



Compartment Syndrome After Corrective Tibia Osteotomy in Patient with Metaphyseal Achalasia-A Case Report

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Abstract

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. In most of the cases it is diagnosed based on the variation of the clinical symptoms and signs in sequential examinations. If it 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. We report a case, of a 29-year-old man with metaphyseal achalasia who developed compartment syndrome, after corrective tibia osteotomy.

Keywords: Compartment syndrome; Negative pressure wound treatment; Metaphyseal achalasia

Case Report



Figure 1: a) Bizarre gait with varus and valgus tibia deformities, b) Preoperative X-rays, c) Postoperative x-ray after corrective osteotomy, d) Photo of the limb with developed compartment syndrome (note the skin blisters), e) After two incision fasciectomy the limb is edematous, f) Couple days after fasciectomy NPWT is applied (due to spongy bridge both wounds are treated with one suction), g) Lateral incision heals 4 weeks after beginning of the treatment, h) The skin of the anterior incision, after eleven weeks of NPWT.

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We report a case, of a 29-year-old man with metaphyseal achalasia of both legs. The patient was diagnosed with this condition in 2001, after he accidentally fell of his bike and he couldn't extend his leg. The diagnose 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 achalasia of his left leg. The day after the surgery he started complaining of pain and swelling in his left leg, and 20 hours after the surgery he developed compartment syndrome with risk of developing gangrene. Two skin incisions were done for massive fasciectomies (anteriorly and laterally). Three days after compartment decompression and soft tissues a negative pressure wound treatment (NPWT) was applied. Wounds were treated with one suction, due to spongy bridge between the incisions. First to heal was the lateral (smaller) incision. The plate used for the corrective osteotomy was producing problems in epithelization of the anterior wound and 7weeks after the osteotomy was extracted and plaster cast was applied. Approximately 11weeks after NPWT both wounds were healed and walking with crutches and minimal pressure on the leg was allowed. Complete bone reconsolidation with slight deformity persisting was seen after 6months of the osteotomy (Figure 1).

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 [1]. It is defined as increased pressure within a fibro-osseous space resulting in decreased tissue perfusion to structures within that space [2]. The compromised microcirculation in an acute setting in most of the cases may lead to potentially irreversible neuromuscular ischemic damage, and its sequelae [3]. 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 [4]. 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 literatureacute and chronic [2].

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 fasciotomy is needed. On the other hand, chronic compartment syndrome typically presents with exercise-induced pain, which is commonly seen in athletes [3]. ACS needs urgent attention and intervention and it is more worrying. Ischemia of up to 6hours is associated with irreversible changes more likely to produce functional impairment [5,6]. A proper diagnosis of compartment syndrome is important because of direct morbidity to the patient and because it creates a high-risk medicallegal environment for the provider [7]. The classic signs of acute compartment syndrome include the 6 "P's": pain, poikilothermic, paresthesia, paralysis, pulselessness 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 [8,9]. Paralysis, pulselessness and paresthesia's present late in the disease process, often after a damage to the structures, and they should not be part of the routine diagnostic criteria for acute compartment syndrome [10].

The traditional treatment for lower extremity compartment syndrome includes a two-incision, four - compartment fasciotomy [11,12]. 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 realize of the pressure [13]. 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 [14,15].

Conclusion

Compartment syndrome 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 early diagnosis of compartment syndrome. This entity should be treated urgent, especially acute compartment syndrome, on contrary it can lead to devastating complications and morbidity for the patient.

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