De Quervain’s disease treatment using partial resection of the extensor retinaculum: A short-term results survey

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Summary
Background: Several operative methods have been described for de Quervain’s disease, but no definite consensus has emerged in the literature. Sometimes simple release of the extensor retinaculum can cause incomplete relief, whereas re-adhesion and excessive excision of the extensor retinaculum can cause volar subluxation of the abductor pollicis longus and extensor pollicis brevis tendons. In this prospective study, we evaluated the early results of operative treatment with one-quarter partial resection of the extensor retinaculum when conservative methods have failed.

Hypothesis: We hypothesized that partial removal of the extensor retinaculum may be used as an alternative to solve problems such as incomplete release or re-adhesion and volar subluxation of the tendons.

Patients and methods: Thirty-four patients (36 hands; 30 females and four males; mean age: 48.2 years; range: 20 to 75 years) with de Quervain’s disease were surgically treated. The surgical procedure was performed under local infiltration anesthesia. One-quarter partial resection of the extensor retinaculum on the dorsal side of the wrist was performed. During the clinical follow-up period, treatment results, a patient-based scoring system and visual analogue scale were used. The mean follow-up duration was 23.7 months (range: 12 to 71 months).

Results: Two patients with wound infections were treated with adapted antibiotics. All patients were relieved of their symptoms; no triggering, recurrence or volar subluxation of the tendons of abductor pollicis longus or extensor pollicis brevis occurred. With this partial resection technique and according to a treatment scoring system described by Sawaiizumi et al., 23 hands had excellent results, 11 hands had good results, and two hands had fair results; no hand exhibited a poor result. The mean visual analogue scale score was 1.8 (range: 0–6).

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Discussion: Our results showed that one-quarter partial resection of the extensor retinaculum on the dorsal side of the wrist can be safely used for the operative treatment of de Quervain’s disease with satisfactory short-term clinical results and no serious complications.

Level of evidence: Level IV: low-power prospective study.

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Introduction

The first dorsal compartment of the wrist lies over the styloid process of the radius and contains the abductor pollicis longus (APL) and extensor pollicis brevis (EPB) tendons [1,2]. The entrapment of the first dorsal compartment of the wrist is a common cause of wrist and hand pain and disability. The first description of a specific entity involving the APL and EPB sheaths at the radial styloid process was done by Fritz de Quervain, a Swiss surgeon, in 1895 [2,3]. The etiology and pathology of de Quervain’s disease remain unclear [2,4], and several methods have been recommended to treat this disease [3–5]. Generally, the management of de Quervain’s disease is nonoperative in the first instance, but surgery should be considered if conservative measures fail for 4 to 6 months [4,6]. Most surgeons agree that abnormal septation of the compartment and variations in the tendons and their sheaths contribute to the process and help explain the poor response to conservative treatment in certain individuals [2,7–9]. In this situation, operative release of the first dorsal compartment may be inevitable. Surgical release of the first dorsal compartment is an effective procedure for de Quervain’s disease and can yield satisfactory results but sometimes may result in volar subluxation of the APL and EPB tendons [2,4,10,11]. Although this is usually asymptomatic, the patient may occasionally become symptomatic [2,10]. Surgical complications of de Quervain’s disease are rare and are usually due to damage to the superficial branch of the radial nerve or due to incomplete release or re-adhesion of the extensor retinaculum [2,4,12,13]. Thus, we hypothesized that partial removal of the extensor retinaculum may be used as an alternative to solve problems such as incomplete release or re-adhesion and volar subluxation of the tendons.

To our knowledge, there are no reports in the English language literature on early results of surgical treatment with partial removal of the extensor retinaculum in de Quervain’s disease. In this prospective study, we present the early results of surgical treatment of de Quervain’s disease with one-quarter partial removal of the extensor retinaculum.

Patients and methods

In this study, 42 consecutive patients (48 hands) who were treated operatively from November 2002 to December 2008 were studied. Written informed consent was obtained from all patients, and approval to use their medical records and to re-evaluate each patient was obtained from the Local Research Ethics Committee.

Inclusion criteria

All patients included in the study had a positive Finkelstein’s test [14] and sharply localized tenderness and pain on exertion at the first dorsal compartment of the wrist. Patients who had rheumatoid arthritis, tuberculosis, gout, chronic renal failure, diabetes mellitus, posttraumatic wrist deformities or those who were pregnant or nursing mothers, and patients who had previously undergone surgery for the same reason were excluded from this study. Four patients (six hands) who underwent surgery with different treatment protocols were excluded.

Patients

Forty-two consecutive patients (48 hands) were selected for this study. The study consisted of 36 (86%) women and six men (14%) with an average age at operation of 47.6 years (20–75 years). The right hand was involved in 23 (55%) patients, and the left hand was involved in 14 (33%); five (12%) cases were bilateral. In 31 (74%) patients, the dominant hand was affected. In some cases, positive radiological findings such as localized osteopenia or spurring at the radial styloid were observed (Fig. 1). Patients with de Quervain’s disease who did not respond to conservative treatment with analgesics, splintage and local steroid injection were treated surgically. In two patients with bilateral de Quervain’s disease, surgical procedures were performed on two separate sessions.

Surgical technique

All procedures were performed with only local infiltration anesthesia (3–4mL of 2% lidocaine HCL) under pneumatic...
tourniquet control. A 2–3 cm transverse skin incision was made over the first dorsal compartment about 1 cm proximal to the tip of the radial styloid process. Sensory branches of the radial nerve and vascular structures were identified and protected. The exposed extensor retinaculum over the first dorsal compartment was sharply incised along the dorsal margin and APL and EPB tendons were identified. Particular attention was paid to identify any anatomical variations in the compartment. Extra septations were excised if they were found. If there was a ganglion within the first compartment, then it was resected. In addition to these surgical applications, we performed one-quarter partial removal of the dorsal portion of the extensor retinaculum (Fig. 2). The tourniquet was then deflated and hemostasis was established. The skin was closed with 3.0 or 4.0 non-absorbable monofilament sutures, and a dressing was applied. Flexion and extension movement of the thumb were encouraged immediately.

Methods

Patients were evaluated with regard to three different criteria. The first of these clinical assessments, the second evaluation of treatment results and the final evaluation of pain were used. Clinical evaluation was performed using the following patient-based scoring system: 1 = no symptoms, normal hand activities; 2 = mild pain, normal hand activities; 3 = moderate pain, reduced hand activities; and 4 = severe pain, no work activities [6]. The treatment results were categorized into four groups: no pain or disruption of daily life was classified as excellent; occasional pain but no disruption of daily life as good; reduced pain but disruption of daily life as fair; and continued or worsening pain and disruption of daily life as poor [15]. Additionally, the visual analogue scale (VAS) was used for evaluation of pain (0 = no pain, 10 = most severe pain).

Results

In this study, four patients (six hands) were lost to follow-up. Of these four patients, one patient (two hands) was deceased during the follow-up period, and three patients (four hands) were lost to follow-up evaluation. Additionally, four patients (six hands) were excluded due to different treatment protocols. We evaluated the clinical and treatment results and VAS scores of the remaining 34 patients (36 hands). The mean follow-up period was 23.7 months (range: 12 to 71 months).

Complications

There were two postoperative complications, including one superficial wound infection and one case of delayed wound healing. These patients were treated with adapted oral antibiotics (amoxicillin/clavulanic acid 2 × 1000 mg per day for 10 days) and there was no progression to deep infection or osteomyelitis of the distal radius.

Anatomical finding

There was an abnormal septation between the APL and EPB tendons in three hands subdividing the compartment into two compartments: a dorsal compartment containing the EPB tendon and a volar compartment containing the APL tendon. However, we did not see any anatomical variations in the tendons.

Functional results

All the patients were relieved of their symptoms, with no triggering, recurrence or volar subluxation of the APL and EPB tendons. All patients returned to their normal activities. At the final follow-up visit, Finkelstein’s test was negative in all cases. There were no instances of crepitus, squeaking or sensory deficits of the superficial radial nerve. All females were housewives exposed to manual work. Two patients (38 and 45 years old women) with bilateral de Quervain’s disease returned to working life within 3 to 4 months. In these patients, surgical procedures were performed on two separate sessions spaced 3 weeks apart to allow for the restoration of full daily living activities of the patients.

Clinical results

At the last follow-up exam, the mean functional score was 1.4 (range: 1–3) in the clinical evaluation: 23 hands had no symptoms; 11 hands had mild pain; two hands had moderate pain; and no hand had severe pain. Furthermore, treatment results were excellent in 23 hands (64%), good in 11 (30%), and fair in two (6%); no hand showed a poor result. Two patients who with fair results indicated that they feel occasional moderate pain when loading the affected wrist during manual work. The mean VAS score was 1.8 (range: 0–6) among all cases. Cosmetically acceptable scars were present in all cases.

Discussion

The surgical results of 34 patients (36 hands) with de Quervain’s disease from 2002 to 2008 with an average follow-up period of 23.7 months demonstrated 94% excellent or good clinical results. All patients were relieved of their symptoms and returned to their normal activities. There were only two complications (one wound infection and one delayed wound
healing). In the present study, patients were evaluated with regard to three different criteria. The first of these clinical assessments, the second evaluation of treatment results and the final evaluation of pain were used. On the other hand, the absence of a control group, a shorter follow-up duration and a limited number of patients may be considered limitations of the study.

De Quervain's disease can cause serious disability and absence from work due to impaired functioning of the wrist and hand. Although conservative treatment includes local anesthetic and corticosteroid injections, other conservative treatment modalities, such as heat, cold, strapping, splints, rest, massage and medications, have also been described [3,5,6,16]. When conservative treatment implemented for 4 to 6 months fails, operative treatment of the first dorsal compartment should be considered [4,6,9].

Anatomical variations of the first dorsal compartment have been reported from 20 to 58% of cases [2,7,17]. These variations may explain the poor response to conservative treatment in some de Quervain's patients. In the present study, we encountered an abnormal septation between the APL and EPB tendons in three hands (8%). In a recent study, the accurate injection of triamcinolone into the sheaths of both the EPB and APL tendons was very effective for treating de Quervain's disease [15]. Another study showed that the EPB compartment was often missed (13 out of 19 cases), possibly because it was separated or due to its small size and deep location, which may be a factor in failed injections [18]. Therefore, the injection method currently used for effective treatment of de Quervain's disease is a two-point injection.

Operative treatment of the first extensor compartment for de Quervain's disease has been reported to be effective with a 91% cure rate. However, the possibility of surgical complications exists (e.g., volar subluxation of the tendon, inadequate decompression, and damage to the superficial branch of the radial nerve) [2,4,12,13,19].

Most anatomical variations in tendon structure can cause persistent or recurrent pain due to incomplete surgical release of the tendon sheath [4,13,20]. In our surgical technique, APL and EPB tendon sheaths were released; then, the extensor retinaculum was released and one-quarter partial removal of the extensor retinaculum was performed on the dorsal side of the wrist. This method was necessary to prevent incomplete release or re-adhesion of the extensor retinaculum. Additionally, avoiding excessive excision of the extensor retinaculum prevents volar subluxation of the tendons. Our results indicate that decompression can be achieved with one-quarter partial removal of the extensor retinaculum.

With a conventional technique, the extensor retinaculum is opened along the midline portion. This technique can therefore sometimes cause volar subluxation of the tendon. In a clinical study, Belsole [21] reported 36 complications in 19 patients after surgical release of the first extensor retinaculum for de Quervain's disease. Of these 36 complications, eight (22%) were related to volar subluxation of the tendons, eight (22%) to injury of the nerve, and seven (20%) to inadequate decompression. The rest of the complications (36%) were related to scars and incorrect diagnoses. Arons [20] reported 14 complications in 16 patients after surgical release of the first extensor retinaculum. Five complications (36%) were related to injury of the superficial branch of the radial nerve and one (7%) was related to volar subluxation of the tendons, other complications (57%) were related to the scar and reflex sympathetic dystrophy. In addition, there have been several case reports of symptomatic volar subluxation of the tendons in de Quervain's disease [10,11,22]. Although volar subluxation of the tendon is usually asymptomatic, the condition may occasionally become symptomatic when the hand is used for manipulative activities [2,10,17,23,24]. Several authors have described different techniques for preventing volar subluxation of the tendon. Ramesh and Britton [10] used the extensor retinaculum to prevent subluxation. With this technique, part of the extensor retinaculum is used to create a U-shaped flap to retain the EPB and APL tendons. Wilson et al. [23] successfully used a distally-based radial forearm fascia-fat flap for recurrent de Quervain's disease. The flap was harvested and turned over 180 degrees; then, the vascularized fascial tube was used to wrap the APL and EPB tendons. Littler et al. [24] also described a reconstruction for the first compartment. In their technique, the septum dividing the first extensor compartment and the EPB are removed from the compartment, and the retinacular sheath is loosely reaproximated over the APL tendon to prevent tendon subluxation. In our series, with one-quarter partial removal of the extensor retinaculum on the dorsal side of the wrist, we did not encounter any volar subluxation of the tendons.

The anatomic relationship of the radial nerve to the first dorsal compartment must be understood in order to prevent complicating injuries to this structure during the surgical procedure because terminal divisions of the radial sensory nerve lie immediately superficial to the compartment [2]. Rask [25] reported three cases with superficial radial neuritis due to de Quervain's disease. In the results from 22 operations on 21 patients, Mellor and Ferris [26] reported 10 complications. One complication (10%) was related to inadequate decompression, six (60%) were related to injury to the superficial branch of the radial nerve, two (20%) were related to wound infections and one (10%) was related to reflex sympathetic dystrophy. Using the longitudinal surgical approach to avoid radial nerve lesions, Bouras et al. [27] noted non-aesthetic scars in three of 20 patients. Harvey et al. [28] reported six complications in 20 wrists treated surgically. Two complications were related to scars, one was a minor wound infection and three were related to a temporary disturbance of the nerve. There were no neural complications in any of the patients included in our study.

Conclusions

The satisfactory clinical results obtained suggest recommending one-quarter partial removal of the extensor retinaculum on the dorsal side of the wrist in order to prevent problems such as an incomplete release, re-adhesion of the extensor retinaculum and volar subluxation of the tendons after operative treatment of de Quervain's disease. Further prospective, randomized comparative studies with larger populations are needed to confirm these results.
Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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