Early fasciotomy due to compartment syndrome with gradual recovery of nerve function

Kompartment sendromu nedeniyle erken fasiotomi yapılan hastada sinir fonksiyonlarının kademeli iyileşmesi

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Abstract

The overall incidence of arterial injury following penetrating injury to the extremities is approximately 10%. Lower extremity artery injuries may lead to adverse outcomes like pseudoaneurysm, arteriovenous fistula, dissection, thromboemboli, stenosis. If not properly managed, these injuries can cause compartment syndrome, eventual limb loss or death. In this article, we present the successful surgical treatment of a traumatic left anterior tibial artery complication by compartment syndrome and eventual resolution of neural sequela.

Keywords: Acute artery injury; gunshot wound; Drop foot; compartment syndrome.


Anahtar Sözcükler: Akut arter hasarı; ateşli silah yaralanması; düşük ayak; kompartment sendromu.

Case Report

A 35-year-old male patient was admitted to Emergency Department with a one hour history of left lower extremity pain and paresthesia following a penetrating gunshot wound. A large, tense hematoma below the knee joint and bullet tract close to the anterior tibial artery were apparent in the clinical exam, however all lower extremity pulses were normal. Motor and sensory examinations were also normal. Within the first hour of observation, the lower extremity swelling progressed. Lower-extremity computed tomographic (CT) angiography showed ATA injury approximately 15 cm distal to the knee joint (Figure 1a–d).
Decision for surgical repair was made after appropriate informed consent. ATA was exposed through a longitudinal incision over the gunshot holes via retraction of the tibialis anterior and extensor digitorum longus muscles anteriorly. Proximal and distal control of the ATA was obtained and primary repair was performed.

Clinical examination in postoperative 4th hour revealed increased pain and rigidity in the involved extremity with new motor (drop foot) and sensory defect. Compartment syndrome was determined clinically and lower extremity fasciotomy was performed (Figure 2) after appropriate informed consent. Patient was discharged on postoperative day 7 after primary closure of fasciotomy defects. First week Doppler ultrasound revealed normal arterial flow, electromyelography showed no conduction in peroneal nerve. At 6th month control electromyelography was concurrent with partial chronic axonal damage in the peroneal nerve and the patient was doing well with complete resolution of drop foot on the involved side.

Discussion

Lower extremity vascular trauma is a major risk factor for lower leg compartment syndrome. The diagnosis and decision to perform a fasciotomy procedure is still done largely on clinical basis as there is no consensus for threshold intracompartmental pressure. Pressures over 30 mmHg are considered critical for collapse of capillary perfusion, leading to nerve and muscle necrosis. Some reports are more permissive for this occurrence like 40 mmHg and 50 mmHg in.

Palpable pulses never rule out compartment syndrome as shown in the study of Mubarak et al, with all but one patient demonstrated palpable pulses and capillary refill, since the compartment pressures rarely rise above levels that would occlude a major artery. Therefore, clinical examination (pain worsening with passive stretch, motor/sensory deficits, swelling, etc.) and intracompartmental pressure recordings are important in regards to diagnosis.

Speedy diagnosis and surgical treatment for compartment syndrome is necessary as the timing is shown to be a strong predictor of long lasting sequelae and function loss. The complete settlement of clinical picture usually results in tissue loss and inferior prognosis. Fasciotomies executed within 12 hours of clinical symptoms are considered “early fasciotomies” and eventual normalization of extremity functions were demonstrated in 68% of the patients, whereas late fasciotomies only 8% of patients were able to gain normal functions. Serious complications, including bone and soft tissue infections, amputation, renal failure were seen in 4.5% and 54% in early vs late fasciotomies, respectively.

In this case, compartment syndrome was unlikely, owing to the small size of the arterial injury, early diagnosis and an uncomplicated primary repair. Compartment syndrome was diagnosed clinically, fasciotomy and postoperative physical therapy/rehabilitation resulted in complete recovery of the motor functions at 6th month of surgery.

The aim of vascular injury repairing must be not only to save limbs, but also to decrease compartment syndrome and additional morbidities. All effort should be made to minimize ischemia time and all patients should be monitored for further complications. Clinical diagnosis and surgical exploration may be preferable instead of compartmental pressure recordings and observation in selected cases.

To conclude, low clinical suspicion threshold for complications is essential for treating limb/life threatening situations. Neural damage can be alleviated for minimal functional loss in the long term if the diagnosis/treatment were done in a timely fashion.
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References