Abstract

The carpal tunnel syndrome (CTS) is one of the most common peripheral neuropathies and is caused by the compression of the median nerve at the wrist region. The aim of this study was to analyze the results of patients who were operated by using 1.5 cm palmer skin incision. (228) carpal tunnel release operations were performed on (181) patients. These patients were assessed pre and postoperatively using Visual Analog Scale (VAS) and Visual Analog Patient Satisfaction Scale (VAPSS) [1]. The (1.5) cm palmer skin incision technique for carpal tunnel release is a safe and effective surgical procedure. It can be used in the surgical treatment of CTS to achieve better cosmetic results and to reduce the complications of other standard techniques.

Keyword: carpal tunnel syndrome (CTS), peripheral neuropathies Visual Analog Scale (VAS) and Visual Analog Patient Satisfaction Scale (VAPSS), Erbil.

Introduction

The carpal tunnel syndrome (CTS) is the most common peripheral neuropathies and is caused by the compression of the median nerve at the wrist region as it passes beneath the transverse carpal ligament. Symptoms of CTS include paresthesia (numbness, tingling and burning) in the median nerve distribution (radial 3 and half digits) along with deep aching pain in the hand and wrist[2]. CTS affect 1% and 5% of general population and working population using their hands and wrists in daily living [3]. CTS mainly affects females aged between 30 and 50 years [4-6].

Diagnosis of CTS needs interpretation of the history, physical examination and electrophysiological results [7,4]. Patients with mild symptoms of CTS can be managed with conservative treatment including non-steroid anti-inflammatory drugs, vitamin B6, local steroid injections or hand braces [7,8]. While patients with moderate and severe symptoms,
surgical treatment is generally needed [4, 8].

The first open carpal tunnel release was performed in 1924 by Mackinnon et al. in Mayo Clinic and popularized later by Phalen et al. [9]. Standard open carpal tunnel release with a long palmer curvilinear incision still remains to be the preferred surgical procedure for many departments and orthopedic surgeons [10,11], but this procedure has many complications including pillar pain, scar tenderness, cosmetic problems, loss of grip and pinch strength or time losses due to inability to work [11-13]. Endoscopic techniques and different mini skin incisions are described in the literature to decrease the risk of such complications [12,14-16].

Although endoscopic surgery tries to decrease complications related to the incision, it has risk of injury to the superficial palmar arc, median nerve, digital nerves, vessels and flexor tendons and insufficient release of the carpal tunnel. Thus, the advantages of endoscopic carpal tunnel release must be balanced against potential injury to adjacent neurovascular structures. In addition, the endoscopic technique has a long learning curve, and it is costly due to the special equipment required for this procedure [17].

Aims of study:

The aim of this study was to analyze the results of patients who were operated by using 1.5 cm palmer skin incision.

Materials and Methods

Between October (2010) and December (2012), we performed (228) carpal tunnel releasing procedures on (181) consecutive patients. There were 171 (94 %) female and 10 (6 %) male patients with a mean age of (49) (ranging from 22 to 75). 132 operations were performed on the right hand and (96) were performed on the left. The mean follow-up period was (17) months (ranging from 4 to 31 months). The operations were done in Erbil teaching hospital, Zheen International Hospital and Hawler Private Hospital.

Each patient was evaluated with his/her history, physical examination and electromyelography (EMG). Night pain and numbness were observed in all patients. EMG showed moderate and severe CTS in 212 hands (93%).

The pain status of the patients was pre and postoperatively assessed with the Visual Analog Scale (VAS). Incision scar hypersensitivity and cosmetic results were evaluated with the Visual Analog Patient Satisfaction Scale (VAPSS) postoperatively.

Informed consent was obtained from each patient.

Surgical Technique

All the patients and their families were informed about the operative technique (length of incision) and postoperative care before the operation.

All the operations were performed in the operating room under sterile conditions in the supine position. Before surgery, the affected hand, wrist and forearm were cleaned with povidone iodine solution. The area to be operated was covered with a sterile compress. Pneumatic tourniquet was used. The hand should be in an extended position. After these routine operation preparations, a longitudinal (1.5) cm long incision was performed at the wrist region, distal to the distal flexion crease, between the third and fourth finger as showed in Figure (1). The incised skin was retracted with the help of a mini retractor and subcutaneous fat tissue was dissected laterally. A small opening done in the carpal ligament with a fine scissors or surgical blade and a dissector was introduced beneath the carpal ligament and then the ligament was cut with surgical blade and scissors as showed in Figure (2). After the homeostasis,
the skin was sutured with 4/0 sutures mattress half buried as showed in Figure (3). The mean operation time was (15) minutes (ranging between 10-20 minutes). The mean hospital stay was 3 hours (2-4 hours).

Results
In this study, (228) carpal tunnel release operations were performed on (181) patients. There were no complications during the operations such as bleeding or nerve injury. The mean follow up period was (17) months and no procedure related complication was observed such as skin infection and palmar tenderness. The mean pre-operative VAS score for pain was 8.5, which decreased to (2.1) postoperatively. We used the Visual Analog Patient Satisfaction Scale described by Kılıncer and Zileli in 2006 [1] to evaluate the patients for cosmetic results, return to daily routine activities, palmar tenderness and scar sensitivity. Mean VAPSS score was (8.7) during the follow up period. In this study, (7) patients had temporary paraesthesia and (1) patient was repeated because of pain recurrence and paraesthesia. For such a patient we started a limited palmer skin incision, which was later extended to (3) cm because of the scar tissue. No problem occurred during the follow-up period (mean 4 months). (3) patients were developed scar tenderness which was treated by conservative measures.

Discussion
In this study, just like in the literatures, 94% of the patients were female with a mean age of 49 [4, 7,18].

Until recent years, standard incision with a long curvilinear incision was the most performed technique for CTS by many orthopedic and neurosurgeons. This technique is safe and effective as reported by authors, but it has some complications [4, 7, 10].

The complications of the standard incision including incomplete release of carpal ligament, injury to the palmar cutaneous and recurrent motor branch of median nerve or injury to the superficial palmar arch and ulnar artery are rare because the operation is performed under direct vision [7].

Some complications, on the other hand, have a relatively high incidence. These are hypertrophic scar formation, scar tenderness, pillar pain, loss of grip strength and sympathetic dystrophy resulting in the delay of returning to daily activities or work and emotional distress [7,12]. To reduce these complications, various limited incisions or endoscopic techniques are described by authors [4,14,19-24].

Some researchers have claimed that the endoscopic carpal tunnel release (ECTR) decreased the postoperative morbidity of standard open carpal tunnel release.[25-27] In previous studies, patients who underwent ECTR had less pillar pain, faster recovery of grip and pinch strength, and earlier return to daily activities and work than those who underwent nonendoscopic treatments.

In spite of the many advantages of endoscopic techniques, there are also some disadvantages; the difficulty of inserting a relatively large device through a narrow tunnel, nerve ischemia due to the use of tourniquet for a long time, performing transverse incision that might damage the superficial palmar arch and the experience needed for such an operation [28]. Also it is reported that the most common complications of these techniques are paresthesia of the median and ulnar nerves, tendon lacerations and injury to the arteries [7,13]. Some authors have also reported multiple limited mini open incision techniques to decrease the postoperative morbidity observed in standard open techniques [2,12, 11, 16,
Mini open procedures have been performed using either a longitudinal incision on the wrist and/or palmar surface, or a transverse wrist incision. These mini open incision techniques represent the midway between the standard open incision and endoscopic technique taking the advantages of both with less disadvantages.

In this study, we aimed to analyze the outcome of patients operated for carpal tunnel syndrome using (1.5) cm palmer skin incision. The incision is performed at the palmer region distally to the flexion crease; therefore, we thought that the complications including cosmetic problems, palmer tenderness and scar sensitivity would be less, as showed in Figure (4). In this study, we saw few complications caused by the type of incision, and the mean VAPSS score was (8.7) when the patients were evaluated for cosmetic results, return to daily routine activities, palmer tenderness and scar sensitivity. In this study, 132 (92 %) of patients have complete remission of symptoms which is near the results of literatures of mini open incisions [4,28,29].

In this study, there were (1) reoperation because of the recurrence of symptoms and (8) patients had temporary paresthesia; such patients gave history of excessive hand working after surgery. The palmar arteries, and particularly the superficial palmar arch, also have a potential risk due to the difficulties in visualization with these limited incisions or endoscopic techniques. However, just like the studies [4,12,18,28,29] we also did not experience any artery, nerve or tendon injury.

**Conclusion**

The (1.5) cm palmer skin incision technique for carpal tunnel release is a safe and effective surgical procedure. It can be used in the surgical treatment of CTS to achieve better cosmetic results and to reduce the complications of other standard techniques.

**References**


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**Figure 1** showed the length of skin incision

**Figure 2** showed the median nerve after incising the flexor retinaculum
Figure 3 showed the suturing of skin incision.

Figure 4 showed the site of surgery after one year.