



Clinical Study

Outcomes of a novel minimalist approach for the treatment of cubital tunnel syndrome



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ABSTRACT

We describe a minimalist approach to perform *in situ* decompression of the ulnar nerve. Our technique employs a unique small skin incision strategically placed to minimize postoperative scarring over the ulnar nerve and potentially decrease the risk of iatrogenic injury to the medial antebrachial cutaneous nerve. We retrospectively report the outcome of patients who have undergone this procedure at our institution, the Michael E. DeBakey Veterans Affairs Medical Center, from January 1 2007 through November 29 2010. All individuals underwent *in situ* decompression via the previously described minimalist approach. Outcome variables were Louisiana State University Medical Center (LSU) ulnar neuropathy grade, patient satisfaction, subjective improvement, complications and re-operation rate. A total of 44 procedures were performed in this cohort of 41 patients. Overall, patients' postoperative LSU grades showed a statistically significant improvement ($p=0.0019$) compared to preoperative grades. Improvement of at least one grade in the LSU scale was observed in 50% of the procedures with a preoperative grade of four or less. Overall procedure satisfaction rate was 88% (39 of 44) with 70% (31 of 44) of the procedures resulting in improvement of symptoms. There were no intraoperative or postoperative complications. One patient required re-operation due to failure of neurological improvement. Our minimalistic approach to perform *in situ* decompression of the ulnar nerve at the cubital tunnel is both safe and effective. We observed a statistically significant improvement in LSU ulnar neuropathy grades and a success rate comparable to those reported for other more extensive surgical techniques while providing the benefit of a smaller incision, less scarring, decreased risk of iatrogenic nerve injury and minimal complications.

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1. Introduction

Cubital tunnel syndrome (CTS) is the second most prevalent compressive neuropathy involving the upper extremity with an estimated incidence of 24.7 cases per 100,000 person-years [1]. Clinical presentations usually include paresthesias of the fourth and fifth digits, elbow pain and motor deficits in severe cases. The surgical options for management of CTS include simple *in situ* decompression (open or endoscopic), decompression with ulnar nerve transposition or decompression with medial epicondylectomy. There is no consensus as to the best treatment modality for CTS. *In situ* decompression is the simplest modality and is considered an effective and safe technique for ulnar nerve release [2–6]. A prospective randomized study by Bartels et al.

showed no significant difference in outcome but a lower complication rate (9.6% versus 31%) among patients undergoing *in situ* decompression when compared to anterior subcutaneous transposition [3]. A later study by this group comparing both techniques also found *in situ* decompression to be more cost effective with shorter operative time, fewer complications and earlier return to work [7]. Subsequently, two meta-analyses found no difference in clinical outcome or neurophysiological parameters when comparing anterior transposition to simple decompression [5,8].

We have previously described an *in situ* decompression technique employing a novel skin incision to perform release of the ulnar nerve at the cubital tunnel [9]. Advantages of our method include utilization of a small incision placed strategically in front of the medial epicondyle in order to avoid iatrogenic injury to branches of the medial antebrachial cutaneous nerve, perseveration of the vascular bed of the nerve, and avoidance of scar formation in line with the nerve. The purpose of this study is to

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characterize the outcomes of patients undergoing this technique at our institution.

2. Methods

2.1. Patient population

The retrospective data review was performed under an Institutional Review Board approved protocol. All data was collected in compliance with the Health Insurance Portability and Accountability Act. We identified 44 procedures from 41 patients (39 men and two women) who underwent ulnar nerve decompression via the minimalist approach at the Michael E. DeBakey Veterans Affairs Medical Center in Houston, Texas from January 1 2007 to November 29 2010. All patients underwent clinical evaluation in our institution and presented history and symptoms compatible with ulnar neuropathy. All patients with isolated subjective sensory symptoms underwent confirmation of ulnar entrapment neuropathy with electromyography and nerve conduction studies.

2.2. Surgical technique

Our approach utilizes a 2 cm straight incision oriented along the long axis of the forearm placed 1.5 cm distal and 1.5 cm antero-lateral to the medial epicondyle. Once the subcutaneous plane is reached, the loose connective tissue of this region allows

mobilization of the medial edge of the incision to reach a plane in line with the exit of the cubital tunnel. The fascia of the flexor carpi ulnaris muscle is opened in front of the exit of the cubital tunnel and the ulnar nerve is identified within the muscle. A Metzemaum scissor is used to open the cubital tunnel and the Osborne's fascia over the superficial aspect of the nerve thus preserving its integrity within its vascular bed (Fig. 1). Placing the skin incision antero-lateral to the medial epicondyle minimizes the risk of iatrogenic injury to the medial antebrachial cutaneous nerves which are located in the subcutaneous tissue in front of the medial epicondyle and minimizes the risk of postoperative scar formation over the ulnar nerve since the skin incision is in a different plane than the decompressed nerve [1]. Upon completing the neurolysis, a Penfield #4 dissector is used to palpate the plane over the nerve and if additional compression is found in the arcade of Struthers, the incision can be extended to complete the release.

2.3. Outcome parameters

The primary outcome variables used for this study were patient satisfaction, subjective improvement of symptoms, improvement in Louisiana State University Medical Center (LSU) grading scale, complication and re-operation rate. Patient satisfaction was collected using retrospective chart review and a phone interview; patients were asked if they were satisfied or not with the surgical result. In a similar fashion, subjective improvement was evaluated when patients were asked if they consider that surgery provided

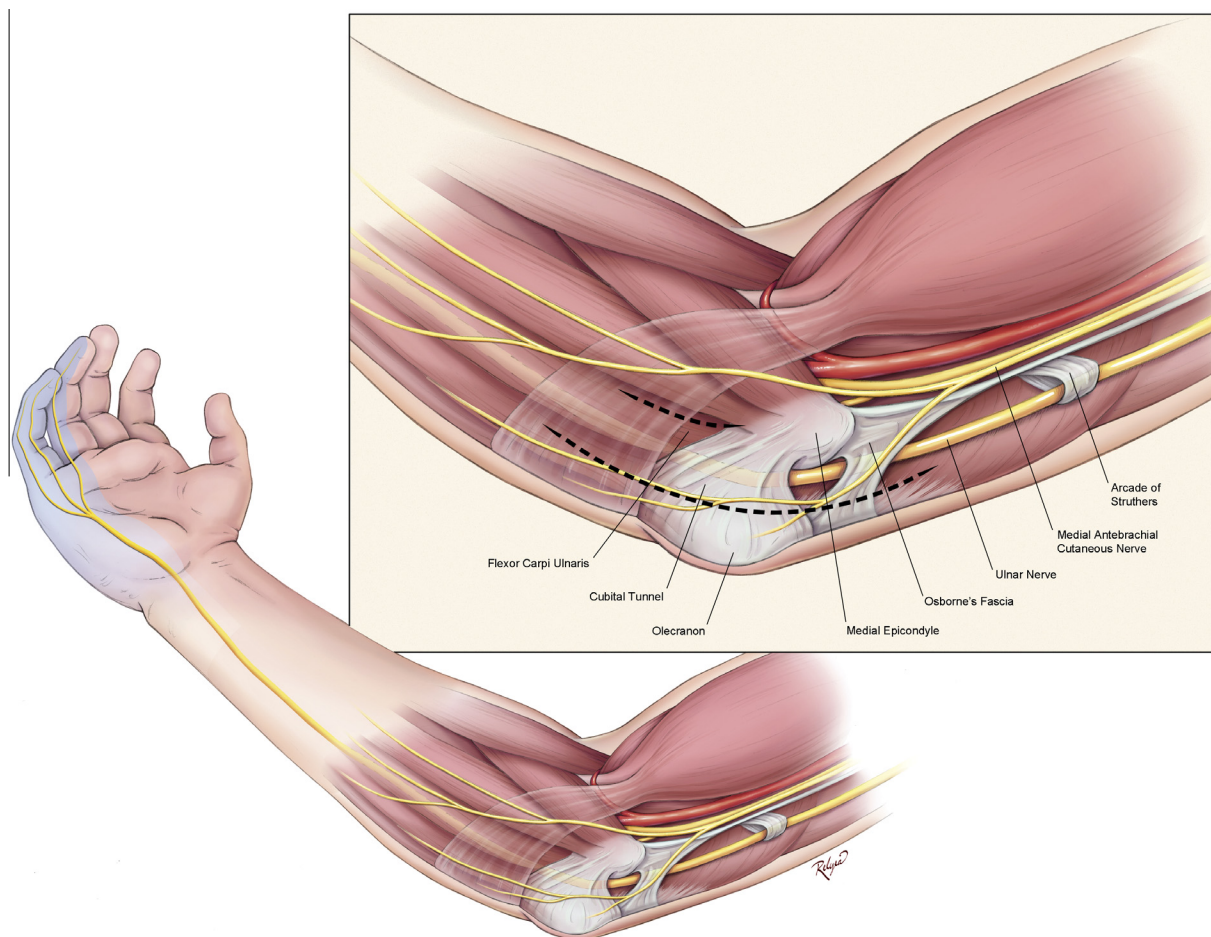


Fig. 1. Artist illustration of the surgical technique. Our incision (short dotted line) is placed distal and antero-lateral to the medial epicondyle, avoiding the branches of the medial antebrachial cutaneous nerve. Once the ulnar nerve is identified distal to the cubital tunnel a metzemaum scissor is used to open the tissue planes above the nerve. The conventional surgical approach involves a larger incision, indicated here by the long dotted line (Illustration by K. Rilea). This figure is available in colour at www.sciencedirect.com.

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