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Efficacy of Platelet Rich Plasma Versus Corticosteroid for Treatment of Lateral Epicondylitis, One Year Randomized Control Trial

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Abstract

Context: Lateral epicondylitis is a micro-tear most often within the origin of the extensor carpi radialis brevis. It has an incidence of 4 to7 persons per 1000 general population per year. *Aim:* To compare the efficacy of Platelet Rich Plasma(PRP) with corticosteroid in treatment of lateral epicondylitis.*Settings and Design*: A hospital based randomized control trial. *Statistical analysis used:* Mean, Standard deviation and Mann Whitney test. *Materials and methods:* One year randomized control trial was done in the Department of Orthopaedics at the KLES Dr. Prabhakar Kore Hospital & MRC, Belagavi. Patients in the age group of 30 to 55 years of either sex who were fulfilling the inclusion/ exclusion criteria presenting to the out-patient department of orthopedics with lateral epicondylitis of either limb were included and randomized into catergory 1 (corticosteroid injection) and category 2 (PRP injection). Category 1(n=30) patients were subjected to local corticosteroid injection and category 2(n=30) were subjected to Platelet Rich Plasma and outcome measured using Visual analogue score(VAS) and NIRSCHL staging. *Results:* At 2 weeks corticosteroid demonstrated significant decrease in VAS score and NIRSCHL staging. At 6 weeks both categories had similar results. At 12 weeks and 6 months follow-up, there was significant decrease of VAS score and NIRSCHL score in the PRP category.*Conclusion*: Thus the study concludes that though local injection of steroids provide good pain relief in short term, platelet rich plasma is better for longer pain free period.

Keywords: Lateral epicondylitis; Corticosteroid; Platelet rich Plasma.

Introduction

Lateral epicondylitis is due to microtear at the origin of extensor carpi radialis brevis.[1] It has an incidence of [4-7] persons per 1000 general population per year.[2] It commonly affects people in the age group of 35-54 years.[3,4,5] No significant difference is noted with respect to gender prevalence.[5,6] It commonly affects people not involved in sports than those involved.[7,8]

Local corticosteroid has good short term outcomes in lateral epicondylitis while no statistically significant difference was observed in intermediate and long terms.[9]

Thus this study aims to compare the efficacy of Platelet Rich Plasma with corticosteroid in treatment of lateral epicondylitis.

Subjects and Methods

Source of data: One year Randomized control trial was done in Department of Orthopedics at the KLE'S Dr. Prabhakar Kore hospital & MRC, Belagavi.

Patients in the age group of 30 to 55 years of either sex who are fulfilling the inclusion/ exclusion criteria presenting to the out-patient department of orthopedics with clinical features of lateral epicondylitis of either upper limb were included and randomized into catergory 1 (corticosteroid injection) and category 2 (PRP injection) utilizing a randomization coding system derived from a computer generated randomization table.

Category 1(n=30) patients were subjected to local corticosteroid injection and category 2(n=30) were subjected to Platelet Rich Plasma and outcome measured using Visual analogue score(VAS) and NIRSCHL staging.

Method of collection of data

a. Study design: A Randomized Control Trial
b. Study Period: The study was conducted from January 2018 to December 2018.
c. Sample size 2 – Thirty cases in each of the two categories who are fulfilling the inclusion or exclusion criteria.

Mean difference(age in years) = 44.1-56.3=12.2

$$\underline{SD= 16.2+17.7 = 16.95}$$
$$2$$

$$\underline{n=2\ (Za +Z\beta)2\times S2}$$
$$d2$$

$$\underline{= 2(1.96+0.84)2 \times 16.952}$$
$$12.22$$

= 30 in each category

(d) Selection criteria:

Inclusion criteria

1. Patients of either sex presenting with typical symptoms of lateral epicondylitis.
2. Patients belonging to age group of 30-55 years.

Exclusion criteria

1. Other causes leading pain in the lateral aspect of elbow such as osteochondritis dissecans, crystal arthropathies, like gout, radial tunnel syndrome, cervical lesions, shoulder pathology and rheumatoid arthritis.
2. Already patient treated with local steroid injection for lateral epicondylitis.
3. Already patient undergone surgical intervention in the lateral aspect of elbow.
4. Injection site (lateral aspect of elbow) local skin pathology.

(e) Procedure

Ethical clearance was obtained. Written informed consent was obtained from all the participants. History and examination was recorded as per the proforma and baseline VAS score and NIRSCHL staging were noted at the time of enrolment.

First category of patients(n=30) were given 1.0 ml of steroid triamcinolone and the second category(n=30) were given autologous PRP. The site of injection was 5 mm distal to the lateral epicondyle in the extensor tendons, particularly extensor carpi radialis brevis tendon.

Injection of PRP / corticosteroid: The skin was painted with povidone-iodine and ethyl alcohol. One ml of 2% lignocaine was injected at the injection site after giving test dose. After 10 mins, the proposed injection was injected. The injection was given in and around the tendon and not inside the tendon. If any resistance was felt during the injection, the needle is withdrawn a bit and again injected. Patients were advised regarding post injection care. The pain might increase during initial 2 weeks which was explained to the patient and paracetamol was prescribed for pain relief. Patients were advised for rest during initial 2 weeks in the form of refraining from strenuous activities by the upper extremity under study after the injection. Bilateral cases were injected simultaneously and the post injection protocol was same.

Follow up was done at the end of 2 weeks, 6 weeks, 3months and 6 months. The results were recorded by visual analogue scale (VAS) score and NIRSCHL staging in the prepared proforma.

Preparation of platelet rich plasma

- 15 mL of patient's blood was obtained by drawing blood through a vein.
- The PRP was prepared using differential centrifugation technique with two spins.
- The blood was collected in three citrate tubes having 0.9% sodium citrate as anticoagulant. The first spin was performed at 1500 rpm for 15 minutes using laboratory centrifuge. This spin separated the red blood cells from the rest of the components.
- The upper half of the supernatant was

discarded. The lower halves of the supernatant from all the three tubes are transferred into another plain tube for the second spin. The second spin was performed at 2500 rpm for 10 minutes.

- The upper half of the supernatant was discarded. One ml of lower half was taken into a 1 mL syringe having 0.1 mL of calcium chloride.
- At the end of preparation of platelet rich plasma the samples were sent for platelet count and the count compared with patient's platelet count.

Pain Score

Visual Analogue Score: It consists of 10 centimeters line with one end representing worst pain ever and the other end representing no pain and the patient is asked to mark on the scale.

No pain1—2 –3—4—5—6—7—8—9—10 Worst pain ever

Nirschl Staging

Phase I: After exercise patient complains minimal pain, within 24hrs pain resolves

Phase II: After exercise complains pain, pain exceeds 48hrs

Phase III: Pain with exercise activity, does not alter activity

Phase IV: Pain with exercise activity, pain alters the activity

Phase V: At rest intermittent pain, light pain with light activity

Phase VI: Pain even at the rest, disturbed sleep

Statistical analysis

Outcomes were analyzed using IBM SPSS program version 22.

Data was computed by statistical methods.

Method of Statistical data analysis:

1. Mean and Standard deviation for age of the patients
2. Mann whitney test for VAS score and NIRSCHL staging

Results

Table 1: VAS Score and NIRSCHL staging at the time of enrolment in both the categories.

Categories			
	Category 1 (Corticosteroid)	**Category 2 (Platelet Rich Plasma)**	**P value**
	MEAN ± S.D.	**MEAN ± S.D.**	
VAS score	8.07 ±1.01	8.070.98±	0.938
NIRSCHL staging	6.030.85±	6.000.91±	0.950

VAS score NIRSCHL staging were similar at the time of enrolment.

Table 2: VAS score and NIRSCHL staging at the end of 2 weeks of Injection in both the categories

Categories			
	Category 1 (Corticosteroid)	**Category 2 (Platelet Rich Plasma)**	**P value**
	MEAN ± S.D.	**MEAN ± S.D.**	
VAS score	5.001.31±	6.831.12±	0.0001
NIRSCHL staging	3.300.95±	4.631.19±	0.0001

VAS score NIRSCHL staging were similar at the time of enrolment.

Table 3: VAS score and NIRSCHL staging at the end of 6 weeks of Injection in both the categories.

Categories			
	Category 1 (Corticosteroid)	**Category 2 (Platelet Rich Plasma)**	**P value**
	MEAN ± S.D.	**MEAN ± S.D.**	
VAS score	2.231.22±	2.170.65±	0.961
NIRSCHL staging	1.330.71±	1.400.50±	0.538

The mean VAS score and NIRSCHL staging for corticosteroid category is 2.23 and 1.33 and for platelet rich plasma category is 2.17 and 1.40. Thus there was no statistically significant difference in decrease of pain in both the categories.

Table 4 : VAS score and NIRSCHL staging after 12 weeks of injection in both the categories**.**

Categories			
	Category 1 (Corticosteroid)	**Category 2 (Platelet Rich Plasma)**	**P value**
	MEAN ± S.D.	**MEAN ± S.D.**	
VAS score	1.531.01±	0.801.13±	0.006
NIRSCHL staging	0.870.57±	0.570.82±	0.027

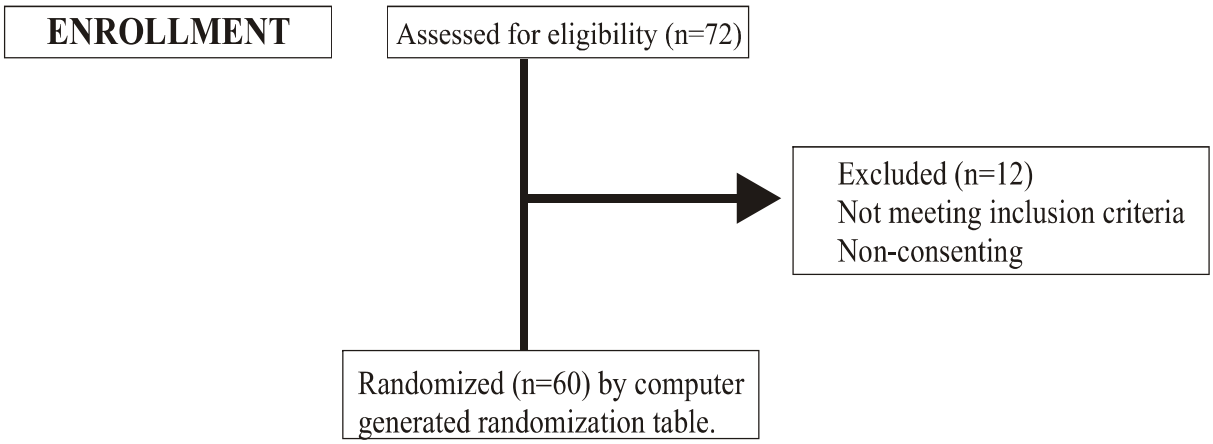
The mean VAS score and NIRSCHL staging for corticosteroid category is 1.53 and 0.87 and for platelet rich plasma category is 0.80 and 0.57. Thus PRP reduced pain better than corticosteroid at intermediate term follow-up.

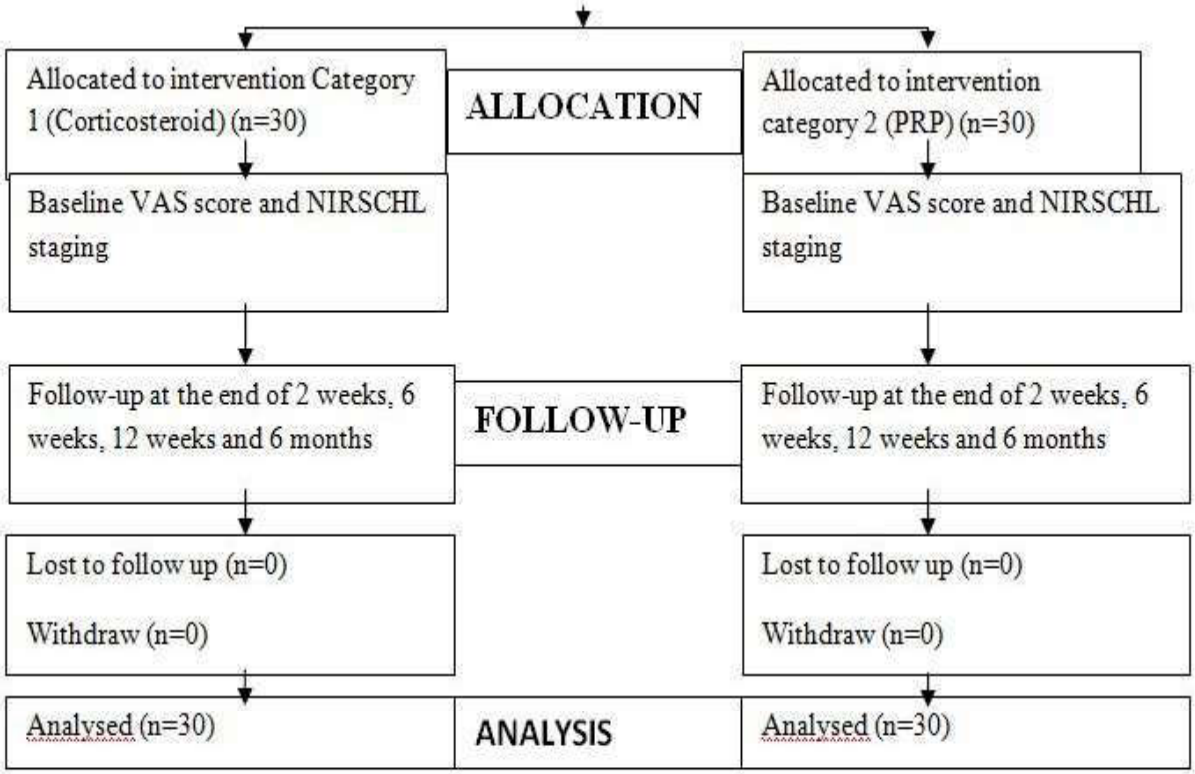
Table 5: VAS score and NIRSCHL staging after 24 weeks of injection in both the categories.

Categories			
	Category 1 (Corticosteroid)	**Category 2 (Platelet Rich Plasma)**	**P value**
	MEAN ± S.D.	**MEAN ± S.D.**	
VAS score	2.771.17±	0.570.97±	0.0001
NIRSCHL staging	1.930.91±	0.470.73±	0.0001

The mean VAS score and NIRSCHL staging for corticosteroid category is 2.77 and 1.93 and for platelet rich plasma category is 0.57 and 0.47. Thus PRP reduced pain better than corticosteroid at long term follow-up.

CONSORT DIAGRAM:





Discussion

Lateral epicondylitis is the frequent problem presenting to the orthopaedic department. Numerous treatment methods are available, including operative and non-operative.

In this current study, the mean age of patients was 43.5 years for corticosteroid category and 44.5 years for platelet rich plasma category. This was similar to a study done by Krogh and colleagues in 2013, where the mean age was 43.9 years in corticosteroid category and 47.6 years in platelet rich plasma category.

In the present study, out of 60 patients, 51.7% were males and 48.3% were females. The more number of male patients in this study was likely due to their profession leading to repetitive trauma on extensor carpi radialis brevis origin. However, according to the current literature, no significant difference is noted with respect to gender prevalence4,5.

The mean VAS score and Nirschl staging before injection at the time of enrolment in both the category were recorded. At the time of presentation, mean VAS score of steroid category was 8.07 and for platelet rich plasma category was 8.07 (p value 0.938). Mean NIRSCHL score for steroid category was 6.03 and for platelet rich plasma category was 6.0 (p value 0.950).

At 2 weeks of follow-up, p value for VAS score is 0.0001 and for NIRSCHL staging is 0.0001, which are statistically significant. The mean VAS score and NIRSCHL staging for corticosteroid category was 5.0 and 3.3 respectively and for platelet rich plasma category was 6.83 and 4.63 respectively. Thus there was significant decrease in pain in corticosteroid category.

After 6 weeks of follow up, no statistically significant difference was observed between the two categories in VAS scoring (p value 0.961) and Nirschl staging (p value 0.538). Mean VAS score and NIRSCHL staging in corticosteroid category was 2.23 and 1.33 respectively and in platelet rich plasma category was 2.17 and 1.40 respectively. Thus there was no significant difference in decrease in pain at 6 weeks in both the categories.

After 12 weeks of follow-up, there was statistically significant decrease in VAS score (p value 0.006) and NIRSCHL staging (p value 0.027) in both the categories. Mean VAS score and NIRSCHL staging in corticosteroid category was 1.53 and 0.87 respectively and in platelet rich plasma category was 0.80 and 0.57 respectively. Thus the decrease in pain was statistically significant in platelet rich plasma category.

At 6 months follow-up, there was statistically

significant decrease in VAS score (p value 0.0001) and NIRSCHL staging (p value 0.0001) in both the categories. Mean VAS score and NIRSCHL staging in corticosteroid category was 2.77 and 1.93 respectively and in platelet rich plasma category was 0.57 and 0.77 respectively.

The present study findings were similar to a study conducted by Peerbooms and colleagues10. At 12 week follow-up there was statistically significant decrease in VAS score in platelet rich plasma category when compared to corticosteroid category with PRP being better in pain relieving. Mean VAS score in corticosteroid category was 4.4 and in platelet rich plasma category was 3.8.

The findings were also similar to another study conducted by Gosen and colleagues11. The mean VAS score in their study was 32.3 for corticosteroid category and 21.3 for PRP category at a similar time interval.

In platelet rich plasma category, increase in post intervention pain was observed in few patients which lasted for few days. In corticosteroid category 8 (26%) patients complained of pain after injection and in platelet rich plasma category 18 patients complained of post-injection pain. (P value of 0.009). The post-injection pain was managed with oral analgesics.

The conclusion of this study is that, platelet rich plasma was beneficial in intermediate term and long term relief while steroid was beneficial in short term pain relief.

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