CLINICAL VIGNETTE

Morel-Lavallée Lesion: An Internal Degloving Injury

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History

A 62-year-old male with a past medical history of end stage renal disease on peritoneal dialysis, myocardial ischemia currently taking prasugrel and aspirin was brought in by ambulance to the emergency department after falling on a bus. Patient reports falling when the bus stopped suddenly. He fell 4-5 feet and reports hitting his back and left buttocks on the change machine. He was ambulatory on the scene but developed severe pain in his left thigh and buttock.

Physical Exam

On physical exam, his vital signs were T 36.7C, BP 157/108, HR 78. The patient was in mild distress due to his left thigh pain. A left proximal thigh hematoma was noted that measured approximately 5cm by 10cm. The skin was otherwise intact and there was no evidence of gross deformity of the femur. The leg was neurovascularly intact distally.

Labs

His initial CBC included white blood cell count of 6.5 k/cumm, hemoglobin: 8.3 g/dL, hematocrit: 23.8%, and platelets: 114 k/cumm. Prothrombin time: 14.7 sec, with INR of 1.16 and partial thromboplastin time of: 33.2 sec.

After one hour his hematoma was notably larger, measuring approximately 10cm by 20cm.

An emergent non-contrast CT of the abdomen and pelvis that extended to the mid-thigh, revealed a 3.6 X 7.2 cm left gluteal fluid collection with mixed internal density.

The hematoma continued to expand on serial re-examinations and Trauma Surgery was consulted. The patient was taken to the operating room emergently where the left thigh hematoma was explored. Intraoperative findings revealed mostly clotted blood and no evidence of active bleeding. The wound was extended to the muscular layer. After washout a blake drain was placed and the wound was closed. The final postoperative diagnosis was a Morel-Lavallée (ML) lesion of the left thigh.

Discussion

In 1853 Maurice Morel-Lavallée first described a unique posttraumatic fluid collection involving the trochanteric region of the thigh.[1]

A ML lesion usually results from severe blunt traumatic shear force to the pelvis or proximal lower extremity, but may be used as a general term referring to various anatomical locations. Most of these lesions result from a motor vehicle collision; however, a low-energy mechanism, such as a sport injury, does not necessarily rule it out.[2] This rare internal degloving injury develops when the mobile skin and subcutaneous fat tissue abruptly separate from the strong firmly secured underlying fascia. The perforating blood and lymphatic vessels in the involved muscle are torn, thereby expelling their contents into the newly formed potential space.[3] The bony protuberances of the body, such as the greater trochanter, are predisposed to ML lesions. These are areas where the underlying tissues (i.e., the fascia lata attached to the iliotibial band in the case of the hip) are relatively fixed, the bone is in the subcutaneous space yet the skin itself is highly mobile.[4]

Clinical Manifestation

Morel-Lavallée lesions generally present as a large swollen bruised area where a hematoma may develop in a delayed fashion or persist for longer than expected. These lesions are often mistaken for simple hematomas and one-third of patients diagnosed with a ML lesion have a delayed diagnosis.[5] For example, in the knee ML lesions have been misdiagnosed as prepatellar bursitis.[6] They can be distinguished clinically from simple hematomas by the presence of increased soft tissue fluctuance. The accumulation of blood, fat, and necrotic debris, in a hypovascular space poorly equipped to drain internally, form the fluctuant cystic mass.[7] The area may or may not have associated ecchymosis. The overlying skin will often have decreased sensation and may appear dry, cracked, or discolored in chronic lesions. The differential diagnosis for ML lesions includes abscess, contusion, and hematoma.

Imaging

Patients who present with extensive bruising after a traumatic mechanism typically undergo standard x-rays to assess for underlying fractures. These injuries are associated with femoral and pelvic fractures. X-rays may reveal the presence of a non-specific oval or fusiform soft tissue mass with or without calcifications that is adherent to underlying fascia.[8] In the acute setting, ultrasound of the area can reveal heterogeneous and lobular areas with irregular margins.[9] Computer Tomography can be used to differentiate ML lesions from hematomas by

assessing the Hounsfield units of the lesion. In ML lesions there is sedimentation of blood components which causes the average Hounsfield unit be 17 in comparison to a hematoma which has a Hounsfield unit of 75.[10] MRI is the preferred method of imaging in identifying ML lesions because it can clearly delineate the relationship of the collection with the underlying fascia and can differentiate blood breakdown products.[7]

Treatment

The two main options for management of acute ML lesions are conservative or surgical. Currently, there is no defined standard of care for the management of ML lesions. However, it is understood that early intervention on acute lesions is critical in-order to avoid complications. Delays in diagnosis have been associated with chronic hematoma formation as well as an increased risk of infection.

There are several conservative management options. Most commonly, a simple compression dressing is placed over lesion, followed by fluid aspiration if the lesion is large.[2] Serial aspirations and compression dressings may be required in large lesions.

Absolute indications for surgical management include deep infection, severe skin necrosis, or association of a lesion with an open fracture. Relative indication for surgical intervention include unsuccessful nonsurgical treatment, symptomatic lesions, and those overlying a planned surgical approach for acute fixation of a closed fracture. Adjuncts to surgical debridement include sclerodesis and drain placement.[7,11] Surgical management involves performing a longitudinal incision along a palpable midpoint. The necrotic fat is then removed and followed by irrigation as well as debridement of the deep fascial layer. This is followed by debridement of necrotic material. Any capsule present should be removed prior to closure in-order to prevent recurrence. The dead space is closed by suturing the healthy fat to fascia.[12] Complications include postoperative/aspiration infections, recurrence of lesion, skin necrosis, and contour skin deformity.[7]

REFERENCES

1. **Morel-Lavallee M**. Decollements traumatiques de la peau et des couches sousjacentes. *Arch Gen Med*. 1863;1:20–38. 172–200, 300–332.
2. **Tejwani SG, Cohen SB, Bradley JP**. Management of Morel-Lavallee lesion of the knee: twenty-seven cases in the national football league. *Am J Sports Med*. 2007 Jul;35 (7):1162-7. Epub 2007 Mar 9. PubMed PMID: 17351119.
3. **Nickerson TP, Zielinski MD, Jenkins DH, Schiller HJ**. The Mayo Clinic experience with Morel-Lavallée lesions: establishment of a practice management guideline. *J Trauma Acute Care Surg*. 2014 Feb;76(2):493-7. doi:10. 1097/TA.0000000000000111. PubMed PMID: 24458056.
4. **Onishi K, Maruyama Y, Iwahira Y**. Cutaneous and fascial vasculature of the leg: anatomic study of fasciocutaneous vessels. *J Reconstr Microsurg*. 1986 Apr;2(3):181-9. PubMed PMID: 3712325.
5. **Hudson DA**. Missed closed degloving injuries: late presentation as a contour deformity. *Plast Reconstr Surg*. 1996 Aug;98(2):334-7. PubMed PMID: 8764723.
6. **Vanhegan IS, Dala-Ali B, Verhelst L, Mallucci P, Haddad FS**. The morel-lavallée lesion as a rare differential diagnosis for recalcitrant bursitis of the knee: case report and literature review. *Case Rep Orthop*. 2012;2012: 593193. doi: 10.1155/2012/593193. Epub 2012 Dec 20. PubMed PMID: 23320230; PubMed Central PMCID: PMC3539348.
7. **Greenhill D, Haydel C, Rehman S**. Management of the Morel-Lavallée Lesion. *Orthop Clin North Am*. 2016 Jan; 47(1):115-25. doi: 10.1016/j.ocl.2015.08.012. Review. PubMed PMID: 26614926.
8. **Bomela LN, Basson H, Motsitsi NS**. Morel-Lavallée lesion: A review. *SA orthop. j*. [Internet]. 2008 June [cited 2018 Feb 15] ; 7(2): 34-41. Available from: http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S1681-150X2008000200007&lng=en
9. **Neal C, Jacobson JA, Brandon C, Kalume-Brigido M, Morag Y, Girish G**. Sonography of Morel-Lavallee lesions. *J Ultrasound Med*. 2008 Jul;27(7):1077-81. PubMed PMID: 18577672.
10. **Luria S, Applbaum Y, Weil Y, Liebergall M, Peyser A**. Talc sclerodhesis of persistent Morel-Lavallée lesions (posttraumatic pseudocysts): case report of 4 patients. *J Orthop Trauma*. 2006 Jul;20(6):435-8. Erratum in: *J Orthop Trauma*. 2006 Sep;20(8):587. Yaakov, Applbaum [corrected to Applbaum, Yaakov]; Yoram, Weil [corrected to Weil, Yoram]; Meir, Liebergall [corrected to Liebergall, Meir]. PubMed PMID: 16825972.
11. **Bansal A, Bhatia N, Singh A, Singh AK**. Doxycycline sclerodesis as a treatment option for persistent Morel-Lavallée lesions. *Injury*. 2013 Jan;44(1):66-9. doi:10.1016/ j.injury.2011.11.024. Epub 2011 Dec 27. PubMed PMID: 22204771.
12. **Carlson DA, Simmons J, Sando W, Weber T, Clements B**. Morel-lavalée lesions treated with debridement and meticulous dead space closure: surgical technique. *J Orthop Trauma*. 2007 Feb;21(2):140-4. PubMed PMID: 17304071.

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