A simple blind tenolysis for flexor carpi radialis tendinopathy

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Abstract

Background Flexor carpi radialis (FCR) tendinopathy is an entity with a chronic form (repetitiveness of work) and an acute form (acute overstretching of the wrist). Confirmation of this syndrome can be established by injection of a small amount of a local anesthetic in the sheath of the FCR at this tender point. Complete relieve of the symptoms after injection confirms the existence of a tendinopathy of the FCR. Whereas rest and/or local application of steroids do not have a persistent effect on the short term outcome, a tenolysis could be performed. Before performing a tenolysis underlying causes should be excluded or treated.

Methods In this article a simple and save technique is described, using a small Beaver knife to open the osteofibrous tunnel of the flexor carpi radialis tendon, without opening the carpal tunnel.

Results Relieve of complaints could be reached up to almost two third of all cases.

Conclusion In cases in which non-operative treatment is not effective regarding FCR tendinopathy, a simple blind technique by opening the osteofibrous tunnel could be successful.

Keywords Flexor carpi radialis · Blind tenolysis · Tendinopathy

Introduction

In 1930, Winterstein described for the first time the existence of flexor carpi radialis (FCR) tendinitis in a patient, based on overuse [13]. Later, Fitton and Weeks described the nonspecific tenosynovitis involving the FCR as a cause of wrist pain [4, 12]. In the 1990s, this phenomenon was linked to osteoarthritis of the joints between scaphoid, trapezium, and trapezoid [2, 6]. Later, MRI studies confirm this entity by showing the direct relationship between the FCR tendinopathy and the triscaphe joint arthritis [9].

In general, FCR tendinopathy can easily be overlooked because other causes of wrist discomfort are seen more frequently combined with low index of suspicion [2, 5]. But, severe tendon damage, including ruptures of the FCR, as the result of a chronic tendinopathy is described [1, 12].

There is a significant association between repetitiveness of work or sports and the prevalence of reported discomfort in the hand and wrist [3, 8]. Tendinopathy of the FCR is seen in this cohort of patients.

In this article, we describe the specific anatomy, the complaints, diagnostics, and a new therapy for this disabling entity.

The FCR is a powerful flexor of the wrist joint with its origin at the medial epicondyle. The insertion is divided between the trapezium and the base of the second and third metacarpal. After contraction of the muscle belly (median nerve), the traction on the volar base of the metacarpals makes it possible for the trapezium, scaphoid, and lunate to roll over and translate ulnar to perform a wrist flexion.

To prevent the tendon (approximately 8 cm) from bowstringing, the tendon is fixed in the volar tunnel next to the carpal tunnel.

Passing the volar aspect of the distal scaphoid, the tendon makes an angle of 45° and enters the fibro-osseous tunnel, palmarly limited by the osseous crest of the trapezoid (Fig. 1).

The tunnel is ulnarly separated from the carpal tunnel by the retinacular septum. Three quarters of the tunnel is formed

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Fig. 1 Specimen of the left hand, showing the trapezial ridge. The retinacular septum and the content of the carpal space are removed

by the trapezium leaving hardly any space for the tendon to move during active flexion. This specific anatomy makes this tendon unique but also vulnerable. Acute overstretching or

chronic repetitive strain, causing swelling and/or lost of the smooth surface, can cause pain or discomfort. In addition, changes in the normal anatomy can challenge the delicate relationship in the trapezial tunnel.

Before the tendon slides into the tunnel, there is a trajectory over the volar distal pole of the scaphoid bone. So, fractures, osteophytes, pseudoarthrosis, malunions, or even benign intraosseous cysts in the distal pole of the scaphoid bone could lead to irritation and subsequent discomfort.

During exploration, a number of disorders can be found. Most patients have, physiologically, adhesions between the tendon and the sheath in different extensions. Adhesions to the trapezium bone seem to be a rule rather than an exception. In a cadaver dissection study performed for anatomical understanding concerning our simple blind tenolysis technique for FCR tendinopathy, we found by coincidence adhesions between the sheath and the bone on a regular base. In patients with complaints, partial rupture or duplication of the FCR tendon and ganglion cysts with hyaluronic acid between the sheath and the tendon are found.

The most important issue of recognition of the FCR syndrome is a high index of suspicion.

Fig. 2 Flow chart of when to perform a FCR tenolysis

Material and Methods

Patients who are prone for FCR tendinitis are those with a history of an acute overstretching or with repetitive work with flexion of the wrist. Acute overstretching occurs in cases of fall and sports activity like volleyball or water polo. Repetitive work is seen in jobs like typists, butchers, and cashiers. The onset could be very acute and specific or slow, without an obvious relationship between complaints and activities. Rest seems to be not effective in the chronic phase. The patient cannot clearly identify the source of discomfort but is, in general, located on the dorsal/radial side of the hand with extension into digits 2 and 3. In half of the patients, there is a radiating pain into the direction of the medial epicondyle and pressure pain over the muscle of the FCR.

There is an aggravation of the pain by passive stretching of the FCR (hyperextension in the wrist) and active flexion against resistance.

Pathognomonic is the specific localized pain during pressure on the tendon just before it enters the fibro-osseous tunnel. This tender spot is the crossing point of the palmar wrist line and the tendon itself. Light pressure gives obviously more discomfort compared with the unaffected side.

Infiltration of the tendon with 1 cc of 1 % lidocaine in the FCR sheath could help to support the diagnosis.

When the specific complaints in rest and during active and passive flexion/extension movements of the wrist are gone or at least substantially diminished after injection, the diagnosis tendinitis of the FCR can be established. In young patients with a history of overuse, treatment can be started. After trauma and in the elderly, X-ray of the carpal bone is mandatory in looking for posttraumatic disorders or triscaphe joint arthritis. The flowchart (Fig. 2) shows the process of decision making for the treatment. In our experience, less than 10 % has a good response on conservative treatment.

MRI can be useful in patients with intralesional pathology of the scaphoid or trapezium or can demonstrate fluid around the tendon on the level of the tunnel (Fig. 3). Sometimes, a ganglion cyst can be seen in the tunnel as cause of the chronic

Fig. 3 MRI (T2) showing a FCR tendinitis (arrow)

Fig. 4 Specimen of the left hand showing the intact retinacular septum (arrow)

recurrence of the complaints of the FCR. Indications for surgical tenolysis are patients who are not responding to nonsurgical techniques, including splints and/or steroid injections without signs of posttraumatic or degenerative disorders of the carpal bones related to the tendon.

The aim of the treatment is to give the tendon in the tunnel more space by opening the retinacular septum between the carpal tunnel and the FCR tunnel (Fig. 4).

The release is classically done through the carpal tunnel as described by Gabel et al. and Schmidt, where the retinacular septum is opened from the inside [5, 13]. The branch of the median nerve to the thumb is at risk and should not be sacrificed. After the treatment, plaster and rest are recommended by many authors [5, 6, 10]. Based on anatomy, we developed our own blind surgical technique in which we start from proximal going distal in the direction of the second metacarpal along to the tendon.

After local anesthesia, a pneumatic tourniquet is established. A 1-cm transverse incision is made on the

Fig. 5 a Small beaver knife before introduction (note the length of the knife). b After incision of the septum, the knife hits the base of the second metacarpal bone

crossing point between the felt of the wrist and the tendon. The tendon is located and its sheath is opened; adhesions are released. The sheath of the tendon is opened using a small knife until it hits the proximal border of the edge of the trapezium bone. From that point, the tip of a Beaver® knife (BD Beaver Arthro-Lok, 4-mm Mini-Meniscus Blade (flat), Ref 379081) is slightly rotated ulnarly until the retinacular fascia is found. Then, the knife is slit carefully into the tunnel at 45° dorsal/distal direction, preventing from damaging the tendon, until the release is completed (Fig. 5). When a small pair of scissors can be brought forward into the tunnel up to the base of the second metacarpal bone, the release is judged as successful. After the release and closure of the skin, only a compression bandage is worn for 2 days. After 2 days, functional after-treatment is started.

Results

We reviewed the records of all patients who had undergone a tenolysis of the FCR from 2003 to 2011. Patients were screened for external causes which could be treated in another way and were excluded from this survey. All patients were treated by one surgeon (PB) in the same way. A blind release was performed under local anesthesia.

Of 72 patients, 41 were available for follow-up. Twenty-nine patients were not traceable and two patients did not want to participate in this study. One of the two patients who did not want to participate was satisfied with the end result; the second person was not completely satisfied. Demographic numbers show female/male ratio of 27:14, mean age 39 years (15–68), and 25 were right-handed and 16 were left-handed (2/3 dominant side). Twenty-one patients had an acute onset and 20 patients had a history of chronic development of the complaints without a trauma.

The mean time between onset of complaints and surgery was 25 months (1–240). Median follow-up was 58 months (4–115).

In 26 (63 %) cases, there were no complaints after surgery, and the patients were satisfied with the end result, 10 (25 %) had less or almost the same complaints, and 5 (12 %) reported even more complaints. In general, within a period of 6 weeks, it was obvious whether the procedure was successful or not. Mean visual analog scale (VAS) score preoperative was 6.1, and mean VAS postoperative was 3.9. Twelve patients received injection therapy after surgery to diminish their complaints. Five patients received second surgery through the carpal tunnel. One patient had temporary CRPS1 complaints.

In case of persistence of the complaints, the carpal tunnel is opened, the median nerve and tendon of the flexor pollicis longus are held ulnarly, and the fascia is exposed from the ulnar side. The eventually incomplete release is completed

until the tendon is freed from its tunnel. In fact, the tendon is now part of the carpal tunnel.

In case of therapeutic resistance, we perform a transection of the tendon just before the entrance of the tunnel and fix the free proximal edge of the tendon side to side at the palmaris longus. This relieves the complaints in all patients.

Discussion

The entity of the FCR tendinitis is more seen in women as described in literature [7]. Operative surgery through the carpal tunnel was already described by Winterstein in 1930, and this technique was described in all publications since [4–7, 13]. Signs of hyperplasia of the synovial, without inflammatory infiltration, are seen on histological examination and mimic the histology seen in tendovaginitis of Quervain [4]. FCR tendinitis was described in the last century as most linked to elderly woman with osteoarthritis. As many patients in our series were young and 50 % had an acute trauma, the entity of FCR tendinitis might need a revision.

The reasonable good results after decompression, using a simple blind technique, are comparable with the standard release through the carpal tunnel [7]. This makes it worthwhile to focus on this entity in all cases of unexplained discomfort on the radial side of the hand and wrist. Positive tests against resistance, followed by pain reduction after an injection of local anesthetic in the sheath, make the diagnosis clear. In case of a bony fragment interfering with the gliding mechanism of the tendon, excision could be helpful [11].

In cases where nonoperative treatment is not effective, a simple blind technique by opening the osteofibrous tunnel could be successful in two thirds of all cases, after excluding external causes like osteoarthritis or malunion.

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