

OPERATIVE TREATMENT OF CARPAL TUNNEL SYNDROME

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The results of surgical treatment of 100 carpal tunnel syndromes are discussed. With respect to paresthesias, pain, muscular weakness of the thumb and numbness, excellent or good results were obtained in 94%, 93%, 79% and 100% of the cases. There were complications (minor algodystrophy syndrome) in only 3% of the cases.

Keywords : carpal tunnel syndrome ; operative treatment.

Mots-clés : syndrome du canal carpien ; traitement chirurgical.

INTRODUCTION

Entrapment neuropathy of the median nerve at the wrist (carpal tunnel syndrome) is the most common of all peripheral neuropathies. In most cases open surgical treatment gives good or excellent results and complications are very rare (3, 5, 8, 9).

During the last 10 years arthroscopic techniques became so popular that some surgeons are now performing an endoscopic release of the median nerve at the wrist (1, 6). Although preliminary reports on the endoscopic technique are promising (2, 6) the benefit of this technique is not yet fully proven.

Before considering the use of the endoscopic technique we therefore found it of interest to review the results and complications we obtained with our own routinely used surgical technique.

MATERIALS AND METHODS

We reviewed the results and complications of 100 wrists (76 patients) we operated on between July 1989

and December 1990. There were 35 right wrists, 17 left wrists and 24 cases were bilateral.

Preoperative evaluation

Preoperatively the patients were assessed for age, gender, paresthesias, pain, muscular weakness of the thumb, numbness, thenar atrophy, duration of complaints before operation, severity of symptoms at night, relationship to manual labor, presence or absence of Tinel's sign and Phalen's sign, associated diseases and electromyographic changes.

Operative technique

The intervention takes place under locoregional anesthesia and with the aid of a pneumatic tourniquet. The carpal tunnel is exposed by a curved incision extending from the medial margin of the thenar eminence to the palmar crease. This incision is not extended across the wrist and up the volar aspect of the forearm. The fibers of the carpal ligament are then transversely sectioned at the ulnar side to avoid damage to the motor branch of the median nerve.

The volar epineurium of the nerve is also incised. The wound is closed using a one-layer technique and an elastic instead of a redon. The wrist is immobilized by a splint in neutral position for 7 days.

One day after the operation the elastic is removed and the patient can leave the hospital. Immediate mobilization of the fingers is encouraged.

After one week the stitches are removed, and full mobilization of the wrist is allowed.

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Postoperative evaluation criteria

Results were evaluated between 2 and 15 months postoperatively with a mean follow-up of 6 months.

We used the following evaluation criteria as proposed by Duchateau and Moermans (3) :

- excellent : resolution of complaints
- good : clear-cut diminution in the intensity of complaints which occurred only occasionally
- fair : diminution in the intensity of complaints
- poor : no improvement.

RESULTS

Preoperative evaluation

In this series there were 21 men and 55 women. The age distribution curve showed a high incidence in patients between 40 and 70 years (mean age : 54, range : 21-82 years).

The most frequent preoperative symptoms were paresthesias (99%), pain (96%), muscular weakness of the thumb (43%) and numbness (28%). Obvious thenar atrophy was observed in 8% of the hands.

The duration of symptoms before treatment was less than 6 months in 36% of the cases. Up to 75% of all hands were operated on within 2 years after the onset of symptoms.

In 34% pain was not only felt at the hand but was also referred to the forearm, elbow or shoulder. Symptoms were most intense at night in 75%. In 20% severe symptoms were present both day and night. In a great majority (88%) no clear-cut relationship was found between manual labor and the appearance of symptoms. Tinel's sign was present in 77% of the hands in this series. Phalen's sign was present in 84%.

Preoperative electromyographic analysis showed a prolongation of the distal motor latency (dml > 4.5 msec.) in 72% of the cases (mean dml : 5.6, range : 3.2-9.9 msec.).

The distal sensory latency was prolonged (dsl > 3.5 msec.) in 83% (mean dsl : 4.4, range : 2.7-6.9 msec.).

In our series the following associated diseases were found : impingement of the shoulder (8%), tennis elbow (6%), osteoarthritis of the wrist (6%), rheumatoid arthritis (4%), de Quervain's disease (2%) and trigger finger (2%).

Complications

Three postoperative complications were seen (3%). They were all minor algodystrophy syndromes which responded well to treatment and caused no sequelae. There were no postoperative infections in this series.

Postoperative evaluation

The results concerning paresthesias were excellent in 86%, good in 8%, fair in 3% and poor in 3% of the cases. The effects of surgical treatment on pain were rated excellent in 87%, good in 6%, fair in 5% and poor in 2% of the cases. The results concerning improvement of muscular weakness were excellent in 25%, good in 54%, fair in 12% and poor in 9% of the cases.

As no patients suffered from numbness after the intervention, one can say that for numbness excellent results were obtained in 100% of the cases. Of the 8 hands with obvious thenar atrophy, 4 regained normal, and 2 regained almost normal thenar musculature within the first year. Two hands showed no improvement, but we noted no progression of thenar atrophy.

DISCUSSION

Any local or systemic condition that causes an increasing volume of structures within the carpal tunnel or a decrease in the diameter of the carpal tunnel can lead to the beginning of a carpal tunnel syndrome because of an increased pressure on the median nerve with resulting nerve ischemia (3, 7, 8, 9, 10, 11).

Many authors have reported the presence of various associated diseases (2, 3, 5, 6, 8, 9). In our series there seemed to be no difference in postoperative results of patients with or without associated diseases.

The diagnosis of carpal tunnel syndrome was based upon clinical findings : paresthesias, pain, muscular weakness of the thumb, numbness, thenar atrophy, Tinel's sign, Phalen's sign, as well as preoperative electromyographic analysis.

Recently a new diagnostic test (carpal compression test) was introduced by Durkan (4). This

carpal compression test was found to be more sensitive and specific than the Tinel and Phalen tests, and we will use it in the future as another routine screening test for carpal tunnel syndrome.

Durkan (4) also discussed the false-negative findings on electromyography and even suggested avoiding the expense and time of electrodiagnostic testing in some cases.

We also believe that the clinical diagnosis of carpal tunnel syndrome is very important, and some of our patients with obvious signs and symptoms were selected for operative intervention even in the presence of normal electromyographic findings.

Looking at our complications we noted only 3 cases (3%) of postoperative algodystrophy syndrome. Following treatment all symptoms were relieved within 6 months.

According to Duchateau and Moermans (3) the absence of splinting in the immediate postoperative period (when the cutaneous incision does not extend over the volar flexion creases of the wrist) should help in avoiding the risks of the Sudeck's syndrome. Perhaps we should therefore no longer use a postoperative splint and permit the patients immediate free mobilization of the wrist and fingers as is done after any endoscopic intervention (2, 6).

We had no infections or reoperations.

After open surgical treatment of 113 carpal tunnel syndromes Duchateau and Moermans (3) also noted 3 postoperative complications (2 minor algodystrophy syndromes and 1 superficial wound infection).

Rommens and Towfigh (9) performed an open release of the carpal tunnel in 35 hands and needed to reoperate in 1 case because of the appearance of postoperative fibrous proliferation. Phalen (8) reported on 2 reoperations and 1 case of postoperative sympathetic dystrophy after an open technique for carpal tunnel syndrome in 212 hands.

Although Chow (2) reported no permanent nerve or vascular damage, hematomas, tendon incisions, infections or recurrences after endoscopic release of the carpal ligament in 142 cases, Okutsu *et al.* (6) experienced one recurrent case and they had 3 patients complain of discomfort and subcutaneous hematoma at the wrist after the endo-

sopic management of carpal tunnel syndrome in 54 hands. An obvious disadvantage is indeed that bleeding cannot be controlled, and therefore the risks of a postendoscopic hematoma will be much higher.

We had poor postoperative results for pain in only 2%, for paresthesias in 3% and for muscular weakness of the thumb in 9%.

Chow (2) reported on 142 cases with an endoscopic release in 104 patients (mean follow-up : 15.5 months). He had poor postoperative results for pain in 6% (prolonged pain in the palmar region in 9 hands) and for paresthesias in 4% (diminished sensation in the median nerve distribution), but all of the 46 patients that returned for weakly examination regained normal pinch and grip strength within 4 weeks.

This was explained by the fact that the continuation of the muscles between the lesser thenar muscles and the thenar muscles were not being cut and that the continuation of the muscle fibers was preserved. This therefore appears to be a possible advantage of the endoscopic technique.

CONCLUSION

When comparing our results with those published in the currently available literature on open and endoscopic technique for carpal tunnel release we can say that the overall clinical results are largely comparable. Probably there will be less loss of grip or pinch strength when performing an endoscopic intervention and there will also be less scarring with this technique.

On the other hand one might not be able to control bleeding sufficiently with the endoscopic technique, and the risks of a postendoscopic hematoma might be higher. The risks of damaging important neurovascular structures or performing an incomplete section of the carpal ligament might be higher, especially when the surgeon does not have extensive experience with endoscopic techniques.

Endoscopic release of the carpal ligament is certainly a promising technique. Today the open surgical technique already has been proved to give excellent or good results in most of the cases. Only a prospective randomized trial performed by a

surgeon sufficiently experienced in both the surgical procedure and the endoscopic release technique will allow us to clarify more precisely the indications for each technique.

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SAMENVATTING

S. WAEGENEERS, P. HAENTJENS, P. WYLOCK. Heelkundige behandeling van het carpaaltunnel syndroom.

De resultaten van een heelkundige behandeling bij 100 carpaaltunnel syndromen worden besproken. Wat betreft paresthesieën, pijn, spierzwakte van de duim en gevoelloosheid zijn de resultaten uitstekend of goed in respectievelijk 94%, 93%, 79% en 100% der gevallen. Overeenstemmend met de literatuur traden er zeer weinig complicaties op (minieme reflexalgodystrofie in 3% der gevallen).

RÉSUMÉ

S. WAEGENEERS, P. HAENTJENS, P. WYLOCK. Traitement chirurgical du syndrome du canal carpien.

Discussion des résultats obtenus dans 100 syndromes du canal carpien traités chirurgicalement. Les résultats sont excellents ou bons quant aux paresthésies, douleurs, faiblesse musculaire du pouce et anesthésie dans respectivement 94%, 93%, 79% et 100% des cas. Peu de complications furent notées (syndrome algodystrophique mineur dans 3% des cas); ceci confirme les données de la littérature.