



Comparison between two mini incision techniques utilized in carpal tunnel release

Açık karpal tünel gevşetmesinde iki farklı mini kesi yönteminin karşılaştırılması

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Amaç: Karpal tünel sendromunun (KTS) cerrahi tedavisinde kullanılan iki farklı mini cilt kesisi yöntemi karşılaştırıldı.

Çalışma planı: Çalışmada, KTS nedeniyle cerrahi tedavi uygulanan 27 hasta gevşetme için yapılan mini kesinin yerine göre iki grupta değerlendirildi. Mini kesiler grup 1'de transvers karpal bağın tam üzerinden, grup 2'de ise distalden yapıldı. Grup 1'de 12 hasta (17 el; 1 erkek, 11 kadın; ort. yaş 55; dağılım 38-66), grup 2'de 15 hasta (17 el; hepsi kadın; ort. yaş 54; dağılım 34-71) tedavi edildi. İki grup, ağrı ve uyuşma şikayetlerindeki azalma, kesi bölgesindeki skar dokusunda sertleşme ve hassasiyet, elin kullanılmaya başlanması için geçen süre, palmar çimdikleme ve kavrama gücü ölçümleri bakımından karşılaştırıldı. Ortalama takip süresi grup 1'de 26.6 ay, grup 2'de 23.7 ay idi.

Sonuçlar: Grup 1'de 14 el bileğinde (%82.4), grup 2'de ise 15 el bileğinde (%88.2) yakınmalar tamamen kayboldu. Semptomatik iyileşme açısından iki grup arasında anlamlı fark yoktu ($p>0.05$). Grup 1'de dokuz (%52.9), grup 2'de ise iki el bileğinde (%11.8; $p<0.05$) kesi bölgesindeki skar dokusunda, sırasıyla ortalama 3.5 ay ve 1.5 ay süren sertleşme ve hassasiyet görüldü. Grup 2'de ameliyat edilen elin temel ihtiyaçlar için (9 gün) ve normal (21 gün) kullanımına geçiş süreleri grup 1'den (sırasıyla 18 gün ve 35 gün) anlamlı derecede kısaydı ($p<0.05$). İki el arasındaki kavrama gücü farkı grup 1'de ortalama -2.78 kg, grup 2'de -0.77 kg olarak ölçülürken, palmar çimdikleme gücü farkı iki grupta sırasıyla -0.60 kg, ve -0.46 kg idi. Güç ölçümleri iki grup arasında anlamlı fark göstermedi ($p>0.05$).

Çıkarımlar: Ameliyat sonrası orta ve uzun dönemde iki gevşetme yöntemiyle de tatminkar sonuç alınmasına karşın, transvers karpal bağın distalinde yapılan kesiler ile cerrahi kesiyeye bağlı sorunların daha az olduğu görülmektedir.

Anahtar sözcükler: Karpal tünel sendromu/cerrahi; dekompresyon, cerrahi/yöntem.

Objectives: We compared two mini skin incision techniques utilized in the treatment of carpal tunnel syndrome (CTS).

Methods: Twenty-seven patients who underwent surgery for CTS were evaluated in two groups according to the site of the mini incision performed for surgical release. A single mini skin incision was performed over the transverse carpal ligament in 12 patients (group 1; 17 hands; 1 man, 11 women; mean age 55 years; range 38 to 66 years), and on the distal side of the ligament in 15 patients (group 2; 17 hands; all women; mean age 54 years; range 34 to 71 years). The two groups were compared with regard to improvement in pain and numbness, rigidity and sensitivity of the scar tissue, time to use of the hands, and palmar pinch and grip strengths. The mean follow-up was 26.6 months in group 1, and 23.7 months in group 2.

Results: Complete disappearance of symptoms was obtained in 14 wrists (82.4%) in group 1, and in 15 wrists (88.2%) in group 2, with no significant difference between the two groups ($p>0.05$). Rigidity and sensitivity of the scar tissue were seen in nine wrists (52.9%) in group 1, and in two wrists (11.8%) in group 2 ($p<0.05$), which lasted 3.5 months and 1.5 months, respectively. In group 2, time to use of the affected hand for basic needs (9 days) and normal function (21 days) was significantly shorter, compared to 18 days and 35 days in group 1, respectively ($p<0.05$). The mean differences of grip and pinch strengths of the two hands were -2.78 kg and -0.60 kg in group 1, and -0.77 and -0.46 kg in group 2, respectively ($p>0.05$).

Conclusion: Although both methods of release yield satisfactory results in the mid- and long-term, mini skin incision performed on the distal side of the transverse carpal ligament is associated with less incision-related morbidity.

Key words: Carpal tunnel syndrome/surgery; decompression, surgical/methods.

CTS is the most common entrapment neuropathy seen and also the most common neuropathy treated by surgery.^[1] Conservative therapy is used in early phases of the disease, chronic cases or cases which conservative therapy fails, surgical decompression is recommended. The aim of surgery is to decompress the carpal tunnel and to release the median nerve. Such a goal is achieved by transecting the transverse carpal ligament and distal fascia of the forearm.^[2] Primary incision lines were located between the distal end of the transverse carpal ligament and proximal end of the palmar crest of the palm, extending to the forearm.^[3] Such incisions are related to serious complications such as extensive scar tissue formation, pain at the incision site, scar hypertrophy, flexion contracture of the wrist, and decreased grasp power.^[2-4] Recent studies aim to decrease these complications by mini open incisions and endoscopic release techniques.^[1-3,5-9] Although endoscopic release seems to avoid complications related to the incision, it is not a complication-free technique, laceration of the superficial palmar arc, median nerve transection and insufficient release of the carpal tunnel are documented.^[6,10-14] Endoscopic technique has a long learning curve, and it is costly due to the special equipment needed for this procedure. Mini open technique is still a valuable procedure of CTS surgery.

Numerous operative techniques are listed in the literature.^[1-3,5,6,8,9] incisions can be planned as distal and proximal double incisions, single incisions located distally, or proximal to the transverse palmar arc. This study compares two mini incision techniques, one distal and other over the transverse carpal tunnel.

Patients and method

In this study 34 hands of 27 patients in which CTS surgery was performed was evaluated retrospectively. Group 1 consists of 17 patients, operated using mini incision technique over the transverse carpal ligament, Group 2 consists of 17 patients, with a mini incision located distal to the transverse carpal ligament. Group 1 contains 1 man and 11 women, and group 2 consists of 12 women. Dominant hand was right on all patients in group 1 and 14 patients in Group 2. Affected side was right in 4 patients, left in 3 patients, and both sides on 5 patients in Group 1. Right side was affected in 10 patients, left in 3 patients and both sides in 2 patients.

The two groups were compared according to the decrease of preoperative pain and hypoesthesia, scar formation, sensitivity of the scar and time needed to use the hand in daily activities.

Difference of power between the operated and non operated hand in both groups were compared by palmar pinch and grip power values measured by computerized dynamometer (Biometrics E-LINK). The decrease of grip and pinch power was documented by negative values. Patients operated from both hands were excluded from this evaluation.

Surgical technique

All operations were performed under axillary block anesthesia and tourniquet.

Standard mini incision technique involved 2-3 cm straight incision located over the transverse carpal ligament in line with the long axis of 3rd web space. Palmar cutaneous branches of the median and ulnar nerves were spared during dissection (Picture 1). Carpal tunnel is decompressed starting from the anteb-
rachial fascia to the distal end of the transverse carpal ligament.

Distal mini open incision was located at the intersection of a line located at the long axis of the 3rd web space and Kaplan's line (Picture 2a). Soft tissues were dissected and superficial palmar arc was visualized. Transverse carpal ligament was dissected free from the volar and dorsal soft tissues and median nerve. At this stage identifying the motor branch of the median nerve is advised to avoid complications related to the anatomical variations. Distal _ of the carpal ligament was sectioned with scissors after vi-



Figure 1 Standard mini incision technique involved 2-3 cm straight incision located over the transverse carpal ligament. Palmar cutaneous branches of the median and ulnar nerves were spared during dissection.

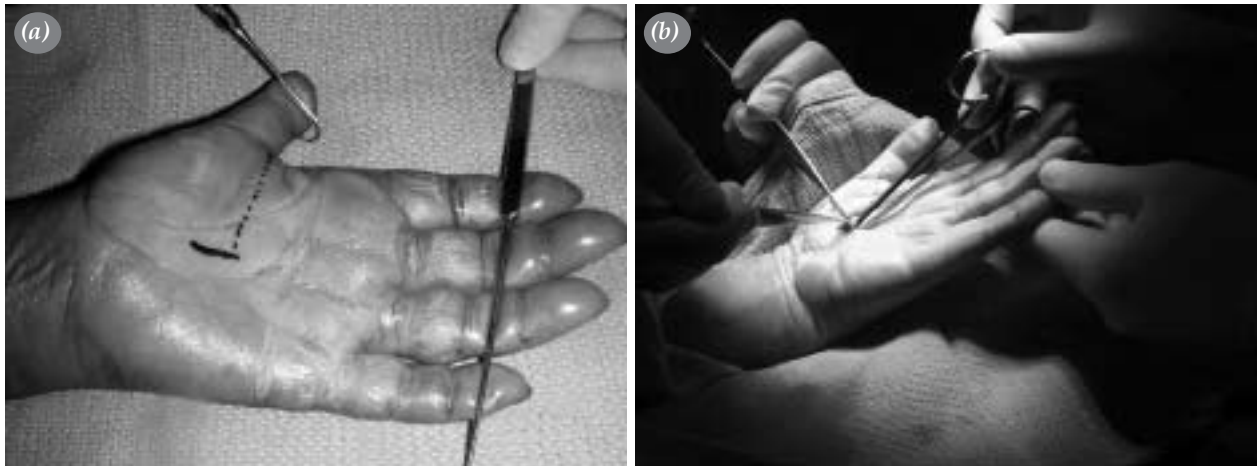


Figure 2. (a) Distal mini incision is located at the intersection of a line located at the long axis of the 3rd web space and Kaplan's line. (b) Proximal part of the transverse carpal ligament is cut under direct visualization at the 30° flexion of the wrist.

visualization by soft tissue retraction, proximal part was cut under direct visualization at the 30° flexion of the wrist (Picture 2b).

Statistical analysis

Statistical analysis of the variables were compared using chi-square and Mann-Whitney-U tests. Results with p values < 0.05 were regarded as significant difference.

Results

All symptoms healed in 14 wrists at 26.6 months of follow up in group 1 (82.4%) and 15 wrists at 23.7 months of follow up in group 2 (88.2%). The remaining patients had some degree of discomfort. No difference was seen between 2 groups in terms of symptomatic healing ($p > 0.05$).

When groups were compared in terms of sensitivity and hardening of the scar tissue, 9 wrists (52.9%) in group 1 and 2 wrists (11.8%) in group 2 were symptomatic ($p < 0.05$). The duration of symptoms was 3.5 months in group 1 and 1.5 month in group 2. Return to daily activities in group 1 was 18 days and in group 2 was 9 days ($p < 0.05$). Limitation of dexterity of the operated hands was 35 and 21 days consecutively in groups 1 and 2 ($p < 0.05$).

Difference of average power grip between operated and non operated hands was -2.78 kg in group 1 and -0.77kg in group 2. Difference in palmar pinch was -0.60 kg and -0.46 kg in groups 1 and 2 consecutively. No statistical difference was found between 2 groups in grip power and pinch power ($p > 0.05$).

Discussion

Open release of the carpal tunnel is a worldwide routine operation.^[1,3,5-7] The standard incisions used in this operation carries the risks of excessive scar formation and hypersensitivity, decrease of grip and pinch power, and lengthened time of limitations of dexterity of the hand.^[2-6] Such problems forced the surgeons to modify the incisions and endoscopic releases were introduced. Open release techniques are recently gaining popularity again, because endoscopic techniques has a long learning curve, contains high complication rates, and needs expensive equipment.^[7,8,10-14]

As anatomic studies revealed detailed anatomical knowledge about the palmar cutaneous branches of the median and ulnar nerves, the incisions and dissection techniques of open surgery are revised.^[15-17] Ahan et al^[16] informed that scar hyperesthesia greatly is reduced in incisions with subcutaneous nerve branches protected. Biyani and Downes^[2] compared the standard long incision with double incision technique and informed that scar hyperesthesia is diminished in double incisions. Wilson^[8] compared double incision technique and endoscopic release and revealed no difference in between in terms of grip power and scar hyperesthesia.

To avoid incisions at the pillar, carpal tunnel can be released using special blades from a skin incision located distal to the transverse carpal ligament.^[3,5,6,14] Tetik and Erol^[14] compared distal mini incision using by light-knife technique with endoscopic and standard incision techniques, and found that in

both techniques, return to daily activities is decreased compared to the standart technique. The only drawback is the cost of equipment used in light-knife and endoscopic techniques.

All the mentioned studies compare a modified incision with the standard incision or endoscopic technique.^[2,7-12] This study compares two modified techniques. The results revealed satisfactory results in both techniques, distal mini incision technique offers diminished symptoms related to the incision. Although this technique is favorable, it needs experience and a profound knowledge of anatomic variations.

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