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EFFICACY OF LOCAL GLUCOCORTICOID INJECTION IN CARPAL TUNNEL SYNDROME REFRACTORY TO PHARMACOTHERAPY– AN EXPERIENCE FROM A TERTIARY CARE CENTRE

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ABSTRACT Carpal Tunnel Syndrome (CTS) is a common clinical condition caused by the compression of the median nerve within the carpal tunnel. We aim to assess the efficacy of a local corticosteroid injection for treatment of moderate / severe CTS. We retrospectively collected data from 20 patients who presented with symptoms and nerve conduction suggestive of CTS with no improvement following pregabalin (75mg/day). They were given a local methyl prednisolone injection(40mg). The pre and post injections Boston Carpal Tunnel Questionnaire (BCTQ) was the primary outcome measure and were compared using paired t-test. The BCTQ (3.9 + 0.47 vs 1.8 + 0.92) showed significant improvement between the pre and post injection patients ($p<0.001$). Only one patient required surgical decompression. 18 (90%) of the patients reported there was no longer a difficulty performing ADLs post injection. We thus concluded that local corticosteroid injection can provide an alternative to decompression surgery for moderate/severe CTS.

KEYWORDS : Carpal tunnel syndrome, injection, glucocorticoid

INTRODUCTION

Carpal Tunnel Syndrome (CTS) refers to the myriad of signs and symptoms caused by the compression of the median nerve within the carpal tunnel. CTS is a common disorder among adults. The estimated annual incidence of CTS per 1000 person-years ranges from 2.2 to 5.4 for women and 1.1 to 3 for men. Several risk factors such as sex, obesity, occupation, comorbid illnesses, trauma and genetic predisposition have been proposed for the development of CTS[1-3]. The key pathogenic mechanisms are development of oedema and thickening of vessel walls within the endoneurium and perineurium of the median nerve, noninflammatory synovial fibrosis and vascular proliferation, fibrosis and myelin thinning along with nerve fibre degeneration and regeneration[2].

Based on the symptoms, CTS is can be considered mild, moderate and severe[4,5]. It is clinically mild if there is numbness, tingling, or discomfort in the median nerve distribution but no sensory loss or weakness, no sleep disruption, and no difficulty with hand function or interference with activities of daily living (ADLs). If there is sensory loss in the median distribution or it interferes slightly with hand function, but the patient can perform all ADLs; then it is moderate. If there is clinical weakness in the median or if symptoms are disabling and prevent the patient from carrying out one or more ADLs; it is clinically severe. Nerve conduction are the cornerstone of CTS diagnosis and here too we have a electrodiagnostic grading system for severity. It is summarised as follows: -

- Mild CTS is characterized by prolonged (relative or absolute) sensory latencies with normal motor studies. No evidence for axon loss.
- Moderate CTS is characterized by abnormal median sensory latencies as noted for mild CTS, and relative or absolute prolongation of median motor distal latency. No evidence of axon loss.
- Severe CTS is characterized by evidence of axon loss, as defined by :-
- An absent or low-amplitude sensory nerve action potential (SNAP) or mixed nerve action potential
- A low-amplitude or absent thenar compound muscle action potential (CMAP)

After clinical and electro diagnostic grading of CTS is done, current existing therapies include surgical decompression, physical and occupational therapy, nocturnal wrist splinting, glucocorticoid injections and pharmacological therapy. It is traditionally believed that splinting, glucocorticoid injections, and oral glucocorticoids are useful for symptom relief of mild CTS, but surgery is the treatment of choice for patients with evidence of ongoing nerve damage in the absence of a reversible etiology. Surgical decompression is advised for most patients with significant axonal degeneration on nerve conduction studies (NCS) or denervation on needle EMG. A 2007 systematic review evaluated 12 trials and concluded that glucocorticoid injections provided greater symptom improvement at one month than placebo, but relief beyond one month was not established[6,7]. Effective short-term symptomatic relief has been shown with local corticosteroid injection, although some literature questions the long-term efficacy of local corticosteroid injection. We aim to assess the efficacy of local glucocorticoid injections in the treatment of moderate to severe carpal tunnel syndrome by patient reported outcome measures followed up for a median period of 7 months after the injection.

MATERIAL AND METHODS

Inclusion and Exclusion Criteria

Patient who presented to OPD with clinical symptoms suggestive of CTS along with a nerve conduction study confirming the same were included in the study. An SDL (peak latency) longer than 3.5 ms was considered abnormal[8]. All patients also had failed a therapeutic trial of oral pregabalin (75mg/day). The patients were injected as per protocol (refer below) by the rheumatologist.

Injection Technique

Using a sterile technique, 20 mg methylprednisolone acetate premixed with lignocaine was injected using a 25-guage 9 5/8" needle. The needle was inserted medially to the Palmaris longus tendon at the distal palmar crease in the wrist at an angle of 45° to the forearm. The steroid was injected at approximately 1 cm below the skin. The needle was repositioned if there was any resistance to injection, or any pain or paresthesia in the median nerve territory[10].

Clinical Profile and Outcome Measures

Baseline demographic, co-morbid condition, presence of associated rheumatologic disease and baseline NCS findings were collected for each patient. The well-validated and disease-specific Boston Carpal Tunnel Questionnaire (BCTQ) was employed and its score at pre and post treatment was used as the primary outcome measure[9,10]. It was collected retrospectively via telephonic interview. Other outcomes including patient global assessment (PGA) and the side effects were also collected similarly .

Statistics

The baseline clinical and electrophysiological parameters are summarised by mean and standard deviation. Proportions were also

summated as percentage. Differences in the pre and post BCTQ was studied using paired t test. PGA was also assessed similarly. A p value of <0.001 was considered significant for all analyses. Statistical analyses were performed using the SPSS V.22.0 for Windows. Ethical clearance was obtained from the institution ethical committee for publication of this data.

RESULTS

Baseline parameters

20 patients were included in the study. The mean age of participants in the study was 53.5 ± 7.5 years. 18 subjects (90%) in the study group were female. 14 patients had no associated rheumatological conditions. Amongst the remaining patients (n=7), the asssociated rheumatologic comorbidities seen were mixed connective tissue disorder, rheumatoid arthritis and fibromyalgia. 8 patients were diabetics, 11 patients had dyslipidaemia while only 5 hand co-existent hypothyroidism.

18 patients (90 %) had symptoms and electrophysiological evidence suggestive of bilateral CTS. 15 of 20 patients were having clinically severe symptoms with the CTS affecting their ADL. 10 patients (50 %) had electro-physiological evidence of severe CTS. All others had evidence of moderate CTS. However, only 4 patients in our study group had bilateral injections. Rest of the 16 patients were given glucocorticoid injections in the hand with predominant symptoms only.

Outcome measures

Table 1 Baseline NCS parameters along with pre- and post-injection outcome measures

Nerve conduction study of injected hands			
Onset Latency(Mean, SD)	3.1ms		
Peak Latency(Mean, SD)	4.24ms		
Amplitude(Mean, SD)	20.29ms		
Outcome measures			
	Pre- injection	Post- injection	*p- value*
Boston hand score (Mean, SD)	3.9 ± 0.47	1.8 ± 0.92	< 0.001
PGA (Mean , SD)	8 ± 0.9	2.8 ± 2.6	< 0.001

PGA - Patient Global Assessement SD – Standard Deviation

The baseline NCS parameters (individual and injected hands) along with pre- and post-injection outcome measures (BHS and PGA) are summarised in table 1. The median follow-up period was 7 months. Only two patients in our series reported that CTS symptoms continued to affect ADL even after injections. Of these, only 1 patients underwent carpal tunnel release surgery. All other patients (95 %) did not opt for surgery during the follow-up period. While most patient were continued on medications for the neuropathy, 8 patients subsequently went on to stop these medications. Or reviewing the side effects, only 2 patients noted a hypopigmentation over the injection region. There were no other complications reported on telephonic interview.

DISCUSSION

Our patient cohort who presented with features suggestive of severe/moderate CTS symptoms; though having traditional electrodiagnostic indications for carpal tunnel decompression were initially treated with local glucocorticoid injection. They had significant improvement in both the composite outcomes measure-BCTQ and patient global assessment of the disease. The number of patients who had complained of CTS affecting their ADLs also significantly reduced. Only one of the patients in our cohort required a follow-up carpal tunnel surgery.

Although there is wide variation in success rates among individual studies (ranging between 27% to 100%), the pooled success rate of surgery for CTS was 75%. It has been described that there is a risk of direct needle injury of the median nerve is and the leakage of the corticosteroid injectate from the carpal tunnel can cause complications such as fat tissue atrophy and skin colour changes[11]. Only two patients noted this complication, however their global assessment of the disease showed significant improvement.

However, it is worth noting that US-guided carpal tunnel injection was more effective in improving electrodiagnostic, sonographic findings, and symptoms than blind injections. Further research comparing the efficacy of this technique in Indians need to be studied. A key limitation of our study is that it retrospectively assesses the severity of the disease via the BCTQ and may not clear estimate the minute details. It is for this reason that we also studied/analyse the patient global assessment of the CTS and the percentage of patient who experienced an improvement in their ADLs Also comparison on the efficacy of other non-invasive manoeuvres like splinting (in combination / independently) was not studied[12]. In conclusion, we would like to suggest that; for patients with carpal tunnel syndrome (moderate and severe) local steroid injection can provide an equally effective alternative to decompression surgery in the treatment of patients with moderate/severe CTS.

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