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journal homepage: www.casereports.comUlnar head arthroplasty with posterior interosseous nerve neurectomy: A case report[☆]Luís Mata Ribeiro^{a,*}, Miguel Alves Botton^b^a Plastic and Reconstructive Surgery Department, Hospital São José, Lisbon, Portugal^b Hand and Wrist Unit (Center of Orthopedics and Traumatology), Hospital Cuf Descobertas, Lisbon, Portugal

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ABSTRACT

BACKGROUND: Distal Radioulnar joint (DRUJ) arthropathy can occur as a consequence of multiple mechanisms, including trauma, inflammatory or degenerative arthritis or even congenital anomalies. Ulnar head arthroplasty has been proposed as a viable therapeutic option, potentially restoring wrist function and improving pain control. This can also be achieved by complete wrist neurectomy but it has several risks associated with the procedure. A selective neurectomy may be more effective.

CASE PRESENTATION: We report the case of a 51-year-old man, Tool-Collector, who suffered from constant diffuse left wrist pain aggravated with activities and had a swollen and tender wrist at physical examination with limited range of motion on pronation-supination. Radiographic and magnetic resonance imaging showed degenerative changes in the radiocarpal joint and distal radioulnar joint. In order to preserve the remaining mobility and reduce the wrist pain we proceeded with an ulnar head arthroplasty and a posterior interosseous nerve neurectomy, through a single skin incision in the dorso-ulnar side of the wrist. Afterwards, the patient followed a strict rehabilitation program with a hand therapist. Six months later he returned to his previous job with no limitations.

CONCLUSIONS: Ulnar head arthroplasty seems to be a very good option in the treatment of severe DRUJ arthrosis. It significantly improves pain control while maintains or even improves range of motion. Posterior interosseous nerve neurectomy is a simple technique and highly effective.

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1. Background

Distal Radioulnar Joint (DRUJ) arthropathy can occur as a consequence of multiple mechanisms, including trauma, inflammatory or degenerative arthritis or even congenital anomalies in the joint [1,2]. For severe injuries the most common treatment procedure has been ulnar head excision. This procedure leads frequently to radioulnar instability and does not always bring a significant pain relief [3,4]. Ulnar head arthroplasty has been proposed as a viable option, potentially restoring wrist function and improving pain control.

We describe the case of a middle aged man submitted to an ulnar head arthroplasty (uHead System, Stryker Medical, Kalamazoo, USA) and posterior interosseous nerve neurectomy (PINN) following degenerative arthritis in the DRUJ and radiocarpal joint.

This work has been reported in line with the SCARE criteria [14].

Abbreviations: DRUJ, distal radioulnar joint; PINN, posterior interosseous nerve neurectomy; TFCC, triangular fibrocartilage complex.

[☆] This work has been reported in line with the SCARE criteria (Agha et al., 2006).

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2. Case report

We report the case of a 51-year-old man, left-handed, Tool Collector, who presented to us with constant diffuse left wrist pain aggravated with activities, in particular grip strength. Physical examination showed a swollen and tender wrist, with limited range of motion. He had been operated 20 years before at the same wrist and was submitted to an open triangular fibrocartilage complex (TFCC) repair. He had no significant comorbidities.

He was first submitted to conservative management with rest, anti-inflammatory drugs and cryotherapy. After 3 weeks there was a mild regression of the wrist edema but the pain persisted. Radiographic (Fig. 1) and magnetic resonance imaging were performed to assist in the diagnosis and to plan the eventual surgical treatment. They showed significant degenerative changes in the radiocarpal and DRUJ, with TFCC rupture and ulnocarpal loading.

Since the patient wanted to keep working and maintain a reasonable mobility of the wrist we proposed an ulnar head arthroplasty with prosthesis and PINN.

The operative procedure was performed with axillary block/general anaesthesia under tourniquet control. The first part of the procedure was the PINN. A single, 6 cm, dorso-ulnar wrist incision was performed, beginning distally at the level of the ulnar head. Then, the soft tissues on the radial side were dis-



Fig. 1. Pre-operative X-ray: posteroanterior view.

sected and retracted and the deep antebrachial fascia was incised longitudinally, exposing the digital extensor musculotendinous junctions. These were retracted to expose the dorsal surface of the interosseous membrane where the PIN is located. Approximately 2 cm of the PIN were resected.

Using the same skin incision, the second part of the procedure began by retracting ulnarly the soft tissues and approaching the 5th extensor compartment. Retracting the Extensor Digiti Minimum exposed the DRUJ dorsal capsule. After performing a dorsal capsulotomy, the ulnar head was separated completely from its soft tissue attachments. An approximately 4 cm segment of distal ulna was resected. After reaming and cutting the ulnar medular canal we determined the adequate implant size by comparing the excised ulnar head size with implant trials. We placed the final implant

(uHead System, Stryker Medical, Kalamazoo, USA) and evaluated its stability, taking care not to overstuff the joint and limit wrist mobility. The dorsal capsule was repaired using nonabsorbable sutures and the skin was closed in layers.

A forearm-wrist splint was applied for 3 weeks with the forearm immobilized in supination. After that period the patient began active range of motion exercises with a Hand Therapist with a removable splint for 6 more weeks. At 2 months post-operatively, he began rotational exercises and one month later he initiated load-carrying activities. Six months after the surgery the patient returned to his previous job and activities, with no limitations in prono-supination.

One year after the surgery he remains symptom free and maintains full range of motion of the wrist. The prosthesis has no clinical



Fig. 2. Post-operatively 1 year: posteroanterior view.

or radiological signs of loosening or displacement nor obvious sigmoid notch erosion (Fig. 2).

3. Discussion

Historically, advanced arthrosis of the DRUJ was commonly treated with complete or partial resection of the ulnar head (Darrach procedure) or a combination of this and DRUJ arthrodesis, as in the Sauvé-Kapandji procedure [2–5]. Despite satisfactory results in some patients, especially older ones, these techniques are associated with high risk of wrist instability and pain.

The Darrach procedure eliminates the load-bearing seat of the ulna and changes the dynamics of pronosupination but significantly reduces pain and maintains a decent grip strength. In patients with lower demands of their upper limb this is a very useful technique. However, this patient was young and had an intensive manual labour. Darrach resection can cause debilitating mechan-

ical problems (such as radioulnar impingement and translational instability) in this high demand setting [6]. The Sauvé-Kapandji procedure preserves the ulnar head which is a fundamental component in the wrist motion and stability. Nonetheless, one of its main purposes is to serve as an attachment for the TFCC, in order to improve the longitudinal transmission of forces across the wrist [7]. In this specific patient this would not be an advantage since the TFCC was destroyed. Furthermore, Sauvé-Kapandji is also associated with radio-ulnar convergence, with an incidence of pain and clicking as high as 39% [8].

Another method of treating these disorders is replacing the ulnar head with an artificial prosthesis. Although seen with some scepticism at the beginning, there is now a significant amount of published data regarding very satisfactory mid-term results of these implants [1–3,5,9].

Yen Shipley et al. [2] presented a case series with 22 operated wrists (using different implants) with a follow up of 53.4 months.

He observed a significant pain reduction and the average Modified Mayo Wrist Score was 7273 (good).

Axelsson et al. [5] reviewed 22 arthroplasties using Herbert ulnar head prosthesis with a mean follow up of 7.5 years. They report great improvement in pain control and even in those patients with a Visual Analog Score (VAS) above 5 during activity (5 patients), the satisfaction rate was very high. Supination was the only type of movement significantly improved and there was a trend for less residual pain and better functional scores if it was a primary arthroplasty. These results are consistent with the majority of published data, as verified in a Systematic Review by Calgani et al. [4].

In a personal case series published by Adams et al. [1] with 21 patients, 19 had significant improvement or disappearance of the pain. He did not detect any case of implant loosening. Berger et al. [10] considers that stem loosening is strongly associated with complete wrist arthrodesis.

Since this patient also had moderate radio-carpal arthrosis which might be partly responsible for the pain we opted to perform a simultaneous PINN. This is a simple technical procedure, associated with excellent results [11] and is not associated with decreased proprioception of the wrist [12]. A systematic review conducted by Vande Berge et al. [13] showed a significant improvement in pain in all patients, with a satisfaction rate of 884% and only one complication in 113 cases of PINN.

Ulnar head arthroplasty and PINN seem to be a very good option in the treatment of severe painful DRUJ arthrosis. More information about long term outcomes is needed before recommending its widespread use.

Conflicts of interest

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Consent

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Authors contribution

Luís Mata Ribeiro contributed with the acquisition and interpretation of data, writing and revision of the paper.

Miguel Alves Botton contributed with the concept, writing and final revision of the article.

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Registration of research studies

This paper does not include a research study.

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