

A Curious Case of Atypical Compartment Syndrome of Bilateral Forearm

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Abstract

Herein we report a rare case of young male who developed volar compartment syndrome of forearm and arm with no or minimal external injury following trauma at worksite while trying to hold steelbars from falling on to him. On complete workup and exploration there was internal rupture of flexors of forearm and extensors of arm with hematoma without much external contusion of left upper limb (Fig. 1) while only minimal hematoma without rupture of muscles in the right upper limb (Fig. 6). Development of compartment syndrome was further delayed in the right upperlimb (Fig. 5). Even though the clinical picture was bizarre enough to perform prophylactic fasciotomy at the first contact of patient, it could have prevented necrosis of torn muscles and closure of wound at an earlier period. Emergency fasciotomy did save the left upperlimb while prophylactic fasciotomy in right upperlimb could prevent further necrosis of muscles and wound closure at an earlier period.

Keywords: Acute Compartment Syndrome (ACS); Fasciotomy; Closed tendon rupture.



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INTRODUCTION

Acute compartment syndrome (ACS) is a limb threatening condition which often arises due to trauma of which the most common cause is fracture at the specific site.⁸ Hence failure in timely intervention and prompt treatment can lead to ischemia and eventually necrosis.⁴ Although leg is the most common location for compartment syndrome, upper limb compartment syndrome especially of forearm is not unusual.³ While ACS resulting from open fractures of long bones is predictable, rare causes like internal rupture of muscles due to overt pressure is a matter of concern.



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Hence early diagnosis and prompt treatment can prevent contractures, neurological deficits and complete loss of forearm and hand function.⁶

CASE REPORT

36 year old gentleman with no known comorbidities presented to our casualty with swelling and severe pain over bilateral upperlimb left more than right almost 16 hrs post trauma. Incident occurred at his workplace when he was offloading steelbars while a pile of steelbars fell onto him which he tried to hold with bilateral hands. He had severe pain with minimal external contusions and small wound on left hand (Fig. 1,2) for which he was taken to local hospital from where he was evaluated, planned for conservative management

of pain after ruling out bony fractures and planned for suturing of small open wound at 1st webspace of left hand. Meanwhile he developed excruciating pain from Left upperlimb with increase in swelling of left forearm and arm for which he was referred to us. On initial evaluation he had cold, tense and swollen left upperlimb with passive stretch pain, paraesthesia, and absent peripheral pulses and saturation. He was taken into emergency operation theatre after relevant workup and volar fasciotomy of left forearm and arm was done along with dorsum of hand fasciotomy (Fig. 2,4). Intraop about 150 ml of hematoma evacuated with rupture of following muscles; near total transection of biceps, 50% of triceps, 50% rupture of FDS, FDP bellies and complete transection of FPL. Neurovascular bundle found to be intact. There was deep LW



Fig. 1: Left forearm and arm with minimal external contusion during initial presentation to Emergency Department

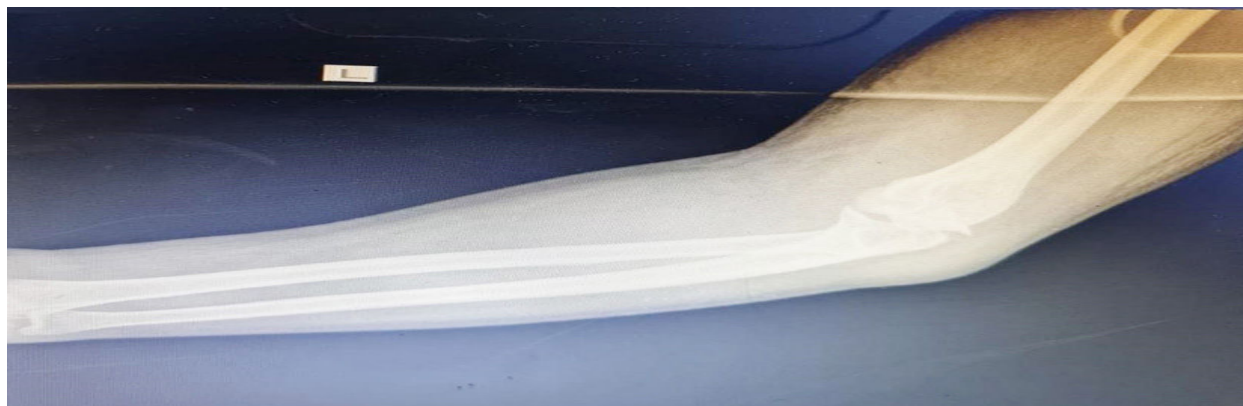


Fig. 2: Left forearm and arm X-ray AP view showing no long bone fractures

over 1st webspace volar aspect with crush injury to thenar muscles (Fig. 1). Viable muscles gradually started to become pink after releasing fascia and warm saline wash, while there was partial necrosis of FDS, FDP bellies to Left middle, ring and little fingers and biceps which was debrided and tacking sutures applied keeping the wound open with

sterile dressings (Fig. 3). He developed tightness and swelling in Right forearm with passive stretch pain and restricted movements but with recordable pulse saturation after 36 hrs of trauma despite limb elevation (Fig. 5) which on emergency fasciotomy had minimal hematoma of about 50 ml without rupture of muscles and minimal discoloration



Fig. 3: Left forearm post debridement of necrosed flexor muscles of forearm extending till medial arm



Fig. 4: Fasciotomy to dorsum of left hand



Fig. 5: Delayed presentation of compartment syndrome in right forearm



Fig. 6: Right forearm after fasciotomy and tacking suture application



Fig. 7: Right forearm post secondary suturing



Fig. 8: Left forearm after 10 days of SSG

of muscles which turned pink soon after volar fasciotomy (Fig. 6). He was taken for second relook after 3 days and proper debridement of devitalised muscles were done followed by negative pressure

wound therapy of left Upperlimb while secondary closure of fasciotomy wound was done for Right upperlimb (Fig. 7). Left upperlimb wound was closed after multiple debridements with secondary suturing and SSG after about 1 month of trauma (Fig. 8).

DISCUSSION

Acute compartment syndrome is commonly seen in young males probably due to relative intracompartmental muscle mass and the frequent mechanism being high energy trauma.⁸

Prophylactic fasciotomy is commonly done in compartment syndrome of forearm or leg associated with long bone fracture especially of both bone fracture. Anticipating Acute compartment syndrome (ACS) following closed muscle rupture and planning prophylactic fasciotomy is not routinely done. Very few similar cases has been reported of which mechanism was different like heavy weight lifting, bucket lifting, circus rigger with FCU rupture and another one conveyer belt traction injury.^{1,2,3} This scenario stood exceptional from those due to discrete clinical findings in either upperlimbs of the same person based on the variable force exerted during the trauma and delayed occurrence of ACS in those limbs accordingly. These cases have atypical evolution of compartment syndrome due to which a proper history taking as to the mechanism of injury and clinical examination supersedes mere external wound appearance and imaging. Site of rupture is usually muscular part rather than tendinous region as tendinous part is quite strong composed of type 1 collagen while muscular part is highly vascular and internal rupture will lead to hematoma and eventually ACS.³ Use of anticoagulants had been reported in several cases as a contributing factor for ACS in minor trauma;⁴ However internal rupture of multiple muscles that too of forearm and arm is a rare entity that has to be foreseen to avoid devastating consequences.

CONCLUSION

Delayed presentation and inappropriate management could lead to life threatening complications like Rhabdomyolysis, renal failure

and eventually death. Clinical suspicion of ACS can be aided by measurement of intracompartmental pressure whenever possible.⁵ Cut off criteria of intracompartmental pressure to do fasciotomy should be set to lower limit in such cases. But compartment pressure cant be relied upon in every single case.⁷ Ideal time for Fasciotomy is within 6 hours of injury which in this case was a point of debate. Hence its to decide between prophylactic fasciotomy in an impending compartment syndrome based on thorough history and clinical evaluation rather than jeopardizing the limb viability and functionality. Accordingly we can reduce the requirement for multiple debridements and plan early wound closure for better functional outcome.

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