CASE REPORT

Compartment syndrome resulting from undetected ulnar artery injury in the absence of a forearm fracture

Priyanka Chadha,¹ Hawys Lloyd-Hughes,² Timothy Halsey¹

¹Chelsea and Westminster Hospital, London, UK

²Department of Plastic Surgery, Broomfield NHS Trust, Essex, UK

Correspondence to

Priyanka Chadha,
priyankachadha@doctors.org.uk

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SUMMARY

A 6-year-old boy presented following a transient crush injury to his forearm. He displayed mild abrasions but no laceration or associated fractures. The injury resulted in traumatic rupture of the ulnar artery, which caused a large forearm haematoma and an acute forearm compartment syndrome. Prompt clinical diagnosis and operative intervention were required to prevent disastrous consequences.

BACKGROUND

Acute limb compartment syndrome is a limb threatening and occasionally life-threatening emergency that requires prompt recognition and treatment. Consequences can range from muscle necrosis and limb amputation to renal failure and death. Causative factors have been well documented and usually involve acute trauma or reperfusion after prolonged obstruction. Diagnosis is most commonly made after repeated examination and, if necessary, on intracompartmental pressure measurement.

Damage of an artery following closed injury has previously been well documented in the literature following a fracture of the proximal long bones and dislocations of the knee and elbow.¹ In addition, traumatic rupture of the ulnar artery following a closed fracture of the ulnar and/or radius has also been described.² However, complete rupture of the ulnar artery, in the absence of a forearm fracture, leading to compartment syndrome has not been documented in the literature. Although the complete rupture of an artery in the absence of a fracture or open wound may seem unlikely, the diagnosis must be considered as a differential, along with one of associated compartment syndrome, so that operative treatment is not delayed.

CASE PRESENTATION

A 6-year-old boy was brought by his mother to the paediatric accident and emergency department 3 h after a crush injury to his right (dominant) arm. His forearm was acutely swollen and painful. The patient had been playing with four other children who were swinging on a heavy metal gate. His forearm was accidentally crushed between the

closing gate and the gatepost. No abrasions or skin lacerations were sustained.

The patient was otherwise fit and well, taking no medications and with no known allergies.

On examination, the patient was found to be in extreme pain with generalised swelling of the forearm and early bruising. The radial pulse was palpable and capillary refill at the fingertips was 2 s. All attempts at active and passive movement were resisted due to pain, which was uncontrolled despite opiate analgesia. Peripheral sensation in the median nerve distribution was reduced during the time he was in the emergency department.

Radiographs of the forearm, wrist and elbow, showed no fractures but significant soft tissue swelling was seen. The patient had routine blood investigations, which were all normal.

INVESTIGATIONS

- ▶ Upper limb radiograph
- ▶ Routine blood tests

DIFFERENTIAL DIAGNOSIS

- ▶ Haematoma
- ▶ Compartment syndrome

TREATMENT

An urgent upper limb fasciotomy was performed. On exploration of the forearm through standard fasciotomy incisions a large haematoma was found, which extended volarly and dorsally. Further exploration confirmed a patent radial artery and complete rupture of the ulnar artery.

The artery was repaired under magnification. The haematoma was completely evacuated and the forearm thoroughly irrigated. All muscles were completely viable and no debridement was required. The fasciotomy wounds were left open. A second exploration was performed 48 h later, the dorsal wound was closed and the volar wound was partially closed. Definitive closure was achieved 1 week later with a split skin graft.

OUTCOME AND FOLLOW-UP

The patient is doing very well postoperatively with no motor or neurovascular deficit. All wounds have healed completely.

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DISCUSSION

Previous damage to the radial or ulnar arteries in the forearm are common following lacerations^{3 4} and open fractures.^{5 6} Vascular complications have also been reported in the literature with closed fractures of the forearm, but these are rare. Rupture of the ulnar artery in the absence of a laceration or any fracture leading to compartment syndrome has not, to the best of our knowledge, been reported previously. Although this mechanism of injury could seem to be an unlikely cause of arterial rupture, early consideration of the diagnosis and prompt surgical management reduced the potentially devastating and irreversible consequences of a missed compartment syndrome.

Patient's perspective

Taking (patient's name) for an operation that evening was scary but has saved his arm and now he can continue to play sports. We found the whole experience very scary as it was obvious that his arm was getting bigger and bigger and he was in so much pain. He had so little to show for the injury—just some grazes—that we knew something had to be wrong because he had so much pain but we just thought that he had broken a bone. We were shocked when the doctor said he hadn't broken anything.

Learning points

- ▶ Consider all possible diagnoses, however unlikely, and act promptly to avoid potential complications.
- ▶ Early exploration in upper limb trauma may save muscles and preserve function.
- ▶ Never disregard the possibility of ulnar artery injury in the absence of forearm fractures.

Competing interests None.

Patient consent Obtained.

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