THREE CASES OF COMPOUND POSTERIOR DISLOCATION OF THE
ELBOW WITH RUPTURE OF THE BRACHIAL ARTERY

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Traumatic rupture of either the brachial artery or one of its divisions in association with
severe injuries of the elbow is surprisingly rare. Marnham (1934) reported the first case to
appear in the British literature. This was a simple posterior dislocation of the elbow in a woman
of forty, associated with rupture of the brachial artery about half an inch above the bifurcation.
Immediate ligation of the vessels above and below, and reduction of the dislocation, were
followed by return of the radial pulse in three weeks, and after four months movements of
the elbow were full apart from loss of the last 10 degrees of extension.

In 1937 Eliason and Brown reported a further case of compound posterior dislocation
of the elbow with interruption of the arterial supply just below the bifurcation of the brachial
artery in a man of twenty. Reduction of the dislocation and ligation of the severed vessels
resulted in normal elbow movement except for slight loss of extension, together with return
of the radial pulse. These authors also reviewed twenty other cases of major vascular damage
associated with either a dislocation or fracture-dislocation of the elbow which they were able
to collect from the world literature, of which only four were published after 1900. In fifteen
cases the brachial artery was involved above its bifurcation, and in five cases the damage
occurred below the point of division. Further cases have been published by Jackson (1940),
Mathewson (1940), Spear and Janes (1951), and Henderson and Robertson (1952).

The methods employed in dealing with the injured artery vary widely. For example,
Marnham (1934) ligated the divided ends of the artery, as did Henderson and Robertson
(1952). Jackson (1940) employed a venous graft. Mathewson (1940) succeeded in performing
end-to-end suture; thrombosis followed but the vessel subsequently became recanalised. In
one of the cases published by Spear and Janes (1951) only the proximal end of the artery was
identified and tied. The follow-up of these diverse cases showed uniformly satisfactory results
both in respect of function and return of adequate arterial supply to the limb. It seems likely
that simple ligation of the vessels is just as efficacious as either grafting or end-to-end arterial
suture, and far less time-consuming. Ligation of the distal segment is desirable in order to
prevent reflux bleeding (Janes and Ghormley 1950).

Pathological anatomy—If a study is made of the operative findings of these reported cases a
consistent pattern of muscle damage emerges, but the median nerve escapes injury. In all
the limbs that were explored it was noted that the common flexor origin was avulsed from the
medial epicondyle; the brachialis and biceps suffered a varying degree of damage and the median
nerve was displaced to the posterior aspect of the humerus.

CASE REPORTS

Case 1—A girl aged thirteen years was admitted to the Royal Liverpool Children’s Hospital
in August 1959 with a compound posterior dislocation of the right elbow (Fig. 1). There was
a transverse wound across the front of the elbow, and the lower part of the humerus protruded
through the wound. The hand was cold and blue and the radial pulse was not palpable.
Operation—At operation one hour later it was found that the brachialis and biceps muscles
were ruptured; the flexors were avulsed from the medial epicondyle, and the brachial artery
was ruptured about half an inch above its bifurcation. The median nerve was intact and lay
behind the lower end of the humerus. The dislocation was reduced, both ends of the vessel
were ligated, and the muscles were repaired.
Progress—Within twelve hours the hand was warm, and the radial pulse was detected on the fourth day. Subsequently the patient was found to have a warm hand with an easily palpable radial pulse and full movement of the fingers and wrist. Movements of the elbow improved rapidly, and four months later the patient had full flexion and a loss of only 20 degrees of extension, with full rotation. Fifteen months later, however, there was severe restriction of elbow movements, with only 5 degrees of flexion above the right angle and 45 degrees of extension below the right angle (Fig. 2), and half the normal range of rotation. Radiographs showed evidence of myositis ossificans.

Case 2—A woman aged forty-five was admitted to hospital in August 1959 with a compound dislocation of the right elbow and a transverse wound in the antecubital fossa. The hand was cold, cyanotic and pulseless.

Operation—At operation it was found that the brachialis and the flexor muscles were ruptured, together with the brachial artery, the median nerve being intact. The proximal arterial segment was ligated, but it was not possible to locate the distal trunk. The muscles were repaired and the skin was closed. The circulation of the hand improved as soon as the dislocation was reduced.

Progress—Six months later the hand was warm, but a radial pulse was not palpable. The patient was able to flex the elbow to the right angle, and to extend it 60 degrees beyond the right angle; rotation was through half the normal range. Radiographs showed myositis ossificans.

Case 3—A boy aged eleven years was admitted to the Royal Liverpool Children’s Hospital in April 1961 with a compound dislocation of the left elbow and a compound fracture of the left radius at the junction of the middle and lowest thirds, with the proximal part of the shaft of the radius overlying the palm. The hand was cold and blue, and the radial pulse was absent. There was slight sensation, with a flicker of movement, in the thumb and index finger. There was anaesthesia over the rest of the hand with absence of movement in the middle, ring, and little fingers. There was a transverse laceration over the front of the elbow, extending up the lateral side of the arm and down the antero-medial aspect of the forearm to become continuous with the skin defect overlying the compound fracture of the radius. The capsule over the anterior and medial aspect of the joint was torn. The brachial artery was ruptured one and a half inches above its bifurcation. The flexor muscles were detached from the medial epicondyle,
and the biceps and brachialis were severed. The median nerve was found to be intact, although displaced round the trochlea.

Operation—Both ends of the brachial artery were ligated. Dead pieces of the biceps, brachialis, pronator teres and common flexor muscles were excised. The fascia was incised from the mid-arm to the wrist. All the flexor muscles were found to be contractile and of a good colour. The elbow dislocation was reduced and the skin only sutured. Pressure dressings and a splint were applied.

Progress—At the end of the operation the fingers were of good colour and were warm, with restoration of sensation. In thirty-six hours motor function had returned. The fracture of the radius united satisfactorily and the child is now having exercises to encourage elbow movement.

SUMMARY AND CONCLUSIONS

1. Rupture of the brachial artery or of one of its divisions in association with elbow injuries is probably more common than a survey of the literature would imply. Three cases of rupture of the brachial artery complicating compound dislocation of the elbow are reported.

2. These cases appear to have a consistent pattern of soft-tissue damage, with avulsion of the common flexor origin, and a varying degree of damage to the biceps and brachialis. The median nerve escaped injury.

3. The method of dealing with the divided vessels does not appear to be of importance in determining the outcome, simple ligation being as satisfactory as attempts at grafting or suture.

4. In no case was there any evidence of Volkmann’s contracture. Provided rapid reduction of the dislocation is effected, together with ligation of the vessels, a satisfactory return of the circulation may be expected.

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REFERENCES


