



Comparative Study of Local Injection of Platelet Rich Plasma Versus Corticosteroids in the Treatment of Lateral Epicondylitis (Tennis Elbow)

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Abstract

Lateral epicondylitis, commonly referred to as 'tennis elbow' is seen to affect 1% to 3% of the general population in the 3rd and 4th decade of life. The pathogenesis of lateral epicondylitis is overuse injury, result from cumulative micro trauma that weakens the structural and vascular elements of the tendon. Lateral epicondylitis is commonly encountered problem in orthopaedic general practice. Various treatment have been used in its management including analgesics, elbow bracing, local corticosteroid injection, ultra sound therapy and newer modalities like injecting Platelet Rich Plasma. To study and compare the functional and subjective outcomes in the patients with lateral epicondylitis treated with corticosteroid injections and platelet rich plasma. To compare the effect of corticosteroid injections and platelet rich plasma in lateral epicondylitis. A Comparative Prospective Study, conducted in the Department of Orthopaedics, Sree Mookambika Institute of Medical Sciences, the duration of study is 6 months (April 2022 to September 2022). Patients with symptoms and signs suggestive of Lateral Epicondylitis of more than three months duration not subsiding with rest or analgesics were taken 30-70 years. Symptoms and signs suggestive of unilateral or bilateral Tennis Elbow (unresponsive to treatment with NSAIDs and immobilization) of more than 3 months duration. Age matched with cases, with similar symptoms. Patients with trauma to the affected elbow, patients who underwent surgeries in the affected elbow, patients with degenerative elbow joint diseases, patients with tumors in the affected elbow. patients who have undergone the treatments included in the study were excluded. At the end of 6 months the functional outcome of the patients underwent steroid injection was, 75% showed excellent to good outcome, 15% showed fair outcome and 10% showed poor outcome and for the PRP group the functional outcome was, 90% had excellent to good outcome and 10% had fair outcome and there is no poor outcome. Both PRP and corticosteroids were effective in the treatment of lateral epicondylitis but PRP proved to be more effective modality in the treatment of lateral epicondylitis with a significantly better functional outcome and better pain relief. PRP provide the long term effective when compared with corticosteroid injection for lateral epicondylitis. On the contrary, PRP injection is costly, as compared to steroid injection. However, a longer study with bigger sample size is needed to compare the effectiveness of PRP.

INTRODUCTION

Lateral epicondylitis, commonly referred to as 'tennis elbow' is seen to affect 1-3% of the general population in the 3rd and 4th decade of life. Lateral epicondylitis commonly encountered problem in orthopaedic general practice. The pathogenesis of Lateral epicondylitis is overuse injury, result from cumulative micro trauma that weakens the structural and vascular elements of the tendon^[1]. The dominant arm is most frequently affected. Currently, the exact mechanism is unclear. It is believed that the lesion starts as a tear in the common extensor tendon caused by mechanical overloading which leads to abnormal micro vascular responses^[2]. The diagnosis of lateral epicondylitis is usually made by physical examination. Pain with pressing on the lateral epicondylitis in the elbow and a positive Cozen's test occupies an important place in the diagnosis. Also, resisted wrist extension with the elbow fully extended can exacerbate pain. Various treatment modalities have been used in its treatment including analgesics, elbow bracing, local corticosteroid injection, ultra sound therapy and newer treatments like injecting Platelet Rich Plasma^[3]. The use of platelets as vehicles for the delivery of a balanced pool of healing factors has become a new therapeutic treatment since the late 1990s. Platelet described as the major sources of healing factors within blood clots, the idea of concentrating them around injured site could accelerate and optimize the healing mechanisms set the rationale for the development of PRP. Platelet-rich plasma is defined as the plasma fraction of autologous blood having a platelet concentration above baseline. Studies show clinical efficacy can be expected with minimum this study we increase of platelet concentration by four times the base-line concentration^[4,5]. The healing properties of the PRP have been attributed to the presence of various growth factors like platelet-derived growth factor (PDGF), vascular endothelial growth factor (VEGF), transforming growth factor (TGF), fibroblast growth factor (FGF), epi-dermal growth factor, hepatocyte growth factor (HGF) and insulin-like growth factor-1.5 Several investigators have found increased collagen gene expression and increased production of VEGF and HGF in human tenocytes treated with PRP^[6]. With this brief background, the present study was planned. The aim of this study is to compare the efficacy of CS injection and autologous PRP for the treatment of lateral epicondyle tendinopathy.

MATERIALS AND METHODS

A Comparative Prospective Study, conducted in the department of orthopaedics, Sree Mookambika Institute of Medical Sciences, the duration of study is 6 months (April 2022 to September 2022), Patients

with symptoms and signs suggestive of Lateral Epicondylitis of more than three months duration not subsiding with rest or analgesics were taken, patients were group in to two PRP group and Steroid Group. PRP group which include patient with age of 30-70 years. Symptoms and signs suggestive of unilateral or bilateral Tennis Elbow (unresponsive to treatment with NSAIDS and immobilization) of more than 3 months duration and Steroid group which include Age matched with cases, with similar symptoms. Patients with trauma to the affected elbow. Patients who underwent surgeries in the affected elbow. Patients with degenerative elbow joint diseases. Patients with tumors in the affected elbow. Patients who have undergone the treatments included in the study were excluded.

Study Procedure: All patients coming to department of orthopaedics, Sree Mookambika Institute of Medical Sciences with symptoms and signs suggestive of Lateral epicondylitis (Tennis elbow) of more than 3 months duration and failed conservative management (immobilization and analgesics) initially underwent X ray of the affected elbow to rule out other diagnoses. Mill's test and Cozens test performed to confirm the diagnosis of Tennis Elbow. After ruling out other causes, patients were asked to abstain from taking analgesics or resting for a period of two weeks. They were called back at the end of two weeks for the procedure. Injection of 40mg Depomedrol (Methyl prednisolone) following all aseptic precautions. Patients were asked strictly not to take any analgesics (oral or injections) throughout the course of the study. In case of patients with bilateral affection, similar injections were administered to both elbows but only the worse elbow was included in the study. Patients of both groups underwent assessment of pain and functional outcome, based on Visual Analog scale of pain and Mayo scoring after 26 weeks (period of maximum effect of both interventions based on previous studies). Results of the patients with PRP injections were compared with that of the patients who received steroid injections.

Study Procedure: For patients in the STEROID group, an injection of 40mg of Depomedrol (Methyl prednisolone) was injected under strict aseptic precautions. The region of maximum tenderness on palpation was chosen as the site for injection. For patients in the PRP group, 2.5ml of platelet rich plasma prepared from the individual patient's own blood just prior to the injection, was injected to the affected area. The site for injection was decided in the same manner as for steroid. PRP was prepared and administered in strict aseptic precautions all norms of asepsis. 14.5ml of venous blood was collected from each patient via

venipuncture from the unaffected or less affected arm. The blood mixed with 0.5ml of autoclaved sodium citrate (anti-coagulant) and the mixture centrifuged at 1500 rotations per minute for 15 min. (soft spin). The plasma layer obtained from the first centrifuge was separated through careful pipetting and the isolate centrifuged further at 2500 rotations per minute for 15 min (hard spin). Following this, PRP was pipettes out from the lower one third of the test tube and transferred to syringes for injection. No exogenous factors were used for activation of PRP. The injections were administered in a strict aseptic precaution. Both injection sites were dressed with gauze dressing after the procedure. The tubes and pipettes once used, were discarded. Patients were asked to abstain from any form of activity of the affected limb for 2 days after each procedure. They were asked not to take any pain medication during the entire course of the study.

RESULTS AND DISCUSSIONS

Mean age of the subjects participated in the study were among STEROID group was 37 ± 14 years and among PRP group was 40 ± 13 (Table 1 and Fig. 1). Of the 44 cases, 60% were males and 40% were females among STEROID group and in the PRP group, 75% were males and 25% were females (Fig. 2).

In our present study the subjects were 16 (40%)patients were house wife, 21(52.5%) patients were automobile workers and 3 (7.5%)patients were sports persons (Fig. 3).

In our present study the mean duration of syptoms were 6 ± 2.0 months. Of 40 cases with lateral epicondilitis 35 (87.5%) patients had unilateral symptoms and 5(12.5%) patients had bilateral symptoms. (Fig. 4,5).

At 6 months followup, all 20 patients of the Steroid group showed improved VAS and Mayo scores, and 20 patients in the PRP group showed improvement in both scores. 4 patients from Steroid group and 5 patients from PRP group were found to have complete relief from pain (VAS score of 0). No patients in either group complained of pain lasting more than 24 hours following the injections. There were no post procedural localized infection or signs of it throughout the study. Two patients in the steroid group developed hypopigmented patches at the site of injection at 6 month follow up.

For the Steroid group mean VAS score was 7.0 ± 0.945 initially and at end of 6 months was 2.41 ± 1.652 . For PRP group it was 7.5 ± 1.5 initially and the end of 6 month (Table 2) follow up mean VAS score was 1.73 ± 1.932 . Mean reduction in VAS score was 5.27 ± 1.2 . With respect to reduction in VAS score for both groups p value was found to be 0.02 and hence significantly more for PRP group when compared to steroid group. (Fig. 7).

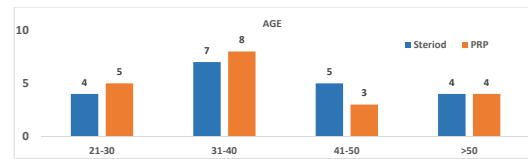


Fig 1: Bar graph of age of patients and the age group they belong to

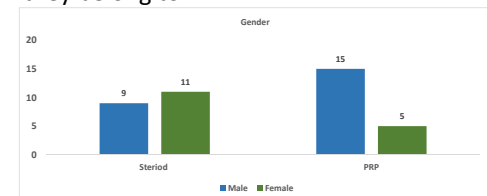


Fig 2: Pictorial representation of gender among patients in each group

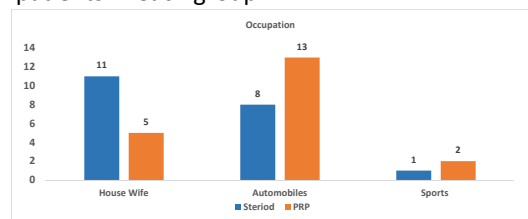


Fig 3: Distribution of occupation among cases and controls

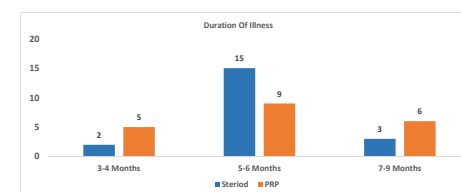


Fig 4: Bar diagram showing duration of symptoms

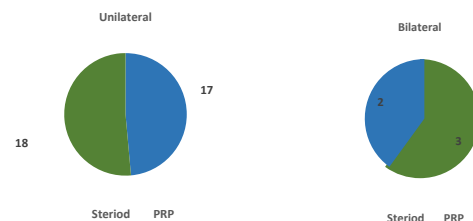


Fig 5: Pie chart showing side of affection

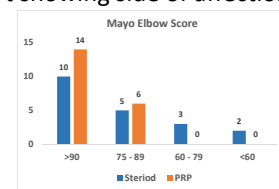


Fig 6: Bar diagram showing Mayo scores at 26 weeks.

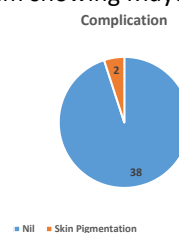


Fig 7: Pie chart complication

Table 1: Age distribution among STERIOD and PRP groups

Age	Steroid		PRP	
	Count	Percent	Count	Percent
21-30	4	20	5	25
31-40	7	35	8	40
41-50	5	25	3	15
>50	4	20	4	20

Table 2: VAS scores prior to injections

VAS Score Before Injection (0-10)	Steroid		PRP	
	Count	Percent	Count	Percent
0 (no pain)	0	0	0	0
1-3 (mild pain)	0	0	0	0
4-5 (moderate pain)	0	0	0	0
6-7 (severe pain)	9	45	8	40
8-9 (very severe pain)	11	55	11	55
10 (excruciating pain)	0	0	1	5

Table 3: VAS scores at 26 weeks after injection

VAS Score at 26 Weeks (0-10) After Injection	Steroid		PRP	
	Count	Percent	Count	Percent
0	4	20	5	25
1-3	10	50	14	70
4-5	5	25	1	5
6-7	1	5	0	0
8-9	0	0	0	0
10	0	0	0	0

Table 4: Mayo scores

Mayo Elbow Scores Initial	Steroid		PRP	
	Count	Percent	Count	Percent
>90	0	0	0	0
75-89	3	15	6	30
60-74	10	50	9	45
<60	7	35	5	25

Table 5: Mayo scores at 26 weeks

Mayo Elbow Scores 26 Weeks After Injections	Steroid		PRP	
	Count	Percent	Count	Percent
>90	10	50	14	70
75-89	5	25	6	30
60-74	3	15	0	0
<60	2	10	0	0

Our study has assessed functional outcome in patients who were given PRP or Corticosteroid injection for the treatment of tennis elbow. Mean age of the subjects participated in the study among STERIOD group was 37 ± 14 years and among PRP group was 40 ± 13 , among Steroid group 60% were females and 40% were males and in the PRP group, 75% were males and 25% were females. A study done by Vishnu Reddy^[7] among 150 patients, Mean age of the subjects participated in the study among STERIOD group was 44 ± 8 years and among PRP group was 42 ± 11 . Of the 150 cases, 48 % were males and 52% were females among STERIOD group and in the PRP group, 56% were males and 44% were females which is comparable with our present study.

Out of 40 patients 52.5% were automobile worker, 40% were house wife and 7.5% were sports person. Mean duration of symptoms for the affected were 5.7 ± 1.4 for steroid group and 5.5 ± 0.9 for PRP group and 87.5% had unilateral symptoms and 12.5% had bilateral symptoms. The A study done by Kurian^[8] among 44 patients 56.7% were house wife, 20.75%

were machine operators, 9.0% were sports person and 3.6% were medical personnel.

Out of 40 patients Mean duration of symptoms for the affected were 7 ± 3.01 months. Of the 44 cases studied 58% had unilateral symptoms and 42% had bilateral symptoms. At the end of 6 months the functional outcome of the patients underwent steroid injection was 75% showed excellent to good outcome, 15% showed fair outcome and 10% showed poor outcome and for the PRP group the functional outcome was 90% had excellent to good outcome and 10% had fair outcome and there is no poor outcome. A study done by Kurian^[8] among 44 patients the functional outcome by using mayo elbow performance score at end of 6 months, the steroid group patient showed 80% showed excellent to good outcome, 18% showed fair outcome and no poor outcome whereas in PRP group the functional outcome was 87% showed excellent to good outcome and 9 % had fair outcome and there is 1% poor outcome.

Qiaolong^[9] done a total of seven randomized controlled trials (RCTs) involving 515 patients which

shows that PRP injection yielded statistically significant superior in pain scores and elbow joint function at a 6-month follow up compared with local corticosteroid injection. No significant difference was identified between two groups regarding the post-injection adverse events.

A meta analysis done by Li, Ang^[11] which conclude that local corticosteroid injections demonstrated favorable outcomes compared with those of local PRP treatments for lateral elbow epicondylitis during the short-term follow-up period (4 weeks and 8 weeks post-treatment). Otherwise, at the long-term follow-up (24 weeks post-treatment), PRP injections had improved pain and function more effectively than corticosteroid injections. A study done by Kemp JA^[10], he conclude that PRP injections appear to be a more effective long-term treatment option than Cortico steroid injections for those with LE who did not respond to conservative management.

In our present study we encounter a 2 cases of hypopigmentation at site of lesion which was compared with a study done by K S Sandhu^[12], which conclude that there is 1 patients with pain and skin atrophy at the site of steroid injection.

Autologous PRP injection is a very promising alternative to steroid injection. As it is safe to use, well-effective to reduce pain in the long-term, with low recurrence rates. It has no deleterious and serious complication of steroid injections like post-injection exacerbation of pain and skin atrophy or necrosis at injection site.

CONCLUSIONS

Both PRP and corticosteroids were effective in the treatment of lateral epicondylitis but PRP proved to be more effective modality in the treatment of lateral epicondylitis with a significantly better functional outcome and better pain relief. PRP provide the long term effective when compared with corticosteroid injection for lateral epicondylitis. On the contrary, PRP injection is costly, as compared to steroid injection. However, a longer study with bigger sample size is needed to compare the effectiveness of PRP.

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