A rare case presentation of rhabdomyolysis progression to acute compartment syndrome in an IV drug user with a surgical treatment using vessel loop closure technique

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Compartiment syndrome is defined as an elevation of the interstitial pressure in a closed fascial compartment that results in microcirculatory compromise. It is well documented that acute compartment syndrome (ACS) of the lower extremity is frequently caused by a traumatic event. However, ACS not resulting from a high energy impact, instead from a drug overdose, prolonged limb compression, and rhabdomyolysis has been minimally reported in current literature 1-3. This case report addresses our diagnosis and surgical approach using vessel loop “shoe lace” closure technique for ACS resulting from a rare consequence of rhabdomyolysis and multi-drug overdose.

A 27 year old male patient with the history of polysubstance abuse and chronic hepatitis C was brought to the ED after being found lying in the park with altered mental status. Upon examination, the patient’s left lower leg was edematous, erythematous, with pain out of proportion. Pedal pulses and peripheral sensation were absent. Left leg circumference was double that of the contralateral leg. The leg was firm and non-compressible with increased intracompartmental pressure. Radiographic evidence was negative for fractures or emphysma. Lab results, consistent with the rhabdomyolysis, showed elevated myoglobin(24000), Lactic Acidosis, and Creatine kinase (414484), WBC (22000), Cr and BUN. Patient tested positive for polydrug abuse. Based on the clinical presentation, supporting radiographic, and laboratory evidence, the diagnosis of ACS secondary to rhabdomyolysis and possible ischemic trauma (due to prolonged pressure on LLE under the multi-drug overdose status) was made.

Case Study

A dual incision technique was used for multicompartment release of the left leg. Upon the incision the muscle bellies herniated from the incision site. The fascia overlying the gastrocnemius muscle was incised exposing the muscle belly. The interval between the gastrocnemius muscle and soleus was opened exposing the soleus and releasing the superficial posterior compartment. The deep posterior compartment was opened by detaching the soleal bridge. This was done to avoid any additional residual muscle compression. Copious amount of fluid was encountered without pusulence. The second incision, was placed laterally over the fibula. The anterior compartment was released. The proximal muscle bellies were then released at the intermuscular septum. All muscles of the anterior and lateral compartments appeared viable. Both incision sites were irrigated with 2 liters of 1% betadine solution. A sterile dressing was placed on the left leg. The wound edges were reapproximated and tensioned using staples and vessel loops using a “shoelace” technique.

An additional fascial release of the thigh compartments were conducted a day later to release the increased compartment pressure in the thigh. Upon the lateral incision laterally starting at the gluteus medius and maximus proximal to the greater trochanter of the femur, and extended to the superior access of the lateral femoral condyle copious amount of fluid was released. There was no pus or hematoma noted. The fascia over the vastus lateralis was released, and vastus lateralis was then reflected off the intermuscular septum bluntly. This released the anterior compartment. The fascia over the gluteal muscles was also released. Hamstrings were then finally released posteriorly at the level of the intermuscular septum. The second 2nd incision was placed medially. The fascia of the medial aspect of the hamstrings was released. There was no pus or hematoma noted. The entire incision was irrigated with a total of 3 liters of 1% betadine solution. The wound edges were tensioned using a “shoelace” technique.

The patient was evaluated as an inpatient every other day for wound check and sterile dressing change. The wound edges were re-approximated and re-tensioned at each concurrent procedure with vessel loops in a “shoelace” technique. After each concurrent procedure there was improvement noted in edema, pain, BROM, and laboratory values. The patient was discharged to a skilled nursing facility. Patient returned to clinic a month later. The thigh incisions, as well as the lateral leg incision had healed without incidence or complication. Additional surgical wound debridement of the medial skin incision with dressing change was performed at 4thmonth post-operatively, which also fully epithelized 1.5 months post the last wound debridement. Delayed primary closure was not performed due to the inadequate soft tissue coverage. At the 14 months post op follow up, the patient was noted to remain fully healed without additional complications.

Surgical Procedure

Results

The significance of intra-compartmental pressures in the diagnosis of direct vs. indirect compartment syndrome is Mercuri I, and Smith J, J Trauma 1993; 34:331-334.

Analysis & Discussion

Acute compartment syndrome is a devastating condition which may result in the loss of limb. The clinicians can diagnose the ACS accurately when the clinical presentation, history of past medical history and possible etiologies of trauma are thoroughly reviewed4-6. This case report highlights ACS resulting from a rare consequence of rhabdomyolysis and multi-drug overdose. Our surgical principles and techniques for this case are presented. Our closure technique, using vessel loops in a shoelace fashion allows for gradual re-approximation of the wound edges with the ability to allow the incision site to drain. Multiple tensioning adjustments are needed to keep the continuous pull along the wound edges. The use of the shoelace techniques allows for delayed primary closure without the use of a skin graft. At the same time it allowed a consistent way to heal the wounds by normal skin coverage via secondary intention.

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REFERENCES