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Comparative Study: Between PRP Injection VS. Physiotherapy in treatment of Tennis Elbow.

Orthopaedics

Dr. S P Gupta Professor and Head Department of Orthopaedics Mahatma Gandhi Medical College, Jaipur

Dr. Sukhjeet Bawa S.R Govt. Hospital Sector-16 , Chandigarh

Dr. Abhishek 3rd Year P.G Resident Department of Orthopaedics Mahatma Gandhi Medical College, Jaipur

ABSTRACT

Introduction: Lateral epicondylitis although named as tennis elbow is seen more commonly in non-athletes then athletes. Non-operative methods are the mainstay of treatment being effective in more than 95% of cases but long term results are not good. Platelet rich plasma application being in a research phase for treatment for Lateral epicondylitis/Tenis Elbow.

Material and methods: This study included 33 patients from December 2015 to November 2016 after taking written consent from patients. And randomly divided into PRP and conservative group.

Result: Follow up at 3 months, pain score improved significantly to 2 in 36.36 % and 1 in 31.82 of patients in PRP group. But pain score remained 5 in 36.36% 4 in 18.18% of patient in physiotherapy group

Conclusion: Patients of tennis elbow treated with injection of platelet-rich plasma after multiple punctures had reduction in pain significantly as compared to physiotherapy.

KEYWORDS:

PRP, Tennis, Elbow.

Introduction:

Lateral epicondylitis although named as tennis elbow is seen more commonly in non-athletes then athletes.1 This is seen most commonly in people who do activities that require repeated pronation and supination movements of forearm & wrist.

This clinical entity was first described by Runge in 1873.2 Although previously it was thought to be an inflammation of lateral epicondyle origin of extensor tendons current view is that it starts as a micro-tear in lateral epicondyle tendons most often from extensor carpi radialis brevis.[3]

Non-operative methods are the mainstay of treatment being effective in more than 95% of cases but long term results are not good. Platelet rich plasma which is a good source of many growth factors & cytokines like PDGF, TGF-beta, IGF-1, IGF-2, FGF, VEGF, EGF, keratinocyte growth factors & connective tissue growth factors is one of the new way of treating this painful & disabling condition.4 It has shown promise in many studies as compared to steroid injection & other modes of conservative treatment.

Platelet rich plasma application being in a research phase more studies are needed before it can be accepted as one of the best & safe mode of treatment for Lateral epicondylitis/Tenis Elbow. By this study we basically want to evaluate its efficacy in our clinical setup in people in the age group most commonly being affected.

Material and Method :

This study included 33 patients from December 2015 to November 2016 after taking written consent from patients at Mahatma Gandhi Medical College and Hospital, Sitapura, Jaipur, Rajasthan after obtaining approval from ethical committee. Patient was evaluated at pre-treatment time, then at 1 month follows up and finally at 3 month follows up in both groups according to Visual Analogue Score from 0 to 10.

- **Inclusion Criteria**

1. All patients presenting with tennis elbow diagnosis were confirmed by Cozen test ,Mill's test and Maudsleys test.
2. Subject with age of 20-50 years of both sex.

- **Exclusion Criteria**

1. Those patient who received local steroid injection within 6 months
2. Patient having significant cardiovascular disease anemia, renal or hepatic disease, pregnancy, any local infection or malignancy, diabetes, hypothyroid, neuropathy or any vascular insufficiency
3. Patient who had previous surgery at the site
4. Patient who had taken NSAID within 7 days

- **DIAGNOSIS OF TENNIS ELBOW**

1. Pain over the common extensor origin increases with pressure over the lateral epicondyle and with resisted dorsiflexion of the wrist and or middle finger.
2. **Cozen's Test:** Patients elbow is stabilized by the examiner thumb, which rests on the patient's lateral epicondyle. The patient activity makes a fist with the forearm pronated. The patient actively extends the wrist and radial deviates, while the examiner resists the motion. A positive finding is sudden, severe pain in the area of the lateral epicondyle of humerus.
3. **Mills Test:**-Examiner pronates the forearm and fully flexes the wrist as the elbow gradually taken into full extension from the flexed position. Mills does not indicate shoulder position it is usually performed with shoulder in neutral position.
4. **Maudsleys Test (Middle Finger Resisted Extension Test):** Pain is experienced in lateral epicondyle when the middle finger is extended against resistance.

- **METHODOLOGY OF PRP PREPARATION:**

PRP was prepared manually, in a day care setting just prior to the procedure. The process was carried out under strict aseptic conditions as well as optimum temperature regulations i.e., 20-22°C. In order to inhibit platelet aggregation, it is prepared with an anticoagulant, commonly using anticoagulant citrate dextrose solution formula A (ACD-A) or sodium citrate. The platelets need to be sequestered in high concentrations (minimum 3 to 4 times), enough for achieving therapeutic benefit and in a viable state at the same time, so that they can actively secrete their GFs.

Under aseptic precautions, 20 ml of blood was withdrawn from the antecubital vein of the patient lying in the supine position. The blood was immediately transferred to 4 sterile test tubes of 5 ml each containing 0.75 ml CPDA. The test tubes were then subjected to centrifuge at the rate of 1000 rpm for 10 min ensuring balance of the centrifuge machine while placing the tubes in it. Subsequently, the supernatant, which constitutes the platelet rich plasma (PRP), was withdrawn into a new sterile test tube.

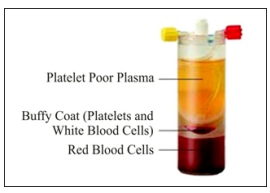


Figure 1: Vial Showing PRP At junction

- Materials Required for PRP Injection in Tennis Elbow

1. Examination table , Pillow, Razor or shaver, 20 ml syringe, 20 no needle, 5ml of anti-coagulant, 20ml test tube, 5ml syringe, 10% betadine, Spirit for skin, Cotton roll, Bandage, Tennis elbow band

- **Patient Position:**

Patient comfort was basic to treatment with forearm supported with pillow on the table; patient was made to sit on a chair next to the supporting table.

- **Technique**

According to ICMS (international cellular medicine society) 66 injection with PRP will be injected at common extensors origin at point of tenderness only after needling at the tendon origin site along with infiltration at surrounding areas. Post injection, patient was monitored for vaso-vagal complication. Patient was given post injection instructions and emergency contact information. Patients elbow was immobilized with crepe bandage for 3 days.

Results :

VAS at Pre Treatment Wise Distribution of Patients in Physiotherapy and Injection PRP Groups.

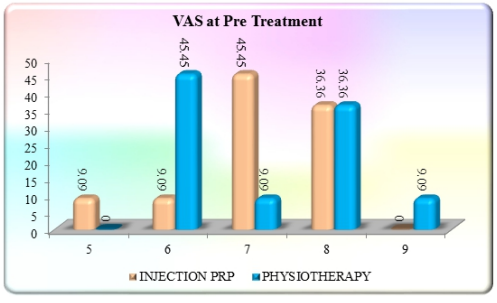
In our study, 45.45% of patient in which injection PRP was given had VAS score of 7 and 45.45% of patient has VAS score of 6 in which physiotherapy was done. Therefore VAS score of both the groups were almost similar before the treatment for Tennis elbow was started.

Table No. 1: VAS at Pre Treatment Wise Distribution of Patients in Physiotherapy and Injection PRP Groups.

VAS Pre Treatment	Injection PRP		Physiotherapy		Total	
	No. of Patients	%	No. of Patients	%	No. of Patients	%
5	2	9.09	0	0.00	2	6.06
6	2	9.09	5	45.45	7	21.21
7	10	45.45	1	9.09	11	33.33
8	8	36.36	4	36.36	12	36.36
9	0	0.00	1	9.09	1	3.03

Chi-square = 7.955 with 6 degrees of freedom; P = 0.241

Graph No. 1: VAS at Pre-Treatment Wise Distribution of Patients in Physiotherapy and Injection PRP Groups.



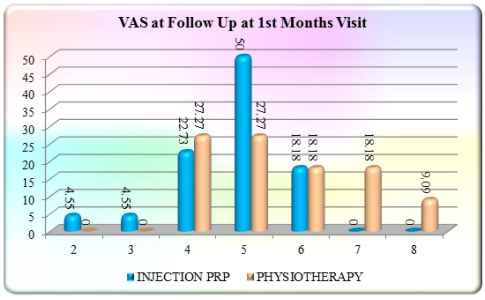
In our study, patients at follow up of 1 month had improvement of pain score in both groups. In PRP group, 50% of patients had VAS of 5 from 7 and in physiotherapy group, 27.27% had 4 and 27.27% had 5 VAS from 6. Therefore in both the groups pain score decreased almost equally at follow up of 1 month.

Table No. 2: Distribution of Patients in Physiotherapy and Injection PRP Groups According to VAS at Follow Up at 1st Months Visit

VAS at 1st month	Injection PRP		Physiotherapy		Total	
	No. of Patients	%	No. of Patients	%	No. of Patients	%
2	1	4.55	0	0.00	1	3.03
3	1	4.55	0	0.00	1	3.03
4	5	22.73	3	27.27	8	24.24
5	11	50.00	3	27.27	14	42.42
6	4	18.18	2	18.18	6	18.18
7	0	0.00	2	18.18	2	6.06
8	0	0.00	1	9.09	1	3.03

Chi-square = 29.000 with 7 degrees of freedom; P = 0.000

Graph No 2: Distribution of Patients in Physiotherapy and Injection PRP Groups According to VAS at Follow Up at 1st Months Visit



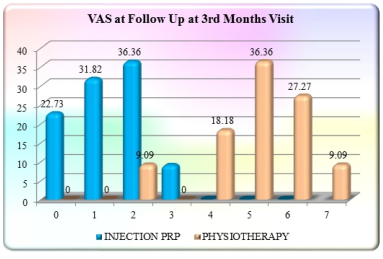
- **Distribution of Patients in Physiotherapy and Injection PRP Groups According to VAS at Follow Up at 3rd Months Visit**

Follow up at 3 months, pain score improved significantly to 2 in 36.36 % and 1 in 31.82 of patients in PRP group. But pain score remained 5 in 36.36% 4 in 18.18% of patient in physiotherapy group. Therefore pain was decreasing in patient continuously in PRP group at 3rd month but in physiotherapy, there was hardly any improvement after 1st month.

Table No. 3: Distribution of Patients in Physiotherapy and Injection PRP Groups According to VAS at Follow Up at 3rd Months Visit.

VAS at 3 month	Injection PRP		Physiotherapy		Total	
	No. of Patients	%	No. of Patients	%	No. of Patients	%
0	5	22.73	0	0.00	5	15.15
1	7	31.82	0	0.00	7	21.21
2	8	36.36	1	9.09	9	27.27
3	2	9.09	0	0.00	2	6.06
4	0	0.00	2	18.18	2	6.06
5	0	0.00	4	36.36	4	12.12
6	0	0.00	3	27.27	3	9.09
7	0		1	9.09	1	3.03

Graph No. 3: Distribution of Patients in Physiotherapy and Injection PRP Groups According to VAS at Follow Up at 3rd Months Visit.



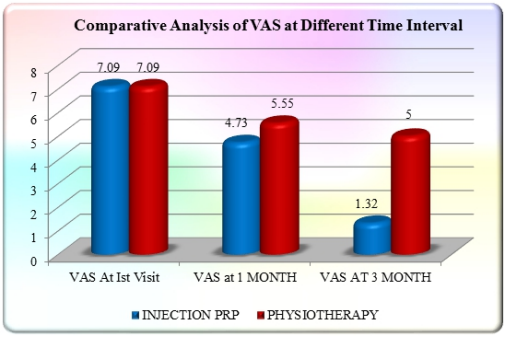
- **Distribution of Patients in Physiotherapy and Injection PRP Groups According to Comparative Analysis of Mean VAS at Different Time Interval**

Study shows Continuous improvement of VAS in PRP group from mean 7.09 to 4.73 to 1.32 at Pre Treatment, follow up 1st month and follow up at 3rd month respectively whereas VAS improved from 7.09 (at 1st visit) to 5.55 (follow up at 1st month) but did not improve after 1st month till follow up at 3rd month as it decreased merely from 5.55 to 5.00.

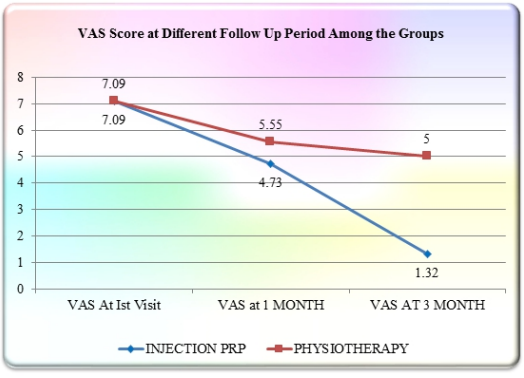
Table No.4: Distribution of Patients in Physiotherapy and Injection PRP Groups According to Comparative Analysis of VAS at Different Time Interval.

		VAS At Pre Treatment	VAS at 1 Month	VAS AT 3 Month
Injection PRP	N	22	22	22
	Mean	7.09	4.73	1.32
	SD	.921	.985	.945
Physiotherapy	N	11	11	11
	Mean	7.09	5.55	5.00
	SD	1.136	1.368	1.342
Total	N	33	33	33
	Mean	7.09	5.00	2.55
	SD	.980	1.173	2.063
P Value LS *(Mann-Whitney U test)		0.904	0.178	<0.001
		NS	NS	S

Graph No.4: Distribution of Patients in Physiotherapy and Injection PRP Groups According to Comparative Analysis of VAS at Different Time Interval.



Graph No.5: Distribution of Patients in Physiotherapy and Injection PRP Groups According to Comparative Analysis of VAS at Different Time Interval.



Pain continued to improve in PRP group at 1 month and 3 month follow up but after initial improvement in pain in physiotherapy group at 1st month, there was no change in pain score at 3 month follow up.

Discussion :

According to the results of our study, local injection of PRP and Physiotherapy in lateral epicondyle both led to significant improvement in subjective (VAS) 1month and 3 month follow-. There was no statistically significant difference between these two groups regarding in short-term follow up (1month). However, at 3month follow-up examinations, this improvement in pain continued to be noted in VAS only in PRP but not in control group.

In a study by Edwards and Calandruccio and Connell et al. in 2003, the efficacy of autologous whole blood injection for pain relief in lateral epicondylitis was evaluated subjectively via Nirschl and VAS scale. Pain severity improved at the end of study; however, the mentioned studies lacked a control group.[4]

In 2006, Mirsha and his colleagues evaluated treatment of chronic severe elbow tendinosis with PRP. Eight weeks after the treatment, patients who had received PRP noted 60% improvement in their visual analog pain scores versus 16% improvement in control patients.[5]

In another double blind randomized clinical trial in 2010, the greater effect of PRP versus corticosteroids injection was shown. According to visual analog scores and DASH outcome measure scores (DASH: disabilities of the arm, shoulder, and hand), treatment of patients with chronic lateral epicondylitis with PRP reduced pain and significantly increased function more than corticosteroids.[6]

In a nonrandomized controlled trial in 2009, 7 comparing a single treatment session of PRP with control injections, PRP subjects improved by a mean of 81% by 27 weeks. At 25.6 months, PRP patients further improved to 93% pain reduction compared with baseline.

The exact mechanisms by which PRP initiates cellular and tissue changes are presently being investigated. There is enough laboratory evidence of PRP effect on tendon healing(2014).[8] It has been considered in some studies that platelet growth factors could be effective in the cartilage healing process in knee osteoarthritis. PRP can stimulate processes associated with tendon healing. The proposed mechanism of action is the elicitation of a healing response in the damaged tendons by growth factors present in the blood.[9] These growth factors trigger stem cell recruitment, increase local vascularity, and directly stimulate the production of collagen by tendon sheath fibroblasts. Increased production of endogenous growth factors has been found in human tendons treated with PRP. The above mechanism helps explain why a single PRP application can have a lasting effect on the healing process as it was shown in previous works of other authors investigating the long-term effect of PRP injection in chronic patellar or Achilles tendinopathy.[9]

Similar results were seen in our study with injection of PRP after multiple punctures at the tender point and the origin of common extensor tendon along with infiltration at the surrounding areas showed very good results as compared to physiotherapy as seen in above studies. It offers cheap and effective mode of treatment in tennis elbow in hospitals where blood bank facilities are available.

Pain continued to improve in PRP group at 1 month and 3 month follow up but after initial improvement in pain in physiotherapy group at 1st month, there was no change in pain score at 3 month follow up.

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