A Case of Cellulitis with Compartment Syndrome: A Case Report

Chloe Chisnell DPM[1], Dr. Shawn Ward DPM, FACFAS[2]

1 Resident Physician, PGY-3, St. Rita's Medical Center Lima, OH; 2 Attending Physician St. Rita's Medical Center Lima, OH

MERCYHEALTH
St. Rita's Medical Center

Statement of Purpose

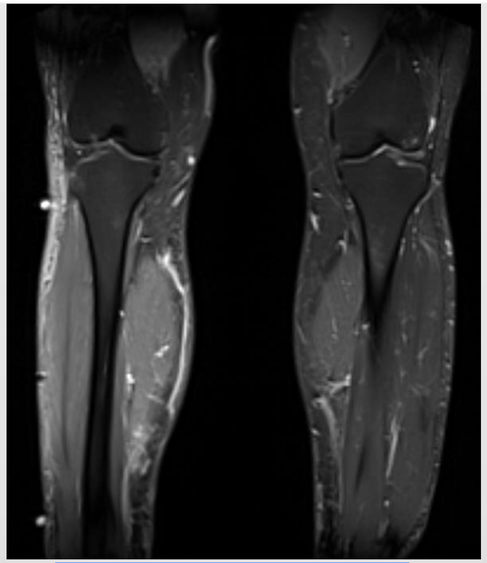
This study discusses a male with coexisting cellulitis and compartment syndrome. The aim of this study is to investigate causes of compartment syndrome and treatment options.

Literature Review

Compartment syndrome is a painful condition caused by the increased intracompartmental pressure (ICP) within a closed osteofascial compartment.[3] It is one of the few surgical emergencies in podiatric medicine. Intracompartmental bleeding leads to increased intracompartmental pressure, which increases venous capillary pressure. Capillary collapse occurs when the compartment pressure surpasses the capillary perfusion pressure, leading to cellular ischemia and necrosis. Interstitial edema develops from tissue necrosis and further worsens compartmental swelling.[1] Compartment syndrome can occur typically after severe trauma, crush injuries, minor injuries or from iatrogenic causes.[3] The diagnosis is made on the basis of physical examination and repeated ICP measures. Hallmark symptoms of ACS include the 6 P's: pain, poikilothermia, pallor, paresthesia, pulselessness, and paralysis.[2] Numbness, tingling and paresthesia are early signs.[3] Measurement of the ICP is an important tool for diagnosis. With ACS, an ICP of 30 mmHg or above is considered critical and treatment with emergent surgical decompression should be considered.[2] The traditional treatment for lower extremity compartment syndrome is a two-incision, four-compartment fasciotomy.[3]Nonoperative measures include loosening ace wraps, compression dressings, splints and uni- or bivalving casts. Timely surgical intervention with a fasciotomy is the primary treatment for ACS preventing complications such as contractures, paralysis, amputation, multi-organ failure, and even death.[2]

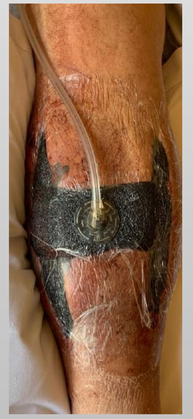
Case Study

A 53 yo male with a PMH significant for OSA, COPD and tobacco use presents to the emergency department with severe pain and swelling to his right leg. Patient states that he has a wound that he reports has been draining. Patient states there is redness and tenderness to the area. Radiographs and a CT were obtained at that time which showed soft tissue swelling consistent with the marked cellulitis. Due to the pain out of proportion including pain to non erythematous areas of the calf as well as parasthesias noted, a Wicks catheter was used to test for compartment syndrome. A reading of 24 mm Hg was noted. The patient was admitted and started on IV antibiotics. It was noted that if the pain did not improve with antibiotics, surgical intervention would be indicated. Patient was seen the following day with no improvement in his pain. Patient states he has had this issue in the past and was successfully treated with antibiotics. Due to the lack of relief of severe pain, patient was consented for compartment fasciotomies and was taken to the OR the following morning. At that time a posterior superficial compartment fasciotomy, deep posterior compartment fasciotomy, lateral compartment fasciotomy and anterior compartment fasciotomy were performed. A wound vac was applied and set to 125 mm Hg. The patient continued IV antibiotics until he was discharged on July 8th on oral antibiotics. Primary closure was then performed on July 11th. Sutures were removed two weeks later and a zipline closure device was applied. Patient was seen on August 13th for severe pain to the right leg. Patient was admitted and started on IV antibiotics. Patient was taken to the OR on August 15 for a right leg lateral and posterior compartment fasciotomies with wound vac placement. Patient was discharged on oral Levaquin on the 17th of August. Patient seen in clinic for regular wound vac changes. On September 19, patient was taken to the OR for harvest and application of split thickness skin graft taken from the right thigh with a wound vac application. Patient was followed up with in clinic and the wound was noted to be clinically healed by October 8th 2018. Patient has had no complaints since then and continues to do well.



MRI Bilateral LE: marked inflammation to RLE seen throughout the ST

7/3/18



7/6/18

7/16/18

Radiographs RLE: ST swelling noted
No osseous changes

8/14/18

8/20/18

10/8/18

Analysis & Discussion

This study looks at a middle-aged male with recurrent compartment syndrome after having multiple fasciotomies. Causes of compartment syndrome range from fractures (open and closed), crush injuries, to minor injuries and more. According to Cone et al, rarely group A streptococcal infections that are associated with exotoxin release, and tissue swelling can also trigger compartment syndrome.[3] When the patient had a second diagnosis of compartment syndrome, the decision was made to allow for the open fasciotomies to heal by secondary intention rather than primary. According to Giai Via et al, the timing of wound closure is still debatable.[3] Delaying closure for about seven days allows wound edges approximation at closure. Dover et al reported better results with healing by secondary intention.[2] This patient was treated with superficial posterior, deep posterior and lateral compartment fasciotomies on July 4 and was primarily closed one week later. He was diagnosed with compartment syndrome a little over a month later subsequently underwent a second lateral and posterior compartments fasciotomies. The wound was closed via secondary intention with the aid of a wound vac and application of split thickness graft. Patient was fortunate to heal and do very well following split thickness graft application. Even with fasciotomy, complications are unfortunately not rare. Nearly one-third of patients receiving fasciotomies will end up with a postoperative complication: soft tissue necrosis, wound dehiscence, skin graft infection or necrosis, or need for tissue debridement.[1] One of the biggest pitfalls surrounding fasciotomy for compartment syndrome is missing or inadequately opening a compartment.[1] Vigilance is key with treating acute compartment syndrome. When diagnosed early, fasciotomy is a simple highly effective treatment.

References

1 Cone J, Inaba K. Lower extremity compartment syndrome. Trauma Surgery & Acute Care Open 2017;2:e000094. doi: 10.1136/tsaco-2017-000094

2 Pechar, Joanne, and M Melanie Lyons. "Acute Compartment Syndrome of the Lower Leg: A Review." The journal for nurse practitioners : JNP vol. 12,4 (2016): 265-270. doi:10.1016/j.nurpra.2015.10.013

3 Via, Alessio Giai et al. "Acute compartment syndrome." Muscles, ligaments and tendons journal vol. 5,1 18-22. 27 Mar. 2015