Surgery for bilateral carpal tunnel syndrome

Endoscopic and open release compared in 10 patients

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In 10 patients with bilateral carpal tunnel syndrome, endoscopic release was performed in one hand, while a conventional open release was done in the other hand. No postoperative differences were noted in the remission of symptoms and grip strength. However, endoscopic surgery was preferred by all patients because of the small skin incision with no painful scar, the short operation time, the reduced postoperative pain, early return to daily activities or occupation, and the short hospital stay after surgery.

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Endoscopic carpal tunnel release (ER) for carpal tunnel syndrome (CTS) has been advocated by many authors (Chow 1989, Okutsu et al. 1989, Resmik and Miller 1991, Agee et al. 1992, Brown et al. 1992). We have performed ER in 89 cases of CTS, of which 10 patients with bilateral CTS were treated with ER in one hand and open carpal tunnel release (OR) in the other. We compared the outcome of the procedures in these 10 patients.

Patients

10 patients (9 women and 1 man) with bilateral idiopathic CTS and with an average age of 53 (39–61) years were included in this study. All patients had numbness of the thumb and fingers and positive Tinel's sign and Phalen tests. No one had significant thenar muscle atrophy. Electrophysiological examination, including nerve conduction study, confirmed median nerve entrapment at the wrist in all cases. In 8 patients, OR had been performed as the first procedure, 2 patients were treated simultaneously with OR and ER with full consent of the patients.

Comparing each hand, no differences were noted in the patients' preoperative chief complaints, physical findings, and electrophysiological findings.

The mean follow-up period was 2.6 years for the ER hands and 3.4 years for the OR hands. The follow-up was performed by the author to evaluate the length of skin incision, the operation time, the duration of the postoperative local pain, the time required for remission of the complaints, the time for return to full use of the hand, the postoperative grip strength at 3 months, the period of hospital stay after surgery, and the associated conditions.

In addition, all patients were given a questionnaire with the following question: Which procedure was better and why?

Statistical analysis was performed using the *t*-test.

Endoscopic carpal tunnel release

Under general or axillar anesthesia, a skin incision was made in the wrist flexion crease between the palmaris longus tendon and the flexor carpi ulnaris tendon. A blunt bar 3 mm in diameter was inserted into the carpal tunnel in the direction of the ring finger. A second skin incision was made in the area where the palmar center crosses the line of the ring finger to remove the bar. A U-shaped teflon tube with an internal diameter of 3 mm and 15 mm long was inserted into the carpal tunnel through the passage produced by the bar. An arthroscope 2.7 mm or 3.8 mm in diameter with 30 degrees of head angle was then inserted into the tube through the proximal skin hole. The carpal tunnel space can be clearly seen through the opening of the tube. A hook knife (Acufex, 3 mm blade) was then inserted into the tube from the distal skin hole. The knife was hooked on the orifice of the transverse carpal ligament and endoscopic release was achieved by sliding the tube as a whole, while monitoring the tip of the knife and transverse carpal ligament (Figure 1).

Safety was ensured by careful observation through the arthroscope. Immediately after ER,

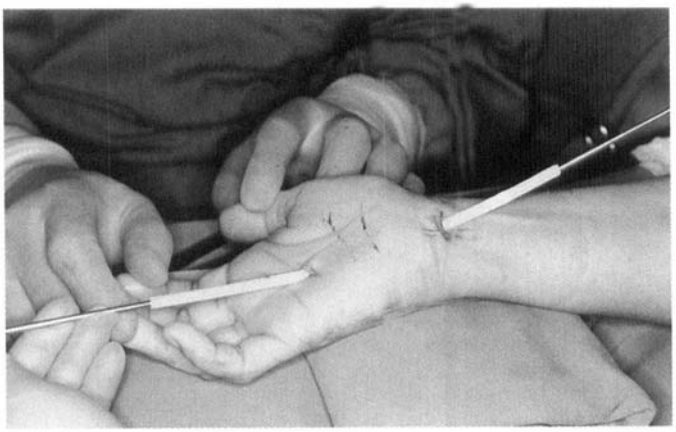

Figure 1. An arthroscope was inserted into a U-shaped teflon tube from the proximal skin hole and a hook knife was similarly inserted from the distal skin hole. Carpal tunnel release was achieved by sliding the entire tube, while simultaneously monitoring the tip of the knife and transverse carpal ligament with an arthroscope.

active finger and wrist motion was permitted.

Open carpal tunnel release

OR was performed in the conventional manner, with a longitudinal volar skin incision, a direct division of the transverse carpal ligament, and a median nerve release, without an internal neurolysis.

Results

The mean length of the skin incision and the operation time from skin incision to bulky dressing were 2.1 cm and 6 min for the ER hands, while they were 5.6 cm and 47 min for the OR hand ($p < 0.01$). The average time required for disappearance of postoperative local pain was 8 days for the ER hands and 31 days for the OR hands ($p < 0.01$). The mean time for remission of the complaints was 2.4 weeks for the ER hands and 2.5 weeks for the OR hands. In the ER hands, the mean time required for return to daily activities with full use of the hand was 12 (4–18) days, compared to 41 (28–51) days in the OR hands ($p < 0.01$). The time required for return to jobs (3 patients) with full range of painless wrist motion was 6 weeks for the ER hands and 7 weeks for the OR hands. The postoperative grip strength, compared to the preoperative one at 3 months, was the same in both procedures. After surgery, we asked all patients to stay in the hospital to avoid wound problems. The average hospital stay was 4 days for the ER hands and 9 days for the OR hands ($p < 0.05$).

The skin scar remained painful for an average of 5 months in 5 OR hands and local swelling with some paresthesia persisted for 6 weeks in 1 ER hand.

The patients preferred ER because of the small skin incision without a painful scar (5), short operation time (3), less postoperative pain (10), earlier return to use of the hand (10) and to jobs (3), and short hospital stay (8).

Discussion

Pain and tenderness, with delayed return to daily activities and employment, are common after open carpal tunnel release (Chow 1989, Futami et al. 1989, Agee et al. 1992). To avoid these problems, many authors have advocated endoscopic carpal tunnel release (Okutsu et al. 1989, Resmik and Miller 1991, Agee et al. 1992, Brown et al. 1992).

Our study is retrospective and non-randomized but it includes patients with bilateral CTS. As far as the author knows, bilateral cases have not been used to evaluate ER.

Comparing both procedures, no significant differences were noted in the remission of postoperative symptoms and signs after surgery. However, ER was superior to OR with its small skin incision and no painful scar, short operation time, less postoperative pain, earlier return to use of the hand, and a short hospital stay. All patients preferred ER.

In my opinion, ER should be used to treat idiopathic CTS. However, ER is a technically demanding procedure, and major iatrogenic complications have been reported (Murphy et al. 1994).

References

Agee J M, McCarroll H R, Tortosa R D, Berry D A, Szabo R M, Peimer C A. Endoscopic release of the carpal tunnel: A randomized prospective multicenter study. J Hand Surg (Am) 1992; 17 (2): 987–95.

Brown M G, Keyser B, Rothenberg F S. Endoscopic carpal tunnel release. J Hand Surg (Am) 1992; 17 (2): 1003–8.

Chow J C. Endoscopic release of the carpal ligamant. Arthroscopy 1989; 5 (4): 19–24.

Futami T, Yamamoto M, Kubotera D. Subcutaneous division of the transverse carpal ligament by use of a Teflon tube and an arthroscope. J West Pacif Orthop Ass 1989; 2 (2): 17–22.

Murphy R X, Allentown P A, Jennings J F. Major neurovascular complications of endoscopic carpal tunnel release. J Hand Surg (Am) 1994; 19 (1): 114–8.

Okutsu I, Ninomiya S, Takatori Y. Endoscopic management of carpal tunnel syndrome. Arthroscopy 1989; 5: 11–8.

Resmik C, Miller B. Endoscopic carpal tunnel release using the subligamentous two-portal technique. Contemp Orthop 1991; 22: 269–77.