ACUTE CARPAL TUNNEL SYNDROME
COMPLICATIONS OF DELAYED DECOMPRESSION

DAVID J. FORD, M. S. ALI

From the Robert Jones & Agnes Hunt Orthopaedic Hospital, the North Staffordshire Royal Infirmary, and Glan Clwyd Hospital, Rhyl

Five patients suffered injuries around the wrist complicated by acute tunnel syndrome. Pain associated with median nerve paraesthesia or hypo-aesthesia are indications for urgent treatment; in four patients where operation was delayed, the outcome was poor.

Acute compression of the median nerve at the wrist after injury occurs infrequently; the cases reported below show typical and easily recognised clinical features which contribute to a poor outcome if operative treatment is delayed.

CASE REPORTS
Case 1. A 17-year-old man sustained a displaced fracture of the distal radius in a motorcycle accident. The fracture was promptly reduced under general anaesthesia on the evening of admission within two hours of the injury and a dorsal plaster was applied with 20° flexion at the wrist. During the night the patient suffered increasing pain in the wrist and needed analgesia with papaveretum. The plaster slab bandage was split and elevation continued.

Fourteen hours after admission severe pain had persisted and profound anaesthesia in the distribution of the median nerve was noted. There was no clinical evidence of forearm compartment syndrome. An extensive decompression of the carpal tunnel and forearm was carried out and the median nerve was observed to be tightly compressed by a haematoma in the carpal tunnel. There was no forearm compartment compression. The fracture had not re-displaced, and the reduction was maintained with a Kirschner wire; only a light plaster was required.

Postoperatively, pain was completely relieved but profound anaesthesia in median nerve distribution persisted. After 10 months there was some improvement but there was still some troublesome hypo-aesthesia. Another exploration and neurolysis was performed, during which intraneural fibrosis was noted, but six months later there was little change in symptoms. Hand function was otherwise unrestricted.

Case 2. A 34-year-old women fell and injured her left wrist in flexion. Initially pain was localised and radiographs showed a flake avulsion from the dorsum of the carpus. A dorsal plaster was applied.

The patient returned complaining of increasing pain in the wrist and burning paraesthesia in the distribution of the median nerve. The plaster was loosened; elevation and analgesics were advised.

One week later pain had decreased but unpleasant paraesthesia continued, with diminished sensation in the median nerve area. Decompression of the carpal tunnel was then carried out and although there was some improvement over the next six months some subjective sensory changes persisted.

Case 3. A 49-year-old woman fell and sustained a displaced and comminuted Colles' fracture of the left distal radius. Under regional intravenous anaesthesia the fracture was reduced within one hour of injury, a dorsal plaster was applied and the patient was discharged. Six hours later the patient returned, complaining of increasing and severe pain in the wrist and hand with paraesthesia and hypo-aesthesia in the distribution of the median nerve.

The plaster was removed and the hand elevated; 72 hours later pain and signs of median nerve compression persisted and carpal tunnel decompression was carried out. The fracture was stabilised with an external fixator and eventually united in a satisfactory position. However, pain and median nerve hypo-aesthesia persisted, as did marked stiffness of the fingers.

THE JOURNAL OF BONE AND JOINT SURGERY
After four months the patient still showed objective signs of median nerve hypo-aesthesia and thenar muscle weakness, though there had been some improvement. A flexor tenolysis improved her movement, but during this procedure gross fibrosis of the nerve and tendons around the wrist was noted. The final outcome is still uncertain.

Case 4. A 17-year-old man, who worked as a forester, fell and injured his left wrist. Initial examination showed some swelling and tenderness around the wrist. Radiographs revealed undisplaced fractures of the hook of the hamate and the trapezium; a volar plaster was applied.

The patient returned two hours later complaining of severe pain at the wrist and unpleasant numbness of the fingers. Intravenous papaveretum was needed before the patient could be examined. Decompression of the carpal tunnel was carried out under regional intravenous anaesthesia about three hours after the injury; during exploration an haematoma containing fat droplets squirted out of the carpal tunnel when this was incised. After release of the tourniquet and recovery from anaesthesia, the patient reported that his pain had resolved; sensation in his fingers improved rapidly. Twelve hours later there was no pain and no sign of median nerve dysfunction. Two months later the patient had no residual symptoms and had resumed his work as a forester.

Case 5. A 19-year-old man sustained an undisplaced fracture of the left trapezium in a motorcycle accident. Initially his wrist was tender and a little swollen, and a volar plaster was applied which included his thumb. The patient returned the next morning because of increasing pain in the wrist and hand as well as paraesthesia of the thumb and the index and middle fingers. The plaster was removed and his hand elevated. His symptoms persisted and sensation was impaired in the distribution of the median nerve. Thirty-six hours after injury the median nerve was decompressed in the carpal tunnel where a tense haematoma was found. Postoperatively his symptoms improved but it was not until four months later that the patient reported that sensation in his hand had returned to normal.

DISCUSSION

All our patients showed similar clinical features, that is, increasing and severe pain in the wrist with paraesthesia and impaired sensation in the distribution of the median nerve. None had had any of these clinical features when they were first seen in an accident unit, but then rapidly developed symptoms in the next few hours.

The syndrome of acute median nerve compression in the carpal tunnel is quite distinct from forearm compartment syndrome; none of our patients showed any evidence of the latter condition. Considerable morbidity resulted in four of our five patients on whom operation was not performed as a matter of urgency and, in two of them, irreparable intraneural fibrosis was clearly evident at re-exploration. By contrast, the one patient who had a very prompt decompression made a complete recovery.

The syndrome of acute compression of the median nerve has only recently been reported (Manske 1978; Bauman et al. 1981; Olerud and Lönnquist 1984). Although fractures of the distal radius are the commonest underlying injury (McClain and Wissinger 1976; Bauman et al. 1981; Adamson et al. 1971), the syndrome may also be seen with carpal injuries (Weiland, Lister and Villarreal-Rios 1976; Olerud and Lönnquist 1984).

It seems that the complication of a local haematoma under tension seen in two of our patients may contribute to fibrosis, probably by causing ischaemic damage within the nerve. Flexion or extension of the wrist is also known to increase pressure on the median nerve (Bauman et al. 1981). Median nerve compression has also been implicated in the aetiology of Sudeck atrophy in the hand (Lankford 1982).

Our results are consistent with those reported by other authors in that delay in treatment may result in a very poor recovery (Bauman et al. 1981); after prompt operative treatment, however, recovery can be excellent (Olerud and Lönnquist 1984).

We thank Professor B.T. O'Connor and the consultants at the North Staffordshire Infirmary and Glan Clwyd Hospital, North Wales for allowing patients treated under their care to be reported, and Mrs E. McClelland for secretarial help.

REFERENCES


