CASE REPORT

A Rare Cause of Septic Shock Secondary to Trauma: Morel-Lavallée Lesion—Case Report

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Abstract

Morel-Lavallée lesion is a hemolymphatic collection in between muscular fascia that can be caused by the separation of soft tissue and muscular fascia in degloving fashion. Morel-Lavallée lesion is an infrequent lesion and can be mortal. It is a rare presentation that can cause life-threatening septic and hemorrhagic shock. Our patient, a 47-year-old male, arrived at the emergency department with an ambulance 1 h after a major road traffic accident. Apart from a right hemopneumothorax with multiple rib fractures, grade 2 laceration in the spleen and bilateral kidneys, and zone 2 fracture of sacrum, computer tomography (CT) revealed a closed, degloving injury of the pelvis, also known as a Morel-Lavallée lesion. On CT, the Morel-Lavallée lesion appeared as well-defined, encapsulated fluid collections that occasionally showed air-fluid levels. A heavy fluid collection was detected in the second CT, which was actually a collection of infected hematoma in the operative setting. The patient was diagnosed in the first 12 h and necrotic tissues were debrided. The patient was considered deceased after 15 days without any improvement in his GCS score. There is one report that describes mortality after the Morel-Lavallée lesion in the autopsy setting. Early diagnosis and treatment are essential to decreasing the severity of necrosis and sepsis though our patient has deceased due to the complications of sepsis.

Keywords Morel-Lavallée · Degloving · Trauma · Septic shock · Case report

Introduction

Morel-Lavallée lesion is a hemolymphatic collection in between muscular fascia that can be caused by the separation of soft tissue and muscular fascia in degloving fashion. Commonly, it occurs on the greater trochanter although occasionally it can also be observed on the femur, pelvis, knee, or back. Morel-Lavallée is a rare presentation that can cause life-threatening septic and hemorrhagic shock [1, 2]. In this case report, we present Morel-Lavallée lesion which can occur with septic shock and bleeding and can be mortal.

Case Presentation

Our patient, a 47-year-old male, arrived at the emergency department with an ambulance 1 h after a major road traffic accident. The patient had the following vital signs: respiratory rate of 18 breaths per minute, 97% oxygen saturation, heart rate of 124 beats per minute, blood pressure of 87/65 mm of mercury, and a temperature of 36.3 °C. The Glasgow Coma Scale (GCS) was 13 (motor: 6, verbal: 4, eyes: 3) and pupils were symmetric and reactive to light.

Physical examination revealed a laceration of 3 cm in the occipital region. Diminished breathing sounds in the right lung and abrasions on the ventral abdominal wall were detected. The patient was tender to palpation bilaterally on upper abdominal quadrants without any distension. Pelvic examination revealed tenderness with compression. Ecchymosis was present in the bilateral perineum and continued on the right greater trochanter for approximately 10 cm. Neurological examination did not reveal any pathologies. The patient went under full body CT scan (cranial, vertebral without contrast and thoracic, abdominal with IV contrast). No pathologies were observed in the cranium. There

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were 4 rib fractures (9–12) on the right side with minimal hemopneumothorax. Grade 2 lacerations in the spleen and bilateral kidneys were also observed. In the sacrum, a zone 2 fracture was detected with an avulsion fracture in the acetabulum and a fragmented fracture in the coccyx. Additionally, in the sacral region, free air was observed bilaterally between intermuscular space (Fig. 1). No fluids were detected in the pericardium or intraperitoneally. The Orthopedics Department was consulted for patient fractures. The patient was transferred to the intensive care unit (ICU) due to tachypnea and hypotension. The patient was intubated after losing consciousness with a GCS of 3. The patient had a cardiac arrest after an episode of bradycardia and hypotension. The patient was resuscitated to sinus rhythm after 15 min of cardiopulmonary resuscitation (CPR). Inotropic agents were given. Subdermal fluid collections in the bilateral sacral and right femoral region increased. A pelvic bandage was performed for compression. The chest tube was inserted right hemithorax and 300 ml was draining serohemorrhagic fluid. Hemoglobin and hematocrit levels dropped to 7 and 21.4, respectively, which were initially 15 and 44. The patient went under CT angiography to detect the source of bleeding. No extravasation was detected but increased free air and hematoma in the sacral region were observed (Fig. 2). The patient was given 3 erythrocyte suspension and 3 fresh frozen plasma. It was observed that the size of the Morel-Lavallée lesion in the gluteal region increased (Fig. 3). He was operated 12 h after admission due to the decrease in hemogram and persistence of hypotension despite replacement. Transverse incision was made in the right and left gluteal regions. Copious amounts of infected hematoma and necrotic muscular tissue were observed (Fig. 4). Hematoma was drained and necrotic tissues were debrided. The patient received sigmoid loop colostomy under laparotomy to prevent fecal contamination. Injury in the mesentery of

Fig. 1 First CT scan of the pelvic region (star: free air bilaterally between intermuscular space)

Fig. 2 Pelvic region in the control CT scan (star: increased free air bilaterally between intermuscular space)

Fig. 3 The patient and the injury can be seen in the preoperative setting

Fig. 4 Necrotic tissues in the right gluteal region
the sigmoid colon was detected. Due to the high likelihood of bleeding, a wound vacuum-assisted closure (VAC) of the Morel-Lavallée lesion was not considered in the first session. Tissue culture revealed gram + coccii (Streptococcus sp.) and gram–rod (Escherichia coli) proliferation. Clindamycin, meropenem, and vancomycin were immediately started. Overall, the patient received 8 units of ES, 8 units of fresh frozen plasma (FFP), and 2 units of pooled thrombocytes. The patient went to the OR 3 days later. Necrotic skin and muscular planes were observed. Vacuum-assisted closure was applied after the second round of debridement and was periodically changed every 72 h. The patient had stable hemoglobin levels in the follow-up. The patient received hemodialysis due to the septic shock without any urine output. The patient still needed inotropic agents without any improvement in his clinical status. The granulation tissue was forming in the Morel-Lavallée lesion after VAC therapies (Fig. 5). The patient was considered deceased after 15 days without any improvements in his GCS score.

**Conclusion**

The lesion was named after Maurice Morel-Lavallée who described a patient who fell off a tram and had a post-traumatic fluid collection in 1863 [3]. Most of the cases occur after a high-energy impact trauma with a significant injury. In the literature, reported cases are usually injured after sport competitions or as post-operative complications [4, 5]. Obesity was also reported as a risk factor to develop Morel-Lavallée lesion due to the increased fragility in the perforation arteries [1]. In the literature, there are also cases of patients presenting with local pain and paresthesia in the lumbar region [6].

There was only one case report in which a patient received heavy vasopressor agents and had gram-negative proliferation in the tissue culture [1]. It is important to keep in mind that Morel-Lavallée lesions can cause fulminating septic shock. In our case, although the patient was in the recovery phase, the patient deceased due to the complications of septic shock. Therefore, we believe our case report is a novel contribution to the existing literature.

Morel-Lavallée lesions usually appear following an injury after a few hours to days. Some lesions can occur after several months in 30% of the lesions that went undiagnosed [7, 8]. There are several imaging techniques that can help us with the diagnosis of Morel-Lavallée lesion such as CT scan or MRI. CT is fast and can be easily consulted in the emergency setting, which was also the case in our patient [8, 9]. MRI was not preferred due to hemodynamic instability. On CT, Morel-Lavallée lesions appear as well-defined, encapsulated fluid collections that occasionally show fluid levels [10]. In this case, hematoma and free air in intermuscular planes were observed in the right gluteal region and in the back, respectively. A heavy fluid collection was detected in the control CT, which was actually a collection of infected hematoma in the operative setting.

In critically injured patients with multiple injuries and unstable pelvic fractures, the primary cause of early death is the uncontrollable blood loss or severe brain injury. If they survive the early period, patients are still at high risk of potentially fatal complications such as sepsis. Takaoka et al. reported sepsis caused by peripelvic soft tissue infection in patients with multiple injuries and unstable pelvis fracture [11]. However, in our case, peripelvic infection is not associated with the open wound. In addition, we performed a sigmoid loop colostomy to prevent fecal contamination. In this case, infection of the Morel-Lavallée lesion is caused by septic shock.

Morel-Lavallée lesion is an infrequent lesion and can be difficult to diagnose. Also, it should be known for medicolegal reports [12]. In our case report, it is seen that the Morel-Lavallée lesion may be the cause of death, despite the early diagnosis. There is one report that describes mortality after Morel-Lavallée lesion in the autopsy setting [13].

In our case, the patient was diagnosed in the first 12 h and necrotic tissues were debrided. Literature data support the fact that early diagnosis and treatment are essential to decrease the severity of necrosis and sepsis. However, our patient deceased due to the complications of sepsis despite early diagnosis and treatment. The source of septic shock is thought to be closed injuries in degloving fashion in the necrotic tissues and bleeding of perforating arteries which resulted in rapid infection and heavy propagation of necrotizing soft tissue infection.

**Fig. 5** Granulation tissue after VAC therapies
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Code Availability  Not applicable.

Declarations

Ethics Approval  Not applicable.

Consent to Participate  Written informed consent to participate in this case report was obtained from the patient.

Consent for Publication  Written informed consent for the publication of this case report was obtained from the patient.

Conflict of Interest  The authors declare no competing interests.

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