

The Morel-Lavallée lesion: case report post road traffic accident management in the Royal Rehabilitation Centre

Moutasem Nofan Alzubi, MD*; Lamees Arabiyat, MD*; Fadi AlRousan, MD*; Ashraf Fowzat Omar, MD*; Laith Altarawneh, MD*;

ABSTRACT

Background: The Morel-Lavallée lesion is an infrequent but life-threatening condition with shearing forces causing a closed degloving lesion and ending with an infected hematoma. Definitive management is dictated by the size, location and the age of the injury and ranges from percutaneous drainage to open debridement. We present a case of (Morel-Lavallée lesion) after road traffic accident).

Aim: To report a case of extensive Morel-Lavallée lesion affecting the right thigh in a young gentleman.

Conclusion: This condition is often missed as a diagnosis. Morel Lavallée lesions are not frequent but unfortunately life- and organ-threatening conditions, mandates a detailed history, physical examination and early diagnosis along with early management by a multidisciplinary team to reach good outcomes; decreasing the rate of complications, the patient stay in hospital and the need for major surgeries

Keywords: Closed degloving insult; Morel-Lavallée lesion

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INTRODUCTION

Morel-Lavallée syndrome or lesion was first described by a French surgeon, Victor Morel Lavallée, in 1863. It is also known as post-traumatic soft tissue cyst or extravasation or Morel-Lavallée effusion or seroma. The Morel Lavallée lesion is a closed soft tissue degloving insult of a limb following a high energy crush insult, with the skin and subcutaneous fatty tissue suddenly separating from the underlying fascia (closed internal degloving insults), forming a cavity filled with bloody serous fluid. The space between the subcutaneous fat and beneath the deep fascia primarily contains blood or lymph. This blood is subsequently replaced with serosanguineous fluid surrounded by a fibrous capsule. Morel Lavallée lesions have been recorded

following high-speed motor vehicle accidents and direct crushing ⁽¹⁾. Shearing forces push bone, muscle and deep fascia to shear in one direction and superficial layers (superficial fascia, subcutaneous fat and skin) to shear in the opposite direction, leading to perforated arteries and torn lymphatic vessels. The damaged capillaries drain into the perifascial level, filling up the virtual cavity with blood, lymph and debris. Closed degloving insults frequently occur near osseous prominences (commonly in the greater trochanter (30.4%), pelvis (18.6%), thigh (20.1%), knee joint (15.7%), gluteal region (6.4%), lumbosacral area (3.4%), abdominal area (1.4%), lower leg (1.5%) and on the head (0.5%) ⁽²⁻³⁾. The size of lesions ranges from small thin slivers of fluid to thickly encapsulated

*Department of surgery, Plastic *reconstruction surgery

E-mail: Mready08@yahoo.com

CASE REPORT

lesions several centimetres in diameter. If chronic, they are oval or fusiform in shape and attached to the underlying fascia. Morel Lavallée lesions are oval, fusiform or crescentic with tapering boundaries uniting with the attached fascial levels. Plain x-ray may show a noncalcified soft tissue mass and fractures. On ultrasound, these are anechoic or hypoechoic; internal debris, including fat globules, might result in echogenic foci or fluid-fluid levels. CT might demonstrate fluid-fluid levels to sedimentation of the haemolymphatic fluid and internal debris including internal fat lobules with a peripheral capsule. Magnetic resonance imaging is the diagnostic modality of choice to ascertain the connection between the collection and the underlying fascia. The fluid demonstrates homogeneous hyperintensity on both T1W and T2W, with a hypointense peripheral ring on T1. Chronic Morel Lavallée lesions demonstrate modified signal intensity on T1W, heterogeneous hyperintensity on T2W and a hypointense peripheral ring. Heterogeneous hyperintensity on T2W indicates chronic organized haematoma. Definitive management ranges from percutaneous drainage to open debridement and irrigation. Chronic lesions may lead to the development of pseudocysts and contour deformities of the extremity. Metabolic and inflammatory materials in the fluid increase cellular permeability and leaks into the space that is formed. Later, granular tissue appears in the periphery of the cavity with fibrotic pseudo-capsule production ⁽⁴⁾. The pseudo-capsule avoids resorption, leading to chronic fluid accumulation and infection of necrotic tissue. As the mechanism of insult is traumatic, bacterial infection is important if an open lesion of the skin is found ⁽⁵⁾.

CASE REPORT:

A 35-year-old male patient, not known to have medical illnesses, presented to the emergency room of Prince Hashem Ibn Alhussein hospital as a victim of a road traffic accident (pedestrian injury),

complaining of right thigh tenderness. Physical examination revealed right thigh tenderness, swelling, ecchymosis and superficial abrasions over the medial aspect of the distal right thigh (Fig. I, II). A skeletal survey was done and showed no fractures. The patient was transferred to King Hussein Medical Centre to rule out vascular injury. Evaluation by a vascular surgeon demonstrated no vascular injury, and the patient was admitted to the orthopaedic ward for further evaluation of the swelling and observation of the compartment by the senior resident by serial examination every 6 hours and the specialist was informed. Second day (17 hours since the injury): the patient was evaluated on the morning round by the orthopaedic specialist the swelling increased gradually and became significant and so MRI was done and he was diagnosed to have Morel-Lavallée lesion and surgery was planned (Fig. III–VI). On 17/4/2019 (3rd day post admission): the patient was operated on through medial and lateral thigh incisions, the haematoma was evacuated, necrotic fat was excised, a drain was inserted through the lateral incision and the medial wound was packed. Three days later: on second look a gush of fluid came out through the medial incision, culture was sent, a proper wash was done and a drain inserted. Skin blisters, ulceration and necrosis started to appear over the medial aspect of the thigh. On 22/4/2019: debridement was done through the medial wound. Culture showed *Acinobacter baumannii*, which was sensitive to Colistin, so the patient started to take the antibiotic till the infection subsided and the culture became negative with serial daily dressings until the infection was controlled. The Plastic team was consulted, the management plan was discussed including soft tissue management and infection control and once necrosis and skin loss took place covering the defect with flap or skin graft according to the presentation and so the patient was listed for surgery. On 29/5/2019: STSG (split thickness skin graft) was harvested and fixed with staplers. One week following discharge: there was a fever of 2 days duration. Amoxicillin-Clavulanic acid was prescribed empirically as there was no discharge. There was mild cellulitis.

CASE REPORT

One week later: During follow up, clinical examination revealed a region of skin necrosis, roughly 10 x 15 cm, with remarkable swelling and fluctuation (Fig. III). Immediate drainage was performed, evacuating 3 L of blood, necrotic muscles and skin (as this is part of the pathophysiology of this condition which is fascia degloving and layers separation resulting in subsequent bleeding and fluid collection which in turn causing tissue necrosis). The patient was admitted. Leukocytosis with high CRP was noted. CT demonstrated hamstring necrosis and a new subdermal collection in the right perineum in alignment with the collection in the right thigh. The patient was assigned for immediate extensive debridement of the hamstring region to the deep fascia. Dressing with vacuum-assisted closure was done. Culture swabs were sent and an empiric therapy using Ceftriaxon and Clindamycin was started till the infection subsided (Fig. IV). As the cultures demonstrated *S. aureus* and *P. aeruginosa*, the management was modified to Ciprofloxacin and Cefazoline. The patient had two split thickness skin grafts. The first graft failed but the second one succeeded and the patient was discharged. Later, the wound was dressed with Aquacel® AG bandage until complete healing. Signs of hypertrophic scarring were managed using silicone dressing (Fig. V–VII). The patient was functioning well at the last follow-up period for 3 years-visit in both the orthopaedic and plastic clinics, with mild hyperpigmented scarring in the grafted area (Fig. VIII).

DISCUSSION:

Confirmation of Morel Lavallée lesions is often late or even missed because of late development or because of other insults such as poly-trauma. Confirmation of Morel Lavallée lesions is mostly based on symptoms of local swelling with fluctuation. Morel-Lavallée lesions usually develop a few hours to days after trauma. Some might develop months or years after primary trauma. They are commonly correlated with fractures, but could be isolated, and are mainly unilateral. These lesions are

usually associated with pain, swelling, stiffness, soft fluctuating contour deformity, with or without skin discoloration. Skin sensation is commonly reduced. Skin necrosis can be seen acutely or late. Magnetic resonance imaging is used for high-resolution soft tissue assessment. Ultrasound shows the lesion as anechoic. Doppler US can exclude deep vein thrombosis⁽⁴⁾. CT might show fluid accumulation. In delayed confirmation, radiological investigations could lead to misdiagnosis as soft tissue mass or neoplasm. Morel Lavallée lesions are chronic when they have a capsule. Management is conservative or operative. Conservative management is used when the lesions are away from a skeletal insult with no fluctuation on palpation and the patient has no clear pain^(2,6). The volume of the cavity formed in the lesion and chronicity have a therapeutic influence⁽⁵⁾. Compression and rest are indicated in the acute state for limited size lesions. When lesions are large, chronic or not suitable for the conservative option, needle evacuation or drainage are used. Needle evacuation is used for Morel Lavallée lesions with a volume of less than 50 mL because Morel Lavallée lesions with larger volumes are likely to recur and thus require surgery⁽³⁾. Early percutaneous drainage with debridement, irrigation and suction drainage are safe and efficient. In a previous study, all patients had management during 3 days of insult. Drainage was performed using two incisions – one on the most distal part of the lesion and one on the uppermost and anterior parts of the Morel Lavallée lesion. Debridement was done then a haemovac drain was placed in the lesion. Early percutaneous drainage is an efficient primary management regimen⁽⁷⁾. Simple open incision drainage of the collection is frequently used with a 2 cm midline incision on the proximal part of the fluid collection and aspiration of fluid with irrigation using normal saline/betadine solution. The wound is closed with a VAC sponge to avoid the dead space⁽⁴⁾. Nose ring drainage with compression

CASE REPORT

under general or subarachnoid blockade during 35 days of insult. All bacterial cultures of evacuated fluid were negative. Healed with no hazards and with an optimum aesthetic appearance. The drains were discontinued when fluid stopped draining from the incision. Continuous drainage and optimum pressure provided a good environment for rapid healing of the cavity and reduced the incidence of recurrence ⁽⁸⁾. Liposuction was used in the management of a large thigh Morel Lavallée lesion, 3 weeks following a motor vehicle accident. Fluid collection was ascertained by X-ray and CT. Liposuction of the cavity and seroma wall was done with a temporary drain, oral antibiotics and thigh compression performed after surgery. No fluid collection was noted after 1 or 6 weeks ⁽⁹⁾. Sclerosing agents were used to close the cavity in the lesion. Sclerosing agents cause cell destruction in the periphery of the lesion with fibrosis. Doxycycline was used successfully in lesions up to 700 mL in volume ⁽¹⁰⁾. Talc was used (under fluoroscopy with suction drainage for 12 days) for chronic Morel Lavallée lesions in the thigh or buttock of more than

3 months. Total pseudocysts showed immediate discontinuation of fluid accumulation in the space with no recurrence. Bleomycin, tetracycline and erythromycin are not appropriate agents **(10)**. Skin grafting or flap transplantation should be reserved for open wounds. In blunt insults of obscure mechanism, confirmation might be late, as disproportionate pain is not always positive with the insult reaching the fascia (Morel-Lavallée lesion), and it is hard to confirm early enough to avoid the consequent hazards.

CONCLUSION:

Morel Lavallée lesions are infrequent but unfortunately are life- and organ-threatening. This **diagnosis** is often missed. The confirmatory steps and the risks of this confirmation are crucial to manage Morel Lavallée lesions quickly before they become life-threatening. A detailed history, physical examination and early diagnosis along with early management by a multidisciplinary team lead to good outcomes, a lower rate of complications, shorter patient stay in hospital and a reduced need for major surgery.

Fig. I.



CASE REPORT

Fig. II.



Fig. III.



Fig. IV.



79

CASE REPORT

Fig. V

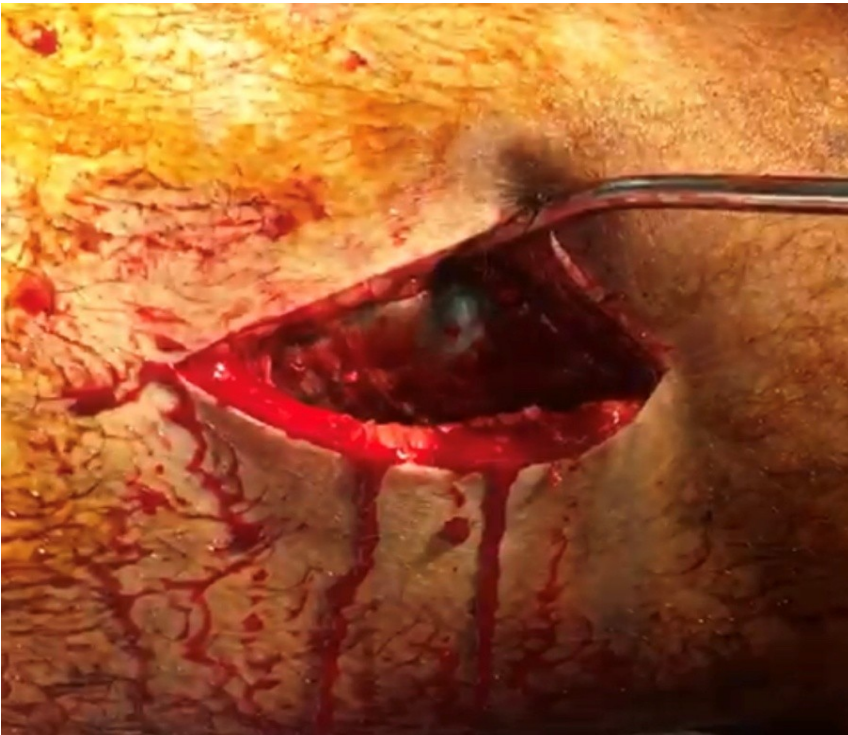


Fig. VI.



CASE REPORT

Fig. VII.



Fig. VIII.



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