



COMPARATIVE STUDY OF EFFECT OF LOCAL INJECTION OF AUTOLOGOUS PLATELET RICH PLASMA AND INJECTION CORTICOSTEROID IN LATERAL EPICONDYLITIS OF HUMERUS

Orthopaedics

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ABSTRACT

Background: Lateral epicondylitis is the most common cause of elbow pain having substantial effects on person's quality of life. Many treatments have been suggested to alleviate the pain and disability associated with this condition. **Methods:** In this study 60 patients satisfying the inclusion & exclusion criteria were enrolled after taking informed consent. Selected patients were assigned into 2 groups (A and B) by closed envelop randomization method. Group A patients were treated with autologous platelet rich plasma & Group B with methylprednisolone i.e steroid. **Results:** In this study we found that lateral epicondylitis has a male predominance with 56.7% patients have involvement of dominant arm. Corticosteroid injections had better pain relief at 2 days, 2 weeks and 2 months, while PRP provided better pain relief at 6 months follow up. **Conclusions:** Corticosteroid injections provided comparatively fast improvement of pain but for lesser duration, while pain relief with PRP injection was maintained for a longer time.

KEYWORDS

Lateral Epicondylitis, Tennis Elbow, Platelet rich Plasma (PRP), VAS (Visual Analogue Scale), DASH (Disabilities of the Arm, Shoulder and Hand),

INTRODUCTION

Degenerative musculoskeletal pains or pains caused by repetitive micro-trauma are known to occur at various places in body and lateral epicondylitis is one of the most common degenerative musculoskeletal pain. Lateral epicondylitis also known as Tennis Elbow, is a common cause of elbow pain having an incidence of 59/10000 patients per year.¹

As the name suggests, tennis players have been reported to account for 5-8% of all cases but it is also seen commonly in housewives and laborers who are involved in repetitive manual work involving overexertion of wrist and finger extensors. Lateral epicondylitis is most prevalent in fourth decade of life (mean age being 43 years) and it is rarely seen in individuals under the age of 30 years.²

It is characterized by tenderness at the lateral epicondyle of humerus and the symptoms consists of elbow pain that may radiate to forearm and wrist which can be reproduced by resisted extension of the wrist or alternating pronation and supination, weakness of forearm and inability to hold relatively heavy items in hand. The pain can also occur during hand-shake or even torquing the door knob.³ On an average, atypical episode of lateral epicondylitis lasts 8-12 months.

PRP is a new treatment method that uses body's own cells to relief pain and promote accelerated, long lasting healing of certain musculoskeletal conditions and hence it offers a possibility for the treatment of lateral epicondylitis. Platelet rich plasma (PRP) is revolutionary new treatment that relieves pain by promoting long lasting healing of the fibrous structures. Platelet rich plasma is an autologous concentration of human platelets in a small volume of plasma. PRP is defined as fraction of autologous blood with a platelet concentration 5 times greater than the platelet count in normal blood.^{4,5} Growth factors present in PRP intensifies body's own natural healing efforts.

Corticosteroids injections are the most common intervention done in lateral epicondylitis and it is compared with PRP injections in this study with prospective evaluation and comparison of efficacy of both treatment modalities and the outcomes are determined by the assessment of pain and functional outcome.

AIMS & OBJECTIVES

To compare the efficacy of local injection of autologous platelet rich plasma with injection corticosteroid in lateral epicondylitis.

MATERIAL AND METHODS

A prospective randomized comparative study was done in Siddhartha Medical College, Vijayawada, Andhra Pradesh between July 2021 to December 2022.

Inclusion Criteria

- Diagnosed cases of lateral epicondylitis.
- Duration more than 1 month, not responding to NSAIDs &

modalities like ice, exercise & activity modification.

- Patients who are willing to participate in the study & come for follow ups.
- Age more than 18 less than 65.

Exclusion Criteria

- Any active inflammatory disease of shoulder, wrist & concurrent pain in the cervical spine
- Coagulation disorders.
- Previous treatment with steroids within last 3 months & NSAIDs within last 7 days.
- Congenital deformities of hand, tendon ruptures, or fractures of the elbow within the previous 12 months.
- Immobility casts or splints within the last 6 months for tennis elbow.
- Coexisting elbow pathology (i.e. osteoarthritis or instability).
- Pregnant women, women trying to get pregnant, or breastfeeding women.
- Patients with uncontrolled diabetes mellitus.
- Age less than 18 & more than 65.
- Selected patients were assigned into 2 groups (A and B), group by closed envelop randomization

METHOD

Patients in group A were injected with platelet rich plasma and group B were given corticosteroid injection. Patients were not allowed to have any other treatment modality during the observation period or 48 hours prior to inclusion into the study. Patients in each group were taught to perform wrist extensor stretching exercises at home.

MATERIALS

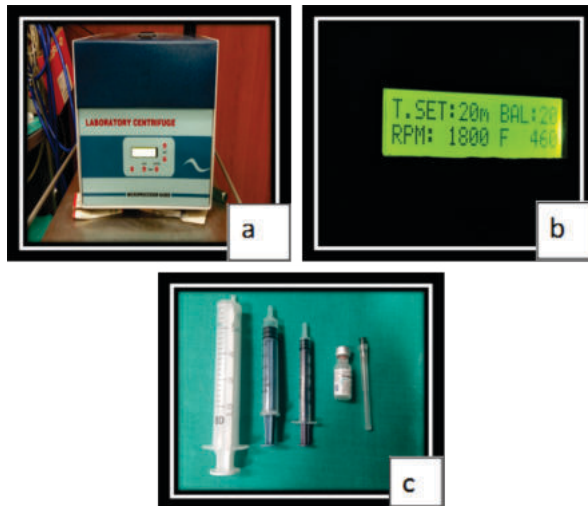


Fig 1a : Laboratory Centrifuge, Fig 1b: Setting Time & Rpm, Fig 1c: Left To Right: 20 ML Bd Syringe; 6ml Syringe; 2ml Syringe;

Injection Methylprednisolone 40 Mg/ml; 22 Gauge 38mm Needle.

Follow ups:-Each patient was followed-up at intervals of 2 days, 2 weeks, 2 months & 6 months after intervention. At each follow up visit, patients were assessed subjectively for pain on Visual.

Analog Scale (VAS)⁶ and functional outcome was assessed according to DASH⁷ scale and the values were recorded. Adverse effects reported by the patients were also recorded.



Fig 2a: Cleaning With Betadine & Spirit

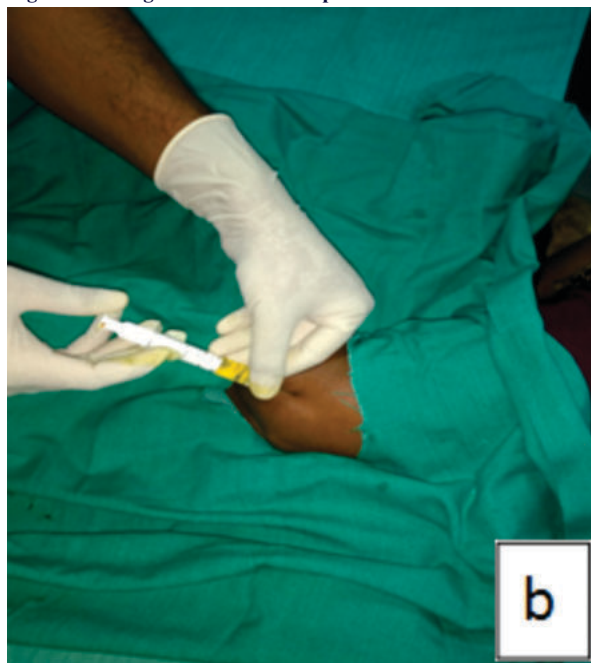


Fig 2b: Injection Technique

Data Analysis

After data collection, data entry was done in Excel. Data analysis was done with the help of SPSS software P Value <0.05 has been taken as level of significance.

RESULTS**Age Distribution**

In our study, patients with lateral epicondylitis ranged from 29 to 56 years of age, mean age in group A was 40.27 years and group B was 40.50 years. Maximum patients (31) were in the age group of 35 to 45 years (52%) as shown in chart 1. There was no statistically significant difference in mean age between two groups ($p=0.895$)

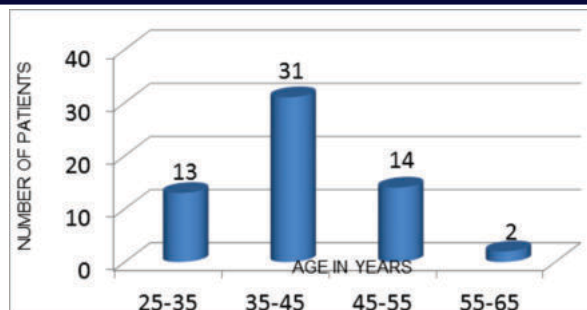


Chart 1:- Age Distribution Of Patients

Gender Distribution

Out of 60 patients, 34(56.7%) were males and 26(43.3%) were females as shown in chart 2.

There was no statistically significant difference between the two groups ($p > 0.05$).

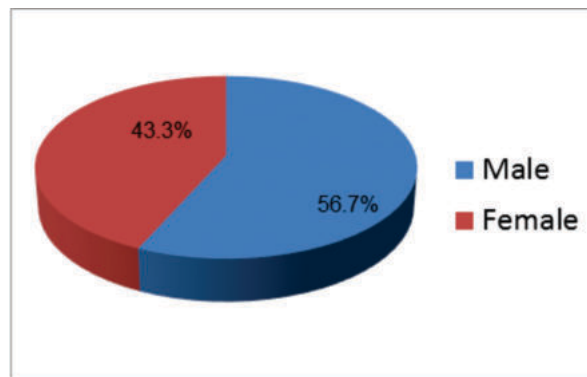


Chart 2:- Gender Distribution

Side Of Involvement

Among the patients 34(56.7%) had dominant side involvement and 26(43.3%) patients were having non-dominant arm side involvement as shown in chart 3.

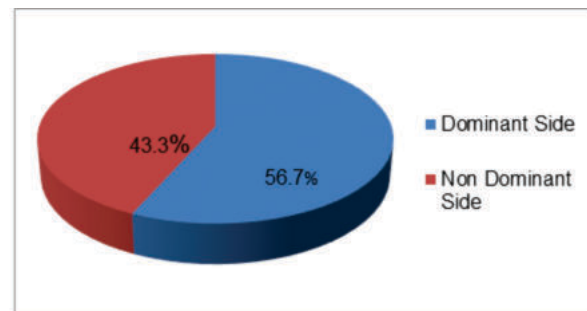


Chart 3:- Side Of Involvement

Duration Of Disease

The mean duration of disease in group A was 3.08 months and group B was 2.98 months.

The overall mean duration of disease was 3.03 months. Maximum number of patients (19) had duration of disease 1-2 months as shown in chart 4. There was no statistically significant difference noted between the two groups ($p=0.75$)

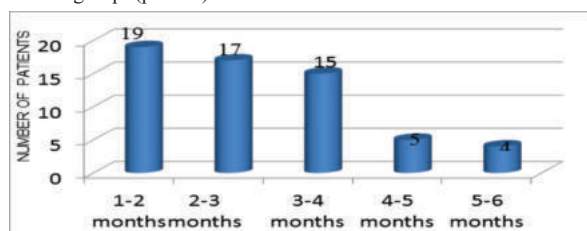


Chart 4: Mean Duration of Disease

Comparison of mean VAS between PRP & Steroid Group at various assessments:-

At the baseline, there was no statistically significant difference ($p>0.05$) in the mean VAS between two groups. At 2 days follow up, Group A not showing any statistically significant ($p>0.05$) improvement in mean VAS but statistically significant improvement ($p<0.001$) in mean VAS was seen in Group B from the baseline and when VAS were compared between two groups, group B had statistically ($p<0.001$) better mean VAS.

At 2 weeks follow up, statistically significant improvement ($p<0.001$) was seen in both the groups and on comparing the groups to each other, mean VAS were statistically ($p<0.001$) better in group B.

At 2 months follow up, statistically significant improvement ($p<0.001$) was seen in both the groups and on comparing the groups to each other, mean VAS were statistically ($p<0.001$) better in group B.

At 6 months follow up, statistically significant improvement ($p<0.001$) was noticed in mean VAS scores in both the groups, however group A had statistically better improvement in mean VAS ($p<0.001$) than group B.

Table 1:- Comparison Of Mean VAS Between Two Groups At Various Assessments

Time Of Assessment	VAS In PRP Group		VAS In Steroid Group		Unpaired t test	P value
	Mean	Standard Deviation	Mean	Standard Deviation		
Pre Injection	8.47	0.97	8.23	0.82	1.006	0.319
After 2 days	8.83	0.87	7.33	0.96	6.331	<0.001
After 2 Weeks	7.60	0.89	4.17	1.42	11.227	<0.001
After 2 Months	4.50	1.53	1.37	1.33	8.491	<0.001
After 6 Months	1.47	0.90	3.97	1.16	-9.332	<0.001

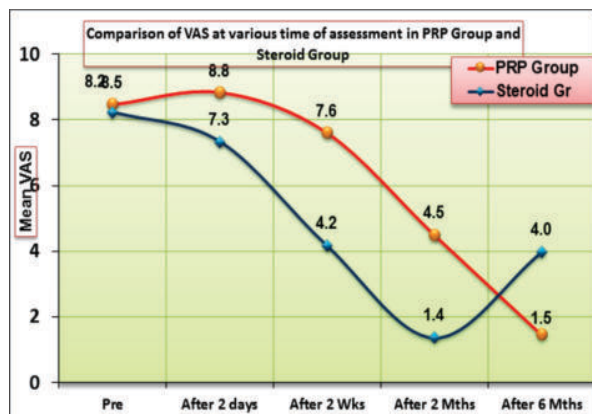


Chart 5: Comparison Of Mean VAS Between Two Groups

Comparison of mean score according to DASH scale between PRP & Steroid Group at Various assessments:-

At baseline, there was no difference in mean scores according to DASH scale ($p>0.05$) between two groups.

At 2 days follow up, Group A showing significant decrease ($p<0.05$) in function, as mean score according to DASH scale increased from the baseline but significant improvement ($p<0.001$) in function was noted in group B as mean score according to DASH scale decreased from the baseline in Group B and when both group compared, mean score according to DASH scale were statistically ($p<0.001$) better for group B.

Similarly, at 2 weeks follow up, improvement in mean score according to DASH scale was statistically significant ($p<0.001$) for both the groups and on comparing groups to each other, statistically ($p<0.001$) better improved score according to DASH scale was noticed in group B.

Similarly, at 2 months follow up, improvement in mean score according to DASH scale was statistically significant ($p<0.001$) for both the groups and on comparing groups to each other, statistically

($p<0.001$) better improved score according to DASH scale was noticed in group B.

At 6 months follow up, statistically significant improvement ($p<0.001$) in mean score according to DASH scale was observed in both the groups, however group A had statistically better mean score ($p<0.001$) according to DASH scale as compared to group B.

Table 2:- Comparison Of Mean Score According To DASH Scale Between Two Groups At Various Assessments

Time Of Assessment	DASH In PRP Group		DASH In Steroid Group		Unpaired t test	P value
	Mean	Std. Dev.	Mean	Std. Dev.		
Pre Injection	87.54	4.56	88.06	5.25	-0.413	0.681
After 2 days	89.11	4.72	81.63	5.12	5.881	<0.001
After 2 Weeks	59.34	3.06	48.90	2.23	15.079	<0.001
After 2 Months	39.26	2.92	9.20	2.45	43.175	<0.001
After 6 Months	9.26	2.36	40.36	3.44	-40.880	<0.001

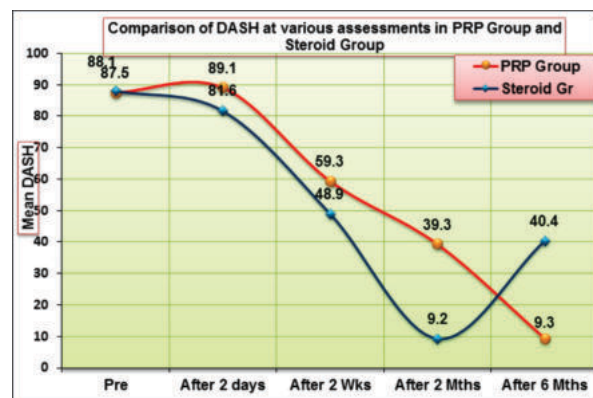


Chart 6:- Comparison Of Mean Score According To DASH Scale Between Two Groups At Various Assessments

DISCUSSION

Pain:- At 2 days follow up group A showing increase in mean VAS from the base line but it was not significant ($p>0.05$). After platelet-rich plasma injections, patients may experience soreness and aching for several days, which is a sign that the healing process has begun & it was described by James J. Guerra, Brett A. Wilhoit.⁸ On the other hand group B showing significant decrease (<0.001) in mean VAS from the base line & on inter group comparison group B having statistically better improvement ($p<0.001$).

Our findings of statistically significant improvement in mean VAS and from baseline at each follow up period of 2 weeks, 2 months and 6 months in both the study groups correlate with previous studies done by Peerbooms et al.⁹, Omar et al.¹⁰ and Gosen et al.¹¹ On inter-group comparison, findings of statistically better improvement in group B at 2 weeks and 2 months and later on, statistically better improvement in group A as compared to group B at 6 months follow up period is correlated with work of Peerbooms et al.⁹ and Gosen et al.¹¹

Function:- At 2 days follow up group A showing significant increase ($p<0.05$) in mean score according to DASH scale from the base line, which may be due to local sore after PRP injection as described by James J. Guerra, Brett A. Wilhoit,⁸ on the other hand group B showing significantly decrease (<0.001) in mean DASH & on inter group comparison, group B having statistically better improvement ($p<0.001$).

Lebiedziński R, Synder M, Buchcic P, Polguy M, Grzegorzewski A, Sibiński M conducted a randomized study of autologous conditioned plasma and steroid injections in the treatment of lateral epicondylitis & concluded that steroid injections give more rapid improvement. Our results correlate with the study.¹²

The findings of statistically significant improvement in mean score according to DASH scale in both the groups from baseline at 2 weeks, 2 months and 6 months is correlated to previous studies done on lateral

epicondylitis. When both groups were compared to each other, we found that group B has better improvement at two weeks and 2 months follow up, while group A has statistically significant improvement than group B at 6 months follow up which is correlated to studies done by Peerbooms et al.⁹ Gosen et al.¹¹

All subjects were taught to perform eccentric elbow extensor stretching and strengthening exercises, with sustained stretching of 20 seconds to be repeated 5 times in a set and to be done three to four times in a day on affected arm. Rescue medicine i.e. Paracetamol 500mg tablet was prescribed on need basis to all the patients. We noted no adverse events during the study period.

Our study findings are comparable to the most of other studies done on PRP and corticosteroid injections as treatment modalities in lateral epicondylitis. Since both the treatment modalities help to effectively relieve pain and improve function when combined with elbow extensor stretching exercises, they are effective ways of treating lateral epicondylitis.

The outcome of our study suggests that corticosteroid injections were comparatively more effective in treatment of lateral epicondylitis at 2 weeks and 2 months while, PRP injections were found to be more effective than corticosteroid injection at 6 months. Although, both the treatment modalities resulted in significant improvement but PRP provides better results in long term.

CONCLUSION

Corticosteroid gives faster pain relief than platelet rich plasma but in long run PRP gives better result. Corticosteroid improves function faster than PRP but in long term follow up

PRP gives better functional improvement. This study gives our patients an effective alternative to surgery in lateral epicondylitis

REFERENCES

1. Hamilton P. The prevalence of humeral epicondylitis: a survey in general practice. *J R Coll Gen Pract* 1986;36:464-465.
2. Kivi P. The etiology and conservative treatment of lateral epicondylitis. *Scand J Rehabil Med* 1983;15:37-41.
3. Major HP. Lawn-tennis elbow. *BMJ* 1883;2:557.
4. Marx RE, Carlson ER, Eichstaedt RM, et al: Platelet Rich Plasma : Growth factor enhancement for bone grafts. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 1998;85:638 – 646.
5. Andrew P. Wroblewski, BS, Hector A. Mejia, MD. and Vonda J. Wright , MD : Application of Platelet Rich Plasma to enhance tissue repair. *Oper Tech Orthop.* 2010; 20:98-105.
6. Delgado DA, Lambert BS, Boutris N, McCulloch PC, Robbins AB, Moreno MR, Harris JD. Validation of Digital Visual Analog Scale Pain Scoring With a Traditional Paper-based Visual Analog Scale in Adults. *J Am Acad Orthop Surg Glob Res Rev.* 2018 Mar 23;2(3):e088.
7. Hudak P, Amadio PC, Bombardier C, and the Upper Extremity Collaborative Group. Development of an Upper Extremity Outcome Measure: The DASH (Disabilities of the Arm, Shoulder, and Hand). *American Journal of Industrial Medicine* 1996; 29:602-608.
8. James J. Guerra, Brett A. Wilhoit; Platelet rich plasma (Autologous conditioned plasma) 1706 Medical Blvd.#201, Naples, FL 34110.
9. Peerbooms JC, Sluimer J, Bruijn DJ et al (2010) Positive effect of an autologous platelet concentrate in lateral epicondylitis in a double-blind randomized controlled trial: platelet-rich plasma versus corticosteroid injection with a 1-year follow-up. *Am J Sports Med* 38:255–262
10. Aziza Sayed Omar, Maha Emad Ibrahim, Mahmoud Said. Local injection of autologous platelet rich plasma and corticosteroid in treatment of lateral epicondylitis and plantar fasciitis: Randomized clinical trial. *The Egyptian Rheumatology* April 2012, Vol.34(2):43-49.
11. Taco Gosen, Joost C. Peerbooms, Wilbert Van Laar and Brenda L. den Ouden. Ongoing effects of PRP and corticosteroid injection in LE: A double-blind randomized controlled trial with 2-year follow up. *Am J Sports Med* 2011 39:1200.
12. Lebedziński R , Synder M , Buchcic P , Polguj M , Grzegorzewski A , Sibiński M . A randomized study of autologous conditioned plasma and steroid injections in the treatment of lateral epicondylitis. *International Orthopaedics* November 2015, Volume 39, Issue 11, pp2199–2203