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Bifid median nerve as a determinant of carpal tunnel syndrome recurrence after endoscopic procedures. A case report

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Abstract A number of complications have been associated with endoscopic technique in treating carpal tunnel syndrome (CTS). We observed a female patient who had previously undergone endoscopic surgery for CTS. Shortly after surgery, this patient complained of pain, numbness and strength deficiency, as severe as it was before the operation. A new, open, surgical procedure was performed. During this second-look surgery, we found a bifid median nerve, which

divided into two branches at the second third of the forearm, proximal to the flexor retinaculum. We strongly suggest a careful exploration of the median nerve in the carpal tunnel. Moreover, we believe that an extensive preoperative assessment of median nerve morphology and function is mandatory prior to endoscopic approach in treating CTS.

Key words Carpal tunnel syndrome • Median nerve neuropathy

Introduction

Anatomic variations of the median nerve in the carpal tunnel have been widely described by Lanz [1], who provided a classification of these conditions. Median nerve separation can be accompanied by an aberrant muscle or a persistent median artery. Schultz et al. [2] reported an association between bifid median nerve and an abnormal lumbricalis muscle. Amadio [3] described a more proximal division with a separate compartment containing the radial branch of the bifid median nerve in the carpal tunnel. These branches can also join together distally to the flexor retinaculum [4], or they may have a communication bridge or an accessory compartment for one of two branches in the carpal tunnel [5].

We report the case of a woman with a bifid median nerve originating from the central third of her left forearm, with its ulnar branch lying in a fibrous connective compartment within the carpal tunnel. The patient had previously undergone carpal tunnel surgery via endoscopic approach, without any definitive postoperative improvement.

Case report

We observed a 68-year-old woman who referred diurnal and nocturnal numbness and paraesthesia of the left hand. She complained of strength reduction and loss of sensitivity of the first and second fingers. The patient had not received any trauma on the left wrist, but she had previous surgery for carpal tunnel release with an endoscopic technique (Agee) 18 months earlier. After the first surgery, she had a slight and temporarily limited improvement of symptoms; then she progressively returned to her pre-operative symptoms and neurological status and subsequently worsened.

Physical exam showed positive Tinel's and Phalen's signs. Thenar atrophy was also present, together with a moderate loss of strength. A plain radiograph of the cervical spine showed mild cervical osteoarthritis at C5-C6. An electrodiagnostic test showed worse results than the previous one: conduction velocity was reduced to 48.4 m/s with a motor distal latency of 6.1 ms and a sensory distal latency of 5.0 ms. Signs of denervation of the left abductor brevis pollicis muscle were also present. The electrodiagnostic tests of

the right median nerve and of left and right ulnar nerves gave normal results.

The patient was informed about her status and she gave consent to undergo a new surgery, due to her severe carpal tunnel syndrome. We decided to make a short incision of 20 mm from the proximal crease of the wrist to the palmar region, along a line lying between the third and fourth metacarpal rays. During surgical exploration a second nervous branch, which laied parallel to the first one, was observed opening a fibrous connective sub-compartment close to the flexor retinaculum. We then explored the two branches along their way (Fig. 1). They were parallel and neither had anastomotic bridges nor re-joined the carpal canal. We performed neurolysis and tenosynovectomy, due to the intense inflammatory reaction. Histologic examination showed pigmented villonodular tenosynovistis.

The patient had complete resolution of her symptoms 3 months after surgery.

Discussion

At the beginning of the surgery, it was not possible to individuate the division of the median nerve. The ulnar branch was covered by a thin fibroconnective layer close to the flexor retinaculum. We exposed this branch because the

radial one suffered from an intense inflammatory reaction of tendons and their synovia. The diameter of the radial branch appeared to be much inferior to the anatomic standard. We then performed accurate neurolysis and tenosynovectomy, which were allowed by the open technique; then we opened the fibroconnective tissue in which the ulnar subunit laied. Surgical exploration of the volar region of the forearm was performed in order to evaluate any other anatomical abnormality, since this is a widely described possibility.

In our experience, mini-incision open technique is a good choice for the treatment of carpal tunnel syndrome (CTS). Wide anatomical exploration of this region, with the possibility to perform an accurate neurolysis and tenosynovectomy, is allowed by "full-open" procedures. Recently, endoscopic technique has been widely performed in treating CTS; however, we think that it has some limits, which indicate its use in mild to moderate CTS and in patients in need of secure cosmetic results. These patients should undergo pre-operative tests such as ultrasonography or magnetic resonance imaging [6, 7].

The female patient we have treated represents the result of unsuccessful endoscopic release of the flexor retinaculum. This technique allows the division of the transverse carpal ligament, but only a limited evaluation of the carpal canal and of its components is possible. Moreover, dissection of the tendons and other anatomical structures with the

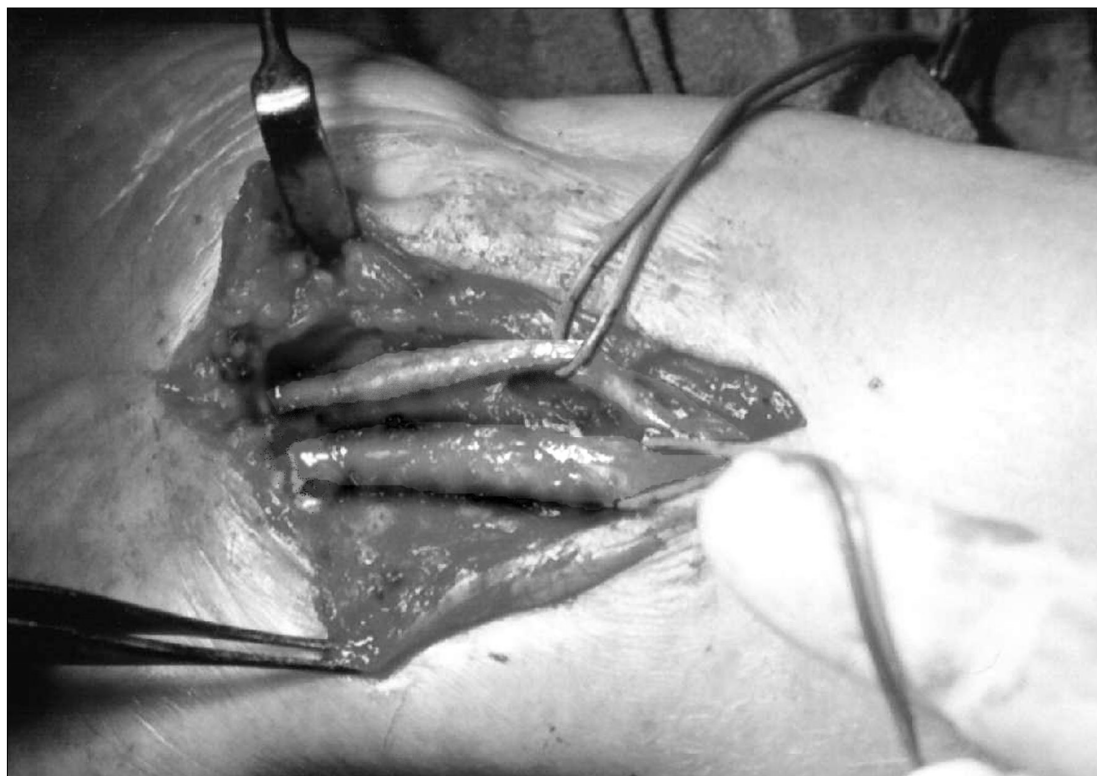


Fig. 1 Surgical exposure showing the two branches of the median nerve