J Shoulder Elbow Surg (2016) ■■, ■■–■■

ELSEVIER

Journal of Shoulder and Elbow Surgery

www.elsevier.com/locate/ymse

ORIGINAL ARTICLE

Endoscopic neurolysis of the ulnar nerve: retrospective evaluation of the first 60 cases

Etienne Sautier, MD[a,*], Thomas Neri, MD[a,b], Giorgio Gresta, MD, PhD[a], Remi Philippot, MD, PhD[a,b], Frederic Farizon, MD[a,b]

[a]*Orthopaedic Surgery, University Hospital of Saint Etienne, Saint-Priest en Jarez, France*
[b]*Physiology Laboratory, EA 4338, University Hospital of Saint Etienne, Saint-Étienne, France*

Background: The aim of this study was to determine the clinical efficacy of minimally invasive endoscopic ulnar nerve release at midterm follow-up.
Methods: This was a retrospective, consecutive, single-center study. The inclusion criterion was presentation of the patient with isolated and stable cubital tunnel syndrome. The surgical technique described by Hoffmann and Siemionow in 2006 was used for all patients. The cubital tunnel syndrome was graded by Dellon's classification and scored as described by MacDermid and Grewal in 2013.
Results: Sixty patients underwent surgery (62 cubital tunnel operations). Fifty-three patients were included in the study. The mean follow-up was 17 months (6-34). In the preoperative period, according to Dellon's classification, 8 patients were grade 1, 29 patients were grade 2, and 16 patients were grade 3. After surgery, according to the MacDermid score, 45 patients (84.9%) had good or excellent results, 6 (11.3%) had moderate results, and 2 (3.8%) had poor results. The mean preoperative score was 103.1 (25-181), and the mean postoperative score was 26.3 (0-135). By comparison with standard surgical technique, the endoscopic technique appears to be reliable with a similar success rate and functional improvement. The advantages are the minimally invasive portion of the surgical technique. Endoscopic control allowed complete release of the ulnar nerve with few complications.
Conclusion: The endoscopic technique as described by Hoffman et al had similar efficacy to open surgical techniques with the advantage of being minimally invasive.
Level of evidence: Level IV; Case Series; Treatment Study

Keywords: Ulnar nerve; endoscopic neurolysis; cubital tunnel syndrome; entrapment; minimally invasive surgery; nerve release; compression neuropathy

Cubital tunnel syndrome is the second most common nerve compression syndrome after carpal tunnel syndrome.[2] It can cause pain, paresthesia, and severe functional limitations. Compression sites are numerous, and each may be responsible for the symptoms.

Compression sites can be localized at the intermuscular septum between the brachialis muscle and the triceps, at the arcade of Struthers, at the triceps fascia, at the Osborne

Ethical Committee approval of Comité d'Ethique du CHU de Saint-Etienne. Commission recherche de Terre d'éthique (Institutional Review Board): No. IRB442016/CHUSTE.

*Reprint requests: Etienne Sautier, MD, Orthopaedic Surgery, University Hospital of Saint Etienne, Avenue Albert-Raimond, 42270 Saint-Priest en Jarez, France.

E-mail address: etiennesautier@hotmail.fr (E. Sautier).

1058-2746/$ - see front matter
http://dx.doi.org/10.1016/j.jse.2016.11.042

ligament (the most frequent), and at the superficial and deep fascia of the flexor carpi ulnaris with a recent discovery of 3 or 4 thicker fascia bands.[12,19,22] These compression sites extend approximately 8 cm proximal and 5 cm distal from the elbow joint.[4] Endoscopically assisted neurolysis techniques, specifically the one described by Hoffmann and colleagues,[10,11] allow complete access to the compression sites.

When a nerve compression requires surgical release, several surgical solutions are possible: an open surgical release with or without transposition, an epicondylectomy, a minimally invasive open surgery, or an assisted endoscopic release. There has been difficulty in evaluating these various surgical techniques. Dellon showed in 1989 that it was difficult to compare techniques of ulnar neurolysis because of the absence of consensus on the assessment of ulnar nerve symptoms.[7,13] New interest in minimally invasive surgery and improvement of endoscopy have promoted the emergence of less traumatic techniques. As a result, it has become necessary to evaluate these newer techniques.

Tsai was the first to propose an assisted endoscopic technique in 1989.[20,21] Several similar techniques were further described by Hoffmann,[10,11] Mirza et al,[15] Cobb,[6] and Bain and Bajhau.[4] These endoscopic surgeries, although less commonly used, have their own benefits. It is therefore necessary to objectively and subjectively assess each technique's effectiveness to analyze its efficacy.

The aim of this study was to report the outcomes of a minimally invasive endoscopic ulnar nerve release by use of the Hoffman technique to determine the clinical efficacy at midterm follow-up.

Materials and methods

Population

This was a retrospective single-surgeon, single-center, case-controlled study. All patients underwent a similar surgical technique between February 2011 and September 2015. All patients included had ulnar nerve compression symptoms confirmed by electromyography. The ulnar nerve compression was diagnosed when slowing segmental conduction velocity was ≤50 m/s. Exclusion criteria were ulnar nerve instability, degenerative osteoarthritis, and previous ulnar nerve release. Before surgery, patients had failed to respond to a trial of nonsteroidal anti-inflammatories and bracing or splinting. Persistent discomfort continued despite nonoperative treatment, therefore indicating surgical management. The consent process was completed and documented before each procedure.

Surgical technique

In our study, the release of the ulnar nerve was performed by a minimally invasive endoscopic surgery as described by Hoffmann in 2006.[10,11] The instrumentation used can be seen in Figure 1.

With the patient supine, the elbow was flexed to 90° on an arm table, with abduction and external rotation of the shoulder. A 2-cm skin incision was made between the medial epicondyle and the olecranon. Subcutaneous planes were dissected to the arcuate ligament, which was also excised to expose the ulnar nerve. The initial release of the nerve was achieved with direct visualization of the exposed nerve through the skin incision. The dissection plane between the fascia and the subcutaneous fat was developed with Rochester-Pean forceps. The endoscope with the dissector was inserted into the distal aspect of the condylar groove to retract the subcutaneous tissue. With long scissors, the nerve was released under endoscopic visualization. Furthermore, the deep fascia of the flexor carpi ulnaris was incised. It is important to preserve motor branches of the flexor carpi ulnaris. After this, the nerve was released distally. Once the distal release was complete, it was necessary to release the nerve proximally by the same method.

After complete release, nerve stability was evaluated intraoperatively. If iatrogenic instability is diagnosed, anterior transposition of the ulnar nerve should be performed.

A compressive bandage was maintained in the first hour to avoid the formation of a hematoma. No immobilization was done in the postoperative period. The patient were allowed to return to work after 7 to 15 days according to the profession. In the immediate postoperative period, patients performed self-rehabilitation by flexion-extension of the elbow. All patients were evaluated between 2 and 4 weeks of follow-up.

Clinical evaluation

The severity of the preoperative nerve damage was assessed by the Dellon score.[7,8] The Dellon score is based on a simple analysis of sensory and motor changes. The score described by MacDermid and Grewal in 2013, the patient-rated ulnar nerve evaluation score, was used to measure the functional discomfort before and after surgery.[14] This score is a specific subjective score of ulnar nerve injuries. It takes into account symptoms related to the ulnar nerve damage and also functional symptoms. It also integrates the impact of the disease on the patient. This score is rated on 200 points (Fig. 2), with 0 being the best result possible. Postoperative MacDermid scores were collected by telephone after surgery. We also used the Bishop score for postoperative evaluation because it is frequently used in the literature (Fig. 3). However, we considered it less accurate than the MacDermid score. Indeed, the MacDermid score takes into consideration both the symptoms and the effects of nerve damage on everyday life. The evaluation with the MacDermid score was possible before and after surgery, and it was a specific ulnar nerve score.

Statistics

Data were gathered in a secure spreadsheet in Microsoft Excel (Microsoft Corp., Redmond, WA, USA). Statistical analysis was performed with SAS software (SAS Institute, Cary, NC, USA). Statistical significance was determined by a P value of $< .05$. The preoperative and postoperative comparison of the quantitative variables was performed using a Student t-test.

Results

Studied population

In our study, 60 patients were operated on during the study period (62 operations). Only 51 (53 elbows) of these patients