

# Atraumatic acute forearm compartment syndrome due to systemic heparin

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## CASE PRESENTATION

A 65-year-old woman was admitted to the hospital for acute heart failure exacerbation. Her history was notable for insulin-dependent diabetes mellitus and mitral valve regurgitation requiring mechanical mitral valve replacement. Found to have mitral paravalvular leak, the patient's home warfarin was held and heparin infusion was started in preparation for valvular surgery.

Eleven days after starting heparin infusion, the patient awoke with severe right forearm pain that worsened throughout the day and by the afternoon had developed decreased sensation at the small finger. Visually, the right forearm had mild swelling and ecchymoses, but was without evidence of traumatic injury, venipuncture, erythema, or fluctuance. On forearm examination, the patient was remarkably tender to palpation over both dorsal and volar compartments, endorsed pain with passive extension of the fingers, and both dorsal and volar compartments were rigid to palpation. The distal compartments of the hand remained soft and non-tender without evidence of increased compartment pressure or ischemia. Vascular examination demonstrated palpable radial and ulnar pulses and a capillary refill of less than 2 seconds.

## WHAT WOULD YOU DO?

- Provide analgesics and continue to monitor.
- Obtain an ultrasound of the right forearm over the region of tenderness.
- Obtain a CT angiography of the right upper extremity.
- Obtain forearm compartment pressures.
- Proceed to the operating room for fasciotomy.

## WHAT DID WE DO AND WHY?

### E. Proceed to the operating room for fasciotomy

After rapid hand surgery consultation, the patient was brought to the operating room to undergo urgent fasciotomy due to concern for atraumatic acute compartment syndrome (ACS). A regional block was pursued secondary to her cardiovascular disease and the related risk associated with a general anesthetic. Once complete, a curvilinear incision was made over the volar forearm, in addition to a limited dorsal incision at the junction between the mobile wad and dorsal compartments. Through these incisions, all compartments were completely released. The volar musculature was noted to be congested, and a bleeding arterial branch within the flexor digitorum superficialis muscle belly was identified and ligated. At time of discharge 2 weeks

after surgery, the patient had a clean and dry incision with preserved motor-sensory function with the exception of persistent decreased sensation of the small finger distal to the palmar digital crease.

Forearm ACS occurs when increase in forearm compartment pressures impede venous and lymphatic drainage, devolving into ischemia and irreversible damage to compartment tissues.<sup>1,2</sup> Of the forearm compartments, the muscles of the deep volar compartment (flexor pollicis longus and flexor digitorum profundus muscles) and the median nerve are most frequently affected. The most common causes of forearm ACS include supracondylar humerus fractures, distal radial fractures, and both bone forearm fractures.<sup>3</sup> Though classic ACS symptoms include pain with passive stretch of muscles, paresthesia, pulselessness, pallor, and paralysis, clinical suspicion should provoke intervention before presentation of the onset of sensory and vascular deficits.<sup>2</sup>

Atraumatic ACS is a challenging diagnosis as the instigating factors are not well known. They have been associated with hematologic conditions such as hemophilia, disseminated intravascular coagulation, deep vein thrombosis, atypical localized infections, and medications including thrombolytics and anticoagulants.<sup>4-15</sup> The purported mechanism is spontaneous hemorrhage that leads to increased compartment pressures. There have been four reported cases of heparin-induced or low molecular weight heparin-induced atraumatic ACS of the thigh, and two reported cases of warfarin-induced atraumatic ACS of the upper arm and forearm.<sup>8,12-15</sup>

This case emphasizes the possibility of atraumatic etiologies for extremity ACS. Patients with known risk factors and symptoms of ACS, even in the absence of trauma, should undergo immediate evaluation and necessary consultation for operative management.

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