

Pseudotendon Formation Causing Painful Tethering of Ruptured Flexor Carpi Radialis Tendons

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Received: 13 August 2012 / Accepted: 7 September 2012 / Published online: 16 September 2012
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Abstract Six patients (five male, one female) between 51 and 64 years of age sustained ruptures of the right dominant flexor carpi radialis (FCR) tendon. Prior to rupture, within the past 3 months to 1 year, each had received one or two corticosteroid injections of the FCR tendon sheath for stenosing tenosynovitis. Three of six patients demonstrated radiographic findings but none had clinical symptoms of osteoarthritis at the scaphoid-trapezium-trapezoid joint. The pain and disability declared by these patients appeared out of proportion to the relatively innocuous nature of a ruptured FCR tendon, with an average pre-operative Disabilities of the Arm, Shoulder, and Hand (DASH) score of 32. In all patients there was a palpable, tender mass of retracted, ruptured FCR tendon around 6 cm proximal to the wrist crease as well as a palpable cord of pseudotendon formed within the residual sheath. Pain along the course of the pseudotendon was consistently provoked by wrist extension and gripping. The patients were initially treated non-surgically with stretching, manual therapy, ultrasound, and oral medications for 2–4 months. None obtained sufficient relief, and the patients requested more definitive care. The painful tethering of the ruptured FCR was solved by complete excision of both pseudotendon and the retracted tendon stump, resulting in complete relief of symptoms with an average post-operative DASH score of 3. Pre-operative and post-operative DASH scores were analyzed with the paired Student's *t*-test, using a *p*-value of 0.05, and found to have a statistically significant difference.

Keywords Flexor carpi radialis · Rupture · Pseudotendon · Tethering · Excision

Introduction

Stenosing tenosynovitis of the flexor carpi radialis (FCR) is a relatively common clinical condition. Non-surgical treatment includes manual therapy and oral medications but is primarily dependent upon corticosteroid injection of the FCR sheath [1]. The post-injection complication of tendon rupture is rare enough to be limited to case reports [2–4]. The etiology of FCR tendon rupture may also include tendon attrition from the scaphoid-trapezium-trapezoid (STT) joint [5]. Rupture of a digital flexor tendon leads to complaints related to loss of tendon function [2, 3]. Loss of FCR function is typically well tolerated clinically despite some laboratory evidence of slight alteration in wrist kinetics [6, 7].

Methods and Materials

Six patients (five male, one female) between 51 and 64 years of age sustained ruptures of the right dominant FCR tendon. Prior to rupture, within the past 3 months to 1 year, each had received one or two corticosteroid injections of the FCR tendon sheath for stenosing tenosynovitis. Three of six patients demonstrated radiographic findings but none had clinical symptoms of osteoarthritis at the STT joint. The pain and disability declared by these patients appeared out of proportion to the relatively innocuous nature of a ruptured FCR tendon, with a mean pre-operative Disabilities of the Arm, Shoulder, and Hand (DASH) score of 32 (+/– 8). In all patients there was a palpable, tender mass of retracted, ruptured FCR tendon around 6 cm proximal to the wrist crease as well as a palpable cord of pseudotendon formed within the residual sheath. Pain along the course

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of the pseudotendon was consistently provoked by wrist extension and gripping. The patients were initially treated non-surgically with stretching, manual therapy, ultrasound, and oral medications for 2–4 months. None obtained sufficient relief, and the patients requested more definitive care. The painful tethering of the ruptured flexor carpi radialis was addressed by complete excision of both pseudotendon and the retracted tendon stump. At surgery, all patients were confirmed to have fully ruptured and retracted FCR tendons. The patients followed a self-directed stretching and scar massage post-operative regimen. Post-operative DASH scores were obtained at the conclusion of treatment around 3 months following surgery. Pre-operative and post-operative DASH scores were analyzed with the paired Student's *t*-test, using a *p*-value of 0.05.

Research was conducted under approval of the local ethics committee in accordance with the standards of the 1964 Declaration of Helsinki. All patients gave informed consent specifically to be included in this research project.

Results

All six patients declared complete relief of the pre-operative symptom of pain induced by wrist extension and gripping. The mean post-operative DASH score was lowered to 3 (± 2), a statistically significant difference compared to the mean pre-operative DASH score of 32 (± 8).

Discussion

Spontaneous flexor tendon ruptures in patients without inflammatory disease are rare and limited to case reports. A 77 year old male ruptured both flexor digitorum profundus and superficialis following two prior injections over a 2 year period [2]. In addition to the functional loss, he reported pain in the area of the retracted and scarred tendons. His function was restored and his pain relieved by staged tendon reconstruction. A 37 year old female ruptured her flexor digitorum profundus after a series of seven injections given over a 14 month period resulting in both functional loss and pain [3]. She was treated with one stage tendon grafting, ultimately resolving both her functional deficit and pain. It has been 20 years since last reports of FCR rupture [4, 5]. Three patients, having sustained spontaneous FCR ruptures, were described as having minimal disability, in contrast to both the functional deficit and pain reported by the aforementioned cases of digital flexor tendon rupture [2–4]. In a separate case report

of spontaneous FCR rupture, the patient was described as having early pain and swelling but not necessarily any long term problems [5].

The six patients in this series reported no particular functional performance deficit due to their dominant hand FCR rupture. However, they each reported an abnormally high degree of disabling pain arising from the tethering effect of the pseudotendon that had formed in the empty FCR sheath following tendon stump retraction. In each case, a concerted attempt was made to achieve resolution of the tethering symptoms through physical medicine including stretching exercises, manual manipulations by a trained hand therapist, ultrasound, and oral medications. The patients requested a more definitive solution after 2–4 months of failure of the non-surgical program to resolve their symptoms. Based on experience with clinically imperceptible loss of function after complete FCR harvest for reconstructive procedures, the chosen treatment strategy was complete excision of both the pseudotendon and retracted tendon stump. Within weeks of surgery, all 6 patients declared complete relief of their pre-operative symptoms which was measurably reflected in the statistically significant reduction of the mean DASH score from 32 to 3.

Taking all of the preceding cases into consideration, the time interval between initiation of injection therapy and eventual rupture ranged from 6 months to 2 years. Most surgeons would agree that injecting the 37 year old patient seven times was excessive. Many would find tendon rupture in a 77 year old patient after two injections not that surprising. The six patients in this series reveal that with only one or two injections, even patients in their fifties can rupture FCR tendons in less than a year's time, perhaps aided by asymptomatic STT arthritis. What remains hard to explain is why the patients reported such a surprisingly high degree of disability from the tethering effect of the pseudotendon.

The primary purpose of this report is to call surgeons' attention to this relatively rare clinical presentation. It is particularly easy to overlook due to the non-traumatic history. Physical examination is also deceptive, in that the pseudotendon that forms in the empty FCR sheath creates a palpable cord that masquerades as an intact FCR if one does not seek out the subtle abnormality of the tender lump of the retracted original tendon stump. Although, intentional excision of a tendon structure seems a misguided treatment, in this series it proved tremendously successful for these patients.

Disclosure No sponsorship has been received in association with this research. The author has full control of the primary data and agrees to allow the journal to review the data if requested.

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