Transradial Catheterization Complicated by Compartment Syndrome

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Introduction

Compartment syndrome is a condition of tissue ischemia caused by increased pressure within a fascial compartment. It is characterized by pain out of proportion to apparent injury that worsens with passive stretching of the muscle and extreme tenderness to touch. A rare complication of transradial catheterization, compartment syndrome is a surgical emergency that can progress rapidly and is often followed by a traumatic injury. During transradial catheterization, a procedure used to diagnose and treat cardiovascular conditions, a catheter is inserted in the right radial artery to evaluate the blood supply and musculature of the heart. In this report we present a case of a 65-year-old female who was admitted for transradial catheterization. Following the procedure, the patient experienced extreme pain and swelling at the site of the catheter and an urgent fasciotomy was performed.

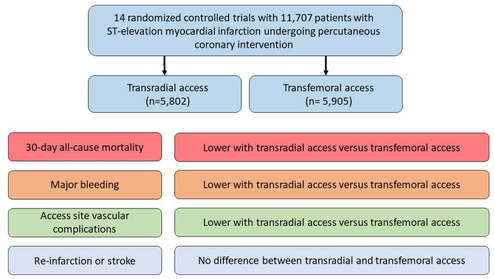
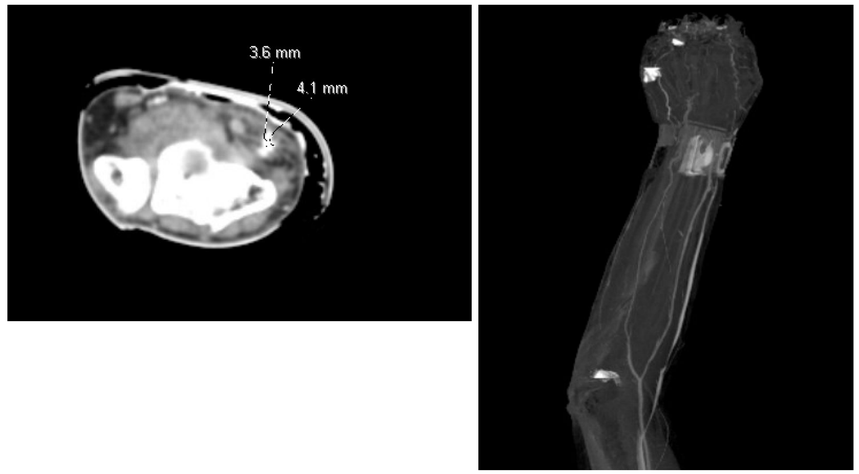


Figure 1: Transradial access versus transfemoral access.

History of Present Illness

The patient is a 65-year-old female with a history of coronary artery disease and asthma that presented to the hospital for a scheduled cardiac catheterization. Cardiology performed a right heart catheterization through her right radial artery. After the procedure, the patient was taken to PCU, and it was later reported that their right forearm was hard and tender. After evaluation by the house resident, the patient was found to have increased right arm swelling, pain as well as numbness and tingling shooting down her right forearm. Subsequently a concern for compartment syndrome, a CTA of the patient's right upper extremity that showed a small pseudoaneurysm of the radial artery was discovered with no arterial dissection or occlusion. Post consultation with orthopedic surgery was consulted, and the patient was taken emergently to the operating room for a right upper extremity fasciotomy. Both the volar and dorsal compartments were released while keeping the extensor compartment intact. Vascular surgery was consulted intraoperatively for exploration of the right radial artery. No gross bleeding, hematoma, or extravasation was noted at the time. The patient tolerated the procedure well and was placed in the ICU for close monitoring. Four days later, plastic surgery closed her fasciotomy incision which was tolerated well. The patient was found to be stable and was discharged with aspirin, statin, Plavix and a beta blocker. She was instructed to remain on dual antiplatelet therapy for 12 months.

Diagnostic Evaluation



Figures 2 and 3: CTA axial and frontal view with IV contrast showing pseudoaneurysm of right radial artery and right arm

Figure 4: Fasciotomy. Clinical Images obtained and shared with patient consent.

Discussion

Our patient presents a day after catheterization with acute onset wrist pain but quick clinical recognition and diagnosis of compartment syndrome in lieu of a pseudoaneurysm led to appropriate treatment with fasciotomy.

The current approach to cardiac catheterization involves access through the femoral, radial, and brachial artery. Transradial catheterization is the preferred method over transfemoral catheterization due to lower risk of bleeding. However, it carries risks of complications that include hematomas, arteriovenous fistulas, pseudoaneurysm and even compartment syndrome that occur at a rate of less than 1% [1,5]. The proposed mechanism of a pseudoaneurysm development is due to arterial wall trauma from radial artery access site that leads to disruption of blood flow hence poor hemostasis [3]. Prevention of complications can thus be achieved through ultrasound guided vascular evaluation, injection of thrombolytics at access site, and novel techniques of smaller sheath sites with statin therapy [2,4].

Transfemoral approach has been the traditional method with benefits of easier access of a large vessel, less contrast and radiation exposure [6]. But the transfemoral approach compared with transradial approach results in longer hospital stays, more bleeding complications, and a higher mortality rate [7].

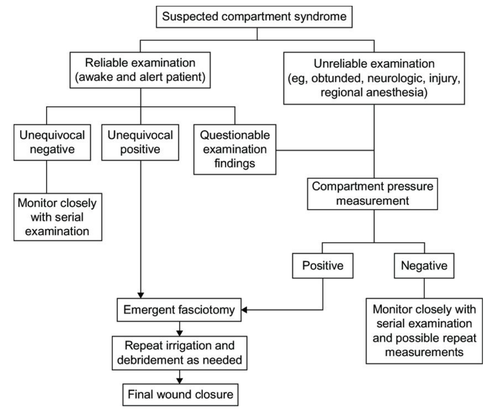


Figure 5: Algorithm for the diagnosis and management of suspected compartment syndrome.

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