

ACUTE COMPARTMENT SYNDROME OF THE THIGH WITHOUT ASSOCIATED FRACTURE: A CASE REPORT

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ABSTRACT

Acute compartment syndrome of the thigh is a rare complication of trauma to the thigh. It occurs less commonly than in other sites such as the leg and forearm. Because of its rarity, it is often not suspected and its diagnosis is frequently delayed with disastrous consequences.

We report a patient who sustained blunt trauma to the thigh without a femoral fracture and subsequently developed acute compartment syndrome. The patient had initially been seen and sent home on oral analgesia but presented five hours later with worsening thigh pain. Then, a diagnosis of acute compartment syndrome was made and fasciotomy done. He recovered uneventfully.

INTRODUCTION

Compartment syndrome refers to an increase in pressure within a closed osteofascial compartment resulting in damage to the nerves and muscles in that compartment. Early diagnosis and treatment are essential if such damage is to be prevented.

Diagnosis depends on proper evaluation of the patient and a high index of suspicion. It is rare for compartment syndrome to involve the thigh compartments and therefore when it occurs, it may be missed as the doctor may not suspect its presence. This is especially so when there is no accompanying fracture leading to failure to appreciate the severity of the injury. We present a case of a 25 year old male with acute compartment syndrome of the thigh without an associated femoral fracture.

CASE REPORT

A 25 year old man was involved in a motor vehicle accident, when the vehicle he was travelling in lost control and overturned. He was on the front passenger seat and his right thigh hit the dashboard. He presented to hospital within an hour of the accident. Then, he was complaining of pain on the lower part of his right thigh, just above the knee, though he could walk without support. Life threatening injuries were excluded. Examination revealed stable vital signs with a blood pressure of 120/70mmHg, pulse rate of 80 per minute, regular, adequate volume. He had a few facial bruises and a laceration on his lower lip. Examination of his right thigh revealed no swelling, with tenderness just above the patella and on the medial side over the vastus medialis. Extensor apparatus was intact and knee range of motion was normal. He had no distal neurovascular deficits. A radiograph of the right femur did not show any fracture. The lip laceration was stitched and he was sent home on oral amoxicillin and diclofenac.

Five hours later, he returned to hospital with excruciating pain and swelling of his right thigh. The thigh was found to be markedly swollen and the skin stretched taut and shiny (Figure 1). There were no bruises, lacerations or ecchymoses. On palpation, the thigh was tense and exquisitely tender over its lower inner aspect. The pain was worsened by passive knee flexion. He had no sensory loss or paraesthesiae on the leg. Capillary refill distally was less than 2 seconds and both the dorsalis pedis and posterior tibial pulses were palpable. He had no weakness of the leg muscles. A clinical diagnosis of anterior thigh compartment syndrome was made and the patient prepared for fasciotomy.

A lateral thigh fasciotomy was done and the bulging vastus lateralis found to be viable (Figure 2). The lower end of the rectus femoris was bruised but viable and contracted on stimulation with electrocautery. The lateral intermuscular septum was also released to decompress the posterior compartment. However, the tightness over the medial aspect of the thigh was not sufficiently released and it was judged that a separate medial incision was needed to address it directly. The vastus medialis was found to have a tear, through which bleeding had occurred. Five hundred milliliters of clotted blood was found within the muscle rent and evacuated (Figure 3). Bleeding muscular vessels were cauterized. All compartments felt soft after the decompression. The wounds were left open and dressed loosely. Post-operatively, the patient was managed on antibiotics, analgesics and limb elevation. Frequent neurovascular assessments were done distally. Pain went down significantly after surgery.

After 72 hours, the patient was returned to theater where inspection of the wounds showed that there was no further muscle necrosis (Figure 4). The lateral thigh incision was closed primarily and the medial wound covered with a split thickness skin graft (Figures 5 and 6). The wounds healed well without

infection. He was initially ambulated using crutches, bearing weight as tolerated. Quadriceps exercises were started after one week and he was discharged to continue with physiotherapy as an outpatient.

After two weeks, he had active knee flexion up to 90° and extension up to 120° (Figure 7). One month later, he had knee extension up to 180° and knee flexion up to 130°. He went back to work soon after.

Figure 1

Thigh swollen, bulging vastus lateralis (White Arrow)



Figure 2

Vastus lateralis bulging through fasciotomy wound



Figure 3

Evacuation of hematoma from Vastus medialis



Figure 4

Lateral thigh wound after 72 hours



Figure 5

Skin graft over medial thigh wound



Figure 6

Delayed closure, lateral thigh wound



Figure 7*Knee extension after two weeks***DISCUSSION**

Mubarak *et al* (1) defined compartment syndrome as a rise in the tissue pressure in a closed fascial space, resulting in compromise of the nerves and muscles in the affected compartment. Untreated, compartment syndrome ends in permanent ischemic damage to the contents of the compartment. As such, prompt diagnosis is needed followed by decompression to prevent this catastrophic consequence (2, 3).

Compartment syndrome occurs commonly in the leg and forearm, and in such cases usually associated with fracture of the corresponding bones. Comparatively, compartment syndrome of the thigh is rare. According to Suzuki *et al* (4), by 2004, only 80 cases had been reported. It has been postulated that the thigh is spared because the large volume of thigh compartments requires a massive increase in content to cause significant increase in compartment pressure. The fact that the thigh compartments blend with those of the hip and gluteal region also potentially allows for extravasation of blood outside the compartment envelope (5).

In the setting of multiple injured patients, acute compartment syndrome of the thigh is found in association with various predisposing factors. In a retrospective review, Schwartz *et al* (5) found that acute compartment syndrome of the thigh was associated with systemic hypotension, external compression of the thigh, use of Military Anti Shock Trousers (MAST), coagulopathy, vascular injury and femoral fracture.

Acute compartment syndrome of the thigh occurring in absence of a femoral fracture has been reported to occur more in elderly patients with medical comorbidities like haemophilia, hepatitis, HIV infection and those on anticoagulation (6). It has also been reported in young, fit, muscular men after extreme exercise and contact sport like rugby and soccer (7-11). Other cases were in association with arterial injury (4, 5, 12).

The diagnosis of acute compartment syndrome of the thigh requires a high index of suspicion as it is

not a common complication of thigh injury (5). Like compartment syndrome elsewhere, thigh compartment syndrome is attended by extreme pain, out of proportion to the injury, and on palpation the thigh may be tense and very tender, with pain on passive stretch of the muscles in the affected compartments (13). Classically, extreme pain on attempted knee flexion indicates compartment syndrome of the anterior thigh. It may be accompanied by paresthesiae and loss of sensation over the distribution of the saphenous and the cutaneous nerves of the thigh, which pass through the anterior compartment. Posterior thigh compartment syndrome produces pain on passive extension of the knee and may be accompanied by compromise of sciatic nerve function. Medial thigh compartment syndrome will compromise the adductors and may be associated with paresthesiae over the distribution of the cutaneous branch of the obturator nerve (5). In the awake patient, the above symptoms and signs are generally sufficient to make the diagnosis. However, in unconscious, uncooperative or obtunded patients, or where diagnosis is equivocal, then resort must be had to measurement of compartment pressures. Controversy still persists regarding the pressure at which fasciotomy should be done. Mubarak *et al* (1) took a compartment pressure of 30mmHg as the threshold for fasciotomy. However, Matsen *et al* (13) considered that fasciotomy should only be done if compartment pressures were higher than 55mmHg. Compartment pressure measurement was not done in the patient presented, as the hospital did not have such facilities. This is probably the case in many other centers in the developing countries. In such situations, frequent clinical examination of the patients at risk and those with equivocal signs should be done, and decompression considered early (10).

Once the diagnosis is made, prompt decompression should be done, as it has been shown that delay in fasciotomy results in poor outcome (3,13). This is typically through a lateral thigh incision as described by Tarlow *et al* (2). In the patient presented, the lateral thigh incision was not adequate to evacuate and decompress the vastus medialis and this necessitated a separate, direct incision. The wound is left open to be closed later by delayed primary closure or split skin grafting. Vacuum assisted wound closure has also been described in closure of the fasciotomy wound (14).

Non-operative treatment of compartment syndrome of the thigh has been reported by Riede *et al* (15). This involved keeping the leg straight and initially no motion or massage allowed for 48 hours. Enoxaparin for thromboprophylaxis was administered, with bromelain and paracetamol. Physical therapy was started after 48 hours and at follow up, the patient had regained significant function. Other authors have also reported good recovery after non-operative treatment of quadriceps contusions (9). Currently, no comparative studies between operative and non-operative treatment

have been done and more research is needed to find the place of non-operative treatment.

Though a rare complication of injury to the thigh, compartment syndrome should always be borne in mind and sought, and promptly treated to prevent the disastrous sequelae of delayed treatment.

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