



Compartment Syndrome after Corrective Tibia Osteotomy in Patient with Metaphyseal Aclasia - A Case Report

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Abstract

Compartment syndrome is defined as a condition in which a closed anatomic compartment's pressure increases to such an extent that the microcirculation of the tissues in that compartment is diminished. The compartment syndrome is mostly diagnosed on variation in clinical symptoms and signs in sequential examinations. If the diagnosis is missed and left untreated, it can lead to serious damage to the soft tissues of the limb including muscles, nerves, and vessels. It can sometimes result in limb loss or even loss of life. We report a case, a 29-year-old male patient with metaphyseal aclasia who postoperatively developed anterior compartment syndrome, after corrective tibia osteotomy.

Keywords: Compartment syndrome; Tibia osteotomy; Metaphyseal aclasia

Introduction

Compartment syndrome is a condition in which the pressure in a closed compartment increases to such an extent that the microcirculation of the tissues is diminished [1]. In most of the cases it is diagnosed based on the variation of the clinical symptoms and signs in sequential examinations. If its missed or not treated on time it can lead to serious damage to the soft tissues of the limb including nerves, vessels and muscles in some cases even with limb loss or loss of life [1].

We report a case, of a 29-year-old man with metaphyseal aclasia who developed compartment syndrome, after corrective tibia osteotomy.

Case Presentation

We report a case, of a 29-year-old man with metaphyseal aclasia of both legs. The patient was diagnosed with this condition in 2001, after he accidentally fell off his bike and he couldn't extend his leg. The diagnosis was made due to clinical examination and X-ray. He has previous history of multiple corrective orthopedic surgeries of both legs and one surgery for resection of giant benign tumor of the tibia. Year and a half ago, he was admitted in our clinic for performing corrective tibia osteotomy due to his metaphyseal aclasia of his left leg. One day after the surgery he started complaining of pain and swelling in his left leg, and the 3rd day after the surgery he developed Compartment syndrome with risk of developing gangrene. Fortunately it was treated on time with decompression of the compartments and tissues and long term therapy with NPWT (Negative Pressure Wound Treatment).

Discussion

Compartment syndrome is a term that describes a syndrome and not a disease, as there are many diseases and pathophysiological processes that lead to such a scenario [2]. It is defined as increased pressure within a fibro-osseous space resulting in decreased tissue perfusion to structures within that space [3]. The compromised microcirculation in an acute setting in most of the cases may lead to potentially irreversible neuromuscular ischemic damage, and its sequelae [4].

Misdiagnosis of Compartment Syndrome was firstly described by Volkmann in 1881. His landmark article described the ischemia of the limb that was left untreated for several hours which led to paralytic contracture [5]. In that time the prevailing theory was that the ischemic insult was caused by the tight bandages. Two types of compartment syndrome are described in the literature – acute and chronic [3]. Acute Compartment Syndrome (ACS) in most of the cases occurs after limb trauma, commonly affecting the lower limb. In this kind of situation decompression by extensive

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Figure 1: a) Radiography of deformity of the left tibia before the operation, b) postoperative radiography, c) radiography after the osteosynthesis extraction, d) photo of the left shin with anterior compartment syndrome developed, skin bullae and edema, e) NWPT applied on both skin incisions with sponge bridge, f) photo of the wound before osteosynthesis extraction, g) spontaneous epithelization of the treated wounds after four months Negative Wound Pressure Treatment (NWPT).

fasciotomy is needed. On the other hand, chronic compartment syndrome typically presents with exercise – induced pain, which is commonly seen in athletes [4]. ACS needs urgent attention and intervention and it is more worrying. Ischemia of up to 6 hrs is associated with irreversible changes more likely to produce functional impairment [6,7].

A proper diagnosis of compartment syndrome is important because of direct morbidity to the patient and because it creates a high – risk medical – legal environment for the provider [8]. The classic signs of acute compartment syndrome include the 6 “P’s”: pain, poikilothermic limb, paresthesia, paralysis, pulseless limb and pallor. Usually the initial complaint of the patient is the pain and that should trigger the work up of acute compartment syndrome. In most of the cases the diagnosis is unclear, and monitoring of the pressure is required, If the clinical diagnosis of compartment syndrome is confirmed, it should be followed by surgical decompression. However, the absence of pain cannot negate the possibility of compartment syndrome. There are several case reports that describe patients with acute compartment syndrome who never felt pain [9,10]. Paralysis,

pulseless limb and paresthesia present late in the disease process, often after damage to the structures, and they should not be part of the routine diagnostic criteria for acute compartment syndrome [11].

The traditional treatment for lower extremity compartment syndrome includes two-incision, four-compartment fasciotomy [12,13]. In our case we made lateral incision to decompress the anterior and lateral compartments. On the other hand medial incision decompresses the superficial and deep posterior compartments. The most important step of the intervention is to make complete fasciotomy and release of the pressure [14]. We made the lateral incision from the tibia tuberosity to just above the lateral malleolus. We continued the incision deep through the subcutaneous tissue, and we performed a fasciotomy to enter the anterior compartment. We performed an extension *via* longitudinal incision along the entire length of the fascia with blunt- tipped scissors. The intramuscular septum is identified by its perforating vessels.

Alternatively, transverse incision over the suspected site of the septum to confirm the location of the anterior and lateral compartments could be made [15].

Conclusion

In the end, compartment syndrome of the lower leg is rare, but very serious complication and a surgeon should be aware of it. The awareness of the surgeon of this complication and the appropriate clinical examination are the two most important steps in diagnosing compartment syndrome. This entity should be urgently treated, especially ACS on contrary it can lead to devastating complications and morbidity for the patient.

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