A Rare Case of Chronic Exertional Compartment Syndrome in Four Limbs Requiring Fasciotomies

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Statement of Purpose

Chronic exertional compartment syndrome is an uncommon cause of arm or leg pain. It is most often observed in young adult athletes and military members and is associated with vigorous exercise. As chronic exertional compartment syndrome can cause debilitating pain, recognizing and treating this condition is imperative. This case study is essential when considering differentials for unexplained extremity pain.

Literature Review

Compartment syndrome is defined as a condition that results from increased pressure within a myofascial compartment. Compartment syndrome can be acute or chronic in nature and most commonly occurs in the leg or forearm. Compartment syndrome is usually secondary to trauma, resulting after a long bone fracture or crush injury. In fact, 69% of acute compartment syndrome cases were found to have an associated fracture[4], with 40% occurring after fractures of the tibial shaft[3]. In contrast, chronic exertional compartment syndrome, or CECS, is an uncommon cause of arm or leg pain. It is most often observed in young adult athletes and is associated with vigorous exercise. However, the exact mechanism behind exertional compartment syndrome is unknown.

The diagnosis of acute compartment syndrome is typically clinical in nature. Historically, there are six hallmark symptoms to consider. In the setting of exertional compartment syndrome diagnosis can be difficult. Therefore, direct compartment pressure monitoring usually plays a significant role.

Literature Review

In regards to treatment, CECS can be approached nonoperatively, such as with cessation of activity, physical therapy and gait training. However, the long-term outcomes of nonoperative management are relatively unknown[1]. Operative treatment with elective fasciotomies has been shown to be effective in the management of upper and lower extremity exertional compartment syndrome.

Case Study

A 42 year old male construction worker and avid weight lifter presented with a one year history of bilateral leg and foot pain, that worsened with walking and jogging. A full workup was completed and radiographs were obtained. Imaging showed no acute osseous abnormality other than enthesopathy of the Achilles tendon. Clinical testing indicated no soft tissue injuries, except for possible Achilles tendonitis. The patient was educated on stretching exercises, placed into orthotics and underwent physical therapy. He returned with ongoing pain that continued to worsen with exercise with no improvement in symptoms. He underwent compartmental pressure studies, both pre- and post-exercise, which showed elevated pressures of the bilateral legs and feet. He subsequently underwent bilateral fasciotomies of all four compartments of the legs and medial and central compartments of the feet. The patient went on to heal uneventfully with significant improvement in his symptoms.

Figure 1: Needle manometer used for compartment pressure testing

Case Study

He returned to clinic for follow up with a new complaint of increased unilateral wrist pain and bilateral upper arm pain that was also worsened with activity. He was referred to an orthopedic surgeon for evaluation with suspicion for another incidence of exertional compartment syndrome. He underwent MRI and EMG testing, which were all normal by report. The patient tried physical therapy and rest, in addition to cortisone and PRP injections without any resolution of symptoms. Compartmental pressure testing was completed of both upper extremities which again showed elevated compartmental pressures. The patient elected to undergo bilateral forearm and upper arm fasciotomies. His postoperative course was relatively uneventful and the patient noted resolution of his symptoms.

Figures 2, 3: Similar case, courtesy of Brian Kissel, DPM, FACFAS

Analysis & Discussion

This case study represents the first instance we were able to find in the literature where chronic exertional compartment syndrome was present in all four extremities. Very little is known about the incidence of this occurrence. Additionally, forearm CECS is also rare when found in isolation, with little research previously done on the topic[1]. Furthermore, CECS in the foot is also uncommon as there are only a handful of articles which discuss the condition. The incidence of CECS in the foot has never been reported and most articles are case studies[5].

Analysis and Discussion

Due to the lack of significant literature available, there is no generalized consensus on appropriate treatment, however conservative therapy often fails and fasciotomies of the affected compartments remain the treatment of choice[1]. This coincides with the management and treatment course of our patient. In addition to physical therapy, rest, and injections, other experimental courses of treatment, such as Botox therapy, have shown promise, however not without complications such as concomitant muscle loss[1,6]. Additionally in multiple studies, those treated with fasciotomy had significantly better outcomes and less pain than those treated conservatively[1].

This case study is an example of this rare condition that should be considered in atypical pain associated with activity not responsive to conservative care. Since the data continues to be limited, further research would be beneficial to increase the general knowledge, understanding and successful outcomes in those individuals with the condition.

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Financial Disclosures:
Leslie Pyle – None , Nicole Spalj – None,
Erik Kissel – None, Charles Kissel – None