



ROLE OF LOCAL CORTICOSTEROID INJECTION VS THERAPEUTIC ULTRASOUND REGARDING IMPROVEMENT IN PAIN FREE GRIP STRENGTH OF TENNIS ELBOW PATIENTS

Pradip Kumar Mallick

Assistant Professor, Department of Physical Medicine & Rehabilitation (PM&R), Bankura Sammilani Medical college and Hospital, Bankura, West Bengal, India.

Ushnish Mukherjee*

Tutor, Department of Physical Medicine & Rehabilitation, NRS Medical College, Kolkata, West Bengal, India. *Corresponding Author

ABSTRACT **Background:** Tennis elbow or Lateral epicondylitis is now a days a well known condition with mixed etiopathogenesis of inflammation and microtear resulting in decreased hand grip strength. Among the various treatment options, therapeutic ultrasound and local steroid injection are commonly used in managing these patients, but comparative effectiveness of these two treatment procedures are often debated. **Aim of Study:** To compare the efficacy of local corticosteroid injection versus therapeutic ultrasound in terms of improvement in painfree grip strength (PFGS) of affected upper limb. **Method:** This interventional study was conducted on 56 patients of both sexes within the age group of 18-60 years with unilateral Tennis elbow. They were randomly divided in two groups of same number (28 in each group)- Group-1: managed with local injection of steroid (methylprednisolone-10mg, single dose) with 2% of 0.5 ml lignocaine and Group-2 : managed with Therapeutic Ultrasound. Improvement of PFGS was assessed by hand held Dynamometer. Data collected at 0 week (Visit-1 or Pre-initiation), 3weeks (Visit-2) , 6 weeks (Visit-3), 12 weeks (Visit-4). **Result:** For PFGS score, in both Group-1 and Group-2, there was significant increase in subsequent visits ($p < 0.05$). The mean PFGS score of Group-1 was significantly higher than that of Group-2 in visit-2 ($p < 0.01$), but in visit-3 ($p > 0.05$) & visit-4 ($p > 0.05$) there was no statistically significant difference noted. **Conclusion:** Local Steroid injection & therapeutic ultrasound both are effective in improving PFGS. Though Local steroid injection is more effective in initial period, but in subsequent followups, the difference was statistically insignificant.

KEYWORDS : Tennis Elbow, Lateral epicondylitis, Local Steroid injection, Therapeutic Ultrasound, Pain free grip strength (PFGS).

INTRODUCTION

Tennis elbow is defined as a pathological condition of the wrist extensor muscles at their origin on the lateral humeral epicondyle.¹ It occurs more frequently in non athletes with a peak incidence in the early fifth decade and many patients have poorly conditioned muscles.² Almost 95% patients are non tennis player.² It is more common in male than in female tennis players, but does not display a gender predilection in general population.³ Main pathology is micro tearing commonly within the origin of extensor carpi radialis brevis and there is vascular ingrowth known as angiofibroblastic hyperplasia.^{1,4,5} Cozen's Test can clinically detect Tennis elbow or Lateral epicondylitis. This condition often makes the hand grip painful resulting in impaired hand function.^{1,6}

Among the various treatment options, both therapeutic ultrasound and local steroid injection are used in managing tennis elbow patients, but comparative effectiveness of these two treatment procedures are often debated.^{2,7,9} Therefore this study was formulated to evaluate the efficacy of local corticosteroid injection versus therapeutic ultrasound regarding pain free grip strength (PFGS) improvement in such unilateral tennis elbow cases.

MATERIALS & METHODS

This Prospective interventional Study was initiated after receiving the approval from the Institutional Ethics Committee. All the patients diagnosed with recent onset unilateral Tennis elbow at the Department of Physical Medicine & Rehabilitation, R.G.Kar Medical College & Hospital, Kolkata, West Bengal, from 01.12.2011 to 31.05.2013 were screened according to the following inclusion and exclusion criteria and divided (28 patients in each group) randomly into two groups after receiving informed consent from them, i.e. Group 1: managed with local injection of steroid (methylprednisolone-10mg, single dose) with 2% of 0.5 ml lignocaine and Group 2 : managed with Therapeutic Ultrasound. Post interventional uniform therapeutic exercises given to both the groups.

Inclusion Criteria-

i) Age between 18 years to 60 years, ii) Onset $\leq$ 4 weeks. iii) Unilateral involvement, iv) No previous surgical intervention or injection in the affected site.

Exclusion Criteria-

i) Patients with Diabetes, Hypothyroidism, Rheumatoid arthritis or other inflammatory arthritis. ii) Evidence of dysfunction of the shoulder, neck or thorax,

iii) Generalised neurological abnormality/Nerve entrapment in the upper limb. iv) Coagulation disorder/ Patient on anticoagulant therapy. v) Tumour/ generalised or local infection in affected area. vi) Uncooperative patient, vii) Patients with cardiac pacemaker or metallic implants, post myocardial infarction, Post stroke, viii) Hypersensitivity to lignocaine, steroid.

Injection Technique:

After informed consent, the patient was placed in the sitting position, with the arm resting on the examination table, palm up, and the elbow flexed to 45 degrees. The elbow was palpated at the junction of the forearm extensor group at its attachment to the bone near the lateral epicondyle to determine the point of maximal tenderness.² Patient was prepared in a standard aseptic fashion over an area large enough to allow palpation of landmarks. Throughout the procedure sterile technique was used. A 1.5 inch (4 cm) and 23 gauge needle was inserted at the point of maximal tenderness. After negative aspiration 0.5 ml mixture of 10 mg methylprednisolone with 2% lignocaine was injected at the maximum point of tenderness.²

Therapeutic Ultrasound (UST) parameters-

a) Duration: 10 minutes /day, 5 days/ week for 2 consecutive weeks. b) Intensity: 0.5 W/cm², c) Frequency: 1MHz, d) Mode: Pulse mode (1:1).¹⁰

Outcome Measurement:

Pain free grip strength (PFGS) of the affected limb was quantified by hand held Dynamometer.

Data Collection and Analysis:

Data collected at 0 week (Visit-1 or Pre-initiation), 3weeks (Visit-2 or 1st Follow up), 6 weeks (Visit-3), 12 weeks (Visit-4) during study period as per specific proforma & analyzed by Epi InfoTM.

STATISTICAL ANALYSIS AND RESULTS

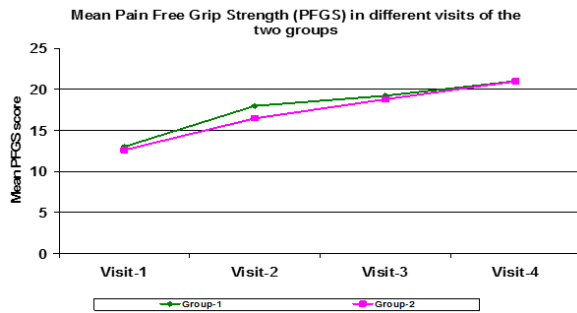
Descriptive statistical analysis was performed to calculate the means with corresponding standard deviations (SD). One Way Analysis of Variance (ANOVA) followed by Tukey's test was performed. $p < 0.05$ was taken to be statistically significant.

Table 1: Comparison Of PFGS Score Between Two Groups

Groups and other statistical parameters	Visit1 (V1)	Visit2 (V2)	Visit3 (V3)	Visit4 (V4)
Group-1 (n=28)	13.01 $\pm$ 0.32	17.98 $\pm$ 0.38	19.23 $\pm$ 0.39	21.01 $\pm$ 0.38

Group-2 (n=28)	12.60±0.31	16.46±0.29	18.79±0.35	20.98±0.32
F-values (ANOVA)	$F_{1,54}=0.82$	$F_{1,53}=9.79$	$F_{1,51}=0.68$	$F_{1,50}=0.59$
p-values	>0.05	<0.01	>0.05	>0.05

SD= Standard Deviation, Gr-1 = Injection group, Gr-2 = UST group.



In Visit-1, ANOVA showed no significant difference in PFGS score of the two groups ($F_{1,54}=0.82$; $p>0.05$). In Visit-2, ANOVA showed statistically significant differences in PFGS scores of the two groups : $F_{1,53}=9.79$; $p<0.01$, but the differences were insignificant in next two visits: $F_{1,51}=0.68$; $p>0.05$ in V3, and $F_{1,50}=0.59$; $p>0.05$ in V4.

DISCUSSION

Tennis elbow is the most common presentation of lateral elbow pain and quite disabling entity in Musculoskeletal rehabilitation.² Our study shows that age is an important factor for the occurrence of tennis elbow as majority of the patients are in 5th decade as supported by literature.⁴ Mean age (Mean± SD) of the patients was 39.37 ± 8.14 years. Majority of patients were female with 67.9% of total study population. The mean BMI (Mean± SD) of the patients was 25.47 ± 3.22 Kg/m². In whole study population 10.7% are left handed and 89.3% are right handed persons and 55.4% have involved left sided tennis elbow & 44.6% have involved right sided tennis elbow.

In Statistical analysis there was no significant difference between the mean age, gender and BMI of the two groups. The mean PFGS score of Group-1 was significantly higher than that of Group-2 in visit-2($p<0.01$), but in visit-3($p>0.05$) & visit-4($p>0.05$) there was no statistically significant difference noted. This was due to rapid improvement of study parameter following Local steroid injection in group-1, but in sbsequent followups, the progress was slow. In case of group-2 there was slow but consistant progress throughout subsequent followups, and at end of our study, results of both the groups were almost equal. This finding is also supported by Murtezani A et al. in their study in 2015.⁷ El-Badawy MA et al. also concluded in their recent study, that short term outcome is definitely better with corticosteroid injection.⁸ But according to Kim YJ et al. while managing lateral epicondylitis, electrophysiotherapy and physical therapy should be prioritized before other interventions for better long term beneficial effects.⁹

Limitations Of The Study:

i) Sample size was small. ii) No long term follow up, iii) No control group.

CONCLUSION:

Local Steroid injection (methylprednisolone) & therapeutic ultrasound both are effective regarding pain free grip strength improvement in tennis elbow patients. Though Local steroid injection has prompt beneficial effect than therapeutic ultrasound specially during first 6 weeks, but in subsequent followups, the difference was statistically insignificant. No significant adverse reaction occurred in any group of patients, which suggests that both the treatment options are safe, if not otherwise contraindicated.

REFERENCES

- Baker Jr. Champ L, Mark B. Lateral And Medial Epicondylitis. In: Brotzman B, Kevin WE(eds). Clinical Orthopaedic Rehabilitation. 2nd Edition, 2003;chapter2, p104.
- Mark KD, Kathieen F. Upper Extremity Soft Tissue Injuries. In: Frontera WR, Delisa JA(eds), DeLisa's Physical Medicine & Rehabilitation Principle And Practice, 5th ed, Philadelphia PA,USA: Lipincott Williams & Wilkins,a Wolters Kluwer business, 2010;chapter35, p916-917.
- Jonathon FT. Musculoskeletal Problems of the Upper Limb. In: Braddom RL(ed). Physical medicine & rehabilitation, 3rd edition. 2007; Chapter 39, p 836.
- Robert MH, Jeffrey DA. Shoulder and Elbow Injuries. In: Terry CS, James BH(eds). Campbell's Operative Orthopaedics. 11th edition, 2008; chapter44, p2634.
- John DM. et al. History and Physical Examination of the Musculoskeletal System. In: Gary FS(ed). Kelley's Textbook of Rheumatology. Vol-1. 2009; chapter35, page 520.
- Lyn WD, Jay WM. Epicondylitis. In : Frontera WR, Silver Julie SK, Rizzo Thomas RD(eds). Essentials of Physical Medicine and Rehabilitation. 2nd edition, 2008;

chapter19, p105.

- Murtezani A, Ibraimi Z, Villasolli TO, Sllamniku S, Krasniqi S, Vokri L. Exercise and therapeutic ultrasound compared with corticosteroid injection for chronic lateral epicondylitis: a randomized controlled trial. *Ortop Traumatol Rehabil.* 2015 Jul 1;17(4):351-7.
- El-Badawy MA, El-Nagaar HA, Mohammed MM, Assaf NY, EL RM. Musculoskeletal ultrasonographic evaluation of perineural injection therapy versus therapeutic ultrasound in chronic lateral epicondylitis. *Egyptian Rheumatology and Rehabilitation.* 2021 Dec;48(1):1-1.
- Kim YJ, Wood SM, Yoon AP, Howard JC, Yang LY, Chung KC. Efficacy of Nonoperative Treatments for Lateral Epicondylitis: A Systematic Review and Meta-Analysis. *Plastic and Reconstructive Surgery.* 2021 Jan 1;147(1):112-25.
- Angela F et al. Ultrasonic therapy. In: Clayton' Electrotherapy Theory and Practice. 9th edition. 2004; chapter5, p165-167.