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Median nerve entrapment in elbow dislocation

A case report

When the elbow dislocated posteriorly in an 11-year-old boy the median nerve was caught behind the medial epicondyle and in the joint. The condition was diagnosed at 7 months when a total paralysis had developed. Good function was obtained after neurolysis. This rare condition has typical signs and symptoms which should permit an earlier diagnosis.

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Introduction

In 1981 Hallett described a case of entrapment of the median nerve after dislocation of the elbow, and reviewed 13 previously reported cases. In addition to these 14 cases, Roaf (1957) and Meissl (1967) each described one case, both boys, who at the age of 11 and 13, respectively, had sustained a dislocation of the elbow and a fractured medial epicondyle. In 1979 Holmes et al. reported a similar entrapment of the median nerve i a cadaver.

Case report

After a fall from a swing, an 11-year-old gipsy boy sustained a closed dislocation of the left elbow and a fractured medial epicondyle. Before reduction he had paresthesia in the median nerve area and the radial pulse was weak. Reduction was not satisfactory until the second attempt. The elbow was immobilized in a plaster cast. After reduction the median nerve symptoms disappeared and the radial pulse was normal. The patient was discharged after two days and was followed as an out-patient at his local hospital. Radiographs 10 days after reduction revealed a slightly increased joint space on the ulnar side of the elbow, which had reverted to normal two weeks later when the plaster was removed (Figure 1). When the patient reported for examination three months after injury the range of elbow motion was normal. However, a partial median nerve paralysis was diagnosed with reduced sensitivity in the median nerve area, a total paralysis of the flexor pollicis longus and the opponens pollicis, and a partial paralysis of the flexor carpii radialis and the flexor digitorum communis to the index and long fingers. Tinel's sign was positive 5 cm distal to the elbow. One month later sensibility had improved and he was able to flex the interphalangeal joint of the thumb and oppose the thumb, albeit with reduced strength. He did not return for further checks until seven months after the injury at which time both sensibility and active motion were impaired and the paralysis of the median nerve was total.

Using a tourniquet the elbow region was explored. The median nerve was not in its normal location in front of the elbow. It was identified further distally under the superficial flexor muscle, and was followed proximally until it disappeared into the joint between the humerus and the ulna. It was then identified proximal to the elbow joint and followed distally behind the medial epicondyle, lying at first in a bone groove and then disappearing into a bone tunnel.

After lysis of the ulnar nerve, the bone encircling the median nerve was nibbled away behind the epicondyle. The flexor muscles and ligaments were then released subperiostally from the epicondyle and the median nerve was relocated. The released structures were then re-inserted using a bone-needle. Proximal to the entrapment the median nerve was swollen. The nerve was also elongated and 4–5 cm of the trapped part had a diameter 1/3 that of normal. Distal to the elbow joint the nerve was normal. After reconstruction of the medial joint structures the median nerve was embedded in fat and placed in its normal location in front of the joint. The elbow joint was immobilized in a dorsal slab for two weeks.

Postoperatively the boy gradually improved. After ten months he had normal sensibility in the thumb, long and ring fingers, but incomplete recovery in the index finger. The motor function of the flexor carpii radialis and digitorum profundus II and III was normal. The flexor pollicis longus was, however, still very weak, and the opponens pollicis totally paretic. The elbow joint was stable with a normal range of motion.

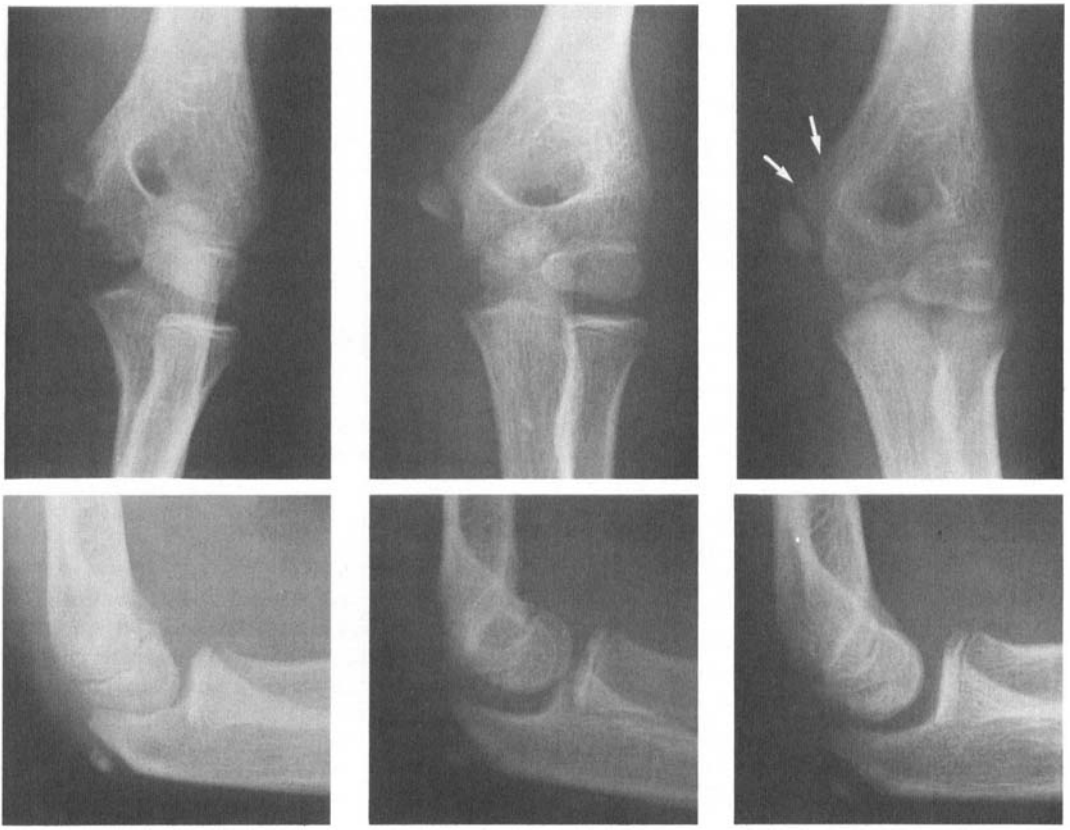

Figure 1. Dislocation of the left elbow. Immediately after reduction. The ulnar epicondyle somewhat displaced.

Ten days later. Increased joint space, especially on the ulnar side.

Fracture healed. The groove and the sclerotic lines in the frontal view are the margins of the bony tunnel through which the median nerve passes (Matev's sign).

Three and a half years after operation, at the age of 16, he had no complaints and neither fine precision work nor heavy work troubled him. He had moderate atrophy of the thenar region, some loss of muscle power in the flexor pollicis longus and the opponens pollicis, and a two point discrimination of 4 mm compared with 2 mm on the healthy side.

Discussion

According to Fourrier et al. (1977) and Hallet (1981) the median nerve can be trapped in three different ways after dislocation of the elbow. My case appears to be a modified Type I with the nerve dislocated behind the medial epicondyle passing from a bone groove to a bone tunnel and then into the joint behind the medial half of the trochlea and out of the joint between the humerus and the ulna. The fact that the nerve is located in a bone groove and a bone tunnel is not always due to an entrapment in the fracture between the bony fragments. Considering the location of the nerve and the Matev's (1976) sign lateral to the fracture (Figure 3) this might be interpreted as an attempt by the nerve to ulcerate its way back through the bone into its proper position (St. Clair Strange 1982).

The rarity of this injury and the initially slight symptoms of median nerve compression may be to blame for the delay in diagnosis. Thus, the early signs of median nerve compression may, if recognized, be interpreted as secondary to the traction of the nerve, and spontaneous recovery may be expected. Impairment after mobilization is not uncommon in late diagnosed cases and an initial partial

paresis of the median nerve may become total. In the previously described cases the delay was, on an average, 17 months. The key to early diagnosis is a high degree of suspicion combined with thorough and repeated neurological examinations. In this case the minor, early median nerve symptoms, in combination with a history of a dislocated elbow, a fractured medial epicondyle, difficulty in reducing the dislocation and an increased joint space on the ulnar side of the elbow joint in the radiograph 10 days after reduction, should have suggested the diagnosis. Unfortunately the Matev's (1976) sign which is pathognomonic, was unrecognized in this case.

Early diagnosis and treatment will favour a normal result. In late diagnosed cases the question will arise whether to use the procedure described here or a microsurgical technique for nerve resection and nerve grafting. In this case the recovery was excellent, with a two point discrimination of 4 mm. This has to be compared with Dellon's (1981) summaries of different studies of high median nerve repair and nerve grafting. In high median repair (10 studies, 406 cases) none recovered to a two point discrimination less than 6 mm and only three per cent to 7–15 mm. The corresponding figures for nerve-graft patients (8 studies, 136 cases, level not reported) was two per cent and 24 per cent, respectively. Children attained better results than adults.

Therefore the best treatment of an established entrapped median nerve is probably release from the groove and tunnel and, after freeing the flexor muscles and the ligaments from the medial epicondyle, restoring the nerve to its proper place anteriorly. In old cases, resection, microsurgical repair and a regular program of sensory re-education may perhaps be the treatment of choice.

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