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Original article

Total distal radioulnar joint prosthesis as salvage surgery in multioperated patients

Prothèse totals de l'articulation radio-ulnaire distale, chirurgie de sauvetage chez les patients multiopérés

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Abstract

The purpose of this study was to report the results following implantation of a total distal radioulnar joint prosthesis in five multioperated patients with posttraumatic or Essex-Lopresti injury. The range of motion (ROM) for flexion and extension, radial deviation and ulnar deviation of the wrist, and pronation and supination of the forearm, grip strength, pain intensity through a visual analog scale (VAS), surgical complications and ability to return to work, were recorded. Subjective and objective functions were assessed using the quick DASH questionnaire and the modified Mayo wrist score, respectively. The mean postoperative follow-up was 4.3 years. Average postoperative increase in ROM was 28.8° for flexion-extension; 2.2° for radial and ulnar deviation, and 18° for pronation-supination, reaching 85.8%, 85% and 80.8% of the contralateral hand function, respectively. Grip strength increased by 6.8 kg, with recovery of 78% of the strength of the unaffected hand. VAS score decreased to a mean of 6.2 postoperatively. There were complications in two cases. All five patients showed no signs of implant loosening or movement. The quick DASH score decreased from a mean of 85 preoperatively to 38.6 postoperatively. The modified Mayo wrist score increased from a mean of 24 preoperatively to 73 at final follow-up. Four patients recovered their professional and daily activities without restriction and were satisfied with the procedure; one patient with heterotopic bone formation at the distal tip of the ulnar stem did not want any further surgery and agreed to job modifications.

Keywords: Distal radioulnar joint; Salvage surgery; Prosthesis

Résumé

Le but de cette étude était de rapporter les résultats de l'utilisation de la prothèse totale de l'articulation radio-ulnaire distale chez cinq patients multiopérés souffrant de séquelles post-traumatiques ou d'une lésion d'Essex-Lopresti. Nous avons évalué l'arc de mobilité (ROM) pour la flexion-extension, les déviations radiale et ulnaire du poignet, et la pronation-supination, la force de poigne, l'intensité de la douleur sur l'échelle visuelle analogique (EVA), les complications chirurgicales et les conditions de retour au travail. Les fonctions subjective et objective ont été évaluées respectivement par un score quick DASH et un score de la Mayo Clinic modifié pour le poignet. Le recul moyen était de 4,3 ans. L'amélioration postopératoire de l'arc de mobilité a été de 28,8° pour la flexion et extension, de 2,2° pour les inclinaisons radiale et ulnaire, et de 18° pour la pronation-supination, atteignant respectivement 85,8 %, 85 % et 80,8 % de la fonction de la main controlatérale. La force de préhension était améliorée de 6,8 kg, atteignant 78 % de la main saine. La réduction moyenne de la douleur postopératoire sur l'échelle visuelle analogique était de 6,2. Deux complications postopératoires ont été notées. Aucun patient n'a montré de signes de descellement ou de mobilisation de l'implant. Le score quick DASH moyen a diminué de 85 en préopératoire à 38,6 en postopératoire. Le score moyen de la Mayo Clinic modifié était de 24 en préopératoire et de 73 à la fin du suivi. Quatre des

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cinq patients ont repris leur travail et leurs activités quotidiennes et ne regrettent pas d'avoir subi cette intervention ; un patient avec une ossification hétérotopique à la partie distale de la prothèse a bénéficié d'une adaptation de son poste après avoir refusé une chirurgie itérative.

Mots clés : Articulation radio-ulnaire distale ; Chirurgie de sauvetage ; Prothèse

1. Introduction

The distal radioulnar joint (DRUJ) has a key role in forearm pronation and supination, and contributes to wrist stability. It is a common site of inflammation, degenerative conditions, infections, tumours, and congenital abnormalities. DRUJ chronic instability leads to osteoarthrosis, persistent pain and decreased grip strength and mobility. Treatment is difficult. Several surgical procedures have been described with no consensus regarding indications and results [1]. This results in repeated surgical procedures, leading to a dead end where a total DRUJ prosthesis is one of the few options left to maintain function and relieve pain. Nevertheless, the current literature about these implants is scarce and lacks long-term results [2]. The purpose of this study was to report the outcomes following implantation of a total DRUJ prosthesis in a small series of patients who had undergone several previous procedures.

2. Patients and method

We performed a prospective study on five women who ranged in age from 36 to 65 years (average 49.4) and had undergone a total of 15 DRUJ surgical interventions (average 3, range 2–5). In four cases, the injury was traumatic. Three of them had undergone the Sauvé-Kapandji procedure (Fig. 1) or matched hemiresection interposition arthroplasty of the DRUJ (Fig. 2); the fourth one suffered from failed reconstruction of a distal radius and ulna fracture. The fifth patient had undergone radial head excision at the age of 10 due to congenital dislocation of the radial head and suffered a severe radial neck impaction with humeroradial joint destruction and ulnar impaction syndrome (Fig. 3); this patient required an additional radial neck resection at 36 years of age, four months after the arthroplasty procedure. All patients had painful instability in the DRUJ or in the ulnar stump after osteotomy, range of motion deficits and decreased grip strength.

Between January 2008 and May 2011, all patients underwent salvage surgery with implantation of a second-generation, semiconstrained ball and socket DRUJ Scheker prosthesis (Aptis Medical, Louisville, Kentucky, USA) using the published surgical technique for this prosthesis [3,4]. This prosthesis was made of cobalt chromium. The radial plate provided better contact with the bone; the ulnar stem was a press-fit design for greater strength during heavy lifting and was coated with porous plasma titanium on its distal intraosseous third. In one patient, the ulnar stem was used without an extension (Fig. 4); in another, the extended stem was 1-cm long and in the three remaining patients, the extended stem was 2-cm long (Fig. 5). The size of the radial plate was 20 in three patients, and 30 in two patients. The left non-dominant side

Fig. 1. Sauvé-Kapandji procedure with radioulnar impingement upon lifting a 2-kg load.

Fig. 2. Hemiresection arthroplasty of distal ulna as salvage surgery after distal radius fracture fixation.