Compartment Syndrome Following Elective Tibial Neoplasm Excision

Adam L. Weaver, DPM; Taylor Wasserleben, DPM; Muhaiminu Hossain, DPM, AACFAS; Robert M. Rajczy, DPM, AACFAS; Steven F. Boc, DPM, FACFAS, FACFAOM

Podiatric Surgery Department, Hahnemann University Hospital / DUCOM, Philadelphia, PA

Statement of Purpose

One of the most commonly seen incidences of lower extremity acute compartment syndrome (ACS) is following a crush injury. Accordingly, there are a scant number of reports that discuss CS following elective, lower extremity surgery. This report describes the case of an elective excision of a benign distal tibial neoplasm and the subsequent development of ACS in the ipsilateral lower leg and foot despite intra op hemostasis.

Literature Review

ACS is most commonly seen with high velocity crush injuries, but can also exist in the absence of fractures. The literature has shown that cases exist with compressive dressings, hemangiomas, vascular injury, and surgery. The common signs and symptoms of ACS are pain out of proportion, pain with passive stretch of the compartment, paresis, parathesias, and intact pulses. Prompt identification, diagnosis and treatment are essential to prevent complications including paralysis, sensory neuropathy, deformities, contractures, and weakness[1].

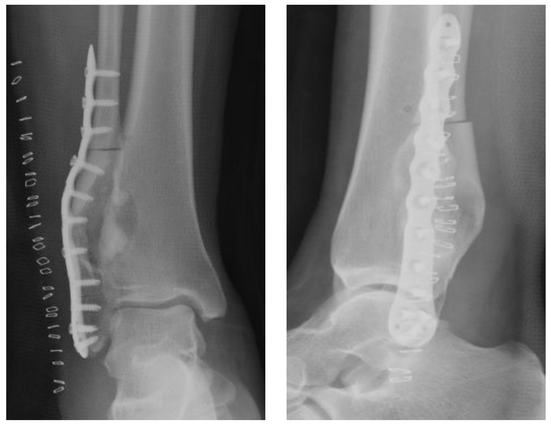
Although majority of lower extremity surgeons know to be cautious for the development of ACS following a crush trauma, there have been reported incidences of the development of this condition following ORIF of a bimalleolar fracture or even an ankle sprain[1,2,3,4]. ACS has also been reported following elective placement of an intramedullary nail for DJD[5]. One may think that drain placement following surgery may seem like an obvious solution to preventing this lower extremity affliction. However, most studies fail to show statistical difference in outcome whether using a drain or not in clean, elective cases[6].

Case Presentation

This report relates the case of a 33 year old female who underwent tibial osteochondroma excision, which was confirmed from a prior outpatient bone biopsy, with fibular ORIF. The procedure itself was uneventful, and adequate hemostasis was observed before closure of deep tissues and skin with application of sugar tong posterior splint. However, the following 48 hours brought forth some very concerning symptoms.

12-24 hours after the operation, the patient's regional block began to wear off and the patient began experiencing moderate to severe pain. Despite this opioid naive patient having a PCA morphine pump pain regimen while elevating and icing of the lower extremity, the patient's pain increased in what would seem to be in an uncontrolled and severe fashion. Clinical evaluation showed an onset of paralysis and paresthesia of the digits, absence of skin tension lines at the foot and ankle, and bedside compartment pressures in the 40's mm Hg in the foot and ankle. With this high suspicion of ACS, the patient was brought emergently to the OR, in less than 48 hours

Case Presentation



following the prior elective procedure for fasciotomies, compartment decompression and drain application.

The patient showed marked improvement over the following 2 days in house with return of digital sensations and motor function, appearance of skin tension lines on the foot and ankle, and pain level well controlled.

The patient was brought back to the OR 3 days after the fasciotomy for delayed primary closure and drain removal. Over the course of 2 additional days in the hospital, the patient's pain was controlled with an acceptable oral pain regiment and discharged home following physical therapy clearance.

The patient continued to follow up outpatient and once her fibular osteotomy had healed, she was transitioned to full weight bearing in a CAM walker and underwent physical therapy.

Today the patient is fully transitioned into normal shoe gear, is participating in regular exercises a few times a week and is seldomly experiences paresthesias and spasms in her lower extremity after prolonged bouts of sitting or increased activity.

Analysis & Discussion

Trauma and crush fractures most commonly precede lower extremity ACS. However, not all cases of acute ACS are due to acute trauma. There has been an instance where a pediatric hemangioma resulted in emergent fasciotomies of the foot[7]. What is concerning about these scenarios of ACS without a fracture or obvious trauma are the occurrences of more muscle necrosis due to delay in the decision for emergent fasciotomies[8].

This case study supports that even elective ankle surgery, that was carried through without incident, can still result in ACS. Post operative care and diligence should be taken after performing procedures that include aggressive resection of large bones, such as the tibia, with substantial exposure of the medullary canal.

References

1. Towater, Laura, MD, Heron, Sheryl, MD. Foot Compartment Syndrome: A Rare Presentation to the Emergency Department. The Journal of Emergency Medicine; 2013; 44, 2; e235-e238.
2.David Neilly, Santosh Baliga. Acute CS of the foot following open reduction and internal fixation of an ankle fracture. The Journal Foot and Ankle Surgery; 2010; 16; e72–e75.
3. Adam M. Starr, MD, Kenneth G. Swan, Jr., MD. Isolated Anterior CS After Bimalleolar-Equivalent Ankle Fracture in a Collegiate Football Player. Sports Health; 2011 Nov v.3(6): 560-563.
4. N. J. Ward,G. P. Wilde. CS following ankle sprain. The Journal of Bone and Joint Surgery (Br); JULY 2007; VOL. 89-B, No. 7.
5. Tischenko, G J; Goodman, S B. Compartment syndrome after intramedullary nailing of the tibia. The Journal of Bone and Joint Surgery; 1990; 72.1. p 41-44.
6. Gaines, Robert, M, Dunbar, Robert, MD. The Use of Surgical Drains in Orthopedics. Orthopedics. 2008; 31(7).
7. F. Javier Downey-Carmona, MD, Pedro González-Herranz, MD. Acute Compartment Syndrome of the Foot Caused by a Hemangioma.The Journal of Foot and Ankle Surgery; Jan/Feb 2006. Vol. 45, Number 1(52-55).
8. Hope, M. J.; Ed, MRCS; McQueen, M. M. MD. Acute Compartment Syndrome in the Absence of Fracture. Journal of Orthopaedic Trauma; Apr 2004 - Volume 18. Issue 4. p 220-224