Original Research Article

A Comparative Study to Evaluate the Short Term and Long Term Efficacy of Platelet-Rich Plasma and Corticosteroid (Methyl- Prednisolone) in the Treatment of Lateral Epicondylitis

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Abstract

Introduction: Lateral epicondylitis or Tennis elbow is the most commonly diagnosed condition of the elbow(1) whose prevalence in the general population is about 1-3%(2).It is mostly attributed to over use of wrist extensors and supinator muscles and eccentric loading.Platelet rich plasma(PRP) offers a new option for the treatment of tennis elbow.This study was conducted with an aim to compare the efficacy of PRP Versus Corticosteroid (Methyl Prednisolone) injection in patients with tennis elbow.**Materials and Methods**: This study was conducted between 2013 and 2015.The patients who presented to the orthopaedics OPD in Aarupadai Veedu Medical College and Hospital, Puducherry with complaints of elbow pain were assessed and enrolled into the trial once the diagnosis was confirmed and proper consent was obtained from the patient.Out of 67 patients that reported to orthopedics OPD 19 were rejected as they fell into the exclusion criteria. 48 patients who satisfied the inclusion criteria were enrolled for the study randomly into either Group A (Platelet Rich Plasma) or Group B (Corticosteroid) with a follow up period of 6 months.**Results**:The values of Mean VAS Score were significantly higher at the time of presentation to the time of last follow up with significant improvement in Group A.Though the values of Mean qDASH Score were similar at time of presentation there is considerable improvement at the final follow up in Group A. Mean quick disability of arm, shoulder and hand score at the time of final follow up were better in Group A**.Conclusion:** The results revealed that the long term efficacy of platelet rich plasma treatment is better when compared to corticosteroid treatment for lateral epicondylitis.Therefore, it is concluded that Platelet Rich Plasma local infiltration is the superior treatment option in lateral epicondylitis.

Keywords: Platelet rich plasma, Corticosteroid(methyl prednisolone).

Introduction

Lateral epicondylitis or Tennis elbow is the most commonly diagnosed condition of the elbow whose prevalence in the general population is about 1-3%[1,2]. Both men and women are equally affected between the age group of 30-55 years [3,4].Most cases of lateral epicondylitis has no obvious etiology [5].

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It is mostly attributed to over use of wrist extensors and supinator muscles,eccentric loading and inadequate blood supply. Extensor carpi radialis brevis (ERCB) is the most commonly affected muscle as originally described by Cyriax[3].As the word suggests inflammation the pathology behind lateral epicondylitis was earlier considered to be from tendinitis as a result of inflammation of the tendons[6].Histopathological studies have revealed that they have a paucity of inflammatory cells such as macrophages and neutrophils[7-9].The pathological findings have been described as angiofibroblastic tendinosis by NIRSCHL[10].Thus it has been considered a form of tendinosis, defined as a degenerative process[3].

Lateral epicondylitis treatment modalities include rest, NSAIDS, bracing, physiotherapy, Interferential and ultrasound therapy. Invasive procedures include corticosteroid, autologous blood, platelet rich plasma injections along with surgical procedure[11-18]. Corticosteroid injections have been in use since 1950 and was the treatment of choice for many years.However several studies show there is no or limited beneficial effect in the long term[12].Hence several biological injection therapies have become available of which two have been mentioned to show promising results namely Autologous Blood And Platelet Rich Plasma [19-29]. Several Randomized Control Trials have been done comparing Autologous Blood with Platelet Rich Plasma(19),(25,26,27,28) Platelet Rich Plasma with Corticosteroid [20,21,23,24,25]. and Autologous Blood with Corticosteroid[21,28].

Materials and Methods

Source of data

This prospective study has been conducted between October 2013 and June 2015.

The patients who presented to the orthopaedics OPD in Aarupadai Veedu Medical College and Hospital, Puducherry with complaints of elbow pain were assessed and enrolled into the trial once the diagnosis was confirmed and proper consent obtained from the patient.Out of 67 patients that reported to the orthopedics OPD 19 were rejected as they fell into the exclusion criteria. 48 patients who satisfied the inclusion criteria were enrolled for the study randomly into either group A (Platelet Rich Plasma) or group B (Corticosteroid) with a follow up period of 6 months.Approval was obtained from the ethical committee and informed consent from all patients.

Inclusion Criteria

1. Above 18 Years
2. Lateral Epicondylitis Cases Where Other Modes of Conservative Management have Failed

Exclusion Criteria

- History of Anemia (<7.0 G/Dl)
- Thrombocytopenia (<1.5 Lakhs)
- Significant Cardiorespiratory, Renal, Hepatic disease
- Malignancy
- Comorbidites
- Active Infection
- Trauma

No of groups

- TWO (GROUP A- PRP, GROUP B- CORTICOSTEROID)

Sample Size

- GROUP A – 25
- GROUP B – 23

Method

Once the clinical diagnosis was made the patient was sent for radiological assessment of the affected elbow including both Anteroposterior and Lateral views, Complete Blood Count, Random Blood Sugar. If the criteria are met the patient is informed of the procedure with the follow up schedule, exercise protocols, work modification, the temporary increase in pain for approximately a week and strict avoidance of Non Steroidal Antinflammatory Drugs. Informed consent is obtained in the native language. Then the patient is randomly put into either GROUP A(Platelet Rich Plasma) or GROUP B (Corticosteroid).Once the patient is placed in a group, arrangements are made based on which group the patient falls into, GROUP A patients are taken to the BLOOD BANK where 10 ml of blood is drawn from the patient using 10ml syringe. This blood is then centrifuged. PRP is prepared, the patient is then taken to the Minor Operation Theatre. Following this equipment's that are required for the administration of PRP are made ready and arranged.

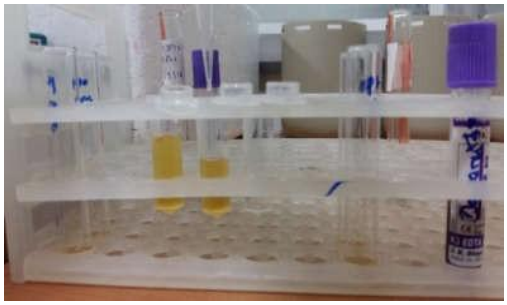


Fig. 1 & 2:Centrifugation and Preparation of PRP

The equipment's required are

- SYRINGE 5ml – ONE
- 21 GAUGE NEEDLE – TWO
- PLATELET RICH PLASMA PREPARATION.
- STERILE GLOVES – TWO
- CENTRAL HOLE TOWEL – ONE
- BABCOCKS SPONGE HOLDER – ONE
- STERILE TRAY
- STERILE GAUZE
- POVIDINE IODINE SOLUTION
- SPIRIT
- MICROPORE

Patients that fall into GROUP B are taken to the Minor OT for the procedure after all equipment's necessary are made available.

The equipment's required are

- SYRINGE 5ml – ONE
- 21 GAUGE NEEDLE – TWO
- DEPOMEDROL 40 mg/ml
- STERILE GLOVES – TWO
- CENTRAL HOLE TOWEL – ONE
- BABCOCKS SPONGE HOLDER – ONE
- STERILE TRAY
- STERILE GAUZE
- POVIDINE IODINE SOLUTION
- SPIRIT
- MICROPORE

Fig. 3: Equipment required for injection

Procedure

Under sterile aseptic precautions the part (affected elbow up to 5cm proximal and distal) is painted using povidine iodine first and then spirit and draped using the central hole towel.

Fig. 4: Parts preparation and draping

Once the LATERAL aspect of the elbow is well exposed palpate the LATERAL EPICONDYLE and the site of maximal tenderness (often the same).

Fig.5: Localization of maximal tenderness

The preparation of either Platelet Rich Plasma (3ml) Or Corticosteroid (3ml) is made ready in the 5ml syringe. The needle used to aspirate the preparation is discarded and another sterile 21 gauge needle is mounted onto the syringe. The patient is then informed about the prick that is going to be felt on entry of the needle followed by the temporary increase in pain. After this the preparation is injected slowly into and around the site that was localized.

Fig.6: Injection of Platelet rich plasma

Fig.7: Injection of corticosteroid

Once the preparation is administered the patient is allowed to cope with the pain (if any) during which the site is painted again with spirit following which a sterile dressing is applied using sterile gauze and micropore.

Sterile dressing

The patient is then asked to sit down for 30 minutes in the waiting bay. At the end of 30 minutes an enquiry is made to the patients about any general or local discomfort. Once the condition of the patient is found to be satisfactory the patient is sent home with a

reminder of the instructions to be followed and follow up schedule.Further progress is assessed during follow up sessions scheduled at 6 weeks, 3 months and 6 months. During the three sessions the patients improvement is measured using-

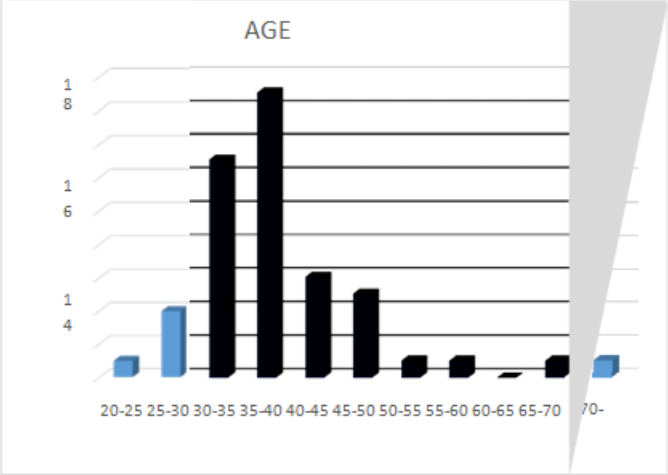
1. VAS SCALE
2. qDASH SCORE

In VAS scale the patient is handed out a paper containing a horizontal line with no pain (start point) on one end and worst possible pain (end point) at the other and the patient is asked to draw a straight line between the start and end point based on the amount of pain they experience.Next step is the functional assessment of the affected elbow using the quick DIABILITY OF ARM, SHOULDER, HAND (qDASH)questionnaire. Once the data is collected the patient is given appropriate advice based on the progress (work modification, exercise) and asked to come for the next follow up.

Results

Age Distribution

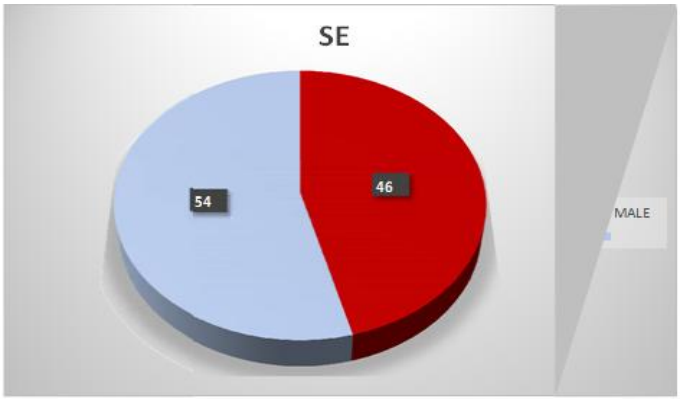
The mean age of the patients was 39 years. The maximum number of cases was seen in the age group 35-40.



Graph 1: Age distribution

SEX DISTRIBUTION

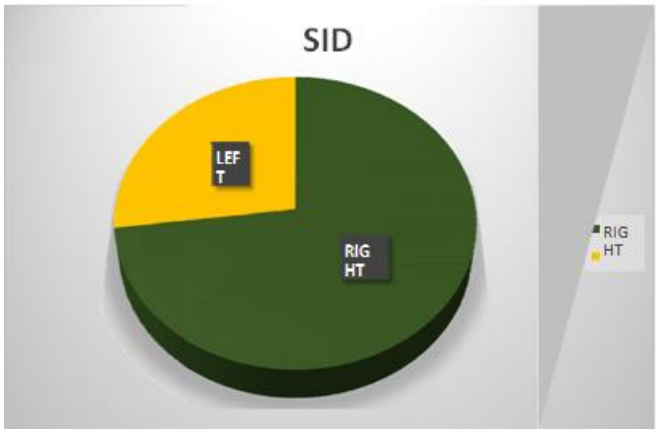
Of the total 48 patients 22 were male and the rest 26 female.



Graph 2: Sex distribution

SIDE

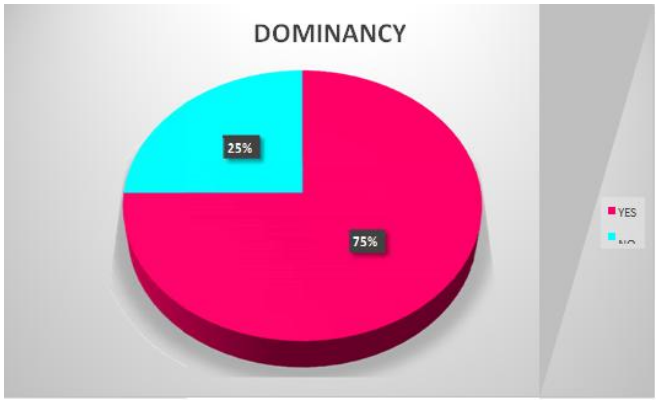
35 patients had involvement of their right hand whereas the rest 13 had involvement of the left.



Graph 3: Distribution of Side

DOMINANY

Out of the 48 patients 36 had involvement of their dominant hand and the rest 12 had involvement of non-dominant hand.



Graph 4: Distribution of dominancy

STATISTICS

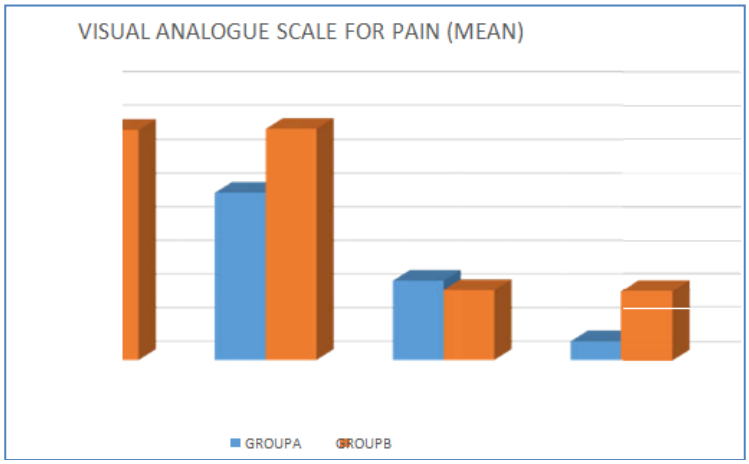
VAS

Table 1: Mean VAS at presentation and follow up (VAS)

	MEAN	
FOLLOW UP	**GROUP A**	**GROUP B**
AT PRESENTATION	7.4	6.84
6 WEEKS	4.98	3.88
3 MONTHS	2.36	2.08
6 MONTHS	0.56	2.04

MEAN VAS

The values are significantly higher at the time of presentation to that at the time of last follow up with significant improvement in group A.



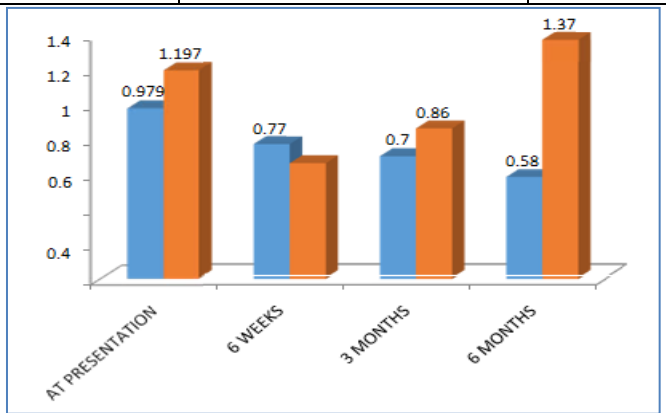
Graph 5: Mean distribution of visual analogues scale for pain

(VAS)

STANDARD DEVIATION

Table 2: Mean standard deviation values at presentation and follow up

	STANDARD DEVIAITON	
FOLLOW UP	**GROUP A**	**GROUP B**
AT PRESENTATION	0.979	1.197
6 WEEKS	0.77	0.66
3 MONTHS	0.70	0.86
6 MONTHS	0.58	1.37



Graph 6: Mean standard deviation values

Mean standard deviation (VAS)
STANDARD DEVIAITON

Table 3: P values at presentation and follow up (VAS)

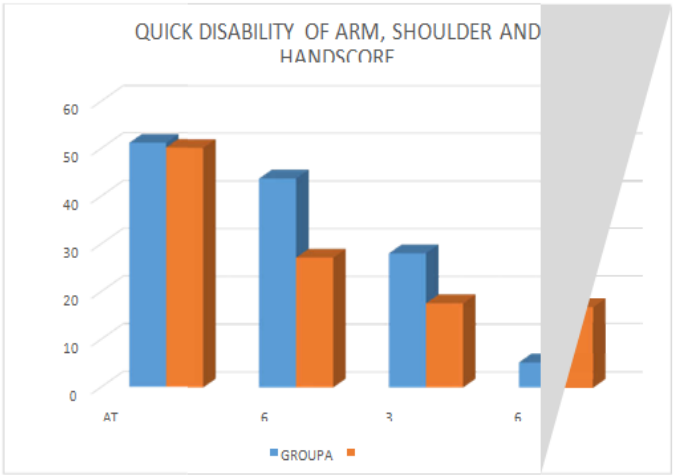
FOLLOW UP	P VALUE
AT PRESENTATION	0.0764
6 WEEKS	0.0001
3 MONTHS	0.2135
6 MONTHS	0.0001

Table 4: qDASH values at presentation follow-up

	MEAN	
FOLLOW UP	**GROUP A**	**GROUP B**
AT PRESENTATION	51.136	50.152
6 WEEKS	43.720	27.176
3 MONTHS	28.096	17.632
6 MONTHS	5.276	16.572

MEAN qDASH SCORE

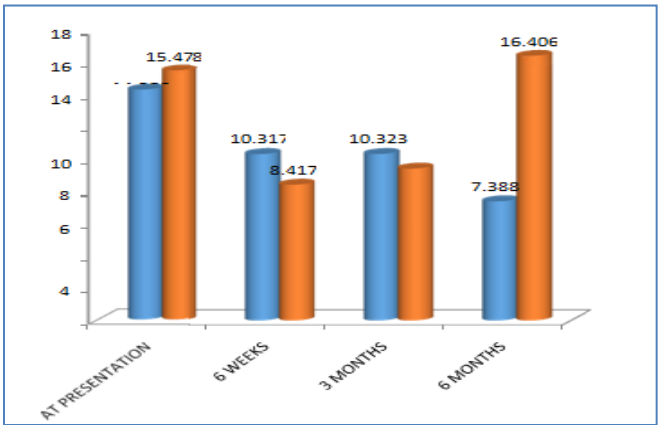
Though the mean values were similar at the time of presentation there is considerable difference at the final follow up.



Graph 7: Mean quick disability of arm, shoulder and hand score

Table 5: Standard deviation values at presentation and follow up

	STANDARD DEVIATION	
FOLLOW UP	**GROUP A**	**GROUP B**
AT PRESENTATION	14.289	15.478
6 WEEKS	10.317	8.417
3 MONTHS	10.323	9.418
6 MONTHS	7.388	16.406



Graph 8: Mean standard deviation at presentation and follow up

Mean standard deviation

Table 6: P values at presentation and follow-up (qDASH)

FOLLOW UP	P VALUE
AT PRESENTATION	0.8163
6 WEEKS	0.0001
3 MONTHS	0.0005
6 MONTHS	0.0029

Discussion

Lateral epicondylitis also known as Tennis elbow is one of the most perplexing disorders of the musculoskeletal system.There has been a lot of controversy over the pathophysiology of Lateral epicondylitis.The most common theory proposed is of micro or macroscopic tears in the common tendon, incomplete healing alongwith degenerative changes.The origin of the extensor carpi radialis brevis muscle is the commonest site of injury and pathological changes have been consistently documented at this location.The mean age of the patients included in the study was 39 years, with a peak in the third decade. A study by Hamilton included the population with the age ranging between 14-75 years with a mean age of 45 years. Other studies have reported mean ages of approximately 42 years.Some studies have reported a female preponderance.The findings of this study also supports a female preponderance. HazelmanBL stated that lateral epicondylitis involves the dominant arm more frequently.Similar findings are reflected from the results of this study.Histopathological studies have shown that lateral epicondylitis is not an inflammatory condition rather, it is a fibroblastic and vascular response called angiofibroblastic degeneration, now more commonly known as tendinosis.[9] Thus, the term epicondylitis and tendinitis are misnomers.Various conservative and non-invasive treatments have been tried without a consistent or satisfactory results. Injections are the treatment of choice where conservative and non-invasive methods

have failed.As there is no local inflammatory reaction a local injection of steroid only provides with short term relief of symptoms and other treatment options have to be explored for long term relief. In this context platelet rich plasma may be considered as a better treatment option.However, local corticosteroid injection is one of the most commonest injective intervention that has consistent and satisfactory results and hence has become the gold standard for comparison of newer therapies.Altay et al reviewed 13 randomized controlled trials and found that corticosteroid injection is effective in pain relief and improving grip strength as compared to other methods.The exact mechanism in which the local steroid injection acts is uncertain. Platelet rich plasma on the other hand is an ideal autologous biological blood-derived product that releases high concentrations of platelet-derived growth factors on injection which enhance tendon healing due to its effects on angiogenesis and collagen synthesis. Various growth factors and cytokines in PRP include Platelet Derived Growth factors (PDGF-aa, PDGF-bb, PDGF-ab),Transforming Growth Factor beta (TGF-b1, TGF-b2), Fibroblast growth factor (FGF), Insulin Like Growth Factor-1 and 2 (IGF-1, IGF-2),Vascular Endothelial Growth Factor (VEGF), Epidermal Growth Factor(EGF), Interleukin – 8 (IL-8), Keratinocyte Growth Factor, Connective Tissue growth factor.Platelets release more than 95% of the presynthesized growth factors within an hour of activation. This initial burstis followed by a steady synthesis and secretion of growth factors till the end of their life span.The present study is therefore an attempt to compare the clinical efficacy of platelet rich plasma to that of corticosteroid.Mishra and Pavelko and Gosens T et al., [18] compared the effectiveness of platelet rich plasma to corticosteroid treatment for lateral epicondylitis and found that at short term follow up both groups showed significant improvement in pain and function, but over long term follow up, pain and functional scores of platelet rich plasma group were higher than that of corticosteroid group. In this study also there was a better response with local corticosteroid injection in the initial follow up,however at 6 months, the improvement was significantly better in platelet rich plasma group.The findings of significant improvement in corticosteroid group at 6 weeks, while significant improvement in all outcome measurements in platelet rich plasma group at 6 months follow up are consistent with the work of Gosens T et al., and Kamezia et al., [18,19] The P value for both the groups were also significant similar to the findings by Gosens T et al.,(18)It is possible that PRP offers a long term healing effect on the affected tendon. The disparity in the efficacy of platelet rich plasma in some studies may be due to the relative difference in the quantity of growth factors delivered to the degenerated tendon.

Conclusion

The results revealed that the long term efficacy of platelet rich plasma treatment is better when compared to corticosteroid treatment for lateral epicondylitis.Therefore it is concluded that Platelet Rich Plasma local infiltration is the superior treatment option in case of lateral epicondylitis.

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