Internal Neurolysis or Ligament Division only in Carpal Tunnel Syndrome—
Results of a Randomized Study

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Summary

In a series of patients with clinically and neurophysiologically well defined carpal tunnel syndrome a randomization has been made into two groups, one for operation with internal neurolysis and a microscopical technique, and the other group for cutting of the carpal ligament (flexor retinaculum) alone. The two groups have been compared postoperatively regarding clinical and neurophysiological parameters. All patients improved, 89% in both groups considered themselves totally free of symptoms at follow-up examinations but there was no significant difference in any parameter between the two groups. As a conclusion the use of internal neurolysis cannot be recommended as a routine procedure in carpal tunnel syndrome.

Keywords: Carpal tunnel syndrome; internal neurolysis.

Introduction

The carpal tunnel syndrome (CTS) is the most common cause of pain and numbness of the fingers with a reported incidence of 2.1 ± 1.3% in Sweden¹. When operative treatment is necessary a simple division of the carpal ligament is probably the most used technique and the overall results are reported to be good¹².

There are, however, several reports containing a varying percentage of partial or total failures in patients with continuous symptoms and thenar atrophy. For these patients a combined procedure of division of the ligament and internal neurolysis of the median nerve have been suggested and also reported to give a high incidence of very good results—about 90%⁵,¹⁷,¹².

The aim of the present study was to compare the results of the two types of surgical treatment in patients with clinical and neurophysiological signs of CTS.

Material

48 patients—33 females and 15 males—aged 21–80 years (mean age 50 ± 14) with clinical and neurophysiological (see below for definition) signs of CTS have been operated. The patients were randomized into two groups, A and B, for either type of operation.

Methods

The following clinical signs were noted: pain, paresthesia, especially brachialgia paresthetica nocturna, hypoesthesia in the hand corresponding to the median nerve distribution, motor weakness of the thenar muscles, and muscular atrophy.

The following neurophysiological parameters were measured: sensory conduction velocity with distal latency, motor conduction velocity with distal latency, electromyography³,⁶, vibration perception threshold⁹.

The diagnostic criteria were at least one of the above mentioned clinical symptoms together with a positive Tinel's sign or Phalen's sign and slowing of the sensory conduction velocity of the median nerve with a prolongation of the distal latency¹⁰,¹⁵.

Motor conduction velocity was measured with standard techniques with stimulating electrodes over the appropriate muscle. It included median, ulnar and peroneal nerves bilaterally—the ulnar and peroneal nerves being included to detect a possible polyneuropathy. A conduction velocity less than 50 ms was considered abnormal in the arms and less than 42 ms in the peroneal nerves. A motor distal latency = > 4.5 ms n/s was considered abnormal.

Sensory conduction velocity was measured by recording the action potential from ulnar and median nerves following supramaximal stimulation of the appropriate fingers. Velocities less than 50 ms were considered abnormal, as was a sensory distal latency = > 3.5 ms.

All patients have been evaluated clinically and neurophysiologically before operation, 3–4 weeks after operation, when the wound had healed and postoperative swelling disappeared, and 6 months after operation.
Operative Technique

All patients have been operated with local anaesthesia, normally intravenously but in a few cases with plexus anaesthesia, and in a bloodless field. The incision was a modified S, starting in the thenar crease, linea vitalis, just distal to the thenar eminence and following the semicircular crease to the wrist, there turning towards the ulnar in the most proximal wrist crease. The median nerve was identified and the flexor retinaculum (carpal ligament) divided along the ulnar margin of the nerve, to avoid injury of the palmar cutaneous branch\textsuperscript{2,14} and the motor branch\textsuperscript{19,20}. In the group A-patients nothing more was done to the nerve, whereas in group B an internal neurolysis was performed under the microscope. The epineurium was opened and the individual fascicles dissected free within the perineurium.

Wound closure was achieved with simple mattress sutures in the skin only, and fixation from the metacarpophalangeal joints to the elbow, with the wrist in a neutral position. The stitches and fixation were kept for 11–12 days, and the patients usually returned to work after 3–4 weeks.

Results

The overall results did not show any significant difference between the patients operated with internal neurolysis and those who were operated with division of the flexor retinaculum only, neither regarding clinical nor neurophysiological parameters (Figs. 1–4,