A RADILOGICAL SIGN OF ENTRAPMENT OF THE MEDIAN NERVE IN THE ELBOW JOINT AFTER POSTERIOR DISLOCATION

A REPORT OF TWO CASES

Ivan Matev, Sofia, Bulgaria

From the Institute of Orthopaedics and Traumatology, Sofia

Two boys with entrapment of the median nerve in the elbow joint after closed reduction of a posterior dislocation with fracture of the medial epicondyle showed a characteristic radiological sign in the antero-posterior radiograph after two to three months. The sign was a depression in the cortex on the ulnar side of the distal humeral metaphysis, with interruption of the local periosteal reaction. At operation in both patients the depression was found to correspond with the place where the median nerve reached the posterior surface of the humerus. Radiographs taken after transverse section of the nerve above and below the joint capsule and end-to-end suture showed gradual disappearance of the cortical depression.

Median nerve entrapment within the elbow joint after posterior dislocation is rare. Cases have been published by Gurdjian and Smathers (1945), Mannerfelt (1968), Steiger, Larrick and Meyer (1969), and Rana, Kenwright, Taylor and Rushworth (1974). The purpose of this paper is to draw attention to a radiological sign of continued entrapment which has remained unnoticed, no doubt because in most cases the nerve is freed within a few days of the injury.

CASE REPORTS

Case 1—A boy fell from a bicycle in June 1972 and sustained a posterior dislocation of the right elbow with fracture of the medial epicondyle. Closed reduction was carried out and the joint was immobilised for two weeks in a plaster cast. Before the splint was removed the boy’s mother noticed that he could not close the thumb and index finger of the affected hand. The boy also complained that he could not distinguish hot from cold water with his thumb, index and long finger. He was readmitted to the hospital, where it was confirmed that there was a lesion of the median nerve at elbow level. Management was expectant at first, but review after ten weeks showed no evidence of recovery.

At the end of September the boy was first seen in our hospital. There was a flexion contracture of the elbow of 40 degrees, with wasting of the forearm and thenar muscles. The lesion of the median nerve at the level of the elbow was total in every respect. The radial pulse was weak, and plethysmography revealed a slightly reduced supply to the fingers. Radiographs of the elbow showed some periarticular ossification, sclerotic changes in the epiphysis of the humeral trochlea and a united fracture of the medial epicondyle. A distinct

periosteal reaction was present on both sides of the humeral metaphysis.

Of particular interest was an appearance on the antero-posterior radiograph of a depression in the cortex of the humeral metaphysis just above the medial epicondyle, with a break in the local periosteal reaction (Fig. 1). Distal to this depression there was a well-defined oblique strip with sclerosed margins.

Operation—The median nerve was explored in October 1972. Dense fibrous tissue was encountered anterior and medial to the elbow joint. The nerve was identified above and below the joint. The distal portion emerging from the capsule below the trochlea was very thin and fibrous. The proximal portion together with the brachial artery, which was not patent, ran distally behind the ulnar side of the metaphysis of the humerus (Fig. 2). At this point there was a palpable irregularity of the cortex. The segment of nerve overlying the depression presented the typical picture of a complete lesion of the median nerve at the level of the elbow, which had a full range of movement. There was no difference in the radial pulses.

The antero-posterior radiographs at two months and more showed a depression in the humeral border at the same place as in the first patient (Fig. 5).

At operation the median nerve was found trapped in the ulnar part of the elbow joint. The lower part of the proximal segment was again thicker and harder than normal. It was again possible to palpate the irregularity in the ulnar margin of the humeral metaphysis beneath the displaced median nerve. End-to-end epineural suture was performed between the disparate nerve ends, closing a gap of 3.5 centimetres. Three and a half months later reinnervation potentials were recorded from flexor carpi radialis. The radiograph at four months showed that the depression in the humerus was diminishing (Fig. 6).

seen in the radiograph, about 5 centimetres in length, was harder in consistency and thicker than normal. Direct electrical stimulation of the nerve above and below the elbow failed to provoke any contraction in the musculature of the forearm or hand. After section of the nerve at the entry to and exit from the joint capsule a gap of three centimetres was left; the diameter of the distal end of the nerve was half that of the proximal end. Epineural suture was performed under no tension with the joint flexed 60 degrees. The elbow was supported in a plaster cast for one month.

Progress—Recovery of motor power started three months after the operation, in the long flexor of the thumb and the deep flexor of the index. Electromyographs at one year showed advanced reinnervation of the abductor pollicis brevis and opponens muscles. In July 1975, nearly three years after the operation, there was only a slight flexion contracture of the elbow, minimal impairment of function of the median nerve, and radiographically, disappearance of the depression in the cortex (Fig. 3).

Case 2—The second case, very similar to the first, concerned a boy of nine who sustained a dorsal dislocation of the right elbow (Fig. 4) and a fracture of the medial epicondyle. A median nerve lesion was recognised in the second month and prolonged physiotherapy gave no improvement. A year after the injury, when the boy was admitted to our hospital, he

DISCUSSION

In the first case the median nerve was trapped together with the brachial artery, whereas in the second case only the median nerve was involved. In both cases posterior dislocation of the elbow joint was complicated by fracture of the medial epicondyle, as in the two patients reported by Steiger et al. (1969). It is evident that an essential part of the mechanism of median nerve entrapment following dorsal dislocation of the elbow joint is detachment of the proximal insertions of the flexor muscles, which in children includes the medial epicondyle. The same mechanism is obviously responsible for the occasional entrapment of the brachial artery. The patient reported by Mains and Freeark (1975), a man aged fifty, had a complete tear of the flexor muscle insertions from the medial epicondyle.

The changes in the involved segment of median nerve are no doubt mainly attributable to traction and friction effects on the nerve held in the joint. It is interesting to note that pain is not characteristic of this lesion. Despite the gross difference between the cross-sections of the
proximal and distal cut nerve ends and the considerable gap between them, simple epineural suture both in our first case and in the case of Rana et al. (1974) resulted in very good recovery of both sensory and motor function. In both our cases an identical radiological appearance was observed on the medial side of the distal humeral metaphysis—a depression in the cortical layer with interruption of a local periosteal reaction. The depression corresponded with the place where the median nerve passed behind the humerus. Distal to this depression a strip with dense margins could also be seen; this corresponded with the segment of median nerve lying behind the distal end of the humerus. The radiological signs described were first noticed between two and three months after the entrapment. In the first case serial films taken up to three years after transection, realignment and suture of the nerve showed gradual disappearance of the cortical depression.

REFERENCES