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COMPARATIVE STUDY OF PLATELET RICH PLASMA VS CORTICOSTEROIDS FOR THE TREATMENT OF CHRONIC LATERAL EPICONDYLITIS

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Abstract

The aim of this study is to compare the efficacy and safety of PRP, Corticosteroids and placebo injections for the treatment of chronic lateral epicondylitis. .

The objectives were to study pain and function using various tools like VAS (Visual Analogue Score), Function and Disability score for both PRP and Corticosteroid.

Keywords: Platelet rich plasma, Corticosteroids, Chronic lateral epicondylitis

Introduction

Lateral Epicondylitis is the most commonly diagnosed condition of the Elbow and affects approx. 1% to 3% of the population. This condition mostly occurs in patients whose activities require repetitive wrist movements and strong gripping.

It is thought the lesions occurs in the common origins of wrist and finger extensors on the Lateral Epicondyle. ECRB origin is the most commonly sited location of Lateral Epicondylitis pathology. Kraushaar & Nirschl described 4 stages of tendonosis. Stage 1 is described as Peritendinous Inflammation (Tendonitis). Stage 2,3,4 refer to the presence of angiofibroblastic degeneration.

Pain over the lateral aspect of the elbow is the most consistent symptom of Lateral Epicondylitis. Tenderness positive at ECRB tendon. It can be differentially diagnosed as (1) cervical radiculopathy, (2) Inflammation and oedema of Anconeus, (3) Degenerative Arthritis. In most cases diagnosis can be made clinically, other investigations like MRI, USG can be done which reveal presence of degenerative changes within the tendon & Thickened and Hypoechoic tendon origin respectively.

Non Surgical Modalities include 1) Bracing like elbow straps, clasps, sleeve orthosis. 2) NSAID's 3) Physiotherapy. Surgical modalities like Arthroscopic debridement and Open debridement.

Platelet Rich Plasma (PRP) is defined as volume of plasma that has a platelet count above baseline of whole blood it is a bioactive component of whole blood, the main Growth Factors involved are EGF, PDGF, VEGF, IGF, FGF, TGF. These are responsible for increased

healing aspects of various tissues and actions such as self proliferation, chemostasis, cell differentiation and angiogenesis. It is postulated when injected into injured tissue, the PRP acts in modulation of collagen synthesis and tissue healing releasing Cytokines and Chemoattractant. PRP has been shown to be helpful in treating chronic severe Tendinopathies.

Materials And Methods

This study was a prospective comparative study, conducted at Department Of Orthopaedics Dr. D.Y Patil Medical College, Nerul over a period of 24 months (June 2017 to June 2019). Study was initiated after taking Ethical Approval from institutional Ethics committee. Total of 90 patients were taken for the study. 30 were treated with PRP, 30 were given Corticosteroids and 30 were given placebo effect. All patients had pain over the lateral epicondyle for 6 months and above and all of them had taken conservative treatment in the form of NSAID's, splints and physiotherapy

Three tools were used for analysis Short form 12 health survey(0-100) a set of 12 questions to assess general health and wellbeing(good to worse), Patient related tennis elbow evaluation to assess functional outcome of affected elbow range 0-100(best 0 and worse 100), visual analogue scale (0-10, Good to worst).

Inclusion Criteria

- 1) Adults over the age of 18 years.
- 2) Pain while resisted wrist extension.
- 3) Pain with gripping activities.
- 4) History of more than 6 months of unsuccessful conservative treatment.

Exclusion Criteria

- 1) Age below 18yrs.
- 2) Previous surgery done for lateral epicondylitis.
- 3) Haemorrhagic disorder or anticoagulant therapy.
- 4) Less than 6 months of conservative treatment taken.

Variables

Out of the 90 patients, 11 had Diabetes Mellitus and 12 had H/O Hypertension

TABLE 1

Age (yrs)	Number of patients	Diabetes Mellitus	Hypertension
18-30	29	0	0
31-40	26	1	0
41-50	18	4	4
51-60	17	6	8

Male to Female Ratio

TABLE 2

Male	Female
47	43

Procedure: The dosage of injections used were

- 1) Platelet rich plasma (PRP):- 2ml of PRP mixed with 1ml of 1% lignocaine.
- 2) Corticosteroid: 2ml of 40mg/ml methylprednisolone mixed with 1ml of 1% lignocaine.
- 3) Placebo: 2ml of 0.9% NS mixed with 1ml of 1% lignocaine.

The patient affected extremity scrubbed with povidone iodine scrub and draped using sterile drape. All injections were given to the site of maximum tenderness over the lateral epicondyle. We used a multiple peppering technique using single skin entry point, 4 imaginary quadrants were created and the solution was equally infiltrated in all 4 quadrants.

Fig-1**Fig-2****Fig-3**

The elbow of the patient was locally cleansed with betadine solution and a bandage was applied, according to the post injection protocol patients were given NSAIDs like Indomethacin BD for 5 days and Physiotherapy stretching exercises.

All patients were followed up at 1 week, 3 weeks, 3 months, 6 months and 1 year, Post the injection using the patient rated tennis elbow score, VAS score and SF-12 Survey.

Statistical Analysis

All data was analysed using the Mann-Whitney U test, a P value of 0.05 was considered significant.

Results & Observations

According to **visual analogue scale** data all groups had significant improvement in scores pre-injection and 12 months follow up. Both the

PR and CS group had a significant improvement in VAS score vs. the placebo group at the end of the follow up. The sub group compared against each other were PRP vs. CS, PRP vs. Placebo, CS vs. Placebo.

There was a statically significant difference between the **PRP group and CS group** at 3 weeks,

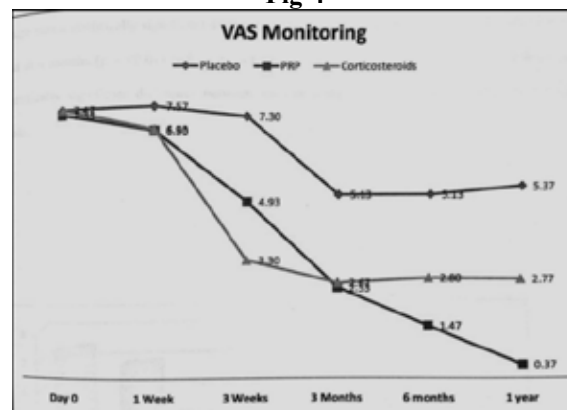
($P = <0.01$) and at 6 months and 12 months ($P = <0.01$).

PRP and Placebo groups at 3 weeks, ($P = <0.01$) and at 6 months and 12 months ($P = <0.01$).

CS and Placebo group at 3 weeks, ($P = <0.01$) and at 6 months and 12 months ($P = <0.01$).

TABLE 3

VAS	Placebo		PRP		Corticosteroids		P Value (Student t test)		
	Mean	+SD	Mean	+SD	Mean	+SD	Placebo Vs PRP	Placebo vs	Corticosteroid vs PRP
Day 0	7.47	0.82	7.33	0.96	7.47	0.90	0.56	0.90	0.58
1 week	7.57	0.97	6.90	0.88	6.93	0.69	0.01	0.05	0.87
3 week	7.30	0.88	4.93	0.94	3.30	0.84	<0.01	<0.01	<0.01
3 months	5.13	0.78	2.53	0.57	2.67	0.88	<0.01	<0.01	0.49
6 months	5.13	0.78	2.53	0.57	2.67	0.88	<0.01	<0.01	<0.01
1 year	5.37	0.72	0.37	0.49	2.77	0.86	<0.01	<0.01	<0.01

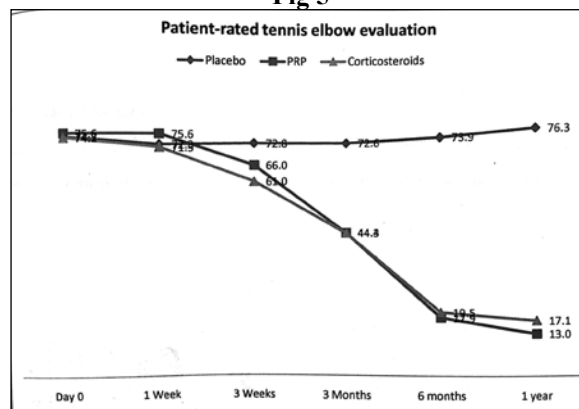
Fig-4

Patient related tennis elbow score

Both the PRP and CS group had a significant improvement in tennis elbow score vs. the placebo group at the end of the follow up period. CS demonstrating greatest improvement in 3 months to 12 months follow up period.

Table 5

Patient related tennis elbow evaluation	Placebo		PRP		Corticosteroids		P Value (Student t test)		
	Mean	+SD	Mean	+SD	Mean	+SD	Placebo vs PRP	Placebo vs Corticosteroid	Corticosteroid vs PRP
Day 0	74.47	4.36	75.57	4.88	74.23	5.46	0.36	0.85	0.32
1 week	72.33	4.19	75.57	4.88	71.47	5.59	0.08	0.49	0.004
3 week	72.80	4.77	66.00	4.84	60.97	4.62	<0.01	<0.01	<0.01
3 months	72.60	4.85	44.43	4.74	44.33	4.59	<0.01	<0.01	0.931
6 months	73.93	4.65	17.90	1.65	19.50	1.36	<0.01	<0.01	<0.01
1 year	76.33	4.60	13.00	1.82	17.10	1.27	<0.01	<0.01	<0.01

Fig 5

SF-12 health survey data: PRP and CS group had a significant improvement in SF-12 score vs. the placebo group at the end of the follow up period.

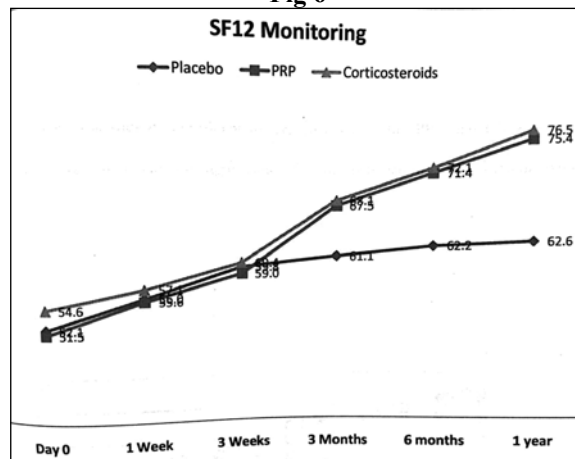
CS demonstrating more but not statically significant improvement in first 3 weeks and PRP demonstrating more but not statically improvement in 3 months to 12 months follow up period.

The P value being <0.01 at 3 months, 6 months, and 12 months. Between the PRP and Placebo group and the CS and Placebo Group.

Table 6

SF -12	Placebo		PRP		Corticosteroids		P Value (Student t test)		
	Mean	+SD	Mean	+SD	Mean	+SD	Placebo vs PRP	Placebo vs Corticosteroid	Corticosteroid vs PRP
Day 0	52.13	5.93	51.50	5.59	54.83	5.31	0.67	0.09	0.03
1 week	55.97	5.81	55.80	4.63	57.13	4.97	0.78	0.41	0.220
3 week	59.83	5.30	59.00	5.11	60.37	4.87	0.530	0.680	0.290
3 months	61.07	5.24	67.47	3.87	68.10	3.47	<0.01	<0.01	0.510
6 months	62.23	5.05	71.43	4.09	72.07	4.15	<0.01	<0.01	0.50
1 year	62.63	4.96	75.43	5.35	76.50	4.53	<0.01	<0.01	0.41

Fig 6



Discussion

This randomized, double blind study was designed to compare the use of concentrated autologous platelets to corticosteroid in patients with lateral epicondylitis, its application proves to be both safe and easy. The corticosteroid group was better initially and then decline returning to base line level, while the PRP group progressively improved. The remarkable finding was that the PRP group had worse patient rated tennis elbow scores before treatment and better after 26 weeks of the initial treatment.

Corticosteroid injections are merely the best treatment option for short term often poor results are seen after 12 weeks of follow up, treatment with corticosteroid has a high frequency of relapse and recurrence.

Platelet rich plasma is promoted as an ideal biological autologous blood derived product. The activation of the platelet occurs through the exposure of the platelet to thrombin. Collagen is an attractive alternative to bovine thrombin as it is naturally involved in the intrinsic clotting cascade.

With respect to pain, we found that both PRP and Corticosteroids

significantly improve the VAS score vs Placebo treatment in the short term and long term. Corticosteroid has better results in short term vs. PRP, and PRP has better results in long term vs. corticosteroid. Pain relief with both PRP and Corticosteroid is better than Placebo.

With respect to function, both PRP and Corticosteroid significantly improved the patient rated tennis elbow score vs. placebo treatment in short term and long term, here also we noticed that corticosteroid had faster improvement than PRP in short term and vice-versa in long term.

With respect to general health both PRP and corticosteroid had improved the SF-12 score vs placebo treatment in short term and long term.

With respect to complication, we found no serious complication either local or systemic.

Conclusion

We conducted a prospective comparative study of 90 patients of chronic lateral epicondylitis treated with either PRP, corticosteroid or placebo injection. Our results show that both corticosteroids and PRP

are superior to placebo in the short term and long term with respect to pain and function, and general health. Corticosteroids appear better in the short term however their results are less superior to PRP in the long term. Additionally, we found no significant 'drop-off' effect of corticosteroid in the long term. Further, we found that the complication rate in both groups was negligible however more patients with corticosteroids require either repeat injection.

In summary, both PRP and corticosteroid are safe and effective treatment options for chronic lateral epicondylitis. The longer term results and less re-injection rate of PRP makes it more attractive as an injection treatment option versus corticosteroid injection.

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