

Original article

Comparison of results after surgical repair of acute and chronic ulnar collateral ligament injury of the thumb

Comparaison des résultats obtenus après réparation chirurgicale des lésions aiguës et chroniques du ligament collatéral ulnaire du pouce

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Received 15 July 2014; received in revised form 23 September 2014; accepted 5 October 2014

Available online 22 October 2014

Abstract

This study sought to demonstrate that successful outcomes can be achieved with the new technique presented here for chronic ulnar collateral ligament (UCL) injury of the thumb metacarpophalangeal (MCP) joint, as well as with K-wire pinning for acute UCL injury. We followed 19 patients who suffered an UCL rupture (mean follow-up: 14.26 ± 4.65 months) and 32 patients who presented with UCL avulsion fracture (mean follow-up: 16.81 ± 7.54 months). We used a free tendon graft for UCL reconstruction in the UCL rupture group. Both ends of the graft were stabilized with bioabsorbable suture anchors, which were used as biotenodesis interference screws. Closed reduction and K-wire fixation was used in UCL avulsion fracture group. There were no statistically significant differences between operated and contralateral healthy thumb MCP joint in both groups in the grip strength, tip pinch strength, flexion, extension, ulnar deviation, and radial deviation movements at final follow-up. Grip strength, tip pinch strength, ulnar deviation and radial deviation were significantly better in the avulsion group than the rupture group. All patients regained full stability at the MCP joint in avulsion group; 16 patients regained full stability and 3 patients presented with mild laxity (less than 10° laxity) in rupture group. Glickel grading scale used as a functional score was excellent for 30 patients and good for 2 patients in avulsion group; it was excellent for 17 patients and good for 2 patients in rupture group. Our study shows that closed reduction and percutaneous K-wire fixation of acute displaced large UCL avulsion fracture is a simple technique and achieves adequate stability of UCL. For UCL rupture, free tendon reconstruction with bioabsorbable suture anchors provides adequate stability and stable fixation within the tunnels.

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Keywords: Ulnar collateral ligament; Thumb; Free tendon graft; Rupture; Avulsion fracture; Surgery

Résumé

Le but de cette étude était de montrer que des résultats satisfaisants pouvaient être atteints avec notre nouvelle technique dans les lésions chroniques du ligament collatéral ulnaire (LCU) de l'articulation métacarpo-phalangienne (MCP) du pouce comme avec l'embrochage avec des broches de Kirschner dans les lésions aiguës. Nous avons suivi 19 patients qui présentaient une rupture (recul moyen: 14,26 ± 4,65 mois) et 32 patients qui présentaient une fracture-avulsion du LCU (recul moyen : 16,81 ± 7,54 mois). Nous avons utilisé une greffe tendineuse libre pour la reconstruction du LCU dans le groupe « rupture ». Les deux bouts du greffon étaient stabilisés grâce à des ancrs et des sutures résorbables, utilisées comme des vis d'interférence. Une réduction à foyer fermé et une ostéosynthèse par broches de Kirschner étaient utilisées dans le groupe « fracture-avulsion ». Il n'y avait pas de différence statistiquement significative au niveau des articulations MCP entre la main opérée et la main controlatérale dans les deux groupes pour les critères suivants : force de poigne, force de pince, flexion, extension, abduction palmaire, et abduction

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radiale au recul final. Cependant, la force de poigne, la force de pince, l'abduction palmaire et l'abduction radiale étaient significativement meilleures dans le groupe « fracture-avulsion » que dans le groupe « rupture ». Tous les patients avaient récupéré une stabilité complète de l'articulation MCP dans le groupe « fracture-avulsion » ; 16 patients avaient récupéré une stabilité complète de l'articulation MCP et 3 conservaient une légère laxité (moins de 10°) dans le groupe « rupture ». Le score de Glickel utilisé comme indice fonctionnel était excellent pour 30 patients et bon pour 2 patients dans le groupe « fracture-avulsion », excellent pour 17 patients et bon pour 2 patients dans le groupe « rupture ». Notre étude montre que la réduction fermée et l'embrochage percutané des fractures-avulsions récentes déplacées du LCU à gros fragment est une technique simple qui restaure la stabilité du LCU. Pour les lésions en plein corps ligamentaire, une greffe tendineuse libre fixée par des ancrés résorbables rend une stabilité satisfaisante. Les ancrés résorbables procurent une fixation stable dans les tunnels osseux.

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Mots clés : Ligament collatéral ulnaire ; Pouce ; Greffe tendineuse libre ; Rupture ; Fracture-arrachement ; Chirurgie

1. Introduction

The ulnar and radial collateral ligaments are the two main supporting ligaments for the metacarpophalangeal (MCP) joint of the thumb [1]. Injuries of the ulnar collateral ligament (UCL) are more common than those of the radial collateral ligament [2]. Injuries to the UCL can lead to symptomatic joint instability [3]. The patient has pain, swelling, and bruising on the ulnar side of the thumb MCP joint. The patient may be unable to hold objects. Weaker pinch and grip strength may occur after UCL rupture [4].

Injury to the UCL of the thumb MCP joint are most of the result of valgus loading [5]. Valgus laxity indicating a complete tear of the UCL has been defined previously as greater than 30° of deviation or 15° greater than the normal hand. UCL tenderness with less than 30° of deviation or 15° greater than the normal hand is indicative of a partial tear [6].

UCL rupture most often occurs at the ligament's distal insertion at the base of the proximal phalanx [7]. With X-rays, one can identify major laxity by comparing the line tangent to the base of the proximal phalanx and the line tangent to the sesamoid bones. When these two lines are not parallel, there is an avulsion of the collateral ligament [8].

Different surgical techniques have been described for chronic UCL rupture such as the dynamic transfer of the adductor pollicis tendon, refashioning the ligament from capsular remnants, tendon advancement and MCP joint fusion [9–12]. Some surgeons prefer reconstructing the ligament with a free tendon graft [4].

UCL ruptures may be associated with an avulsion fracture from the ulnar aspect of the base of the proximal phalanx. In avulsion fracture cases, the treatment protocol is based on the size of the fracture fragment. Small fragments are excised; larger fragments are fixed by K-wires, mini-screws, and transosseous suture [13].

The goal of this study was to demonstrate that successful outcomes can be achieved with the new technique presented here for chronic UCL injury as well as with K-wire pinning in acute UCL injury.

2. Patients and methods

2.1. Patients

Fifty-one patients diagnosed with UCL injury between January 2009 and January 2013 were involved in the study. Nineteen patients had an UCL rupture, 32 patients had an UCL avulsion fracture. Patients with additional tendon, nerve injuries and bone fractures were excluded from the study. The preoperative age, gender, men/women ratio, time between injury and surgery was evaluated in both groups (Table 1). There were various UCL injury mechanisms: traffic accident (19 patients), fall from height (14 patients), sports activity (11 patients), work-related accident (4 patients), and heavy lifting (3 patients).

The patients mainly complained of weak pinch grip and pain on the ulnar side of the MCP joint with use. The diagnosis was primarily based on the clinical examination. All patients had laxity of the UCL of the thumb MCP joint (Fig. 1D). X-rays were very important if the patients had a suspected UCL avulsion fracture (Fig. 1A).

2.2. Methods

Evaluation of all patients was performed by a hand physiotherapist in a different rehabilitation center. The surgical results were evaluated objectively, subjectively and radiographically. Objective evaluation consisted of range of motion in the thumb MCP joint, grip and tip pinch strength. These results were compared to the contralateral healthy thumb. Grip

Table 1
Patient demographics.

	Ulnar collateral ligament rupture	Ulnar collateral ligament avulsion fracture
Age	30.15 ± 5.79	27.75 ± 7.28
Men/women	17/2	26/6
Time between injury and surgery	12.89 ± 7.01 months	14.00 ± 9.45 hours
Follow-up period (months)	14.26 ± 4.65	16.81 ± 7.54

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