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Injection of platelet rich plasma versus corticosteroid injection in the treatment of tennis elbow: A prospective randomized comparative study

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Abstract

Lateral epicondylitis is common tendinopathy for which various modalities of treatment have been advised for short term relief but the enigma continues. Local steroid injection has been commonly used for short term relief. This study was done to know the efficacy of autologous platelet rich plasma in the treatment of tennis elbow over a period of 6 months. This was a randomized study where patients were selected randomly and allocated two groups with group A being given local methylprednisolone 80 mg injection and group B given autologous PRP injections locally. 25 patients were allocated in each group. One patient was lost during follow up in each groups leaving only 24 patients in each group. All patients were evaluated with VAS and Nirschl staging before injection and at 1 week, 2 months and 6 months follow-up. A comparison of VAS and Nirschl staging showed better results with steroid group at 1 week follow up and the results being significant as per P value, while at the 2 months follow up the results were similar in both groups with PRP group slightly better though p value was insignificant. When results were compared at 6 months follow up the PRP group showed much better results than steroid group and that is because of no recurrence of cases in PRP group while we have few recurrences in steroid group. This study shows steroid shows early resolution of symptoms with only short term relief but PRP has a better long term relief with no recurrences at 6 months follow up. Larger cohort and longer follow up are required to support our study.

Keywords: Tennis elbow, Platelet rich plasma, steroid injection, lateral epicondylitis, autologous PRP

Introduction

Tennis elbow also known as lateral epicondylitis and lateral epicondylalgia is a common cause of elbow pain in the adult population and affects 1-2% of the general public each year^[1, 2]. The incidence is much higher in certain populations such as tennis players (9-40%) and physical laborers^[3]. It is proposed to be most commonly due to micro traumatic injury to the extensor carpi radialis brevis (ECRB) but may also involve other tendons within the forearm extensor muscles such as the extensor digitorum communis^[4, 5]. The patients with lateral epicondylitis mainly complain of pain around the bony prominence of the lateral epicondyle of the elbow that radiates along the forearm within the area of the common extensor mass, more so during activities^[6, 7]. Lateral epicondylitis is commonly a self-limiting condition that will resolve in approximately 90% of cases within one year without surgical intervention^[8, 9]. However, Walker-Bone *et al.* showed that 27% of patients with lateral epicondylitis reported severe difficulty with activities of daily living, and 5% of patients with lateral epicondylitis had taken sick leave from work, with an average duration of 29 sick days in the last 12 months due to their elbow symptoms^[10]. Thus, treatments for lateral epicondylitis are needed to help relieve patients' symptoms in a timely manner.

Numerous treatment modalities have been mentioned in literature for the management of epicondylitis including nonsteroidal anti-inflammatory drugs, physiotherapy, local anesthetics, autologous platelet rich plasma, etc.^[11-16] Corticosteroid injections are the gold standard, but they have a short-term effect (2-6 weeks)^[17].

Regarding autologous platelet rich plasma, it is hypothesized that autologous blood preparations may help with healing because it initiates an inflammatory process while also delivering nutrients and high concentrations of growth factors that may promote tendon

healing [18]. This study was conducted to compare the efficacy of corticosteroid injection with that of the autologous platelet rich plasma.

Materials and Methods

The study was conducted in Government Medical College-Srinagar from January 2017 to December 2017, with prior approval from the ethical committee of the hospital. All patients were informed regarding the study beforehand and written consent obtained from all. During the above said period 50 adult patients were diagnosed with tennis elbow who had failed to improve with conservative trial involving two week course of NSAIDS, tennis elbow brace, U.S. massage and eccentric exercise. Patients were randomly allocated in two groups with 25 each. Group A was given 2 ml of PRP prepared from autologous blood, while group B was given 2ml (80 mg) of methylprednisolone injection, no local anaesthetic injection was administered along with the injection to avoid any interference in the study results. Post-injection all the patients were given small sterile dressing over the injection prick site without any bulky dressing. Patients were advised to continue with the tennis elbow brace for few days, until pain gets relieved (5-7 days). All patients were asked to follow up after 1 weeks, 2 months and 6 months. All patients were assessed by 10 Point VAS and 7 phase Nirschl staging at presentation and at every follow-up. Statistical analysis was done by using SPSS-10 software.

Inclusion criteria: Pain and tenderness over lateral aspect of the elbow with one among the following tests being positive - cozens test, Mill's maneuver, broom test etc.

Exclusion criteria: Age below 18 years, history of surgery on lateral side of elbow, history of any previous injection for lateral epicondylitis, presence of other causes of elbow pain such as elbow joint osteoarthritis, osteochondritis dessicans, cervical radiculopathy, epiphyseal plate injuries, varus instability, posterior interosseous nerve syndrome, chronic regional pain syndrome.

Results

Out of a total of 50 patients included in the study 25 were distributed in each group. Two groups were given the name group A and group B, The patients included in Group A were given local methylprednisolone 80 mg, while patients in group B were given 2 ml of autologous platelet rich plasma injections. 1 patient from group A and 1 patients from group B were lost in the follow-up, leaving a total of 24 patients in each group. The demographics of the patients of the two groups are given in table 1.

Table 1: Baseline clinical and demographic characteristics of each group.

	Group-A (n=24)	Group-B (n=24)	p-value (2- tailed sig)
Age (yrs)	36.958	38.791	0.521
Laterality (R/L)	21/3	19/5	0.438
Sex (M/F)	8/16	4/20	0.182
Mean duration of symptoms (wks)	8.66	7.78	0.890
Mean VAS score	7.54	7.75	0.396
Mean Nirschl stage	5.95	5.54	0.067

Group A comprised of 8 male and 16 female patients with the mean age of 36.95 years (24-56 yrs) and group B comprised 4 males and 20 females with a mean age of 38.79 years (20-58

yrs). The baeline demographics like age, sex and laterality as shown in table 1 were comparable. VAS and Nirschl scoring was done in all patients at the time of presentation, and post injection at 1 week, 2 months and 6 months of follow up. Details of the Nirschl staging is given in table 2.

Table 2: Details of the Nirschl staging system

Phase Description
1 Mild pain with exercise, resolves within 24 hours
2 Pain after exercise, exceeds 48 hours
3 Pain with exercise, does not alter activity
4 Pain with exercise, alters activity
5 Pain with heavy activities of daily living
6 Pain with light activities of daily living, intermittent pain at rest
7 Constant pain at rest, disrupts sleeps

The pre injection VAS score and nirschl stage in the patients in the two groups were comparable as shown in table 1, and the P value was insignificant; though the results of both VAS and nirschl showed a dramatic change but different course in the follow up.

The mean VAS score of Group A at pre injection visit was 7.54(SD 0.73) which showed a significant change at 1 week follow up where the mean VAS score was 1.60(SD 1.19) which is a dramatic decrease in the pain score with highly significant P value.; same is the case with Nirschl stage which showed a decrease from the pre injection level of 5.95(SD 0.76) to 1.65(SD 1.46) after 1 week with P value highly significant. The trend of this decrease in the VAS score and the Nirschl stage continued at 2 months with VAS score of 0.17(SD 0.57) and Nirschl 0.34(SD 0.77). At 6 months follow up the mean VAS score and Nirschl stage showed a slight increase in the value though the value was much less than what it was at pre injection levels, with mean VAS score of 1.34(SD 1.82) and Nirschl stage 1.60(SD2.18) this increase was attributable to recurrence of elbow pain in few patients in group A, which can be seen from the increase in the standard deviation value, though most of the patients were symptom free.

Statistical analysis of group B patients reveal the comparable mean VAS and Nirschl score at the pre injection levels as depicted by the table 3 and 4 which changed very slightly at 1 week follow up. The mean VAS score at pre injection and 1 week follow up being 7.73(SD 0.81) and 7.21(SD 1.16) respectively. The mean Nirschl stage changed from 5.52(SD 0.79) to 5.26(SD 0.61) at 1 week follow up. Most of these patients complained of increase in pain for first few days after the injection which started to decrease after 5-10 days. At 2 months follow up the mean VAS and Nirschl stage were 0.30(SD 0.55) and 0.30 (SD 0.55) respectively. These values are much less than the pre injection levels and most patients were pain free while few have slight persistence of pain.. At 6 months follow up the mean VAS and Nirschl stages values were similar to that of the 2 months value showing thereby there were no recurrences in the tennis elbow and the results were statistically significant as compared to the pre injection levels.

Comparison of the results VAS and Nirschl of group A and group B which were comparable at pre injection time showed a significant difference at 1 week follow up. The mean VAS score at 1 week follow up for group A was 1.60 (SD 1.19) and for group B was 7.21(SD 1.16) which are not comparable and are statistically highly significant with P value 0.000. The pain relief is quite significant in the steroid group and with about no pain relief in the platelet rich plasma group. So the

results of platelet rich plasma group are much inferior to the steroid group when compared early at 1 week. Same is the result with Nirschl stage with 1 week follow up, mean Nirschl score of 1.65(SD1.46) and 5.26 (SD 0.61) for group A and group B respectively. Mean VAS score at 2 months follow up for group A was 0.34(SD0.77) and for group B was 0.30(SD 0.55); which means the scores were comparable and P value being insignificant. So the pain relief with both interventions at 2 months follow up were similar with platelet rich plasma group score being slightly better. The mean Nirschl stage at 2 month follow up for group A was 0.17(SD 0.57) and for group B was 0.30(SD 0.55) which is comparable and insignificant as per P value.

At 6 months follow up the mean VAS score for group A was 1.60(SD 2.18) and for group B was 0.30 (SD 0.70). This shows there is significant difference (p value 0.009) in the mean vas scores in the two groups with the platelet rich plasma group having better results with no recurrences at all in this study, at 6 months follow up. The mean Nirschl score at 6 months follow up for group A was 1.34(SD 1.82) and for group B was 0.21(SD 0.51) which is significantly low in the group B with a P value 0.007. These results are similar to the VAS score, showing thereby that platelet rich plasma injection has a better response at 6 months follow up as compared to the local steroid injection, but the results of both the groups were comparable at 2 months follow up.

Table 3: Mean Visual Analogue Scale (VAS) for pain in group A and group B.

Follow-up	Group A Mean (SD)	Group B Mean (SD)	p- value (2-tailed sig)
Pre-injection	7.54(0.73)	7.73(0.81)	0.396
1 week	1.60(1.19)	7.21(1.16)	0.000*
2 months	0.34(0.77)	0.30(0.55)	0.814
6 months	1.60(2.18)	0.30(0.70)	0.009*

Table 4: Mean Nirshl Staging for group A and group B.

Follow-up	Group A Mean (SD)	Group B Mean (SD)	p- value (2-tailed sig)
Pre-injection	5.95(0.76)	5.52(0.79)	0.067
1 week	1.65(1.46)	5.26(0.61)	0.000*
2 months	0.17(0.57)	0.30(0.55)	0.479
6 months	1.34(1.82)	0.21(0.51)	0.007*

Discussion

Lateral elbow tendinopathy is primarily a disorder related to degeneration in the tendon of extensor carpi radialis brevis rather than inflammatory process. Tendinopathy is a clinical diagnosis while tendinitis and tendinosis should be reserved as a histopathological diagnosis [19].

Various types of treatments have been tried in the treatment of elbow tendinopathy, like conservative with rice regimen, NSAIDS, manipulative therapy, pulsed ultrasound, exercises and braces, followed by injection therapies e.g. steroids, autologous blood, platelet rich plasma, hyaluronic acid, botulinum toxin, dry needling etc followed by surgical release of lateral epicondylar tendons [19-26]. The current study was done to compare the effects of steroid with the autologous platelet rich plasma injection therapy. Tonks *et al.* showed marked decrease in pain with steroids injections in the short term, in lateral elbow tendinopathy, while some studies like Lindenhovius A, *et al.* reported that outcomes may be due to the placebo effect of injection itself or a reflection of concurrent resolution of a self-limited disease. [27]

PRP has been demonstrated as a potent agent for tissue

healing in chronic wounds, tendinitis, and even bone. A possible explanation for the long-lasting effect of PRP in chronic tendinopathy is that it promotes revascularization and enhances healing at the microscopic level [28-30]. The study by Edward *et al.* indicated dramatic pain relief in 28 patients of tennis elbow after injection of autologous blood. [12] Varshney *et al.* in their study of 83 patients divided in two groups of 50 and 33 treated with corticosteroid and PRP respectively showed” Six months after treatment with PRP, patient’s with elbow epicondylitis had a significant improvement in their VAS ($P < 0.05$) and MAYO ($P < 0.05$) in contrast to steroid, whereas no statistical difference was found between the two groups at 1 and 2 months after intervention.” (31). Yadav *et al.* who noted that at 3 months, PRP treated patients had significantly better grip strength. (32) These are in line with our study which showed the significant improvement in both the groups during the follow up though corticosteroid group showing few recurrences while the PRP group showing no recurrence upto 6 months of age besides more clinical symptomatic improvement in the PRP group in the long term follow up. Though our study which did not use any local anaesthetic during injection showed corticosteroid group showed early improvement as compared to the PRP group which started to show improvement after around 7 to 10 days.

Conclusion

As per our study the results of the two groups in the follow up show that steroid injection causes early relief of pain and better function as compared to the platelet group at 1 week follow up, while both the groups have same results at 2 months follow up. But the results of PRP are much better at 6 month follow up, this is because of more recurrences in the steroid group with no recurrence in the PRP group. Hence the PRP shows better results at 6 months follow up. Longer follow up, and larger cohort studies are required to know the long-term efficacy and superiority of the PRP over steroid.

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