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Introduction

Over one hundred different surgical techniques exist in the treatment of patellar instability yet no gold standard has emerged in the literature [1]. Fulkerson osteotomy technique was designed to restore abnormal force vectors on the patella and decrease pressure on involved cartilage [2]. A case of Fulkerson surgical technique resulting in acute compartment syndrome could not be located in the literature for comparison with this case. Compartment syndrome occurring in the lower leg is classified as either acute or chronic with chronic sometimes referred to as chronic exertional, and is defined as a condition in a closed compartment with increased pressure to the extent that microcirculation of the tissue is decreased [3]. Compartment syndrome has been reported due to many various originating reasons, and in locations such as the shoulder, arm, hand, gluteal region, thigh, and foot, but most commonly in the anterior compartment of the lower leg [4]. There are four compartments involving the lower legs that are separated by fascia and contain muscle from the knee to the ankle: anterior, lateral, superficial posterior and deep posterior compartment. The anterior compartment is the most commonly involved in the lower leg.

Acute Compartment Syndrome (ACS) develops when intracompartmental pressure (ICP) exceeds venous capillary pressure resulting in arteriolar compression in that compartment [5]. Neuropathy and lack of distal pulse in the limb are noted as ACS progresses, with muscle necrosis and permanent nerve damage as likely outcomes if surgical intervention is not rapidly employed. An important prognostic factor for outcome in these cases is the time of development of ACS, to the time of diagnosis, to the time of surgical intervention [6].

Chronic Compartment Syndrome (CCS)/Chronic Exertional Compartment Syndrome (CECS) typically occur in repetitive type physical activities, usually in young people and athletes. The hallmark symptomatology for CCS/CECS is sharp pain during activity that requires rest to alleviate the pain, usually within minutes. Measured increase in ICP can require either abstention from the originating activity or fasciotomy surgery repair though the procedure can be less invasive than in the case of ACS.

Case presentation

Routine, outpatient, left-sided Fulkerson's technique surgical

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hospital for further evaluation. A full leg ultrasound was performed to rule out deep vein thrombosis (DVT) and was ruled negative. She was rushed to surgery where a lateral fasciotomy was performed on the leg lower leg to release all four compartments. A small hematoma in the leg anteromedial proximal tibia area of her prior knee surgery was also discovered at that time and was evacuated. When the ICP measured 32 mmHg, both her original sports medicine orthopedic surgeon and an orthopedic surgeon specializing in the ankle proceeded with lateral fasciotomy. The fascia was released producing immediate bulging of the muscle tissue, which was edematous but normal in color. She was then admitted to the hospital with a leg lower leg wound measuring 17 cm by 9 cm with tissue extruding approximately 1 cm. Her symptoms of paresthesia and paralysis in her ankle joint continued despite the fasciotomy. 2 mg/hour hydromorphone (Dilaudid) IV drip was used but the pain remained debilitating for her and she was unable to ambulate, requiring observation for DVT threat. Her wound was dressed but leg surgically unclosed.

Surgical closure was attempted two days later on November 19, 2011. The extruding muscle was noted to be bright red with some bleeding, indicating successful blood flow to the tissues. Musculature in the posterior, deep posterior and lateral compartment was normal in appearance and contractile to Bovie type stimulation. Anterior compartments showed hemorrhagic changes particularly in the most proximal portion of the tibialis anterior without liquefaction or obvious malodorous component and the distal portion of the muscle was contractile to stimulation. The wound was cleansed with antibiotic irrigation, debrided, and redressed as closure was not possible at that time.

Surgical closure was again attempted two days later on November 21, 2011 with concurrent plastic surgery consultation. There was hemorrhagic muscle in the proximal anterior compartment and the mid portion of the deep posterior compartment without drainage, liquefaction, or odor. The wound was irrigated again with a mixture of antibiotic and saline solution and treated with a negative pressure wound therapy unit (V.A.C.) to help promote granulation and draw the wound

protocols in both diagnosis and treatment procedures for ACS. Accurate and detailed understanding of limb neurology, physiology, and anatomy is crucial for successful procedural outcome of ACS. An awareness of the many causative reasons for compartment syndrome for improved case management should also be an important educational objective for broad spectrum health care professionals who may encounter compartment syndromes in practice.

References

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