Surgical Treatment of a Delayed Diagnosed Morel-Lavallee lesion: A Case Report

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Abstract
Morel-Lavallee lesions are uncommon closed degloving injuries that are typically caused by a post-traumatic soft tissue injury between the subcutaneous tissue and underlying fascia. These lesions are characterized by intact skin, which may hinder and delay diagnosis. We report the case of a patient who was mostly lying in bed after undergoing thoracic spinal surgery and reported pain and fluctuation due to fluid collection approximately 2 weeks postoperatively. Magnetic resonance imaging (MRI) showed a 14 cm × 8 cm × 5 cm fluid collection between the right fascia lata and subcutaneous fat. First, percutaneous drainage was performed and a pressure bandage applied. However, conservative treatment alone was ineffective; therefore, the lesion was excised completely via direct surgical incision. Morel-Lavallee lesions are often overlooked at the time of initial injury, which delays the diagnosis and leads to the formation of a capsule. Complete surgical excision is effective in these cases.

Keywords: Seroma, Soft tissue injuries, Capsule

Introduction
Closed degloving injury, also known as Morel-Lavallee lesion, are soft-tissue injuries caused by a sudden and strong shearing force that damages the underlying fascia, and area between the skin and subcutaneous tissue [1,2]. These types of lesions are usually caused by post-traumatic soft-tissue injuries and their incidence is rare [3,4]. Several cases treated using non-invasive treatment including percutaneous drainage, sclerotherapy, and compression dressing have been reported in Korea [5,6]. However, a case treated using surgical excision has not been reported. We describe a case of Morel-Lavallee lesion treated surgically.

Case
A 49-year-old man fell 2 m while working on the top of a truck. Based on the general examination performed in the emergency room (ER), he was diagnosed with a T9-10 fracture, and underwent posterior fusion. Approximately 2 weeks after the injury, a consultation with our department was requested upon the observation of a painful, soft mass in the patient’s right intertrochanteric region. During the physical examination, a fluctuating oval mass of approximately 14 cm × 8 cm was palpated in the right intertrochanteric region. While taking his history, the patient remembered that he had hurt his right thigh during the fall. Magnetic resonance imaging (MRI) showed a 14 cm × 8 cm × 5 cm fluid collection between the right fascia lata and subcutaneous fat (Fig. 1). After the initial examination, we proceeded with conservative treatment including percutaneous drainage (175 mL of fluid was drained), and the application...
of a compressive bandage. However, surgical treatment was planned when fluid collection developed again and another percutaneous drainage did not reduce the drained volume (70-175 mL). Gram staining and culture of the aspirated fluid in the lesion area were performed, but bacterial growth was not observed. A skin incision was made under general anesthesia and dissection performed to the inner fascia. A wide capsule was found between the subcutaneous fat and muscle fascia. Fluid and necrotic debris were irrigated. The lesion was completely excised during capsulectomy and the wound was closed with cutaneofascial sutures to reduce dead space (Fig. 2). The patient was discharged without complications or recurrence. An MRI obtained 2 months postoperatively confirmed that the size of the fluid collection in the lateral aspect of the subfascial area of the right intertrochanteric area decreased (Fig. 3).

**Discussion**

Morel-Lavallee lesions are uncommon injuries usually caused by a post-traumatic soft-tissue injury [3,4]. It occurs between the subcutaneous tissue and underlying fascia, and has been described as a closed degloving injury [3,4]. The lesions are characterized by intact skin, which may hinder and delay diagnosis [3].

Furthermore, diagnosis may even be more challenging in those with limited ambulation. In our case, the patient was mostly lying in bed after thoracic spinal surgery and reported pain and fluctuation due to fluid collection approximately 2 weeks postoperatively. At the time of presentation to the ER, the medical staff focused on the patient’s thoracic fracture, and considered the trauma on his thigh region to be a simple contusion, because of a lack of abnormal visual findings. Thus, they did not perform a more thorough physical examination or radiological testing. This suggests that physicians should learn how to differentiate between contusions and Morel-Lavallee lesions, primarily based on fluctuation and skin mobility [7]. Rha et al. [8] reported that symptom onset is delayed in approximately one-third of all patients, and symptoms can develop several months or even years after the initial trauma. Therefore, it is difficult to pinpoint the rele-
vance of the trauma to the symptoms in many cases, which further delays diagnosis. Taking a thorough patient history is crucial in these cases. In addition, physicians should not overlook a history of trauma and must perform a meticulous physical examination.

Getting a complete and accurate history as well as performing a physical examination are the first steps in diagnosing patients with Morel-Lavallee lesions. If the lesion is suspected during a physical examination, needle aspiration of the fluid should be performed to confirm blood and necrotic fat. Moreover, analysis of the protein and cytology of the fluid have been reported to be conducive to making the diagnosis [5,7]. Medical imaging techniques, such as ultrasonography, computed tomography (CT), and MRI, are also helpful in reaching a diagnosis. Ultrasonography enables the physician to estimate the size, volume, and depth of the suspected lesion [3]. A CT scan shows the fluid-fluid level caused by sedimentation of cellular blood components as well as the capsule surrounding the mass [3]. MRI enables observation of the progression of the lesion from the initial hyperacute hematoma to the chronic serosanguinous type lesion [3]. These radiological methods help physicians to confirm the diagnosis in patients who show symptoms that mimic the lesion in the physical examination and differentiate the lesion from a soft-tissue tumor [3].

Several treatment methods are available in these cases. First, small, acute lesions can be treated conservatively with compression dressings and percutaneous drainage or partial incision [3]. If the diagnosis is delayed and the lesion matures, an inflammatory reaction may occur with various factors involved in the blood clotting cascade and resulting by-products induce chronic inflammation [3]. In addition, the inflammatory reaction will transform granulation tissue into a fibrous capsule, which will disturb the absorption of fluid collection [9].

In these cases, conservative treatment alone is ineffective; therefore, invasive methods are required. Complete excision through a direct surgical incision is the most effective treatment option. One of the complications of Morel-Lavallee lesions is skin necrosis at the onset site. Damaged perforating vessels, which supply blood to the subcutaneous and dermal tissues, is the main cause of skin necrosis, but increasing hematoma formation in the subcutaneous plane of separation after the initial injury also induces skin necrosis by further disrupting the blood supply [3,7]. Furthermore, fluid collection may be the source of bacterial growth [5]. Pseudomonas aeruginosa infection was observed in necrotized tissues, and its spread to the dead space was reported to cause a wide skin and soft-tissue defect in the lesion area [5]. If this leads to wide skin necrosis, flap coverage or skin grafting is inevitable. Therefore, the complete surgical excision of the lesion is necessary to prevent the lesion to be a bacterial source.

Morel-Lavallee lesions are often overlooked at the time of initial injury, which delays diagnosis. If lesions mature, conservative treatment alone is ineffective; thus, surgical treatment is required. Taking an accurate patient history regarding trauma and performing a thorough physical examination are crucial to prevent a delayed diagnosis. Complete excision is needed in patients in whom capsules have formed.

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