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Original article

Dorsal scapholunate stabilization using Viegas' capsulodesis: 25 cases with 26 months-follow-up

Stabilisation scapho-lunaire par capsulodèse dorsale selon Viegas : 25 cas à 26 mois de recul

E.J. Camus [a,*], L. Van Overstraeten [b]

[a] *SELARL chirurgie de la main et du pied, clinique du Val-de-Sambre, 162, route de Mons, 59600 Maubeuge, France*
[b] *HFSU, rue Pierre-Caille n° 9, 7500 Tournai, Belgium*

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Abstract

Intercarpal instability is often secondary to a scapholunate interosseous (SLIO) ligament lesion. Its reconstruction is thus essential. Classical capsulodesis techniques fix the scaphoid in extension and do not reproduce the physiologic ligamentous isometry of the wrist. The authors use the technique of Viegas, which seems to respect this isometry: the dorsal intercarpal ligament is re-inserted dorsally to reattach the capsule on the dorsal SLIO and to reinforce it. Between 2006 and 2010, 25 wrists were operated on in 12 men and 12 women of mean age 38 years. All patients presented with pain often associated with loss of power, decreased mobility or a debilitating click. The mean follow-up was 26 months. Postoperative and preoperative data were compared. Flexion/extension range increased by 2.6°, radioulnar deviation increased by 21.1°. Grip strength increased by 8.7 kgf. Pain decreased by 3 points on the VAS and the PRWE improved by 59 points. We observed four CRPS, one EPL lesion and one case of superficial track pin infection. We got eleven excellent results, nine good, two moderate and three bad, two of which were re-operated. Viegas' capsulodesis does not present major technical difficulty. The results show no stiffness in flexion/extension. There was evident improvement in radioulnar deviation, grip strength, pain and PRWE scores. This technique provides effective treatment for a difficult or irreparable lesion of the SLIO ligament, without fixed carpal instability corresponding to Geissler arthroscopic stages 2 to 4 and Garcia-Elias stages 3 and 4. The capsulodesis produces an effective stabilization without stiffness. Precautions should be undertaken to avoid CRPS and pin complications.

Keywords: Wrist; Instability; Scapholunate; Capsulodesis

Résumé

L'instabilité intracarpienne est souvent secondaire à une lésion du ligament scapho-lunaire. Sa reconstruction paraît donc essentielle. Les techniques classiques de capsulodèse refixent le scaphoïde en extension, mais ne reproduisent pas l'isométrie ligamentaire physiologique du poignet. Les auteurs utilisent la technique de Viegas qui semble respecter cette isométrie : le ligament intercarpien dorsal est utilisée pour réattacher le composant dorsal du ligament scapho-lunaire à la capsule et pour le renforcer. Entre 2006 et 2010, 25 poignets ont été opérés chez 12 hommes et 12 femmes, d'âge moyen 38 ans. Tous présentaient une douleur handicapante avec une perte de force, de mobilité ou des ressauts gênants. Le recul moyen est de 26 mois. Les données pré- et postopératoires ont été comparées. L'arc de flexion/extension a gagné 2,6°. L'arc d'abduction/adduction a gagné 21°. La force de poigne a gagné 8,7 kgf. La douleur a diminué de 3 points sur l'échelle EVA. Le score fonctionnel PRWE s'est amélioré de 59 points. Les résultats furent excellents onze fois, bons neuf fois, moyens deux fois et mauvais trois fois dont deux ont été réopérés. Les auteurs ont déploré quatre syndromes douloureux régionaux complexes, une lésion du tendon EPL et un cas d'infection superficielle sur broche. La technique de capsulodèse selon Viegas ne présente pas de difficulté chirurgicale importante. Les résultats ne montrent pas de raideur du poignet. On note une amélioration de l'arc de mobilité en abduction/adduction, de la force de poigne, des scores de douleur et de fonction. Cette technique permet un traitement des lésions non ou difficilement réparables du ligament scapho-lunaire, correspondant aux stades d'instabilité arthroscopique 2 à 4 selon

* Corresponding author.
E-mail address: emmanuel.camus@wanadoo.fr (E.J. Camus).

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Geissler, et 3 à 4 selon Garcia-Elias. La capsulodèse permet une stabilisation effective du carpe, sans raideur. Il faut prévenir un possible syndrome douloureux régional et les complications des broches.

Mots clés : Poignet ; Instabilité ; Ligament scapho-lunaire ; Capsulodèse

1. Introduction

Posttraumatic instability with carpal misalignment was first described in 1977 by Linscheid et al. [1]. The instability is usually related to a scapholunate ligament (SLIO) lesion. This ligament should be the first ruptured in the trauma process [2]. It appears to be one of the principal restraints for carpal stability, especially its dorsal portion [3], and it is mechanically the most prone to injury [4]. The repair of this dorsal portion thus seems essential to future stability and integrity of the wrist. Several techniques of stabilization have been proposed, from simple immobilization with isolated pinning [5] to intracarpal fusions [6–8], passing by various techniques of ligament repair [9], capsulodesis and tenodesis [10]. Nevertheless, the most notorious of these classic techniques [11–13] do not reproduce the ligamentous isometry of the wrist as well as causing stiffness.

In a study of dorsal carpal ligaments [14,15], Viegas et al. described a capsulodesis technique reinforcing the dorsal portion of the SLIO, which is mechanically the most significant [3,16]. This capsulodesis reproduces most closely the natural carpal ligament structure and probably better respects the ligament kinematics. It reproduces also the anatomical attachment, named the Dorsal Capsulo-Scapho-lunate Septum (DCSS), between the SLIO and the dorsal intercarpal (DIC) ligament, recently precised in a cadaveric study [17].

The aim of our study was to assess functional results of such a capsulodesis.

2. Patients and methods

Between 2006 and 2010, 24 patients (25 wrists) were included in a prospective study (Table 1). Inclusion criteria were adults in whom the symptoms caused disability, and a scapholunate (SL) chronic sprain was demonstrated with arthro CT and arthroscopy, without any associated injury of the wrist. The Viegas' technique was proposed when there was no cartilage lesion at arthroscopy [18] and when the DIC ligament was usable.

Preoperative and postoperative results were compared. Clinical symptoms, mobility, force, pain, PRWE score and global results were recorded.

The series was continuous and includes 12 men and 12 women. The mean age at operation was 38 (17–60) years. The mean delay between the lesion and surgery was 12 months (1.5–60). The dominant side was involved in 19 cases. Subjectively patients reported debilitating pain in all cases, a loss of grip strength in 21 cases, clicking in 12 cases, swelling in five cases and significant loss of mobility in three cases. Pain was 5.6 (2–9) on the VAS. The PRWE score was 101 (35–141). Flexion/extension ROM was 107° (40–150) and radioulnar deviation was 45° (20–90). Grip strength was 19 kg force (kgf) (2–62).

Radiographic measurements were recorded on digital images using Telemis PACS^{TM} software (Telemis SA, Louvain la Neuve, Belgium). The SL interval on grasp anterior posterior (AP) views was 2.5 mm (1.4–5). For three cases the gap was over than 3 mm (cases 2, 4, 15). The SL angle was 55.1° (39–78) on lateral view in neutral position. There was a DISI in five cases (2, 3, 6, 10, 14).

The CT arthrogram showed scapholunate leakage in 16 cases. All patients were evaluated arthroscopically before undergoing a capsulodesis. Scapholunate laxity was assessed as Geissler [19] stage 2 in three cases, stage 3 in 16 cases and stage 4 in six cases (Table 1).

The type of radiologic instability was indicated:

- static (S) means an instability installed and visible on radiographs (5 cases);
- dynamic (D) means an instability visible on dynamic radiographs (2 cases);
- occult or pre-dynamic (P) means an instability non visible on radiographs, but present at arthroscopic testing with a hook (18 cases).

The state of the SLIO was indicated: ruptured (R) in 19 cases, loosened (L) in three cases, or fibrous (F) in three cases.

The capsulodesis technique used was described by Viegas in 2000 [20], using a proximal transverse portion of the DIC ligament, which is reinserted at the dorsal SL interval (Fig. 1). This was most often performed using a scaphoid and a lunate anchor. The repair was protected by scapholunate and scaphocapitate pinning using two K-wires of 1.2 mm diameter for 7.5 weeks, associated with a rigid forearm splint.

Grasping was prohibited while free finger mobility was encouraged.

Results were considered excellent when the patient resumed all previous activities at the same level without symptoms. They were considered good when functional return to activity was complete but little symptomatic, moderate if activity modification was necessary and bad if full return to activity was not possible due to residual symptoms.

3. Results

The mean follow-up was 26 months (13–54) (Table 2). At final follow-up the flexion-extension ROM was 109°