Experience with Transtrapezium Approach for Transverse Carpal Ligament Release in Patients with Coexisted Trapeziometacarpal Joint Osteoarthritis and Carpal Tunnel Syndrome

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Abstract An experience with transtrapezium approach for carpal tunnel release is reported. This technique seems to be successful in cases when carpal tunnel syndrome and first carpometacarpal joint osteoarthritis coexist and surgical treatment is indicated for both conditions. The transtrapezium approach to carpal tunnel release allows for complete carpal tunnel release without increasing the risk of surgical complications.

Keywords Carpal tunnel syndrome · Trapeziometacarpal joint osteoarthritis

Introduction

Carpal tunnel syndrome (CTS) and trapeziometacarpal joint arthritis (first carpo-metacarpal osteoarthritis [1st CMC OA]) are common clinical conditions with acknowledged coexistence. Burton and Melone were the first to empha-

size the frequency of simultaneous carpal tunnel syndrome and basal joint arthritis of the thumb [1, 6]. Florack reported a 43% rate of carpal tunnel syndrome associated with basal joint arthritis of the thumb [4]. Traditionally, the basal joint and the carpal tunnel approached using separate surgical incisions. Given the high prevalence of carpal tunnel syndrome in patients with basal joint arthritis of the thumb, care should be taken to treat them at the same time, diminishing the risk of postoperative morbidity and delayed symptoms. We would like to share our experience with transtrapezium approach to carpal tunnel, which allows for complete carpal tunnel release (CTR) and minimize surgical dissection.

Materials and Methods and Results

From 1999 to 2005, the senior author (S. P. S.) performed 15 transverse carpal ligament releases in 14 patients with coexistent carpal tunnel syndrome and first carpometacarpal joint osteoarthritis. All patients diagnosed with coexistent CTS and 1st CMC OA requiring surgical treatment for both conditions underwent CTR using the radial transtrapezium approach. All patients had a history of numbness and night pain in the hand including the radial three or four fingers, without response to conservative treatments. The presence of CTS was confirmed by nerve conduction studies in all patients. A retrospective analysis of preoperative and postoperative subjective signs and symptoms was obtained. At mean follow-up of 38 (13–82) months, we observed a complete disappearance of paresthesia and disturbance of sleep by pain in 14 cases. One patient reported an incomplete but substantial relief of numbness and night pain. All patients reported disappearance of 1st CMC joint pain.

This study was performed at the Division of Hand Surgery, Department of Orthopedic Surgery, State University of New York, University Hospital, Stony Brook, New York.

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Figure 1 The first carpometacarpal joint is approached using curvilinear incision along the radial border of the metacarpal and extending ulnarly in the distal wrist flexion crease as far as the flexor carpi radialis tendon.

Indications and Contraindications

This technique is recommended for treating median nerve compression at the wrist in patients with coexistent CTS and 1st CMC arthritis. In our opinion, the technique is contraindicated in cases of recurrent CTS associated with 1st CMC arthritis.

Surgical Technique

The first carpometacarpal joint is approached using curvilinear incision along the radial border of the metacarpal, extending ulnarly in the distal wrist flexion crease as far as the flexor carpi radialis tendon (Fig. 1). This approach to the 1st CMC joint was first described by Wagner and later popularized by Eaton and Littler [3, 9]. Attention should be

Retracted flexor carpi radialis tendon

Divided deep leaf of TCL

Figure 3 The deep leaf of the TCL is longitudinally incised with either a knife or scissors, completely releasing the TCL.

paid to protect the superficial branch of the radial nerve, the palmar cutaneous branch of the median nerve, and the superficial branch of radial artery. The abductor pollicis brevis muscle is sharply reflected off the first metacarpal base and the capsule is longitudinally incised in line with skin incision. Trapezium is subperiosteally exposed and then osteotomized with an osteotome to facilitate trapezectomy. A complete trapezectomy is performed with a rongeur. Upon completion of trapezectomy the flexor carpi radialis (FCR) tendon is identified at the bottom of the surgical wound. The superficial leaf of the transverse carpal ligament (TCL) overlying the FCR tendon is usually transected as a result of trapezectomy (Fig. 2). The remaining portion of the superficial leaf is incised with scissors, completely releasing the roof of the FCR. The FCR tendon is retracted and the deep leaf of the TCL below

Figure 2 The complete trapezectomy is performed. The superficial leaf of the transverse carpal ligament (TCL) overlying the FCR tendon is usually transected as a result of trapezectomy.

Figure 4 After release of the deep leaf of the TCL, the content of the carpal tunnel can be inspected. The flexor pollicis tendon can be easily retrieved through the surgical incision for inspection (see arrow).

the FCR tendon becomes clearly visualized. A clamp is inserted between the deep leaf of the TCL and the flexor pollicis longus (FPL) tendon to protect contents of the carpal tunnel, and the deep leaf of the TCL is longitudinally incised with either a knife or scissors, completely releasing the TCL (Fig. 3). Care should be taken to extend the release more proximally along the scaphoid insertion of TCL. The contents of the carpal tunnel can be easily inspected through the surgical wound (Figs. 4 and 5). From this point the basal joint arthroplasty can be carried out according to the surgeon's preference. We use a technique described by Burton for the ligament reconstruction tendon interposition (LRTI) with half of FCR tendon [2]. We split the FCR tendon all the way to its insertion on the base of the index metacarpal and then pass into the medullary canal of the first metacarpal and out through the hole in the radial metacarpal cortex. The tendon slip is pulled tightly and sutured to the lateral periosteum of the metacarpal. The remainder of the tendon is then folded in place to act as a spacer and sutured to itself in the deep palmar capsule with the previously placed deep palmar suture.

Rehabilitation and Complications

Postoperatively, the thumb is immobilized in a plaster thumb splint. The sutures are removed in about 10 days and the thumb splint is replaced with a short arm cast, which is worn another 3 weeks. Active-assisted and passive range-of-motion exercises are begun at 4 weeks. Resistive lateral pinch and grip strengthening exercises are started 12 weeks after the surgery [8]. In our opinion, risk of injury to the superficial branch of the radial nerve, the palmar cutaneous branch of

the median nerve, and the superficial branch of radial artery with this procedure is the same as for trapezectomy alone.

Discussion

Lluch (1994) reported the approach for the concomitant surgical treatment of trapeziometacarpal joint osteoarthritis and carpal tunnel syndrome through the same incision, but details of the results were not described [5]. Weber and Sanders (1997) described an approach to the carpal tunnel through the flexor carpi radialis compartment and reported minimal surgical complications with use of this approach for carpal tunnel release [10]. Stahl et al. (2003) described the approach for concomitant treatment of trapeziometacarpal joint osteoarthritis and carpal tunnel syndrome and provided with the only published clinical report of outcomes in patients treated with this approach, reporting good and excellent results in majority of the patients [7]. Our clinical results also support use of this approach to carpal tunnel for treating median nerve compression at the wrist in patients with coexistent CTS and 1st CMC arthritis. In our opinion, the advantages of this technique include: no separate incision is needed for carpal tunnel release; this approach allows decreasing an operative time; and radial sided release of transverse carpal ligament prevents volar bowstringing of the contents of carpal tunnel. The potential disadvantages to transtrapezium approach are limited visualization of the ulnar and distal aspects of the median nerve and inability to explore the motor branch. We believe that given the high prevalence of carpal tunnel syndrome in patients with basal joint arthritis of the thumb, care should be taken to treat these conditions, at the same time, minimize

Figure 5 After release of the deep leaf of the TCL, the median nerve can be easily retrieved through the surgical incision for inspection (see arrow).

surgical dissection, shortening operative time and thereby diminishing the risk of postoperative complications.

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