D:\Nsurg\Vol. 22, No. 3, Jul. – Sep., 2018\Nsurg-7.Doc Fig. 1 – 2 Color (A) P. 134 – 138 II

ORIGINAL ARTICLE

Out Come of Mini Open Carpal Tunnel Release (OCTR) in Patients with Carpal Tunnel Syndrome

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ABSTRACT

Background: *Among peripheral neuropathies the incidence of carpal tunnel syndrome (CTS) ranks higher. At present surgery is considered as gold standard technique among the various available treatment options. Mini OCTR is the minimally invasive technique with better efficacy and less morbidity.*

Materials and Methods: *Thus is prospective nonrandomized clinical study in which mini open carpel tunnel release (OCTR) under local anesthesia with a 2-year follow-up.45 patients diagnosed with carpal tunnel syndrome, some patients have bilateral disease so total number of cases 55.*

Results: *Instant response was noted in 78.2% cases in regard to pain and numbness. At final follow up 95% reported improvement and 5.5%% reported persistence of symptoms, with no functional deficit.*

Conclusion: *Under local anesthesia, the mini OCTR technique is a treatment of choice in reducing the morbidity and cost.*

Abbreviations: *OCTR: Open Carpal Tunnel Release. CTS: Carpal Tunnel Syndrome.*

Key Words: *mini open, carpel tunnel syndrome, release.*

INTRODUCTION

Among entrapment neuropathies the CTS is usual variety and approximately involves 3.5 to 5.5% of the population. It usually involves the people of working age group of 30 to 60 years. It affects females more than men. It is estimated that if five patients presenting with features of pain that is more at night, numbness, and tingling in hands, one of them can have CTS.[1–3] Presence of three or more of the following clinical features are sufficient to make the diagnosis of CTS: (1) Pain along the distribution of median nerve, (2) paresthesia at night, (3) atrophy of thenar muscle, (4) positive Tinel sign, (5) positive Phalensign, and (6) diminished sensation.

Although the etiology is un-known in most cases it has been related with other diseases like diabetes mellitus, pituitary disorders namely acromegaly, rheumatoid arthritis, Trauma, hypothyroidism, and pregnancy.[4,5]

Different studies showed that the most related histological form is inflammatory fibrosis and thickening of the sub synovial connective tissue. The important and gold standard treatment is surgery. Surgical treatment has different techniques including standard open, mini open and endoscopic or percutaneous techniques for release of carpal tunnel. Therefore it is very difficult to decide which is the most effective strategy to resolve the entrapment [6, 7] .In regard to anesthetic technique in many techniques, duration of admission, return to work, and recurrences including in the analysis,[23,24] the efficacy of mini open release has been evaluated.

MATERIAL AND METHODS

Prospective nonrandomized clinical trial in which ethical approval was obtained from institutional ethical board. Between June 2015 and March 2017. Mini OCTR technique was used in 45 patients with carpal tunnel syndrome, some patients have bilateral disease

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so total number of cases were 55. Presence of three or more of the following clinical features are sufficient to make the diagnosis of CTS: (1) Pain along the distribution of median nerve, (2) paresthesia at night, (3) atrophy of thenar muscle, (4) positive Tinel sign, (5)positive Phalen sign, and (6) diminished sensation.

Inclusion Criteria

1. Failure of 03 months of conservative treatment which includes rest, physical support and pharmacological measures.
2. Severe numbness and pain persisting for a long time.
3. Presence of weakness or muscle atrophy of the thenar musculature.

Exclusion Criteria

1. Recurrent cases of Carpal tunnel syndrome.
2. Post injury or post surgical cases including wrist.
3. Patients having rheumatoid arthris, diabetes and thyroid disease.

After marking the superficial palmar arch and the ulnar artery by the use of Doppler ultrasound 3 cc of 2%, lidocaine given locally in the thenar sulcus with an insulin needle, the incision of 1.5 cm was made. With mini OCTR technique the dissection was completed in the subcutaneous plane. After isolating the carpal tunnel ligament, its horizontal fibers were cut under microscope, the median nerve was identified and adhesions around the nerve were released. Wound washed with normal saline, hemostasis secured and wound was closed with proline 2/0. Antiseptic dressing was done and patient was discharged after two to three hours if stable. All the patients were advised physiotherapy and hand care for 14 days. Stitches were removed 10 to 12th post operative day.

RESULTS

Our study included 45 patients diagnosed with carpal tunnel syndrome; some patients have bilateral disease so total number of cases operated was 55 in number with carpal tunnel syndrome using Mini Open Carpal Tunnel Release (OCTR) technique. These patients 09 male and 36 female, of 31 years to 67 years (ave, 44 years). We operated upon 37 right and 18 left hands (Table 1). All patients were followed for two years. 78.2% patients showed satisfactory relieve of symptoms after the surgery, although few symptoms persisted but decrease in clinical features was so significant and compatible with daily work of patients as shown below (Table2). Regarding operative and peri-operative complications there was no significant injury to median nerve, ulnar artery, palmer arch, marked pain at scar site in the distribution of median nerve. In two cases there was mild wound infection treated with local antiseptic dressing (Fig. 2).

Table 1: *Preoperatively Specific Physical Findings.*

Physical Findings	No. of Patients	Percentage
Positive phalen sign	43	78.2%
Hypesthesia	41	74.5%
Positive Tinel sign	38	69.1%
Muscle atrophy	28	51%

Table 2: *At the final follow-up, some specific symptoms and signs persisted.*

Findings persisted	No of Patients	Percentage
Positive phalen sign	03	5.4%
Hypesthesia	03	5.4%
Positive Tinel sign	02	3.6%
Muscle atrophy	04	5.5%

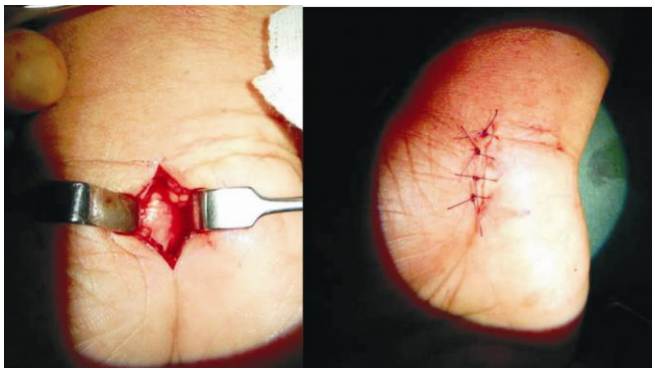

Fig. 1: *Steps of microscopic release of Carpal Tunnel Syndrome.*

Fig. 2: *Results of MINI OPEN release of Carpal Tunnel Syndrome (a) symptoms free (b) scar and paresthesia.*

DISCUSSION

There are different treatment options for CTS including Physiotherapy, Pharmacology and local steroids surgical technique. The steroid reduces the edema and inflammation but at the same time they have degenerative effort on connective tissue.[1,2] Patients whose clinical features did not improve to medical treatment of the carpal tunnel syndrome, the surgical release is the treatment of the choice .In this regard the open method has been considered the gold standard because of its efficacy in the form of good out come in the 75% cases .similar results were found in our study like most of studies which resulted in improvement of pre pain and numbness. Complete recovery is found in 99% of patients with mild conduction disturbances and 94% of those with moderate anomalies in most of the reported series. Both the surgical treatment and rehabilitation in the early postoperative period gives the best outcomes.

A survey report from the American Association for Hand Surgery from 2012 found that most surgeons use local anesthesia, 33.4% are in favor of standard open surgical technique, while 45.5% use mini-OCTR, and endoscopic procedure is preferred by 19.5%. Surgeons having prolonged experience use "mini-open" procedure as method of choice. Injection of steroids to relieve symptoms in CTS are being used regularly by 63.2% of surgeons in their clinical practice.

The Mini OCTR procedure for carpal tunnel syndrome has been routinely practiced by different surgeons. The advantages of mini OCTR has been documented by different results,[10] because this technique has brought improvement in symptoms. Microscopic release there are little chances of surrounding structures like median nerve ulnar artery branches because of small mid line and precise incision.[7] By microscopic release we reported insignificant problems (5.5% in our study) pain at surgical site, wound problems and per operative injury to surrounding neurovascular structures in few patient.[13,14] The mini OCTR has been recognized for its better results regarding improvement of clinical features while Endoscopic Release of carpal tunnel has been related to restoring the symptoms from to 20 to 80%.[6,19] With mini OCTR it is very easy to completely release the transverse ligaments which is necessary for satisfactory improvement of clinical features. Per-operative complications of this surgery becomes less as the experience of surgeon increases with increase in number of cases Chow et al.[4]

In mini OCTR it is very easy to completely releases the transverse ligaments, which is necessary for satisfactory improvement of symptoms and prevention of recurrence.[17] The microscopic procedure is ambulatory and can be admitted directly to the operation room. In most cases patients can be discharged after one hour of the surgery. We did not use a tourniquet in any of our patients,[16] which in our view is an unnecessary traumatic event; and the use of lidocaine as a local anesthetic without epinephrine does not compromise the microcirculation of the perineurium. A key point concerning the benefits of the microsurgical resection is that since it is a small incision, the risk of keloid scars in the area is reduced, and the dissection can be complemented at the distal and proximal level of the transverse ligament of carpal tunnel in the subcutaneous plane.

Carpal tunnel microsurgery with local anesthesia has become a good treatment option because it is fast, safe, and effective. The day care strategy allows reducing the morbidity involved in more invasive anesthetic procedures, hospital stay, and the costs for the procedure. Furthermore, the patient can return sooner to his daily activities.[23,24]

CONCLUSION

The mini OCTR technique is a minimally invasive surgery for the release of carpal tunnel syndrome (CTS) by using local anesthesia and day care scheduled surgery with successful outcomes and significant improvement in patient's problems as resulted by many surgeons. This technique is not recommended for comparison with other techniques regarding efficacy, but in our experience better

technique for mechanical release of carpal tunnel syndrome (CTS).

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REFERENCES

1. Huang JH, Zager EL. Mini-open carpal tunnel decompression. Neurosurgery, 2004; 54: 397-399.
2. K. Current status of outcomes research in carpal tunnel surgery. Hand, 2006; 1: 9-13.
3. Okutsu I, Ninomiya S, Hamanaka I, Kuroshima N, Inanami H. Measurement of pressure in the carpal canal before and after endoscopic management of carpal tunnel syndrome. J Bone Joint Surg Am. 1989; 71: 679-683.
4. Richman JA, Gelberman RH, Rydevik BL et al. Carpal tunnel syndrome: mor-phologic changes after release of the transverse carpal ligament. J Hand Surg. 1989; 14: 852-857.
5. Cellocco P, Rossi C, Bizzarri F, Patrizio L, Costanzo G. Mini-open blind procedure versus limited open technique for carpal tunnel release: a 30-month follow-up study. J Hand Surg. 2005; 30: 493-49.
6. Jacobsen MB, Rahme H. A prospective, randomized study with an independent observer comparing open carpal tunnel release with endoscopic car-pal tunnel release. J Hand Surg. 1996; 21: 202-204.
7. Jimenez DF, Gibbs SR, Clapper AT. Endoscopic treatment of carpal tunnel syndrome: a critical review. Neurosurg Focus, 1997; 3: e6.
8. Jugovac I, Burgic N, Micovic V et al. Carpal tunnel release by limited palmar incision vs. traditional open technique: randomized controlled trial. Croat Med J. 2002; 43: 33-36.
9. Palmer DH, Paulson JC, Lane-Larsen CL, Peulen VK, Olson JD. Endoscopic car-pal tunnel release: a comparison of two techniques with open release. Arthroscopy, 1993; 9:4 98-508.
10. Zyluk A, Strychar J. A comparison of two limited open techniques for carpal tunnel release. J Hand Surg. 2006; 31: 466-472.
11. Cobb TK, Cooney WP, Kai-Nan An. Relationship of deep structures of the hand and wrist to topographical landmarks. Clin Anat. 1993; 6: 300-307.
12. Kluge W, Simpson RG, Nicol AC. Late complications after open carpal tunnel decompression. J Hand Surg. 1996; 21: 205-207.
13. Hankins CL, Brown MG, Lopez RA, Lee AK, Dang J, Harper RD. A 12-year experience using the Brown two-portal endoscopic procedure of transverse carpal ligament release in 14,722 patients: defining a new paradigm in the treatment of carpal tunnel syndrome. Plast Reconstr Surg. 2007; 120: 1911-1921.
14. DaSilva MF. Single portal endoscopic carpal tunnel release. Tech Orthopaedics, 2006; 21: 35-41.
15. Oertel J, Schroeder HW, Gaab MR. Dual-portal endoscopic release of the transverse ligament in carpal tunnel syndrome: results of 411 procedures with special reference to technique, efficacy, and complications. Neurosurgery, 2006; 59: 333-340.
16. 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; 111: 1616-1622.
17. Dayican A, Unal VS, Portakal S, Utkan A, Tumoz MA. Carpal tunnel release: using a short vertical incision above the flexor crease of the wrist. Mt Sinai J Med. 2004; 71: 401-404.
18. Serra JM, Benito JR, Monner J. Carpal tunnel release with short incision. Plast Reconstr Surg. 1997; 99: 129-135.
19. Hwang PY, Ho CL. Minimally invasive carpal tunnel decompression using the Knife Light. Neurosurgery, 2007; 60: 162-169.
20. LoVerme PJ, Saccone PG. Limited portal with direct-vision carpal tunnel re-lease. Ann Plast Surg. 1995; 34: 304-308.
21. Abouzahr MK, Patsis MC, Chiu DT. Carpal tunnel release using limited direct vision. Plast Reconstr Surg. 1995; 95: 534-538.
22. Palmer AK, Toivonen DA. Complications of endoscopic and open carpal tunnel release. J Hand Surg. 1999; 24: 561-565.
23. Boeckstyns ME, Sorensen AI. Does endoscopic carpal tunnel release have a higher rate of complications than open carpal tunnel release? An analysis of published series. J Hand Surg. 1999; 24: 9-15.
24. Cobb TK, Knudson GA, Cooney WP. The use of topographical landmarks to improve the outcome of Agee endoscopic carpal tunnel release. Arthroscopy, 1995; 11: 165-172.
25. Kretschmer T, Antoniadis G, Richter HP, Konig RW. Avoiding iatrogenic nerve injury in endoscopic carpal tunnel release. Neurosurg Clin N Am. 2009; 20: 65-68.
26. Vella JC, Hartigan BJ, Stern PJ. Kaplan's cardinal line.

J Hand Surg. 2006; 31: 912-918.
27. Sacks JM, Kuo YR, Mclean K, Wollstein R, Lee WP. Anatomical relationships among the median nerve thenar branch, superficial palmar arch, and trans-verse carpal ligament. Plast Reconstr Surg. 2007; 120: 713-718.
28. Ruch DS, Marr A, Holden M, James P, Challa V, Smith BP. Innervation density of the base of the palm. J Hand Surg. 1999; 24: 392-397.
29. Cobb TK, Dalley BK, Posteraro RH, Lewis RC. Anatomy of the flexor retinaculum. J Hand Surg. 1993; 18: 91-9.

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