Endoscopic Cubital Tunnel Release

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Abstract

Cubital tunnel syndrome is the second most common entrapment neuropathy after carpal tunnel syndrome and occurs as a result of compression of the ulnar nerve at the elbow level. Surgery is performed in cases that do not respond to conservative treatment and in cases with severe symptoms. Many surgical techniques such as in situ decompression, anterior transposition of the nerve, and medial epicondylectomy are used in the treatment of cubital tunnel syndrome. In recent years, endoscopic decompression techniques have become popular. Along with improvements in endoscopic techniques, anterior ulnar nerve transfer has also been defined. Both open and endoscopic approaches have been reported with similar outcomes. Postoperative pain, patient satisfaction, and early return to work are features in which endoscopic technique is more advantageous than the open technique. In this chapter, Endoscopic Cubital Tunnel Release and its outcomes are discussed.

Keywords

Endoscopy · Cubital tunnel syndrome · Endoscopic cubital tunnel release · Ulnar nerve

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30.1 Introduction

- Cubital tunnel syndrome occurs as a result of compression of the ulnar nerve at the elbow level. It is the second most common trap neuropathy after carpal tunnel syndrome. It is 2–3 times more common in men than in women.
- Historically, Panas had first described "tardy ulnar palsy" in 1878, Benjamin Curtis described the subcutaneous transfer in 1898, Geoffry Osborne described a fibrous band that causes the compression as well as declared a brief description of the technique to decompression for early and mild cases of neuritis in 1957, and Tsai had first reported endoscopic decompression in 1995 [1–4].
- Although there are surgical methods such as in situ release (open or endoscopic), transposition (subcutaneous, intramuscular, transmuscular, submuscular), epicondylectomy, there is no standard surgical treatment with consensus on it so far.
- Endoscopic techniques, which provide better results and fewer surgical complications compared to traditional open methods, have become increasingly more used with the development of technology and industry.
- The nerve can be decompressed using fully endoscopic or endoscopic-assisted methods [4–6].
- Structures that may cause ulnar nerve compression such as the medial intermuscular septum, struther arc, medial epicondyle, Osborne ligament, deep flexor-pronator aponeurosis, and anconeus epitrochlearis (muscle anomalies) can be successfully released by the endoscopic method [6].
- Although the number of studies related with endoscopic method is low in the literature, the results are comparable to the open method.

30.2 Indications

- Not responding to conservative treatment.
- Those with mild to moderate symptoms unable to tolerate conservative treatment.
- Severe symptoms.
- Significantly delayed NCV (nerve conduction velocity) of the ulnar nerve across the elbow (less than 40 m/s).

30.3 Contra-indications

- Ulnar nerve instability (preoperative-intraoperative evaluation).
- Previously elbow trauma (humerus malunion, etc.)
- Recurrence.
- Elbow deformity (cubitus valgus).
- Osteophyte and elbow arthrosis.
- Contracture in the elbow joint.
- Scarring and adhesion around the nerve.
- Mass or space-occupying lesions.
- Late ulnar palsy (relative).

30.4 Author's Preferred Technique

30.4.1 Preoperative Planning

- As with all other surgical procedures, preoperative preparation and appropriate instrument selection determine the quality of surgery.
- Required instruments: 4 mm, 30°, endoscope, lightweight camera, spatula, cannula, trocar, special blade of the system (Integra™ EndoRelease™ System).

30.4.2 Patient and Medical Team Positioning

- The limb to be operated is placed on a hand table and the patient is supine on the operating table. The arm is brought from shoulder to abduction and external rotation and from the elbow to 90 degrees of flexion. Tourniquet application should be as proximal as possible. Since this is a dry endoscopic technique, no fluid flow system is required.
- The surgeon takes a position on the medial side of the limb. The first assistant takes a position on the lateral side of the limb, to provide easy access to the elbow and comfortable movement to the elbow and arm (Fig. 30.1a, b).
- The rack carrying the video screen, the endoscopy device, and all other electronic equipment and endoscopic accessories are positioned on the other side of the surgical table.
- Endoscopic surgery can also be performed under regional block anesthesia and general anesthesia, according to the request of the anesthesia team.

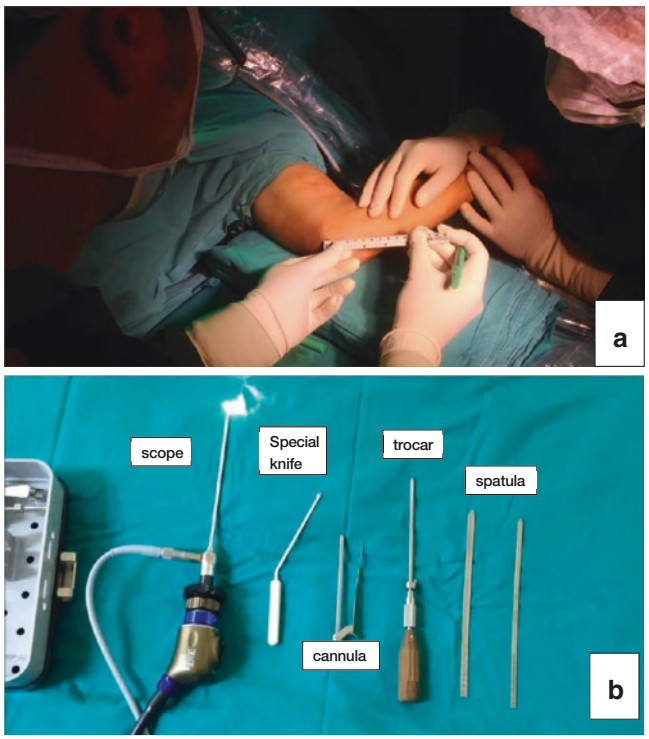

Fig. 30.1 (**a**) Positioning of the patient, medical team, and equipment for the endoscopic cubital tunnel release. (**b**) Instruments that used for Endoscopic Cubital Tunnel Release

30.4.3 Step-by-Step Description of the Technique

- The patient's medial epicondyle and olecranon are marked with a marker pen to keep the incision safe. A 2 cm incision is made on the cubital tunnel from the posterior of the medial epicondyle with a number 15 scalpel.
- It is dissected to the deep fascia with the help of scissors and forceps. The ulnar nerve is palpated and localized by finger. The Osborne ligament posterior to the medial epicondyle is opened longitudinally. An incision is made through the ceiling of the cubital tunnel. The nerve is exposed to the incision site (Fig. 30.2a, b).
- Then the ulnar nerve is separated from the cubital tunnel ceiling with the help of a spatula moistened with saline. The spatula should not be faced with any difficulty while advancing. Proximal release is done first. The spatula is advanced proximally along the nerve pathway (Fig. 30.3).
- After the spatula is removed, the cannula and trocar are advanced together. The trocar is then removed and the endoscope is gently inserted (Fig. 30.4).
- The ulnar nerve can be seen through the holes of cannula by the endoscope (Fig. 30.5).
- The structures that cause ulnar nerve compression are released with the help of the special blade of the endoscopic release system toward the 12–15 cm proximal (Fig. 30.6).

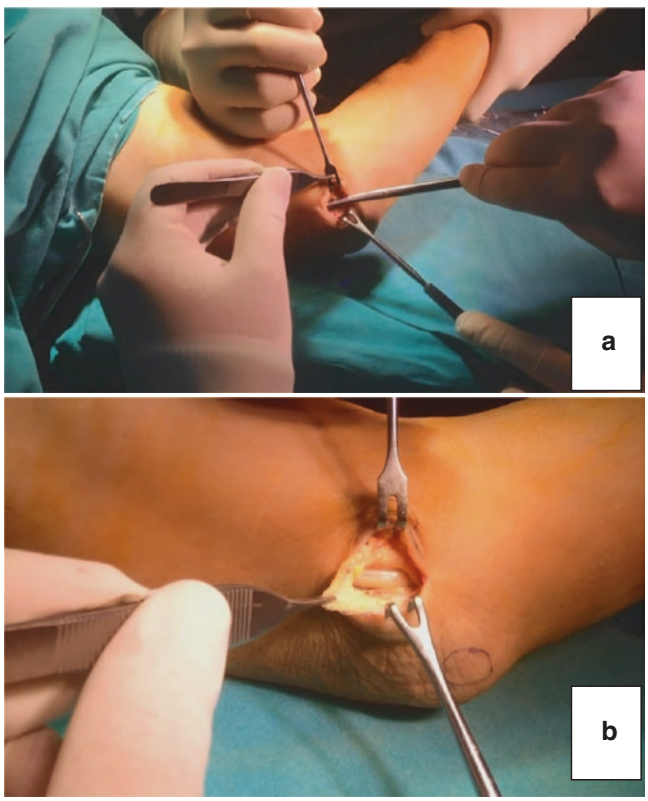

Fig. 30.2 (**a, b**) The approach on the medial epicondyle

Fig. 30.3 Positioning of the spatula

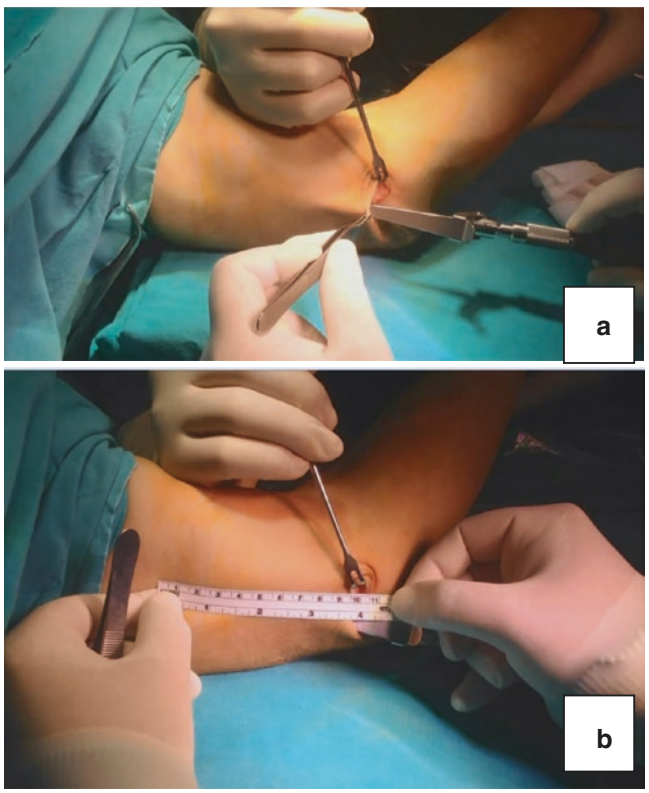

Fig. 30.4 (**a, b**) Positioning of the cannula/trocar 12 cm proximal to medial epicondyle

- The same process is repeated distally for a length of 10–12 cm.
- If the ulnar nerve is not reliably seen through the slots under the cannula with the endoscope during these procedures, structures should never be blindly divided by the special blade of the system.
- After releasing the possible structures that cause nerve compression, ulnar nerve stability is assessed by flexion

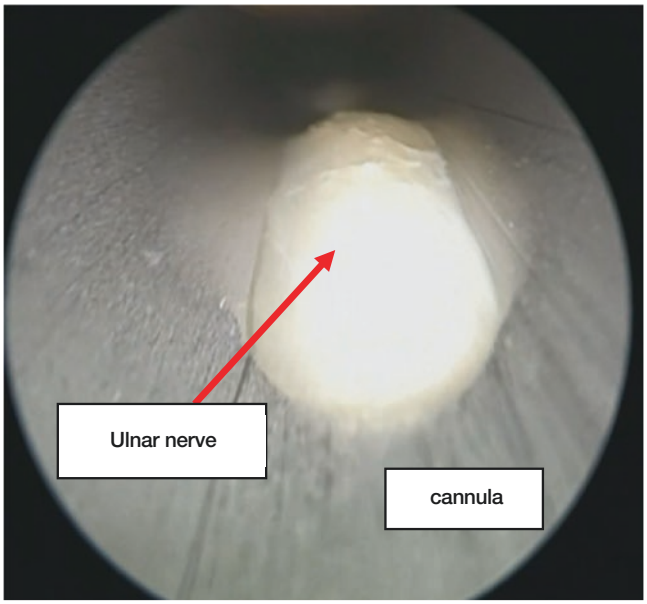

Fig. 30.5 The ulnar nerve must be seen under cannula before release

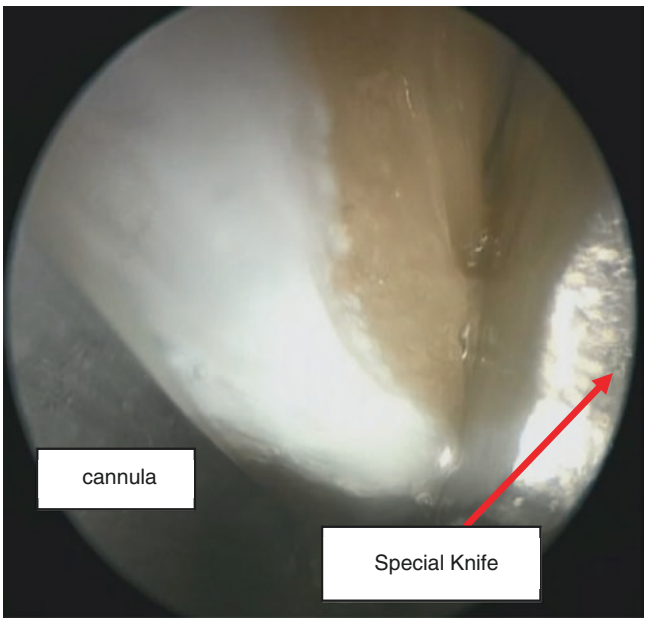

Fig. 30.6 Endoscopic image of decompressed ulnar nerve with releasing roof of cubital tunnel by the blade

and extension of the elbow joint to look for any subluxation or dislocation in the ulnar nerve. The tourniquet is relased, strong compression is applied for 10 minutes, then hemostasis control is performed before the incision is closed. Bulky compressive bandaging and intermittent cold application are performed (Fig. 30.7).

Fig. 30.7 Positioning of the cannula/trocar 10 cm distall to medial epicondyle for distal release

30.4.4 Complications and Management

- Possible medial antebrachial cutaneous nerve injury in the incision site.
- Formation of hematoma in the incision area (This situation can be prevented by releasing the tourniquet and adequate hemostasis before wound closure).
- Infection.

30.4.5 Postoperative Care

- The compressive bandage is removed on the first postoperative day. Elbow ROM (Range of Motion) exercises start early and then the patient is discharged.
- Nonmanual labors can start working on the fifth postoperative day, and manual labors on the tenth postoperative day.

30.4.6 Outcomes

- In publications related to endoscopic release, the success rate of this procedure varies between 86% and 98% [6–9]. The success rate of 172 cases published by Cobb, the technique described in this section (Endorelease system), is 86% [10].
- Although the process and instruments are expensive in terms of endoscopic release, it should be considered that it is more advantageous in terms of pain, recovery, and return to work when cost effectivity is considered. In his study, Cobb reported returning to work 63 days earlier than conventional methods [10].

- Studies have shown that the duration of the procedure is 49 minutes shorter than other conventional open surgeries [10, 11].
- Watts et al.'s study comparing open in situ release with the full endoscopic method, in terms of general complications, it was reported that the full endoscopic method had 10% fewer complications and also a residual numbness of 53% in the full endoscopic method and 80% in open in situ release [12].
- In our own study, in which we performed endoscopic-assisted release, an average of 16 months follow-up, 86% satisfactory results were obtained according to the Modified Bishop score, all patients had advanced recovery compared to the preoperative NCV, while hematoma developed as a complication in only two cases [5].
- On the other hand, not only the decompression but also the anterior transposition of the ulnar nerve have been defined by advances in endoscopic techniques. However, there is a need for long-term studies with large series on this subject [13, 14].

30.5 Summary

- Although the ulnar nerve pathway and anatomy in the elbow area seems simple, there are a few critical points to be considered during the full endoscopic technique application.
- The learning curve can be facilitated by careful preoperative planning and the use of appropriate instruments.
- Should not be forgotten that;
  - The complication rate is low in the endoscopic method. But the most common complication is hematoma formation.
  - The method is effective and safe.
  - It is as successful as open methods.
  - It is more advantageous than open surgery in terms of less pain, smaller incision, and early return to work.
  - Patient selection is the most important part to achieve succesful results for this method.

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