Volar compartment syndrome of the arm complicating a fracture of the humeral shaft

A case report

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A compartment syndrome of the upper arm is rare. It has been described in the extensor compartment after avulsions of the origin of the triceps muscle (Brumback 1987), in the flexor compartment after external pressure (Leguit 1982) associated with a drug overdose or a pneumatic tourniquet (Greene and Louis 1983), and after a blunt injury to the soft tissues (Holland et al. 1985, Jenkins and Mintowt 1986).

We describe a case of compartment syndrome of the upper arm following an undisplaced fracture of the shaft of the humerus.

Case report

A 45-year-old man, standing on the footboard of a bus, was waving his left arm outwards when the upper arm was struck by a pole on the road. He sought medical attention 6 hours after the injury. Progressive swelling and pain in the left upper arm and the forearm were noted. The swelling was pronounced in the upper arm and on the volar side. The radial pulse could not be felt, although the capillary circulation was maintained. All the movements of the wrist and the fingers were free and painless. Radiographs of the left upper arm showed a fracture of the lower third of the humeral shaft with a small butterfly fragment (Figure 1). The fracture was minimally displaced. The arm was kept elevated on a wire splint. The radial artery became palpable within 5 hours. The nail bed circulation was satisfactory.

On the following day, the swelling was not reduced; the flexor aspect of the upper arm appeared more tense and painful. There was no numbness or paresthesia. A compartment syndrome of the upper arm was suspected, and the pressure in the flexor compartment of the left upper arm was measured by the saline injection technique. A comparison was made with that of the opposite arm. The pressures were 60 mmHg and 20 mmHg, respectively.

Figure 1. The fracture in a 45-year-old man who developed a compartment syndrome of the upper arm.

A fasciotomy was immediately performed. The biceps muscle bulged from its compartment, and was pink and firm. The wound was left open. Dressings were applied, and the arm was splinted with the elbow in 90° of flexion in an above-the-elbow plaster splint.

There was considerable pain relief postoperatively. One week later, the fasciotomy wound was covered with a split-thickness skin graft. The patient was discharged from the hospital with a U-plaster splint. The fracture united clinically, as well as radiographically, in 3 months. The plaster splint was discarded, and active exercises of the arm and elbow

were started. In spite of regular physiotherapy, there was 20° of flexion deformity at the elbow joint with 20°–110° of range of movement 9 months after the injury. When flexing the elbow, the patient used his brachioradialis and flexor muscles of the forearm with only a feeble contraction of the biceps muscle.

Discussion

The literature reveals only 5 cases of compartment syndrome of the upper arm. Why is it so rare? One reason may be the fascia itself, which is not strong enough to limit swelling (Gaspard and Kohl 1975). Secondly, the muscle compartments of the upper arm communicate anatomically with those of the shoulder girdle, making it much less likely for the swelling or bleeding to remain confined enough to develop into a compartment syndrome (Brumback 1987).

The nature of injury in this patient, a fracture with minimal displacement with a probably intact periosteum on the posterior surface, made it more vulnerable for developing a compartment syndrome. The absence of the radial pulsation was probably the result of a transient, complete spasm of the brachial artery. A late fasciotomy performed about 30 hours after the injury probably caused the poor result, with loss of extension at the elbow joint and loss of power of the biceps muscle.

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