

A Randomized Interventional Study to Compare the Effect of Corticosteroid Injection and CRYO Therapy in Patients with Lateral Epicondylitis

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Abstract

Introduction: Lateral epicondylitis (LE) is one of the most common sources of medical consultation for non-traumatic elbow disorders causing significant functional impairment in working- age by any activity of recurrent mechanical overuse or overloading of wrist extensors muscles. There are many treatment modalities available for LE. The purpose of our study is to compare the effectiveness of corticosteroid injections v/s Cryotherapy on Lateral epicondylitis.

Methodology: This randomized interventional study was conducted in OPD of Physical Medicine and Rehabilitation department, Sawai Man Singh Hospital, Jaipur. The recruited cases of lateral epicondylitis were divided in to 2 equal groups by computerized randomization. In the group A, 40 patients randomly assigned to the injection corticosteroid & in group B, cryotherapy was given to 40 patients. They were evaluated using the outcome measures of PRTEE, VAS

score and pain free grip strength on post intervention, at one month and three month follow-up.

Results: In our study, Maximum patients (45.6%) were in the age group of 40 to 49 years & females are more prone to LE than men (p-value<0.05). 69.1% had involvement of dominant hand. Although there was a no significant difference of VAS score, pain free grip strength, PRTEE between the groups at the time of presentation but at one month and three month follow up, statistically significant improvement in scores was seen in both the groups from baseline. When comparison was done between the two groups, group A had statistically better improvement (p-value<0.05).

Conclusion: In this study, both the groups have shown significant improvement in their outcome i.e. in PRTEE score, VAS score and pain free grip strength but better improvement of symptoms is seen in the steroid injection group.

Keywords: VAS, PRTEE, MPA.

Introduction

Lateral epicondylitis (LE) is one of the most frequently encountered lesions of myoskeletal system, commonly known as 'tennis elbow'. It affects between 1% and 3% of the population and up to 10% among females of around 40 years of age^{1,2}. Extensor carpi radialis brevis (ECRB) is the most commonly affected muscle but supinator and other wrist extensors can also be involved³. Lateral epicondylitis cause significant functional impairment in working-age by any activity of recurrent mechanical overuse or overloading of these muscles for example tennis, playing an instrument, typing and manual work^{3,4}. The identified possible risk factors were increasing age, longer duration of employment in strenuous jobs and female gender, smoking and obesity and occupations with high incidence rates, including labourers, nursery school cooks^{2,5}.

The clinical presentation involves a sensation of pain or burning sensation over the humeral insertion of the common extensor tendons. This pain can be exacerbated by wrist extensor activation, passive wrist flexion combined with passive elbow extension and tenderness on palpation over the lateral epicondyle or the origin of the wrist extensor muscle group^{1,6}. Patients affected by Lateral epicondylitis will commonly present with a decrease in grip strength^{5,7}.

There are many modalities used in the treatment of Lateral epicondylitis i.e. ultrasound, injection corticosteroid, lasers, extracorporeal shock wave therapy, transcutaneous electrical nerve stimulation (TENS), physical therapy, surgery and cryotherapy along with medicines^{8,9}. The purpose of our study is to compare the effectiveness of corticosteroid injections v/s cryotherapy on Lateral epicondylitis.

Methodology

This randomized interventional study was conducted in OPD of Physical Medicine and Rehabilitation department, Sawai Man Singh Hospital, Jaipur during the period of one and half years. Sample size of 40 patients in each group including loss of follow-up / drop out / attrition was calculated as per seed article¹⁰. All Eligible patients were initially clinically examined and evaluated for pain, rom, grip strength based on the scales of Patient-Rated Tennis Elbow Evaluation (PRTEE), visual analogue scale (VAS) and handheld dynamometer at baseline.

The recruited cases of lateral epicondylitis were divided in to 2 equal groups by computerized randomization. In the group A, 40 patients randomly assigned to the injection corticosteroid (MPA) in 23 gauge needle (dose, 80ml = 1ml + 1 ml xylocine). In group B, cryotherapy was given to 40 patients in first week for 5 days for 3 to 5 minutes according to tenderness and pain.

Post intervention, all patients were advised to continue normal activities but to avoid any strenuous activity Physical therapy in terms of stretching, strengthening and rom exercises of wrist extensors were advised in a graded manner after one week.

Patients were evaluated using the outcome measures of PRTEE, VAS score and pain free grip strength by hand held dynamometer on post intervention and at one month and three month follow-up.

Statistical analysis was done using Microsoft excel and PRIMER version 26. Continuous variable were summarized as mean and standard deviation, whereas nominal variables were summarized as percentage or proportion. Appropriate statistical tests was applied, after data collection. For significance, p value of <0.05 will be considered as significant.

Inclusion Criteria

Age between 18-65 years of age with insidious onset pain of lateral elbow lasting for 3 months.

Exclusion Criteria

- Traumatic onset of pain if duration < 2 week
 - Concurrent of primary medical epicondylitis
 - Previous surgical intervention at the elbow
 - Cervical radiculopathy
 - Same side shoulder or wrist pain
 - Raynaud's disease or syndrome
 - Rheumatoid arthritis
 - Corticosteroid injection <1 month prior to intervention
- Radiology findings of tendon extensor calcification.

Results

Out of 80 patients, 12 did not report for the follow up, so, total 68 patients were finally analysed. In our study, Maximum patients (31) were in the age group of 40 to 49 years (45.6%). Average age in group A was 40.59 ± 10.40 years and group B was 42.09 ± 9.91 years.

Out of 68 patients, 47 (69.1%) were females and the rest were males. There was no statistically significant difference between the two groups ($p > 0.05$). Baseline characteristics between the randomization groups were compared using chi-square test. So in our study females are more prone to LE than men.

A majority of our patients, 47 (69.1%) had right elbow involvement and only 21 (30.9%) patients were having left sided involvement. We also found that 47 (69.1%) patients out of total of 68 have involvement of dominant arm while only 21 (30.9%) patients were having involvement of non-dominant arm. Out of 68 study subjects with lateral epicondylitis, 61 (89.7 %) were presented with tenderness.

Although there was a no significant difference of mean VAS score between group A and group B at the time of

presentation (p value- 0.107) but at one month and three month follow up, statistically significant improvement in change in VAS scores was seen in both the groups A and B from baseline and when VAS were compared between two groups, group A had statistically ($p < 0.001$) better improvement. (Table 1)

At one month follow up, statistically significant improvement in change in pain free grip strength was seen in both the groups individually from baseline and when pain free grip strength was compared between two groups, group A had statistically better improvement. At 3 months follow up, change in pain free grip strength was seen in both groups A and B but the changes were statistically not significant (p value > 0.05) on both follow up visits. (Table 2)

Although there was a no significant difference of mean PRTEE (Pain) score between group A and group B at the time of presentation (p value 0.639) but At one month and three month follow up, statistically significant improvement in change in PRTEE (Pain) scores was seen in both the groups A and B from baseline and when PRTEE (Pain) were compared between two groups, group A had statistically ($p < 0.001$) better improvement. (Table 3)

Although there was a no significant difference of mean PRTEE (Functional) score between group A and group B at the time of presentation (p value 0.428) but At one month and three month follow up, statistically significant improvement in change in PRTEE (Functional) scores was seen in both the groups A and B from baseline and when PRTEE (Functional) were compared between two groups, group A had statistically ($p < 0.001$) better improvement. (Table 4)

Table 1: Comparison of mean VAS score between the study groups

Time	Group A	Group B	P value
Baseline	7.20 ± 1.12	6.79 ± 0.95	0.107
1 month	2.41 ± 1.08	3.59 ± 1.42	<0.001 (S)
3 months	0.53 ± 0.75	1.74 ± 1.29	<0.001 (S)

Table 2: Comparison of mean pain free grip strength (Kg) among the study groups

Time	Group A	Group B	P value
Baseline	19.21 ± 13.72	19.94 ± 11.97	0.815
1 month	20.45 ± 14.01	20.44 ± 12.45	0.997
3 months	20.97 ± 14.46	20.55 ± 12.49	0.898

Table 3: Comparison of mean PRTEE (Pain) among the study groups

Time	Group A	Group B	P value
Baseline	33.15 ± 4.34	32.68 ± 3.87	0.639
1 month	14.15 ± 5.97	22.38 ± 5.45	<0.001
3 months	4.35 ± 5.48	14.59 ± 8.33	<0.001

Table 4: Comparison of mean PRTEE (functional) among the study groups

Time	Group A	Group B	P value
Baseline	66.77 ± 11.44	64.74 ± 9.43	0.428
1 month	24.97 ± 10.10	35.97 ± 10.76	<0.001
3 months	12.97 ± 7.74	25.06 ± 9.98	<0.001

Discussion

Lateral elbow pain is one of the most common sources of medical consultation for non-traumatic elbow disorders. The diagnosis of epicondylitis hinges on a careful history and physical examination. In most patients, the condition is managed conservatively with cessation of the offending activity, applications of ice, administration of a

non-steroidal anti-inflammatory drug (NSAID) or a corticosteroid injection, and use of a splint or brace. These measures are followed by a rehabilitation program aimed at gradually increasing power, flexibility, and endurance with eventual reintroduction into the implicated sport or occupational activity^{11,12}.

This study was carried out to compare the effect of inj. corticosteroid and Cryotherapy in the treatment of lateral epicondylitis.

The total number of patients was recruited for the study was 68. Out of these 68, 34 patients were randomized to group A and 34 to group B. The patients were followed up after one month and three months after the intervention. Most of patients were devoid of any complications after the injection and Cryostimulation except skin irritation and rashes in some subjects after Cryotherapy.

Mean age of our study 41.34 (SD – 10.15) years, that of group A was 40.59 ± 10.40 and group B was 42.09 ± 9.9. This was comparable to the study done by Z. Joyce Fan et al¹³ in which age range in years was 36-50 years. This may be due to many years of repeated movements of the involved muscle seen in the working age group. It is common among working age individual in general population.

Out of total 68 patients in our study, 47 were females and the remaining 21 were males. Out of 34 in group A, 25 were females and 9 were males. In group B, 22 were females and 12 were males. This difference in sex ratio was due to the presence of greater number of housewives in India because of repetitive and forceful movement of arms required during household work. This is comparable to the study done by Shiri et al¹⁴.

Out of the 68 cases with lateral epicondylitis, majority of the patients, 47 (69.1%) had Right side pain, remaining 21(30.9%) with left side pain. This finding shows that

lateral elbow epicondylitis predominantly affects the dominant side since the physical load was assessed for the dominant hand only. Z. Joyce Fan¹³.

In our study the mean VAS score of patients who received inj. Corticosteroid at the time of presentation was 7.20. After the injection was given the mean VAS score decreased to 2.41 and 0.53 at one and three months respectively. This change was statistically significant (p value <0.05). The mean VAS score of patients who received Cryotherapy at the time of presentation was 6.79 and after Cryotherapy was given the mean VAS score decreased to 3.59 and 1.74 at one and three months respectively and this was statistically significant (p value <0.05). The results are comparable to the study Brook k. Coombs¹⁰ In which magnitude of improvement on visual analogue scale was significant till 26 weeks after giving inj. Corticosteroid and in cryotherapy group this result is in concordance with the study done by Nadia Richer⁶ where pain perception in form of VAS score was found significantly decreased at the post intervention assessments from baseline to 1- month follow-up and from post intervention to 3 month follow up.

The mean pain free grip strength (PFGS) which was measured 3 times with 30 second interval between measurements by Hand held dynamometer and the average was used in the study. At one month follow up, statistically significant improvement in change in pain free grip strength was seen in both the groups individually from baseline and when pain free grip strength was compared between two groups, group A had statistically better improvement

At 3 months follow up, change in pain free grip strength was seen in both groups A and B but the changes were statistically not significant (p value >0.05) on both follow up visits. In our study pain free grip measures did not improve in either group. The results obtained here in

agree with those of other studies done by Brooke K Coombs¹⁰, Branson et al¹⁵. No significant differences were found. The absolute value of the grip strength is known to be related to gender, profession, dominance of the arm, type of sports or hobby, and other variables.

In our study the pain and disability on PRTEE score of patients who received inj. Corticosteroid at the time of presentation was 33.15 and 66.77. After the injection was given the mean PRTEE score decreased to 14.17 and 24.97, 4.37 and 12.97 at one and three months respectively. This change was statistically significant. The mean PRTEE score of patients who received Cryotherapy at the time of presentation was 32.68 and 64.74 and after Cryotherapy was given the mean PRTEE 22.38 and 35.97 score decreased to 22.38 and 35.97 and 14.59 and 25.06 at one and three months respectively and this was statistically significant (p value <0.05). The review conducted by Nadia Richer et al⁶ reported positive effects on pain perception and function (PRTEE scores). The results were similar to the findings of Gautam VK et al¹⁶, Jindal N et al¹⁷.

This is the first on of the studies to conduct for Cryotherapy in lateral epicondylitis patients.

Conclusion

From this study it can be concluded that both the groups have shown significant improvement in their outcome i.e. in PRTEE score, VAS score and pain free grip strength but better improvement of symptoms is seen in the steroid injection group.

Our recommendation is that apart from these modalities more stress to be given to physiotherapy for strengthening and endurance and job modification is required as well.

It reinforces that they both have positive outcome in lateral epicondylitis but further studies are needed to investigate the effects of these modalities for long term.

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