

Case Report

Compartment syndrome of the forearm following moderately displaced fracture of the radial head in a 10-year-old child

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ABSTRACT

Compartment syndrome of the forearm is a rare complication of radial head fractures. We report the unusual case of a 10-year-old child who developed acute volar compartment syndrome of the forearm following a moderately displaced fracture of the radial head. The patient underwent volar fasciotomy of the forearm and open reduction of the radial head fracture with Krushner wire. Due to timely intervention the patient had a good postoperative outcome and is expected to have a good functional recovery.

Keywords: Compartment syndrome, Fasciotomy, Radial head

INTRODUCTION

Moderately displaced fractures of the radial head are treated by either closed reduction and immobilization or surgical management depending on the severity and instability of the fracture.¹⁻⁹ The known complications of the radial head fractures include decreased range of motion, radial head overgrowth, premature physal closure, osteonecrosis of the radial head, nerve injury, myositis ossificans and radioulnar synostosis.^{10,11} There have been very few reports of development of compartment syndrome of the forearm following radial head fractures.¹² We report a 10-year-old male child who developed acute volar compartment syndrome of the forearm following a moderately displaced fracture of the radial head.

CASE REPORT

A 10-year-old child presented in orthopaedics outpatient department (OPD) of Artemis Health institute with a

history of fall and injury to right elbow while playing. On examination the patient had mild swelling and tenderness around radial head and the range of motion at elbow was restricted and painful. The distal neurovascular status was normal. Radiographs of the elbow revealed a moderately displaced fracture of the radial head Salter Harris type 2 injury (Figure 1).

He was admitted for closed reduction and internal fixation with a Kirschner wire, but his parents refused admission and sought for admission request the next day. He was discharged with elbow immobilized in a shoulder arm sling, oral analgesics and advised to report next day for surgery.

The patient reported for surgery next day. On initial examination there was no difference in the clinical picture from initial assessment. The patient was posted for surgery, basic preoperative investigations were advised and pre-anaesthetic checkup was done. Within 2 to 3 hours the patient started developing severe pain in

the forearm. On examination active and passive movements of fingers were painful, the volar compartment of the forearm was tense, though the pulses were palpable.

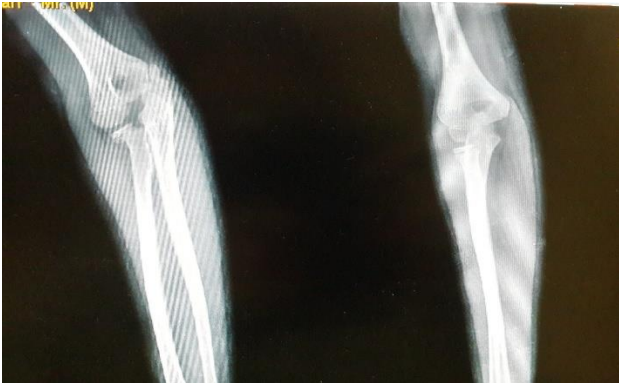


Figure 1: Preoperative x ray of the patient showing the radial head fracture.

The plasma expanders were started and closed watch on the distal neurovascular status was kept with hourly examination. It was observed that there was no improvement in clinical symptoms while the forearm volar compartment had become tenser and the pulses feeble. Based on clinical examination, a diagnosis of volar compartment syndrome was made, and the patient was immediately shifted to the operation theatre.



Figure 2: Post-operative x ray of the same patient following fasciotomy and k wire fixation.

In the operation theatre, an immediate volar forearm fasciotomy was done under general anaesthesia using the standard incision beginning proximal to lacertus fibrosus and ending distally to involve the release of carpal tunnel. Intraoperatively, the findings showed a constriction band arising from ulnar nerve causing compression of flexor digitorum profundus that was released. On release both ulnar and radial pulses returned. The vascularity of the rest of the muscles was seen to be good. The radial head fracture was also fixed in the same sitting with a Kirschner wire inserted from distal to proximal direction (Figure 2). Thorough lavage of the wound was done, the wound was left open, skin staples and vessel loops were

applied at the margins, sterile dressing applied, and an above elbow slab was applied. In the postoperative period the patient had near normal motion of the fingers and vascularity was also good.

The patient underwent two more staged procedures at 48-hour intervals from the first procedure involving debridement and wound closure using vessel loops. By the second stage at 96 hours from the fasciotomy the whole incision was closed. The patient was discharged and followed up in the outpatient department. The sutures were removed after 2 weeks, the plaster and K wires after 4 weeks and range of motion at elbow was started. At subsequent follow ups, the wounds had healed properly. The patient had a good range of motion and is expected to have a normal functional recovery.

DISCUSSION

Compartment syndrome is defined by Mubarak as an elevation of the interstitial pressure in a closed osseofacial compartment resulting in microvascular compromise.¹³ Compartment syndrome of the forearm is associated with several etiologies which include supracondylar fractures of the humerus, fractures of the radial and ulnar diaphysis, the distal radial fractures, crush injuries, snake bites, vascular disruptions and burns.¹⁴

The development of compartment syndrome of the forearm following radial head fractures is a very rare occurrence and there are just a few reports of this condition in literature.

Rood LK et al in 1991 reported a case of acute compartment syndrome of the forearm following a fracture of radial head associated with triceps tendon avulsion.¹⁵

Peters CL et al reported three children who developed volar compartment syndrome of the forearm following minimally displaced or angulated fractures of the radial head.¹⁶ There was a delay of twelve to twenty-four hours in seeking medical attention in all three patients and all of them were managed with emergency fasciotomy of the forearm.

In present case on initial examination there were no signs and symptoms of increased compartment pressure and the patient's attendants refused admission on that day, but twenty-four hours later patient started developing clinical features of compartment syndrome. Based on clinical symptoms and signs a diagnosis of acute volar compartment syndrome was made and an immediate volar fasciotomy was done. The radial head fracture was also fixed with a Kirschner wire. Following the procedure, the wound was closed within 96 hours of the fasciotomy and the patient had a good functional recovery.

The etiology of the development of the compartment syndrome following moderately displaced radial head fracture is unclear. The low compliance of the fibro-osseous space of the antecubital region, the thick tissue of the lacertus fibrosus and its relationship with the brachial artery and median nerve may render this area susceptible to development of high pressure even by a routine fracture haematoma. In our case a constriction band arising from ulnar nerve causing compression of the flexor digitorum profundus was noticed. Upon release of this band distal pulses returned and vascularity of the muscles improved. As of now we can only assume what causes compartment syndrome in radial head fractures.

CONCLUSION

The inference that we draw from the above-mentioned case report is that even a minimally or moderately displaced fracture of the radial head can lead to the development of acute compartment syndrome of the forearm culminating in dreadful consequences. These apparently minor injuries need a thorough clinical examination and close observation in the first forty-eight hours after injury.

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