



Compartment syndrome in a patient on warfarin with a ruptured Baker's cyst

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The Foot and Ankle Online Journal 7 (1): 4

Compartment syndrome of the lower leg is typically viewed as a surgical emergency. Elevated pressure within a closed myofascial space impairs perfusion pressure below a level necessary for muscle viability. It is caused by bleeding or edema in a closed, non-elastic muscle compartment surrounded by fascia and bone. We report the case of a 66-year-old patient on warfarin with acute compartment syndrome caused by hemorrhaging from a ruptured Baker's cyst. The patient responded well to an emergent fasciotomy. The present case highlights the need for an awareness of acute compartment syndrome in patients on warfarin therapy and clinical symptoms consistent with compartment syndrome.

Key words: Baker's cyst, compartment syndrome, lower extremity, warfarin

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Compartment syndrome of the lower leg is a surgical emergency in which elevated pressure within a closed myofascial space reduces circulation below a level necessary for muscle viability. It is caused by bleeding or edema in a closed, non-elastic muscle compartment surrounded by fascia and bone [1]. The long-term consequences were described by Volkmann in the 19th century following the application of casts [2]. Acute compartment syndrome is typically associated with fractures, closed soft tissue injuries, revascularization procedures, and crush injuries [3]. Anticoagulation has been suggested as risk factor in the development of acute compartment syndromes [4-6].

Extravasation of a ruptured Baker's cyst and its damage on surrounding tissue has been linked to development of compartment syndrome [7,8]. However, we did not discover any cases where a Baker's cyst with concomitant anticoagulation leading to compartment syndrome have been discussed.

Patient and Methods

A 66 year-old female presented to the Emergency department with two days of left lower extremity edema and pain that began suddenly and had continued to progress. Past medical history included: psoriatic arthritis, Baker's cyst left lower extremity, left venous stripping, hypertension, GERD, and pulmonary embolism. The patient had a hardware removal from the right foot two weeks prior, but denied any other trauma or injury.

Examination revealed non-erythematous left calf measuring 40 cm in diameter (right calf measuring 33cm) with pain rated severe. Overlying skin was tense and unyielding compared to the contralateral limb. Sensation and pulses were normal. The patient had pain out of proportion with passive dorsiflexion and plantar flexion of the left ankle. Radiographs of the left lower extremity were negative for fracture revealing only arthritic changes.

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Figure 1 MRI T2 Sagittal. The mass is centered in the proximal half of the left calf and extends 20.1 cm in length x7.7 cm transverse x4.4 cm AP and compresses the medial head of the gastrocnemius muscle with myositis evident in the proximal fibers of the muscle. Edematous changes are present over the posterior fascial plane at the interface of the fascial plane and subcutaneous fat.

Venous and arterial ultrasounds were performed and returned negative for deep venous thrombosis. Further ultrasound exam findings revealed an area of approximately 10 cm at the posterior left knee which was read as possible hematoma versus Baker cyst (Figures 1 and 2). With high clinical suspicion of compartment syndrome a wick catheter was used to measure intracompartmental pressures. The patient's blood pressure was 139/70 mmHg. Initial compartment pressures were read at: Anterior-12mmHg, Lateral-10mmHg, Deep Posterior-45 mmHg, Superficial Posterior-12mmHg. The deep posterior and superficial posterior compartment pressures were repeated and with consistent readings at 30mmHg and 12mmHg respectively.

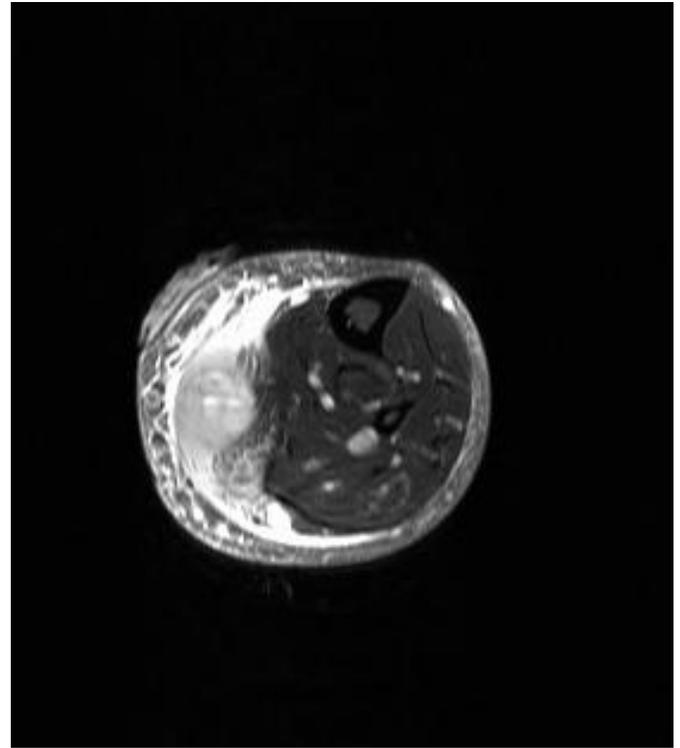


Figure 2 MRI T2 Axial. The heterogeneity signal and characteristics of the mass as well as fluid level are suspicious for an active hematoma adjacent to semimembranosus/popliteal cysts within the gastrocnemius bursa.

Given the unique presentation, a STAT MRI of the left lower extremity was completed. MRI findings revealed a complex large mass to the posteromedial proximal half of the calf with accompanying gastrocnemius muscle edema, suggestive of a complex hematoma with active bleeding (Figure 2). The characteristic enhancement suggested the possibility of a chronic popliteal cyst with intracystic hemorrhage. The mass appeared to be superficial to the muscle and compressed the muscle component. Also of note, the patient was on warfarin for a pulmonary embolism that had occurred 6 months previously. Patient's laboratory values were: Prothrombin time 26.3, INR 2.4, partial thromboplastin time 41. The patient was taken to the operating room for emergent open fasciotomy of the compartments of the left lower extremity.



Figure 3 Intraoperative hemorrhaging and herniation of muscle belly upon release of the fascial compartments.

Through a standard anterolateral extensile approach all four-muscle compartments of the lower extremity were decompressed and hematoma was evacuated (Figure 3). The incision site was approximated using staples (Figure 4). Patient was placed in a modified Jones compression posterior splint. 1500 mL of blood loss occurred during the operation, requiring type and cross match blood transfusion of two units of packed red blood cells.

Results

Post-operatively the patient was transferred to the ICU where pain was improved immediately post-operatively. After a 6-day hospital stay the patient was deemed medically stable and released for outpatient treatment. The patient was taken off of warfarin and an IVC filter was placed. The patient had wound dehiscence of the distal aspect of the incision requiring local wound care of a 4-month duration.

Discussion

Few cases relating an acute onset of compartment syndrome to a Baker's cyst or as a spontaneous occurrence with anticoagulation have been described [4-8]. Petros et al, reported the incidence of a ruptured Baker's cyst misdiagnosed as a deep venous thrombosis, which was then treated with anticoagulation creating hemorrhaging and hematoma into the lower extremity compartment [7].



Figure 4 Incision re-approximated utilizing staples.

The risk of developing a compartment syndrome after a ruptured Baker's cyst especially when associated with coagulopathy should be considered. An acute compartment syndrome is a medical emergency. Irreversible changes are known to occur after 8-12 hours of increased compartment pressure. Immediate evaluation should include compartment pressure measurements, and if elevated, surgical decompression. A fasciotomy should be performed when the difference between compartment pressure and diastolic blood pressure is less than 30 mmHg or when clinical symptoms are obvious [9].

In summary, we present a patient with a ruptured Baker's cyst on long-term anticoagulation therapy with an INR in the therapeutic range complicated by the development of a posterior compartment syndrome.

Acknowledgements: Craig Clifford, DPM; Research Chair, Franciscan Foot and Ankle Institute.

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