures are diagnosed and the lesion appears as a soft tissue density. On ultrasound the lesion is anechoic (lymph) or hyperechoic (blood) fluid collection, internal debris are seen as echogenic foci within fluid or as complex septated fluid collection. CT scan can delineate associated fractures better than X-ray and the lesion shows fluid-fluid density due to the sedimentation of blood products and with internal debris. The peripheral capsule is seen depending on the chronicity of the lesion. [11]

CONCLUSION

MRI imaging plays a vital role in the diagnosis of Morel-Lavallée lesion. MRI helps to delineate the extent of the lesion, stage the lesion and helps its differentiation from contusions in case of trauma. It should be a differential considered in a soft tissue lesion with a history of trauma. Its diagnosis helps the early management of the lesion. History of injury, location and MRI features assist in the diagnosis.

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Abbreviations

1) MRI- magnetic resonance imaging
2) STIR- short tau inversion recovery
3) W- weighted
4) CT - computerized tomography

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