Carpal Tunnel Release Experience with Minimal Wrist Incision

El bileğine Mini İnsizyon ile Karpal Tünel Serbestleştirilmesi Deneyimimiz

Aydemir Kale

Bülent Ecevit Üniversitesi Tıp Fakültesi, Beyin ve Sinir Cerrahisi Anabilim Dalı, Zonguldak, Türkiye.

ABSTRACT

Objective: Carpal tunnel syndrome (CTS) is the most common peripheral trap neuropathy resulting from compression of the median nerve in the carpal tunnel of the wrist. Open release of the transverse carpal ligament is now the most commonly used method. New techniques are being developed to avoid complications of standard long curvilinear incision.
Methods: Between March 2010 and January 2016, carpal tunnel release was performed by the same surgeon with 110 minimally invasive techniques in 96 patients due to CTS. Complaints and physical examination findings were compatible with CTS and mid- to severe-severity CTS cases supported by EMG were included in the study.
Results: Complaints and examination findings were recorded at the post-operative 1st year outpatient clinics of the patients. Of the110 carpal tunnel release, in 50 patients (%45,5) total, in 45 patients (%40.9) significant, in 13 patients (%11,8) slight improvement were recorded, while no improvement was recorded in 2 patients (%1,8). They stated that 88% of the patients were satisfied with the operation and 12% were not satisfied. Visual Analog Scale (VAS) was used to evaluate pain complaints. The mean VAS score was 7,5 pre-operatively and 3,2 at post-operatively 1 year follow-up.
Conclusion: In patients with CTS, median nerve decompression with minimal wrist incision is an effective and reliable surgical procedure.

Key Words: Carpal tunnel syndrome, minimal incision, surgery, median nerve

Received: 07.25.2017 **Accepted:** 10.17.2017

ÖZET

Amaç: Karpal tünel sendromu (KTS), median sinirin el bileğindeki karpal tünelde sıkışması sonucu ortaya çıkan en sık periferik tuzak nöropatidir. Transvers karpal ligamanın açık serbestleştirilmesi günümüzde en yaygın kullanılan yöntemdir. Standart uzun kurvilinear insizyonun komplikasyonlarından sakınmak için yeni teknikler geliştirilmektedir.
Yöntem: Mart 2010- Ocak 2016 yılları arasında KTS nedeniyle 96 hastaya 110 minimal invazif teknik ile aynı cerrah tarafından karpal tünel serbestleştirilmesi yapıldı. Şikayet ve fizik muayene bulguları KTS ile uyumlu olup EMG ile ön tanısı desteklenmiş orta ve ağır derece KTS olguları çalışmaya alındı.
Bulgular: Hastaların post-operatif 1. yıl poliklinik kontrollerindeki şikayet ve muayene bulguları kaydedildi. 110 karpal tünel serbestleştirilmesi sonrası 1. yılda, 50'sinde (%45,5) tam, 45' inde (%40.9) belirgin, 13' ünde (%11,8) hafif düzelme kaydedilirken 2 (%1,8) hastada düzelme olmadı. Hastaların %88' i olduklarını ameliyattan memnun olduklarını, %12' si memnun olmadıklarını belirtti. Hastaların ağrı değerlendirmeleri için Görsel Analog Ağrı Skalası kullanıldı. Bu değer ameliyat öncesi 7,5 iken ameliyat sonrası 1. yılda 3,2 olarak kaydedildi.
Sonuç: KTS hastalarında, minimal el bileği insizyonu ile median sinirin dekompresyonu, etkin ve güvenilir bir cerrahi prosedürdür.

Anahtar Sözcükler: Karpal tünel sendromu, minimal insizyon, cerrahi, median sinir

Geliş Tarihi: 25.07.2017 **Kabul Tarihi:** 17.10.2017

Address for Correspondence / Yazışma Adresi: Aydemir Kale, MD Bülent Ecevit Üniversitesi Tıp Fakültesi Hastanesi Beyin ve Sinir Cerrahisi AD 3. Kat 67600, Zonguldak, Türkiye. E-mail: aydemirkale@gmail.com

doi:http://dx.doi.org/10.12996/gmj.2018.09

INTRODUCTION

Carpal tunnel syndrome (CTS) is the most common peripheral trap neuropathy, which is the result of compression of the median nerve in the carpal tunnel of the wrist (1-3). It affects 1-5% of the population and mostly observed in middle aged women (1). Night-time coincidences, numbness and tingling in the median nerve distribution, weakness and / or atrophy in tenor muscles, tinnel-phalen sign, and loss of two-point discrimination are diagnostic criterias (4). Complaints and physical examination findings are confirmed by electromyography (EMG). Conservative treatment is sufficient for cases with mild symptomatic CTS, but surgical treatment is applied in advanced cases. The open release of the transverse carpal ligament was first performed by Learmonth in 1933 (5). Today, open carpal tunnel release with standard long curvilinear incision is the method of choice for most surgeons (1-3,6). Disadvantages of standard incision include incisional pain, scar tenderness, cosmetic problems, and reduced hand function (1,2,7,8). Alteratively, various surgical methods such as limited incision, endoscopic techniques have been described (1,2,9,10). All of these techniques have advantages and disadvantages as well as low morbidity and high success rates. The aim of this retrospective study is to evaluate the results of patients who underwent surgery for CTS with a single mini-incision in the wrist.

MATERIAL and METHODS

This study was approved by the Local Ethical Committee (2017/08-6) of our instutition. Between March 2010 and January 2016, carpal tunnel release was performed by the same surgeon with 110 minimally invasive techniques in 96 patients due to CTS. All of the patients signed a detailed consent form. There were 75 (78%) female and 21 (22%) male patients. The average age of patients was 56 (35-76). 80 (73%) were found to be right and 30 (27%) left wrist. Complaints and examination findings were recorded at the post-operative 1-year outpatient clinic of the patients.

Complaints and physical examination findings were compatible with CTS. Mid- to severe-severity CTS cases supported by EMG were included in the study. In the EMG findings of 110 cases, 75 had severe and 35 had mid severity findings. Patients who had previously had a history of hand surgery for CTS or some other reason were excluded from the study. Preoperative and postoperative 1-year pain and drowsiness complaints of the patients were recorded (no, mild, significant, complete) retrospectively. The pain status of the patients was evaluated with Visual Analog Scale (VAS) pre and post operatively.

Surgery with minimal incision

All surgeries were performed under local anesthesia in the operating room. At the supine position, the arm was covered with sterile compresses in a 90 degree abduction after appropriate site cleaning and 2% citanest injection was performed. A longitudinal incision of 1 cm was made between the proximal and distal flexion folds at the 3rd and 4th digit in the wrist (Figure 1A). With the help of the ecarteur, the subcutaneous tissues were pulled out laterally. The transverse carpal ligament was passed through with mosquito clamp and the median nerve was relieved by carefully cutting the ligament with scissor (Figure 1B). Decide according to the fact that the transverse carpal ligament is completely cut and there is no sense of hanging when the scissor is vertically retracted. After hemostasis, the skin was closed with three 3/0 prolene sutures (Figure 1C). The duration of the operation was measured as 15-20 minutes. No wristband was used and the incision was followed by daily dressing. It was suggested to avoid wrist flexion and extensor movements while there is no restriction on finger movements. Sutures were taken on the 10th postoperative day.

Figure 1(A) Marking of the incision **(B)** Per-operative view of median nerve **(C)** Closure of the skin incision

RESULTS

In the study, 110 carpal tunnel release with minimal incision were performed in 96 patients. Major bleeding, nerve or tendon damage was not observed during surgery. None of the patients had wound infection. It was noted that scar sensitivity was in early postoperative period in 10 patients and continued in only one patient at 1 year control. Of the110 carpal tunnel release, in 50 patients (%45,5) total, in 45 patients (%40.9) significant, in 13 patients (%11,8) slight improvement were recorded, while no improvement was recorded in 2 patients (%1,8). They stated that 88% of all of the patients were satisfied with the operation and 12% were not satisfied. Satisfaction rate was 94% (33 patients) in mid severity CTS cases and 85% (64 patients) in severe cases. The mean VAS score was 7,5 pre-operatively and 3,2 at post-operatively 1 year follow-up.

DISCUSSION

Open carpal tunnel release with standard long curvilinear incision is the method of choice for most surgeons (1-3,6). This safe and effective procedure' s complications especially in the late period, such as scar sensitivity, pain, hypertrophic scar formation, sympathetic dystrophy, which reduce patient comfort and quality of hand use are well known (2,3,7,11). Various incision techniques and instruments have been used in recent years to prevent these complications (1-3,6,8-10,12). Successful results are obtained with all these techniques and each has its own drawbacks and side effects. In this study, we present the results of patients who underwent carpal tunnel release by applying open surgery with minimal incision to the wrist.

Klein et al. (8) reported successful results of 1 cm mini-incision with minimal scar sensitivity. Scar sensitivity was 13.5% in the early postoperative period and 2.9% in the 6th month. In our study, the rates were 9.1% in the early period and %0.9 in the first year. They also intervened in this study at the same time in bilateral cases (8). In bilateral CTS cases of our study, the surgical procedure was applied at least 1 month after the other hand.

Another method is the endoscopic release of the carpal tunnel. Although it has advantages, introduction of a narrow tunnel with an endoscope, prolongation of the tourniquet, complications of nerve ischemia and superficial palmar arc injury are the risks of the procedure (1,2,10,13).

Three different minimally invasive carpal tunnel release procedures was presented over 88% successful rates in a study (13).

Isik et al. (2) reported that they achieved pain-numbing control and reduced scarring problems by applying microsurgical mini-incision proximal to the curvature of the distal flexion, which is finer than the skin, as in our study. Of the patients in our study, 86.4% reported complete/significant improvement in their complaints, while 88% were satisfied with the operation.

There are a number of risks due to limited vision with minimal incision technique. The recurrent thenar branch of the median nerve is also at risk for possible anatomical variations. In addition, palmar arteries, especially the superficial palmar arc, may be injured (2,9). No damage to these structures occurred in any of the patients in our study. The frequency of such complications will be reduced by slowly and sensibly cutting the carpal tunnel and, if necessary, obtaining assistance from the microscope may be useful

CONCLUSION

In patients with CTS, median nerve decompression with minimal wrist incision is an effective and reliable surgical procedure. Palmar tenderness, cosmetic problems and disadvantages of hand use can be reduced by this method.

Conflict of interest
No conflict of interest was declared by the authors.

REFERENCES

1. Tarallo M, Fino P, Sorvillo V, Parisi P, Scuderi N. Comparative analysis between minimal access versus traditional accesses in carpal tunnel syndrome: a perspective randomised study. Plast Reconstr Aesthet Surg. 2014;67:237-43.
2. Isik HS, Bostanci U. Experience of Carpal Tunnel Syndrome that operated using a limited uni skin incision. Turk Neurosurg. 2011;21:177-80.
3. Yoo HM, Lee KS, Kim JS, Kim NG. Surgical Treatment of Carpal Tunnel Syndrome through a Minimal Incision on the Distal Wrist Crease: An Anatomical and Clinical Study. Arch Plast Surg. 2015;42:327-33
4. Graham B, Regehr G, Naglie G, Wright JG. Development and validation of diagnostic criteria for carpal tunnel syndrome. J Hand Surg Am. 2006;31:919-24.
5. Learmonth J.R. The principle of decompression in the treatment of certain diseases of peripheral nerves. Surg Clin North Am 1933;13:905-13
6. Badger SA, O'Donnell ME, Sherigar JM, Connolly P, Spence RA. Open carpal tunnel release--still a safe and effective operation. Ulster Med J. 2008;77:22-4.
7. Aroori S, Spence RA. Carpal tunnel syndrome. Ulster Med J. 2008;77:6-17.
8. Klein RD, Kotsis SV, Chung KC. Open carpal tunnel release using a 1-centimeter incision: technique and outcomes for 104 patients. Plast Reconstr Surg. 2003;15;111:1616-22.
9. Aydın K, Colluk C, Cengiz N, Bilgici A. Microsurgical open mini uniskin incision technique in the surgical treatment of Carpal Tunnel Syndrome. Neurology India 2006:54:64-7.
10. Chow JC. Endoscopic release of the carpal ligament: a new technique for carpal tunnel syndrome. Arthroscopy. 1989;5:19-24.
11. Açıkgöz B. Karpal Tünel Sendromu. Demircan N, Zileli M (editör). Periferik Sinir Cerrahisi. 1. Baskı Ankara: TND Spinal ve Periferik Sinir Cerrahisi Grubu Yayınları; 2008. p.281-304.
12. Yeo KQ, Yeo EM. Comparison of the results of open carpal tunnel release and KnifeLight carpal tunnel release. Singapore Med J. 2007;48:1131-5.
13. Nazzi V, Franzini A, Messina G, Broggi G. Carpal tunnel syndrome: matching minimally invasive surgical techniques. Technical note. J Neurosurg. 2008;108:1033-6.