

## Morel-lavallée lesion closed legs, site and etiology rare trauma

Oscar Rojas-Rositas<sup>1</sup> Guillermo Padrón-Arredondo<sup>2</sup>, Diego Antonio Muñoz-Garibay<sup>3</sup> and Renán Baqueiro-Canto<sup>4</sup>

<sup>1</sup>Department of Orthopedics and Traumatology Service General Hospital of Playa del Carmen.

<sup>2</sup>Department of General Surgery Service General Hospital of Playa del Carmen.

<sup>3</sup>Departments of Anesthesiology General Hospital of Playa del Carmen.

<sup>4</sup>Radiology and Imagen Department of General Hospital of Playa del Carmen.

### \*Corresponding author

Guillermo Padrón Arredondo MD, Cerrada Corales 138, Residencial Playa del Sol, Solidaridad Playa del Carmen, Quintana Roo. México-77724, Tel: 019841100707; E-mail: gpadronarredondo@hotmail.com.

**Submitted:** 09 Jan 2017; **Accepted:** 18 Jan 2017; **Published:** 30 Jan 2017

### Abstract

**Background:** The Morel-Lavallée Injury (MLI) is a closed soft tissue injury as a result of an abrupt separation of the skin and subcutaneous tissue from the underlying fascia degloving. Clinically this lesion is presented as a long and painful injury to the affected part with soft tissue swelling and fluctuation.

**Clinical case:** Male of 37 years-old, who suffered accident by crushing multiple dermoabrasives injuries drag and edema of both lower extremities without bone fractures, four months after he underwent a needle puncture in the left leg obtaining liquid 1400 ml, practiced 3 times the same procedure with reduced liquid each time. Ultrasound liquid is observed in the affected area septate on the inner side of the leg.

**Discussion:** The MLI is presented to one debonding or avulsion of the skin by the tangential mechanism of injury where a shearing damage to hemolymphatic contribution of the tissues around the muscle fascia occurs, which favors filling with hematic fluid, lymphatic, liquefied fat and debris. All this is surrounded by granulation tissue, a fibrotic organizing pseudocapsule or capsule that prevents reabsorption of liquid; this explains the late onset of MLI. The current treatment of this disease is variable and depends according to the time of diagnosis. Surgical management should be reserved for recalcitrant lesions where aspiration and compression have not been successful.

**Keywords:** Morel-Lavallée Injury, Avulsion, Degloving, Sclerodhesis, Aspiration, Ultrasound, Percutaneous drainage, Surgery.

### Background

Morel-Lavallée Injury (MLI) is a degloving closed by soft tissue injury as a result of abrupt separation of the skin and subcutaneous cellular tissue from the underlying fascia. This lesion was first described by the French physician Maurice Morel-Lavallée in 1853 [1]. Although this lesion was described more than 150 years ago, there are only a little more than 200 cases reported according to Vanhegan IS [2].

The MLI occurs mainly during an accident in motor vehicles or other injuries due to direct trauma of high or low speed. It's most frequent presentation is associated with pelvic or acetabular fractures and in contact sports such as American football, iatrogenically has also been observed after mammoplasty and abdominal liposuction although it has also been presented without an apparent cause, Li Hui [3].

Clinically this lesion presents as an extensive and painful lesion on the affected part with soft tissue swelling and fluctuation and can present in the trunk, lumbar, prepatellar and scapular region, among others. The perifascial planes can be filled with blood, lymph and detritus due to the disruption of capillaries and perforating vessels. An inflammatory reaction may result in the formation of a peripheral capsule which may lead to perpetuation and occasionally to increased lesion, Nair AV [4].

Regardless of the anamnesis, the diagnostic support studies are ultrasound, tomography and magnetic resonance imaging, the latter being the one with the highest diagnostic precision because it reflects the concentration of hemolytic fluid, the chronicity of blood products, the presence of fat (viable or necrotic), The presence or absence of capsule and the various degrees of reinforcement, Carroll JF, Mellado, et al. Developed a diagnostic table with this image method classifying them into types or grades from 1 to 6 (Table 1) [5,6].

Tip	Form	Description	T1W	T2W	Capsule	Reinforcement
1	Laminate	Seroma type	Diminished	Increased	Occasional	Absent
2	Oval	Hematoma type	Increased	Increased	Thickened	Variable
3	Oval	Organized chronic	Intermediate	Heterogeneous	Thickened	Intermediate
4	Linear	Closed Laceration	Hypointense	Hyperintense	Absent	Variable
5	Round	Pseudonodular	Variable	Variable	Thin or Thickened	Intermediate
6	Variable	Infected ± type sinus tract	Variable	Variable	Thickened	Intermediate

Table 1: Mellado and Bencardino Classification (RMN).

### Clinical case

A 37 years-old male who suffered a crushing accident when he passed both tires on a trailer four months ago with multiple dermabrasive injuries due to drag and with edema of both lower limbs and without bone fractures, he was admitted to a hospital. Treated for their injuries and discharged for improvement; One month after his injury and resolving hematomas and excoriations is observed growth in both legs above the knee down to the malleolar region with spontaneous resolution of the edema of the right leg, at four months goes to the emergency department where he is performed A needle puncture in the left leg to continue with edema obtaining a sallow liquid approximately 1400 ml; he returns by continuing accumulating liquid and making an incision in skin and subcutaneous cellular tissue obtaining abundant serous liquid of lateral side face of the leg approximately 1000 ml of the same characteristics, a compressive bandage was applied, and the same procedure was applied 3 times with decreasing liquid at each occasion (Fig. 1). Ultrasound shows the fluid in the septa affected area on the inner side of the leg (Fig 2) and at 15 days the septa formation is observed (Fig. 3). The patient was interviewed with the Traumatology and Orthopedics service and the patient was admitted for surgery with normal laboratory tests and performed debridement according to Tscherné, Schneider, Trueta and Orr criteria and AO / ASIF (Müller) criteria, scarification and brushing of all Tissues. (Figs. 4-7). The postoperative evolution of the patient is satisfactory so far.



Figure 1: Comparative image of both injured legs, right with spontaneous resolution and left with Morel-Lavallée Injury.



Figure 2: In the lateral portion of the left leg, anechoic echogenicity is observed with scant internal echoes, which displaces adjacent muscles in relation to free fluid.



Figure 3: Ultrasound monitoring at 15 days, observing an increase in soft tissue thickness and density and presence of heterogeneous echogenicity between soft tissues and predominantly anechoic muscles, with internal septa.



Figure 4: Cavity content with septa, corpuscles of rice, detritus and pseudocapsule.



Figure 5: Septum in the cavity of the injured area.



Figure 7: Final aspect of the surgical procedure.

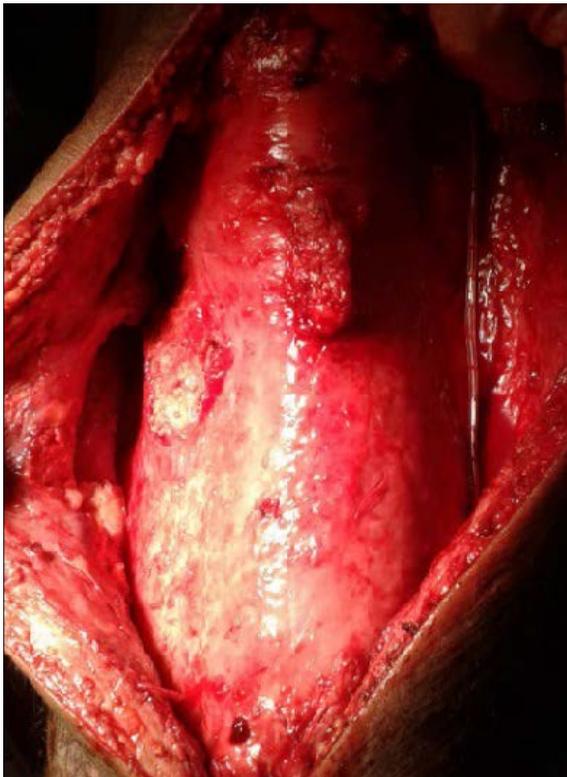


Figura 6: Cavity clean of detritus.

**Our case reports a location and etiology not reported in the literature consulted.**

#### **Discussion**

The Morel-Lavallée Injury occurs when there is a detachment or avulsion of the skin by the tangential mechanism of the injury where shear damage occurs to the hemolymphatic contribution of the tissues that are around the muscular fascia, which favors the filling with Blood fluid, lymphatic, liquefied fat and detritus. All this is surrounded by granulation tissue, organizing a fibrotic pseudocapsule that will avoid the reabsorption of the liquid; This explains the late onset of LML, which in turn may predispose to bacterial colonization by hematogenous or direct route and to infection due to the characteristics and nature of the liquid; The necrosis of the skin is usually due to the internal marginal pressure of the liquid collection and to the vascular interruption, De la Torre [7].

Differential diagnosis should include cutaneous necrosis, hematomas secondary to coagulopathies, and soft tissue sarcomas. Another entity that should be considered is the lymphocele, which may also appear after a trauma; the differential diagnosis is obtained through the cytology of the aspirated liquid. If conservative treatment is chosen, the lymphocele usually resolves more rapidly, disappearing within a few weeks, Li Hui, et al. Kumar Y, et al. have found that many of these lesions are not diagnosed in the initial evaluation of the trauma patient and can occur from weeks, months or years after the traumatic event [8,9].

The imaging studies of choice are ultrasound that is useful based on the time of the hematoma where the lesion appears as an anechoic or isoechoic focal collection located superficially to the muscular plane and below the hypodermis. The dough may contain

fat globules that appear as hyperechoic nodules on your wall. Computed tomography in this type of lesion shows liquid-liquid levels resulting from the sedimentation of blood components and may or may not contain a capsule around the lesion, and magnetic resonance imaging is the mode of choice for imaging [5,6].

The current treatment of this entity is variable and will depend on several factors to consider depending on the time of diagnosis. Initially the treatment could be percutaneous drainage with debridement, irrigation and drainage with suction as it is safe and effective according to Tseng S, et al. Likewise, Alexandris S, et al. add to the previous procedure the compression bandage [10,11].

On the other hand, De Pablo MB, et al. and Guerrero LA, et al. Describe cases of serous formation treated with satisfactory results [12,13]. In cases of very extensive seromas, several therapeutic options have been proposed, such as the injection of sclerosing agents, Tejwani SG, et al. among them we find: tetracyclines McDowell GC, et al. talc Luria S, et al. absolute alcohol Penaud A, et al. myofascial fasciotomies or sutures Jones RM, et al. Doxycycline Tejwani SG, et al. Bansai A, et al. [14-19].

Surgical management should be reserved for recalcitrant lesions in which aspiration and compression have not been successful, Rodrigues EH, et al. Likewise, Pereira PR, et al. recommend that whatever management is used, it should be radical because if this is not the case, the patient is at risk of developing septicemia and possible death of the patient [20,21]. Nickerson TP, et al. in their management of the Mayo Clinic establish that the aspiration of more than 50 ml of fluid in the MLI lesions is more common than they recur, therefore recommend that aspiration greater than this amount requires surgery intervention [22].

Other sites of MLI as arm lesions have been described by Lie Y, et al., where they used the method by liposuction in which the pseudocystic cavity was irrigated until it was free of hematoma and necrotic fat and the retained fatty residues were identified by direct vision injection using a 5 mm endoscope, the cavity and surrounding tissues were infiltrated with tumescent solution (1 L Ringer lactate: 1 mg epinephrine) and the fat retained within the pseudocyst cavity was aspirated using a liposuction cannula of 3 mm with satisfactory results [23].

Knee injuries have also been reported and Hannemann PE, et al. recommend the use of MRI of this disease, which is not always recognized. Hence, the previous history of trauma associated with a periarticular fluid collection of the knee indicates the possibility of MLI in the differential diagnosis together with prepatellar bursitis and pretibial lesion, Ivor S, et al [24,25].

Jumar S, et al, report a case similar to ours in the distal part of a very painful pelvic member in a football player. Greenhill D, et al, emphasize that early diagnosis and treatment are essential to prevent complications such as infection or extensive necrosis of the skin. Unlike these cases, our patient never presented pain in the affected limbs being spontaneously solved the crushing of the right leg and by open surgery the left leg [26, 27].

## Conclusions

the diagnosis of LML should be suspected when fluctuating and smooth fluid is located on the injured skin or fluid collections

recurrence in an area previously injured by shearing or tangential injury. Clinicians and radiologists should know both acute and chronic appearance to make a correct diagnosis, Goodman BS, et al. The most common is to find it in patients with acetabular and pelvic fractures or secondary to high energy trauma with a tangential mechanism in the trochanteric region, although cases of this injury have been reported in low energy trauma without fracture (direct contusion) as it was this case, and even as a sports injury [26].

## References

1. Morel-Lavallée VAF (1853) Decollements traumatiques de la peau et des couches sous-jacentes. Arch Gen Med 1: 20-38.
2. Vanhegan IS, Dala-Ali VB, Verhesdt L, Malluci P, Haddad FS (2012) The Morel-Lavallée Lesion as a rare differential diagnosis for recalcitrant bursitis of the knee: case report and literature review. Case Reports in Orthopedics Article ID 593193, 5 pages.
3. Li Hui, Zhang F, Lei G (2014) Morel-Lavallée lesion. Review article. Chin Med J 127: 1351-1356.
4. Nair AV, Nazar PK, Sekhar R, Ramachandran PV, Moorthy S (2014) Morel-Lavallée lesion: A closed degloving injury that requires real attention. Indian J Radiol Imaging 24: 288-290.
5. Carroll JF (2010) Morel-Lavallée diagnosis. Radsources. Us MRI Web Clinic 15 pags.
6. Mellado JM, Bencardino JT, Morel-Lavallée Lesion (2005) Review with emphasis on MR imaging. Magn Reson Imagin Clin N Am 13: 775-782.
7. De la Torre-Martínez D (2013) Lesión de Morel-Lavallée. Orthotips 9: 93-98.
8. Li H, Zhang F, Lei G (2014) Morel-Lavallée lesion Chinese Medical Journal 127: 1351-1356.
9. Kumar Y, Hooda K, Lo L, Karol I (2015) Morel-Lavallée lesion: a case of an American football injury. Conn Med 79: 477-478.
10. Tseng S, Tornetta III (2006) Percutaneous management of Morel-Lavallée lesions. J Bone Joint Surg Am 88: 92-96.
11. Alexandris A, Alexandropoulos Ch, Goulas V, Varsanis G, Tasios N, et al. (2015) Morel-Lavallée Lesions: Our Treatment Experience. MOJ Orthop Rheumatol 2: 00066.
12. De Pablo MB, Serra GM, González ChD, Arévalo GA (2013) Seroma de Morel-Lavallée. Cartas Clin 350-351.
13. Guerrero LA, Therattil MR (2012) Post-traumatic Morel-Lavallée seroma in young female pedestrian struck by a moving bus: A case report. PM&R 4: S259.
14. Tejwani SG, Cohen SB, Bradley JP (2007) Management of Morel-Lavallée lesions of the knee twenty-seven cases in the National Football League. Am J Sport Med 35: 1162-1167.
15. McDowell GC, Babaian RJ, Johnson DE (1991) Management of symptomatic lymphocele via percutaneous drainage and sclerotherapy with tetracycline. Urology 37: 237-239.
16. Luria S, Yaakov A, Yoram A, Meir L, Peyser A (2006) Talc sclerodhesis of persistent Morel-Lavallée lesions. (Posttraumatic pseudocysts): case report of 4 patients. J Orthop Trauma 20: 435-438.
17. Penaud A, Quignon R, Bahé L, Zakine G (2011) Alcohol sclerodhesis: an innovate treatment for chronic Morel-Lavallée lesions. J Plast Rec Aestet Surg 64: e262-e264.
18. Jones RM, Harta AM (2012) Surgical treatment of a Morel-Lavallée lesion of the distal thigh with the use of lymphatic

- 
- mapping and fibrin sealant. *J Plat Reconstr Aesthet Surg* 65: 1589-1591.
19. Bansai A, Bhatia N, Singh A, Singh AK (2013) Doxycycline sclerodhesis as a treatment option for persistent Morel-Lavallée lesions. *Injury* 44: 66-69.
  20. Rodrigues EH, Lima T, Mizobuchi RR, Júnior AD, Galbiatti J, et al. (2015) Results from surgical treatment of Morel-Lavallée lesions: prospective cohort study. *Rev Bras Ortop* 50: 148-152.
  21. Pereira PE, Guimarães DSG, Rodríguez TLEH, Ryuiti MR, Durigam JA, et al. (2015) Antonio GJ. Results from surgical treatment of Morel-Lavallée lesions: prospective cohort study. *Rev Bras Ortop* 50: 148-152.
  22. Nickerson TP, Zielinski MD, Schilloer HJ (2014) The Mayo Clinic experience with Morel-Lavallée lesions: establishment of a practice management guideline. *J Trauma Acute Care Surg* 76: 493-497.
  23. Liu Y, Sadowski RM, Plastini MA (2014) Treatment of rare Morel-Lavallée lesion of arm with liposuction. *Injury Extra* 45: 6-8.
  24. Hannemann PE, Campos PR, Eltz SM, García HG, Teixeira HF, et al. (2010) Morel-Lavallée lesion in the knee: a case report. *Radiol Bras* 43: 336-338.
  25. Vanhegan IS, Dala-Ali B, Verhelst L, Mallucci P, Haddad FS (2012) The Morel-Lavallée Lesion as a rare differential diagnosis for recalcitrant bursitis of the knee: Case report and literature review. *Case Rep Orthop* Article ID 593193, 5 pages.
  26. Goodman BS, Smith MT, Mallempati S, Nuthakki P (2013) A comparison of ultrasound and magnetic resonance imaging findings of a Morel-Lavallée lesion of the knee. *PMR* 5: 70-73.
  27. Greenhill D, Haydel C, Rehman S (2016) Management of the Morel-Lavallée Lesion. *Orthop Clin North Am* 47: 115-125.

**Copyright:** ©2017 Guillermo P A. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.