Acute Thigh Compartment Syndrome in a Professional Bodybuilder with Anabolic Steroid Use Seen Immediately Post-operatively Following Lateral Decubitus Positioning for Open Reduction and Internal Fixation of a Distal Humerus Pathologic Fracture

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INTRODUCTION

Acute thigh compartment syndrome has been well-documented in the literature with multiple case reports, retrospective studies and small case series describing this pathology in association with fractures, contusions, vascular injury, anti-shock trouser use, external compression, muscular exertion, coagulopathy and hematoma.[1] Case reports have also described compartment syndrome following lithotomy positioning, but upon review of the current literature few reports have been found of thigh compartment syndrome following lateral decubitus positioning. [2, 3]

Similarly, several case reports have proposed the influence of increased muscle mass from androgen use on the development of compartment syndrome. [4] This case report describes an episode of acute thigh compartment syndrome following lateral decubitus positioning in an anabolic steroid using bodybuilder.

CASE REPORT

The patient is a 33-year-old male professional bodybuilder with a body mass index of approximately 37 with known anabolic steroid use who initially presented seven weeks status post fracture to his left distal humerus. One year prior to presentation the patient had x-rays documenting multiple lytic bony lesions in his left upper extremity, without a tissue diagnosis but suspicious for multiple enchondromatosis. He later sustained a pathologic, comminuted extraarticular fracture of the distal humerus that was treated with immobilization at an outside institution. After eight weeks of failed conservative management he sought orthopaedic surgical consultation. Due to the history of multiple enchondromstosis and fracture through one of the lesions, he was scheduled for open biopsy, curettage and bone grafting with open reduction, internal fixation of his distal humerus fracture. His hospital course was complicated by two failed attempts at surgery due to peri-anesthetic complications consisting of hypotension and subendocardial ischemia. Cardiology and endocrine consultations were obtained documenting adrenal cortical insufficiency after co-syntropin stimulation test and cardiac hypertrophy on echocardiogram. His operative risks were mitigated with stress dose steroids and intensive cardiac monitoring and surgery was planned.

The patient was ultimately taken to the operating theatre and successfully induced. He was placed in the right lateral decubitus position using standard technique. A beanbag was used to support his body with his right lower extremity and right upper extremity padded on their dependent sides. Open biopsy, curettage and allograft bone packing with open reduction internal fixation was successfully performed with total operative time of 4.5 hours. His intraoperative potassium rose to 5.9mmol/L without a known etiology. Upon extubation, the patient complained of excruciating right lateral thigh pain. The lateral thigh was found to be hard, noncompressible, erythematous and exquisitely tender to palpation. He described worsening pain with passive flexion of the lower leg. He was not complaining of upper extremity pain. He had palpable pulses in the foot and was moving his toes and ankle to command. The medial and posterior compartments of the thigh were supple, compressible and non- tender to palpation in comparison. A compartment pressure measurement was not performed as the diagnosis of thigh compartment syndrome was made clinically by two conferring attending orthopaedic surgeons. Emergently, after communicating with the family and the patient about the plan, he was reanesthetized and fasciotomy was performed. A longitudinal incision was made from the greater trochanter to the lateral epicondyle of the distal. There was noted to be an impressive and immediate herniation of the vastus lateralis and immediate decompression of the compartment. There was no gross bleeding, no hemorrhage noted and the muscle appeared pink, viable and contractile with excellent circulation. The wound was thoroughly irrigated and was dressed with a VAC dressing. The patient was extubated without incident. The steroid dose was continued post operatively and later transitioned

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to oral prednisone. After three days the wound was closed primarily with no difficulty and his potassium and myoglobin level trended down with aggressive hydration. He was discharged home approximately one week post-operatively.

DISCUSSION

Acute thigh compartment syndrome has been well reported in the literature describing diagnosis, surgical indications, technique and management. Much of the literature is in the form of case studies, retrospective studies and small case series.

Authors have described muscular compartment syndrome caused iatrogenically secondary to surgical positioning in the lithotomy position [2] , the sitting position [5] as well as the lateral decubitus position. [3] This case report futher illustrates that prolonged compression due to lateral decubitus positioning can also result in compartment syndrome. This case further suggests that body habitus should be taken into account in regards to surgical positioning and that percentage body composition may influence the development of compartment pressures following external compressive forces.

Many studies have looked at compartment syndrome in athletes following exertional exercise but the specific influence of percentage muscle mass and its influence on compartment pressures has not been well investigated. [6] Theoretically extreme hypertrophy of muscle fasicles may predispose individuals to compartment syndrome secondary to a baseline pressure elevation in fascial compartments. Prolonged dependency given the patient's body habitus and intramuscular congestion the likely factors in the development of acute rhabdomyolysis and ultimately compartment syndrome in this case.

A case report by Halpern and colleagues [7] of a patient undergoing androgen therapy broached this issue and although a positive cause and effect relationship was not established, it was felt that given the common complaints of leg pain and soreness in patients undergoing androgen supplementation, the relationship to elevated pressures should be considered. Similarly, Bahia and colleagues [4] discussed a 23 year old male bodybuilder on anabolic steroids who was involved in a motor vehicle accident. It was felt that the patients muscle mass contributed to severe life threatening acute multicompartment syndrome resulting in the need for multiple urgent fasciotomies.

The purpose of this case report is to make clinicians aware of several issues. First, although anabolic steroids are not well known to suppress adrenal steroid production and cause severe hypotension during surgery, it may still influence global adrenal function and endocrine consultation should be considered for patients with known anabolic steroid use. Second, in prolonged surgical cases that involve particular patient positioning, a rising potassium level intraoperatively should alert the surgeon to possible rhabdomyolysis or compartment syndrome if the cause is unknown. Body mass index may play a role in the development of compartment syndrome and should be considered with prolonged surgical positioning. Lastly, although thigh compartment syndrome is relatively uncommon compared to leg compartment syndrome, clinical findings even without measuring compartment pressures should increase the suspicion of compartment syndrome or rhabdomyolysis in the setting of increased thigh pain, rising potassium level and a tense extremity.

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