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Outcome of Carpal Tunnel Release Surgery in Bolan Medical Complex Tertiary Care Hospital Quetta

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Abstract:

Introduction: Carpal tunnel syndrome occurs when the median nerve is compressed as it traverses the carpal tunnel. By addressing this research gap, we can better guide clinical decision-making, optimize patient outcomes and contribute to the advancement of evidence-based practices tailored to the unique characteristics and needs of our local population.

Objective: To determine the outcome of carpal tunnel release surgery in Bolan Medical Complex Tertiary Care Hospital Quetta

Methods: This Randomized Controlled Trial was conducted at Department of Neurosurgery, Bolan Medical College / Bolan Medical Complex Hospital from 16-10-2025 to 17-04-2026. A total of 120 patients of both gender with carpal tunnel syndrome were included in the study.

Results: A total of 120 patients, 29 (19%) male and 91 (81%) females were included in the study. Among them 80 were housewives, 8 were drivers, 12 were teachers, 4 were farmers and 16 belonged to other occupations. The age range of patients included was from 32 to 50 years with a mean of 39.29±3.99 years. The duration of symptoms was 5–24 months

Conclusion: Our study has concluded that the wrist crease incision approach yields a significantly better clinical outcome in patients with carpal tunnel syndrome.

Keywords: Carpal tunnel syndrome, Wrist crease incision, Palmer crease incision, Clinical outcome.

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INTRODUCTION

Carpal tunnel syndrome (CTS) occurs when the median nerve is compressed as it traverses the carpal tunnel. The primary factor contributing to the onset of CTS is the elevated pressure within the carpal tunnel.[1] The typical initial signs of CTS include pain, numbness, and paresthesias, which affect the first 3 digits and the lateral half of the fourth digit.[1] Symptoms of CTS can exhibit variability, with pain manifesting at the wrist, involving the entire hand, and potentially radiating up the forearm or extending beyond the elbow.[1] Pain associated with CTS does not typically extend to the neck. As the condition advances, individuals may experience hand weakness, diminished fine motor coordination, clumsiness, and eventual atrophy of the thenar muscles.[2]

Several studies have investigated the effectiveness and safety of different surgical techniques for carpal tunnel release. Mardanpour et al.[3] evaluated the long-term outcomes of carpal tunnel release with a 1.5 cm longitudinal mini-incision technique, focusing on effectiveness and safety. Wang et al.[4] developed a novel bush hook via a mini-transverse incision at the proximal wrist crease and compared the results with those of a mid palmar small longitudinal incision in carpal tunnel release. Teng et al.[5] compared wrist arthroscopy, small incision surgery, and conventional open carpal tunnel release surgery, finding that conventional surgery resulted in more postoperative complications. Rabei and El-Shandawelly[6] suggested that a surgical procedure with an open classic incision crossing the wrist flexion skin crease is a more effective technique in carpal tunnel release.

Furthermore, Atthakomol et al.[7] compared outcomes in terms of early postoperative anterior wrist pain and time to return to work or activities of daily living for patients who underwent carpal tunnel syndrome (CTS) release with short incision and those who had minimally invasive surgery (MIS) with CTS kits. Liawrungrueang and Wongsiri[8] highlighted that standard open surgery is a basic procedure with a 3-5 cm long incision and produces successful outcomes of carpal tunnel release, but wound complications are more frequent than with minimally invasive carpal tunnel surgery. Polat[9] discussed

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the mini-open carpal tunnel release surgery, which can be performed proximal or distal to the distal wrist crease, as a preferable method, but noted disadvantages such as limited surgical exposure, inadequate decompression, and nerve injury risk. Zeng et al.[10] compared the efficacy of ultrasound-guided needle release plus corticosteroid injection and mini-open surgery in patients with carpal tunnel syndrome.

In a study by Muhammed Fazil VV, et al. has shown that good clinical outcome was 34.50% with wrist crease incision as compare to 12.50% with palmer crease incision for carpel tunnel release.[11]

Methodology:

Patients who fulfilled the selection criteria from the Department of Neurosurgery, Bolan Medical Teaching Hospital Quetta, were included in the study after obtaining permission from the ethical committee. Informed consent was taken after explaining the purpose/risk and benefits of taking part in the study.

Carpal tunnel syndrome was diagnosed in all patients meeting the clinical criteria (numbness or pain in the median nerve area and a positive Phalen test lasting less than 60 seconds), and this diagnosis was validated through electro-diagnostic studies. The exclusion criteria included prior surgery for carpal tunnel syndrome, involvement of nerves other than the median nerve, cervical radiculopathy, any connective tissue disorders, fractures in the hand and wrist, diabetes mellitus, and pregnancy. In cases where both wrists were affected, the wrist exhibiting more severe symptoms was chosen to prevent bias. Carpal tunnel decompression surgery was conducted by a single surgeon utilizing a consistent technique of open carpal tunnel release, following appropriate counseling and obtaining consent. General anesthesia was administered, and a 2–3 cm incision was made medial to the mid-palm crease. Roof of the tunnel was incised. After cutting the carpal retinaculum complete release of the median nerve to the point of nerve deviation was achieved. Wound was closed with non-absorbable suture.

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Patients were discharged on second post-operative day and skin stitches were removed on 12 postoperative day. Patients were allowed to return to routine tasks by 4 weeks. Follow-up was scheduled at1, 3 and 6 months to assess the outcome of carpel tunnel release surgery. At each follow-up the patients were assessed for any residual pain, numbness and functional outcome. Pain severity was assessed with visual analogue score. All the data was recorded on a proforma and analyzed by using SPSS-21.0

RESULTS:

A total of 120 patients, 29 (19%) male and 91 (81%) females were included in the study. Figure-1

Among them 80 were housewives, 8 were drivers, 12 were teachers, 4 were farmers and 16 belonged to other occupations. The age range of patients included was from 32 to 50 years with a mean of 39.29±3.99 years. The duration of symptoms was 5–24 months. On first follow-up at 1 month, 92 patients had no pain, numbness and paraesthesia, 17 patients had mild pain and 11 patients were complaining of moderate pain and paraesthesia. The patients with mild to moderate pain were kept on analgesics, conservative treatment and were reassured. On second follow-up at 3 months, all the 22 patients with mild pain were pain free and had good function outcome while the pain severity of those 16 patients who had moderate pain decreased to mild and they were satisfied from the functional condition of their hands. On third follow-up at 6 months only three patients had residual symptoms of pain and numbness that were subjected to further nerve conduction studies and were considered for re-intervention.(Table-1) In the entire series patient functional outcome and satisfaction was 82% at 1 month, 94% at 3 months and 97% at 6 months. 18% patient had residual pain at 1 month post-operative follow-up, 6% at 3 months and 3% at 6 month follow-up.

There was no other surgery related complications like wound infection, wound hematoma and wound oedema.

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Figure-1: Gender Distribution

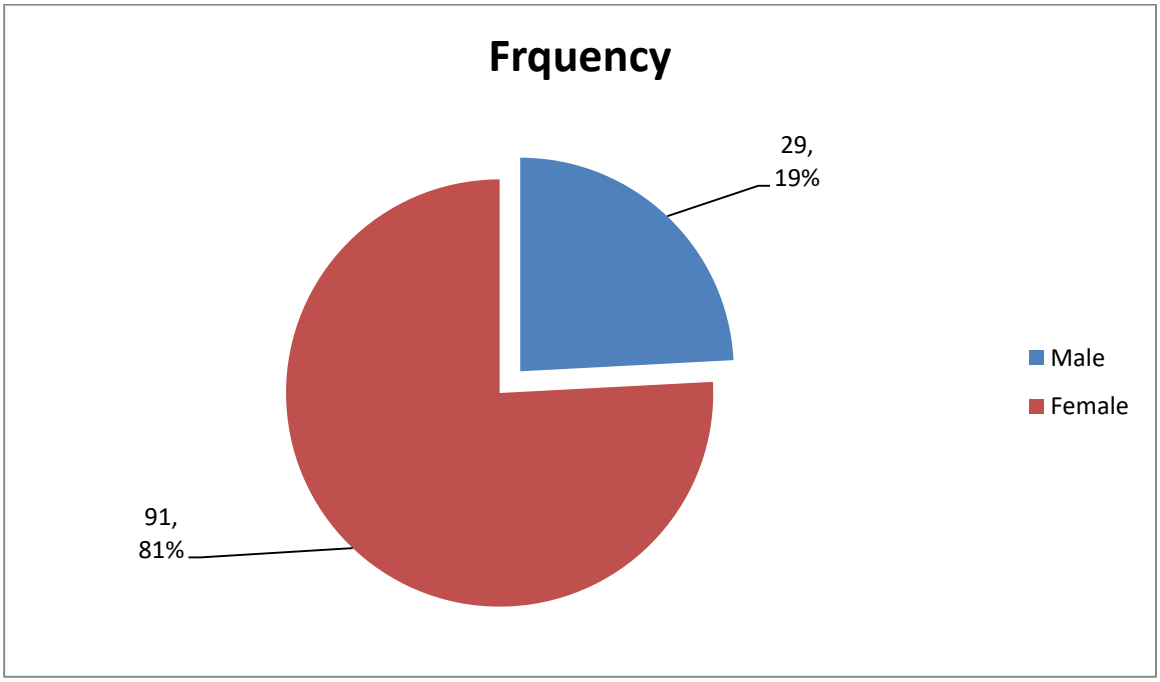

Table-1: Follow-up data

Follow-up	No Pain	Mild Pain	Moderate Pain	Severe Pain	Total
1 month	82 (82%)	22 (12%)	16 (8%)	0	120
3 months	104 (94%)	16 (6%)	0	0	120
6 months	107 (97%)	13 (3%)	0	0	120

Discussion

Carpal tunnel syndrome (CTS), one of the most commonly diagnosed hand disorders, accounts for 90% of all compression neuropathies. It is expected that 1 in 5 patients who complains of pain, numbness and a tingling sensation in the hands will be diagnosed with CTS. This diagnosis is based on clinicalexamination and electrophysiological testing.[12] CTS affects 3.8% of the general populationwith an incidence of 276:100000/ year. It more frequently affects women than men, with a prevalence rate of 9.2% in women and 6% in men. Bilateral hand involvement is commonly seen atthe age of 40–60

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years.[13] CTS affect the life of a patient badly as the hand is the most important tool which one uses for daily activities. Housewives and computer operatorsare badly affected. The continuous agonizing pain leads to the poor functional outcome related to CTS. Sometimes the severity of pain affects the sleep of the patient as well.[14]Among the available treatments for CTS; the most effective option is surgical release of the tunnel either by open or endoscopic approach.[8] Although, some researchers suggest that early response of surgery and local anaesthesia are not statistically significant.[15] We decided to see the functional outcome of open carpel tunnel release surgery in our setup. In our study we noted that the most affected population was women (81%). Among them housewives were more in number. This may be attributed to the daily excessive use of hands by housewives for domestic activities. Rask MR[16] and Phalen GS[17]also found an increase number of women affected by CTS in their studies.

We observed that the pain and other symptoms associated with CTS drastically decreased after the release surgery and 82% of patients were pain free at the first follow-up at 1 month. The percentage of pain free patients increased to 94% at the third month and then to 97% at sixth month. As the patients got rid of their pain, their functional outcome and satisfaction automatically improved. Georgiew F et al[18] Haupt WF et al[19] have similarly found a better pain relief and functional outcome with open carpal tunnel release surgery.

At the 1 month follow-up, we found patients with mild to moderate postoperative residual pain but they ultimately got relief as the time passed so that at 3rd and 6th month follow-up, majority of them were pain free. Many authors [20-21] have found that the postoperative pain after carpel tunnel release surgery decrease with time. There were no other major postoperative complications noted in our series.

Conclusion:

In conclusion, carpal tunnel release surgery is determined to be a safe and effective alternative for patients displaying signs and symptoms of carpal tunnel syndrome, especially those with considerable compression indicated by nerve conduction studies. It is recommended that this option be made

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available to all CTS patients who have moderate to severe symptoms and are not benefiting from conservative treatment. Further investigations are necessary to assess the efficacy of this surgery alongside endoscopic techniques for CTS.

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