Original Article

Division of the First Dorsal Compartment of the Hand into Two Separated Canals: Rule or Exception?

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Background: Tendon entrapment of the first dorsal compartment of the wrist, the de Quervain disease, is a common cause of wrist and hand pain and disability. A group of 50 consecutive patients operated for the treatment of de Quervain disease from 2003 through 2006 were prospectively studied to determine the variation in the pattern of the first extensor compartment.

Methods: Eighty-six percent of the patients were females, and 14% were males. In 80% of the cases the nondominant and in 20% the dominant hand was involved. These interesting findings may rule out the occupation's relation to de Quervain disease.

Results: Our study revealed that the compartment is completely separated into two canals in 86% of the patients which was significantly higher than that reported in similar studies.

Conclusion: The existence of two separated compartments for abductor pollicis longus and extensor pollicis brevis tendons should be considered as a common finding during operation to prevent incomplete treatment and recurrence of the symptoms.

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Keywords: de Quervain disease • first dorsal compartment • separation

Introduction

Tendon entrapment of the first dorsal compartment of the wrist is a common cause of wrist and hand pain and disability. Fritz de Quervain has been credited with the description of a specific entity involving the abductor pollicis longus (APL) and extensor pollicis brevis (EPB) tendon sheaths at the redial styloid process in 1895.[1] A similar entity had also been reported in the 1893 edition of Gray's Anatomy Textbook under the title of "Washer Woman's Sprain." de Quervain disease or first dorsal comportment tenosynovitis is the most commonly occurring tenosynovial condition affecting the extensor tendons.[2]

Considering the anatomic variation of the first extensor compartment and the high rate of recurrence after surgical or nonsurgical treatment, we were persuaded to perform a study on this comportment to determine if it is truly composed of two canals.

Patients and Methods

This prospective study was performed from 2003 through 2006 on 50 patients with de Quervain disease, operated by the authors. These patients were thoroughly evaluated and the anatomic relation of APL and EPB tendons and the status of the first compartment, as a common or two separated canals, were recorded for each patient. The postoperative follow-up period was six to 18 months.

Operative technique

The procedure is usually performed under local anesthesia. A pneumatic tourniquet around the arm is well tolerated for the short duration of the operation, as bloodless surgical field is essential for the identification of radial nerve sensory branches, as well as the anatomic situation discussed earlier.

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Table 1. Reported rates of separation of the first dorsal compartment.

Study	Intraoperative finding	Anatomic study
Green's Operative Hand Surgery[1,2]	—	24% – 34%
Leslie et al. (1990)[7]	—	35% – 45%
Aktan et al. (1998)[4]	46.4%	9.75%
Jakson et al. (1986)[5]	40%	33%
Minamikawa et al. (1991)[6]	47%	75%
Strandell (1957)[8]	—	25% – 45%
Gousheh et al.(the present study)	86%	—

A 1.5 to 2-cm transverse skin incision was made over the first dorsal comportment about 1 cm proximal to the tip of the radial styloid process. Care was taken to identify and gently retract the one to three radial sensory branches that cross the compartment obliquely by using gentle, blunt longitudinal dissection as soon as the deepest dermal layer of the skin has been incised. A common technical error is to transversely incise the subcutaneous fat with the skin knife, which may injure a superficial nerve branch. The explored annular ligament covering the compartment was sharply incised with a scalpel. Complete excision of the entire sheath should be avoided because this has occasionally been associated with painful palmer subluxation of the tendon postoperatively. We agree that a thorough dissection must be performed, with complete division of all intervening septa and identification of each tendon slip. Usually thick septa are excised entirely. If the tenosynovial tissue is thick and opaque, surgical debulking is performed. The tendons are lifted by hook or blunt retractors out of the canal to ensure complete decompression from their muscular tendinous junction to a point at least 1 cm distal to the retinacular sheath. The tendons were replaced and the patient moved the thumb to demonstrate free and independent movement of the APL and EPB tendons.

Figure 1. Two separated canals for EPB and APL tendons are clearly observed in a 32-year-old patient. The edges of EPL tendon tunnel are marked with nylon sutures.

Homeostasis was established with cautery after release of tourniquet and the skin was repaired with separated sutures and adhesive bandage. A soft bulky dressing was applied and thumb motion was encouraged in the immediate postoperative period.

Results

Forty-three (86%) of the patients were females, in 40 (80%) of whom the nondominant hand was involved. The mean age of the patients was 52.7 (range: 38 – 71) years. In 43 (86%) of the patients, the first extensor compartment was separated into two subunits. APL and EPB tendons were separately passed through each of them. During surgery, besides release of the first compartment, the second canal associated to EPB was also released (Figure 1). No recurrence was observed in any of the operated cases.

Discussion

Anatomic variation of the first extensor compartment is a well-described fact correlated to the recurrence of de Quervain disease after surgical and nonsurgical treatments. Different authors have reported incidence rates of 24 – 34%,[1] 25 – 45%,[3] and 46%[4] for the anatomic variation. Jackson et al.reported 40% of complete or partial septation of the first compartment in operated patients.[5] This septation existed in one-third of 300 cadavers studied by them. In the present study, this rate was 86% which is significantly more than the previous studies (Table 1). The recurrence rate was 45% in Miramikawa et al.'s study and the rate of observed septation in cadavers was 75%.[6] We did not record any recurrence in the follow-up period which can be explained by the particular attention paid to the release of the second canal, when observed. Considering the anatomic findings, it can be speculated that the existence of two separate canals

in the first dorsal compartment may result in incomplete release and symptomatic recurrence of de Quervain disease.

References

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