Gluteal Compartment Syndrome Secondary to Traumatic Rupture of Gluteus Maximus

Eurasian Clinical and Analytical Medicine Case Report

Gluteal Compartment Syndrome

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Abstract
Which will result in impairment of interstitial microvascular closed osseofasyal areas of compartment syndrome is defined as the increase in pressure and forearm injuries of the lower extremities are the most common. In terms of the gluteal compartment syndrome is an extremely rare in the region in the region. Compartment syndrome secondary to muscle or tendon rupture has been reported rarely. In this study, we developed a traumatic gluteal compartment syndrome secondary to rupture of the gluteus maximus muscle presented a case.

Keywords
Compartment Syndrome; Gluteal Region; Surgery

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Introduction

Compartment syndrome is characterized by a disruption of circulation and necrosis due to increased interstitial pressure within closed osseofascial space [1-3]. The clinical presentation develops due to either increased compartment volume or decreased compartment area resulting from edema or hemorrhage [4, 5]. Although the compartment syndrome is seen in several regions of upper and lower extremities, it is rarely encountered at gluteal region.

The gluteus maximus is the major extensor muscle of the hip joint. It involves in balance without shifting anterior in the first phase of stance while it provides primary vertical support during gait. In the literature, there are a limited number of cases published on compartment syndrome secondary to the gluteus maximus injury [6, 7].

In this study, we presented a case with the gluteal compartment syndrome secondary to traumatic rupture of gluteus maximus.

Case Report

A 51-years old man presented to the emergency department with pain and swelling at right hip after hit by a bumper of a car. There was an ecchymotic site (7×13 cm in size) at the posteroinferior area of the right gluteal region. Neurological, vascular and motor examinations were normal in the patient. He had no history of comorbid disease or anticoagulant medication.

On pelvis radiographs and computed tomography scan, no abnormal finding other than soft tissue swelling was detected in osseous components. On contrast-enhanced magnetic resonance (MR) imaging, a hemorrhagic area with high signal-intensity that begins from subcutaneous fat tissue at right gluteal region and extends to gluteus medius, reaching up to trochanter major and clouded fascial planes across muscles, was seen on T2-weighted images. In addition, it was found that sciatic nerve was compressed by hematoma with perineural edematous changes (Figure 1).

During follow-up, there was an increase in pain; in addition, pricking and tingling were developed compatible for distribution of sciatic nerve within one hour. When the distance between the spina iliaca anterior superior and intergluteal line at posterior was measured, it was found that the distance was 29.5 cm at left gluteal region whereas 40.5 cm at right gluteal region. Based on the clinical findings, the operation was planned with the diagnosis of the gluteal compartment syndrome secondary to rupture of gluteus maximus. Blood parameters were found to be normal in the patient.

Decompression was performed in gluteal region via posterior approach in the patient at lateral supine position. It was detected that there was an organized hematoma (10×4×5 cm in size) of approximately 500 cc when fascia lata and its extensions were exposed (Figure 2). It was observed that there was ruptured in gluteus maximus, but sciatic nerve was normal. At post-operative period, overall 60 cc discharge was noted from drain that was removed on the day 2. The patient was able to return daily activities at the end of the first month. No complication or weakness at hip joint extension or gluteal atrophy was detected on the control visit after one year.

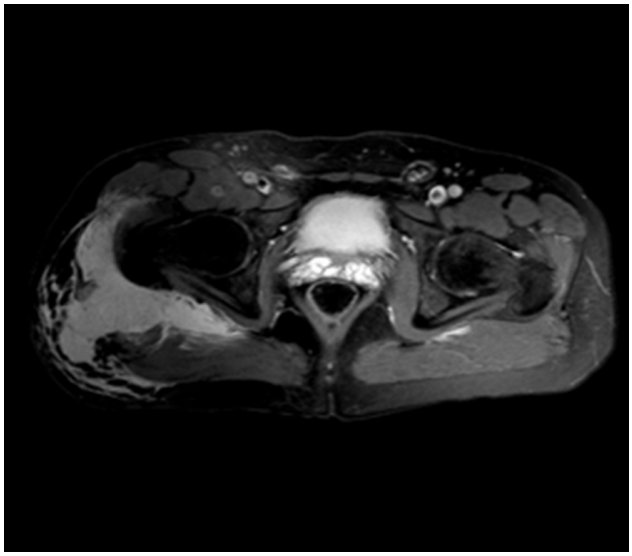

Figure 1. T2-weighted MR images showing a hemorrhagic area with high signal-intensity that begins from subcutaneous fat tissue at right gluteal region and extends to gluteus medius, reaching up to trochanter major and clouded fascial planes across muscles as well as sciatic nerve compression due to hematoma and perineural edematous changes in the same plane.

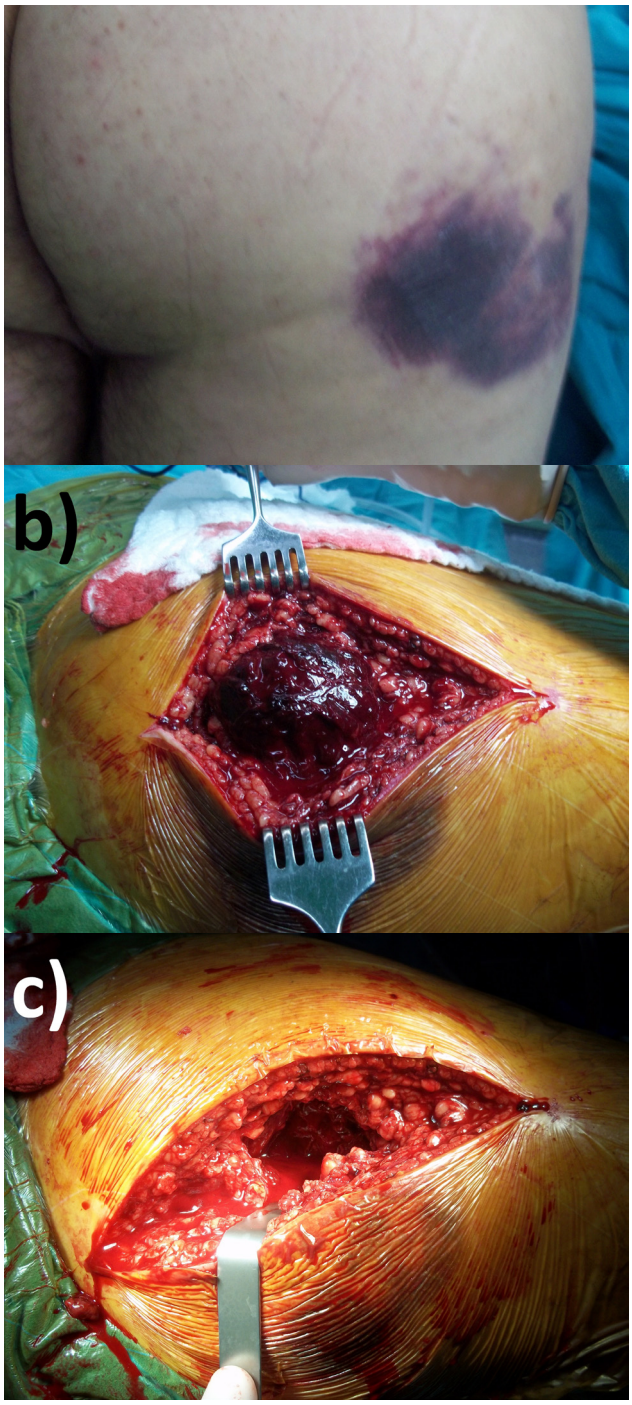

Figure 2. a) Tension and ecchmotyic appearance at right gluteal region before surgery, b) large hematoma between fibers of gluteus maximus after fascia incision and c) appearance of gluteal region after evacuation of hematoma.

Discussion

Gluteus maximus is primary extensor muscle of hip joint [6]. It prevents excessive anterior bending of center of weight during first half of stance phase [7]. Gluteus maximus is the major muscle that provides vertical support and accounts from erecting from squat position during running and jumping [6, 7].

Compartment syndrome is defined as an increase of interstitial fluid pressure within a closed anatomical space among fascias or between osseous components and fascia, resulting in disruption of micro-circulation [2, 4, 5]. The compartment syndrome is rarely seen at gluteal region; thus, early diagnosis couldn't be readily achieved in all cases [4-7]. Gluteal region is surrounded by a strong fascia that continues as fascia lata at thigh. This fascia divides gluteal region into 3 compartments as gluteus maximus, tensor fascia lata, and gluetus medius and minimus [7, 8]. Surgery should aim to appropriate decompression of these regions. Sciatic nerve doesn't stand in the fascial region, as the part that penetrates piriformis being excepted. The nerve is compressed due to edema at adjacent muscles [2]. We detected an intra-compartmental hematoma that extended from gluteus maximus muscle to gluteus medius muscle at right side, reaching up to trochanter major and clouded fascial planes across muscles, and sciatic nerve compression in contrast-enhanced MR images.

The reasons for the gluteal compartment syndrome include rupture of superior gluteal artery [2, 9-11], drug and alcohol overdose [12], long-term immobilization [13, 22] epidural anesthesia [14, 15], lithotomy position [3, 16], aortic aneurysm surgery [17, 18], intramuscular injection [19], bone marrow biopsy [20], following lumbar vertebra surgery [21] and Ehlers-Danlos syndrome [2]. In our case, the mechanism of compartment syndrome was hemorrhage within compartment due to injury of intramuscular perforating vessels secondary to traumatic rupture gluteus maximus.

The findings of the gluteal compartment syndrome are similar to those in classical compartment syndrome. The most important findings are disproportional pain, anesthesia, swelling and tension [4, 5]. However, it is difficult to distinguish pain present in most cases after trauma from pain in patients with compartment syndrome [7]. Although pain occurring with passive stretch is valuable for diagnosis, it is difficult to interpret pain as there will pain at all directions with motions of hip joint in patients with the hip contusion. One of the best methods to confirm diagnosis is measurement of intra-compartmental pressure [8]. Other diagnostic modalities include clinical examination, sonography [4], magnetic resonance imaging [4, 23, 24] and CT scan [4, 25]. Currently, there is no widely accepted algorithm for pathological intra-compartment pressure values and it isn't always possible to measure intra-compartment pressure; thus, the most important step in the diagnosis is clinical examination. We had a technical shortage for intra-compartmental pressure measurement in our case. However, MR imaging is a helpful diagnostic tool in cases of clinical suspicion [23, 24].

In the compartment syndrome, optimal pressure threshold for timing of fasciotomy is unknown; however, fasciotomy is recommended when compartment pressure exceeds 30 mmHg [5, 11]. Minimum time for functional and histological damage of muscle tissue is approximately 4–6 hours. Ischemia longer than 8 hours leads myonecrosis and permanent fibrotic changes in the muscles. Neurons are more vulnerable to hypoxia and time to the first sensorial deficit is 33 minutes in average [11]. Thus, the decision for fasciotomy should be taken by a clinical picture despite low compartment pressure. In the gluteal compartment syndrome, goal of surgical intervention is controlling hemorrhage, decompression through fasciotomy, debridement of necrotic muscle tissues and evacuation of the hematoma. In our case, no complication related to the gluteal compartment syndrome and functional loss of gluteus maximus at postoperative period.

It should be kept in mind that gluteal compartment can be missed easily and that the gluteal compartment syndrome can develop after hip trauma; thus, gluteal regions should be examined.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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