

Special Article - Bariatric Surgery

Minimal Invasive Surgical Treatment of Morel-Lavallee Lesion (MLL)

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Abstract

Morel-Lavallee Lesion (MLL) is a post-traumatic closed degloving soft tissue injury because of shearing or tangential forces. A dead space will be created between the subcutaneous tissue and the underlying fascia. The space will be filled with heamolymphocel and liquefied fat. The patient presents with variable clinical features, ranging from a localized soft tissues fluctuant swelling to abscess formation or skin erythema with necrosis. So, main symptoms are localized pain which increases with movement, malaise and associated nausea and temperature following history of trauma such as motor vehicle accident or a fall. The common anatomical sites for these lesions are the greater trochanter, flank, buttocks and lumbodorsal regions and rarely may occur in the lower limbs as in our case. The MRI is the diagnostic image model of choice and it is vitally important for the radiologists to be aware of the clinical features and the radiological characteristics to be able to establish the diagnosis of Morel-Lavallee Lesion (MLL) in timely manner for an early appropriate treatment. The treatment approaches as they were reported in the literature involve conservative, open drainage and debridement of devitalized tissues as well as skin grafting when significant skin loss took place because of skin necrosis. Furthermore, it is necessary for these patients to have antimicrobial treatment cover to avoid sepsis and to main wound healing. We report a case of Morel-Lavallee Lesion (MLL) of the right leg post a fall at home ten months prior to the diagnosis she received treatment with Minimally Invasive Surgical intervention. Small incision was made and drainage of collection with negative pressure drainage system and compression stockings for six weeks. On follow up the outcome was excellent; the limb returned to normal size, the scars were small and hardly visible. So, based on the treatment outcome of our patient we conclude that Minimal Invasive Surgical intervention can be an option to treat a Morel-Lavallee Lesion (MLL).

Keywords: Morel-Lavallee Lesion; Degloving soft tissue injury; MRI-Minimal Invasive Surgical intervention

Case Report

A 39 years old female, with past medical history of depression and recently diagnosed type-2 diabetes mellitus, presented to emergency department at 1600 hours with one day history of pain, redness and swelling of the right leg. Patient stated the pain was sudden in onset, severe, extended from right knee to right calf and was associated with nausea and increased sweating. The pain worsened during movement and improved by oral analgesics. She denied any history of fever, numbness or discoloration of toes. She did not use any anti-platelet or regular anti-coagulants.

However, patient reported that the swelling was first noticed 10 months ago, after she fell down a flight of stairs. At that time, she attended the emergency department after the fall and based on clinical examination and normal x-rays of the leg, a provisional diagnosis of hematoma was made and she was discharged on analgesics. However, during the next 10 months, patient had noticed repeated swelling and redness at the lateral aspect of leg that was diagnosed as cellulite is by general practitioner and treated with antibiotics at multiple occasions with no improvement. However, on this admission, the patient had

severe acute pain along with previous on-going symptoms with no significant effect by analgesics.

She was regularly taking citalopram (for 2 years) and metformin (2 weeks). She was allergic to penicillin but during admission discovered to be allergic to Ciprofloxacin, Tazocin (tazobactam/piperacillin) and clindamycin.

Physical examination revealed a young obese female, lying comfortably in bed, with no signs of distress and vitally stable. On left lower leg examination showed a diffuse swelling and redness at the superolateral border of left lower limb extending from left knee to left ankle. The swelling was soft, fluctuant, warm and tender to touch. No laceration or ulceration was present. Her gait was normal; however, the swelling prevented the knee from full flexion. Examination of the contralateral limb was unremarkable.

Her blood reports revealed leukocytosis and elevated inflammatory markers. However, d-dimers were normal.

A sonogram and duplex scan was done to rule out deep venous thrombosis. But the sonogram showed a shallow discoid shaped fluid collection measuring 12cm in length within the deep soft tissues

Table 1: Summary of literature on Morel-Lavallée lesions locations of 24 publication of 195 patients with 204 lesions.

Region	Publication	causes	No of lesions	site	No of lesion	treatment	Total
Europe	14	RTA/FALL	167	Hip/trochantric	62	Surgery, debridement conservative or percutaneous	73
North America	9	Sport/wrestling/football	32	thigh	41	Aspiration/compression/bandaging	47
Middle East	2	Surgery/abdominal/lip suction	3	privis	38	No details	255
Asia	1	unknown	2	knee	32	Debridement with vacuum dressing	32
Australia	1	unknown	2	gluteal	13	Roceary method	10
South America	1	unknown	lumbosacral		7	Talc/doxycycline/sclerodesis	
Africa	1	unknown	Unknown	Abdominal calf	3	Surgical/ glue	7
					3	Quilting sutures	3

Table 2: An MRI classification system of Morel-Lavallee lesions.

TYPES	Shape	signals	enhancement	Capsules presence
Type 1	Laminar shaped, seroma-like	Decrease T1 Increase T2	No enhancement	Occasional capsules
Type 2	oval shaped and looked like a subacute haematoma	Increase T1 Increase T2	Occasional enhancement	Thickened capsule
Type 3	oval shaped chronic organizing hematoma	intermediate T1 and heterogeneous T2	Internal/peripheral enhancement.	Thickened capsule
Type 4	linear shaped and looked like a closed laceration	hypo intense T1 signal and hyper intense T2 signal	variable enhancement	had no capsule
Type 5	as pseudo nodular with a round shape	T1 and T2 signal	Internal/peripheral enhancement.	a thin or thick capsule
Type 6	considered infected variable sinus tract formation	with variable T1 and T2 signal	internal/peripheral	a thick capsule

number of publications on the subject. The largest series is the study by Tejwani et al., followed by a series of 24 patients suffering MLL as a consequence of pelvic trauma. A further sizeable series is by Neal, et al. who reviewed sonographs of 21 posttraumatic fluid collections of the hip and unfortunately did not comment on treatment or outcome. Borrero et al. have studied four Morel-Lavallee collections, demonstrating in all the cases a unilocular collection whose limits extended beyond the prepatellar bursa, no blood or fat foci were identified within the collections. Tejwani et al. have demonstrated that Morel-Lavallee collections exceeded the expected dimensions of the prepatellar bursa and reported that many of the 27 cases of Morel-Lavallee knee lesions could only be identified by clinical examination.

Morel-Lavallee lesions are frequently associated with underlying bone injuries, and are often identified within hours to days after the trauma victim receiving medical attention, but one-third of patients present months or years after the initial injury. Acutely, the patient will present typically with history of recent trauma to the site swelling, redness and reduced function of the limb because of pain and may be due to underlying fractures on primary surveys of such patients. The differential diagnosis of the lesion includes subcutaneous haematoma, haemangioma, fat necrosis sarcoma and deep venous thrombosis. It is extremely important to establish an early diagnosis of the Morel-Lavallee lesion for appropriate treatment and in timely manner to avoid the possible complications such as skin necrosis local infection as well as systemic involvement. These collections may develop rapidly when the arterial bed is involved, or otherwise slowly in cases of injury to lymphatic vessels. Considering that MLL may remain undiagnosed for long periods, it is important for the radiologist to know the characteristics of acute and chronic lesions, as well as their therapeutic implications. The appearance of the lesions depends on the amount of present blood, lymph and fat, as well as the time elapsed from the trauma. Morel-Lavallee lesions require surgical intervention to prevent complications. However, MLL may

be initially missed or take some time to develop, which can make clinical diagnosis difficult. In a delayed fashion presentations of these lesions, they can mimic a soft tissue tumour, but the location and shape of the lesion, conforming to that of the facial plane is atypical. So, the lesions may enlarge and become chronic or painful, which may lead to a misdiagnosis of soft-tissue tumour and may often require surgical excision with complete resection. MRI is the standard diagnostic imaging modality of choice in the evaluation and accurate diagnosis of Morel-Lavallee lesion. However, Ultra Sonography (US) and Computerised Axial Tomography (CT) can be used by skilful radiologist to evaluate the lesions as well. The lesions are typically oval, fusiform, or crescentic, consistent with fluid dissecting along traumatized fascial planes. The typical location, morphology, signal characteristics, and enhancement pattern can help identify them and guide appropriate therapy. The presence of a capsule is an important imaging feature [1-5].

Mellado and Bencardino proposed an MRI classification system of Morel-Lavallee lesions based on lesion shape, signal and enhancement characteristics, and presence or absence of a capsule. Six types of lesions were described as follows and as by the (Table 2) and image below

1. Laminar shaped, seroma-like with decreased T1 and increased T2 signal. They -occasionally had a capsule and did not enhance
2. Type II lesions were oval shaped and looked like a sub acute hematoma with increased T1 and T2 signal. They had a thick capsule and variable enhancement.
3. Type III lesions were also oval shaped and had the appearance of a chronic organizing hematoma with intermediate T1 and heterogeneous T2 signal. They also had a thick capsule and internal/peripheral enhancement.
4. Type IV lesions were linear shaped and looked like a closed



Figure 5: Pre-operative images of the lesion limb prepare for drainage of the lesion.



Figure 8: Small scars of drainage incision and drain sites.

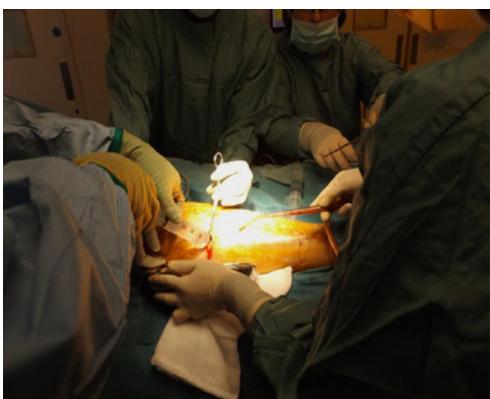


Figure 6: Intra-operative images of incision and drainage of MLL.

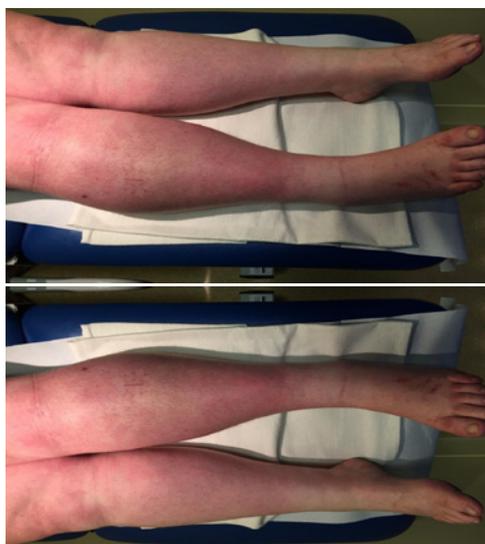


Figure 9: It shows the affected right leg returned to normal, almost similar to the contra lateral un affected left leg.



Figure 7: Intra-operative images of incision and drainage of MLL.

laceration with hypo-intense T1 signal and hyper-intense T2 signal. These lesions had no capsule and variable enhancement T.

5. Type V lesions were described as pseudo nodular with a round shape, variable T1 and T2 signal, a thin or thick capsule, and had internal/peripheral enhancement.

6. Type VI was considered infected with variable T1 and T2 signal and had variable sinus tract formation, a thick capsule, and internal/peripheral enhancement.

Treatment

The treatment modalities range between conservative treatment

with compression stockings application in acute simple cases, surgical drainage insertion of drains or surgical drainage with debridement of the capsule. Moreover, in cases of significant skin necrosis with soft tissue exposure, skin grafting would be appropriate to procedure to protect the underlying structures and accelerate healing process too. Major lesions may develop a pseudo capsule, becoming refractory to conservative treatment No doubt strong antibiotics play in roles to control secondary infection or treating already infected Morel-Lavallee lesions. Sample of the cavity fluid must be sent to the laboratory for cultures and sensitivity for to help in right antimicrobial administration. In addition, any suspicious looking lesion tissue from the lesion should be obtained for histology to exclude an atypical presentation of malignancy. In our case, we established early IV antibiotics treatment at the time of admission as the patient showed pyrexia with temp of 38 degrees Celsius and raised inflammatory markers and clinical leg cellulites. We established the diagnosis by an MRI Imaging exclusion of deep venous thrombosis on an ultra sonography. An operative treatment was planned for the next day. Patient had General Anaesthesia, supine position and full preparation of the affected right leg, an anterolateral 3cm skin incision approaching the collection from the sideway with immediate swap of the drained infected fluid. Negative pressure drainage system

was applied with elevation of the leg (FIG). Although the patient has multiple drug allergies and she had generalized reaction shortly post her surgery, she did good recovery and drain was removed in five days and discharged home on her 10th postoperative day in stable condition with compression stockings with an outpatient review plan in four weeks.

Tseng and Tornetta successfully managed lesions with early percutaneous drainage, debridement, irrigation and suction drainage. In unsuccessful lesions treatment with percutaneous drainage and elastic compression or liposuction, sclerosis with the administration of doxycycline is an option. On the other hand, some physicians perform open debridement with delayed closure or closure by secondary intention for all lesions, but others feel this can be reserved for those lesions that have a peripheral capsule or failed conservative treatment (Figures 5-9).

Conclusion

Morel-Lavallee collections have been increasingly diagnosed in the knee region, and the radiologist's knowledge on the characteristics of the lesion at MRI can help in the diagnosis of this disease that is not always recognized, and sometimes difficult to treat.

We treat our case by minimally invasive technique. Small incision with drainage of the collection and negative pressure darin plus compression stockings. The outcome was satisfactory cosmetically and recurrence after eight weeks outpatient follows up. There for we recommend this procedure as an alternative treatment of Morel-Lavallee lesions provided that the skin covering the site is intact.

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