

Comparative Evaluation of the Efficacy of Platelet Rich Plasma Versus Triamcinolone in Treating Tennis elbow

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Abstract

Background: Lateral epicondylitis is seen more commonly in non-athletes than athletes. Non-operative methods are the mainstay of treatment being effective in more than 95% of cases. Platelet rich plasma (PRP) has shown promising results in many studies as compared to steroid injection & other modes of conservative management. Hence, this study was done to compare the efficacy of PRP and triamcinolone injection in management of tennis elbow.

Material & Methods: This randomized study was conducted at our center, for a period of two years from Aug 2015 to Sep 2017 on 60 consenting patients diagnosed as lateral epicondylitis. Patients were randomized into Group -1 (30 patients) receiving 2 ml of PRP injection and group -2 (30 patients) receiving 2 ml of Triamcinolone injection. Post therapy assessment was done using with Oxford elbow score.

Results: Average age at presentation was 31.11 year (range 20 to 40). Mean Oxford Elbow Score for both PRP injection group and in triamcinolone group at 6 weeks, 3 month and 6 month improved from pre injection score with p-value less than 0.001. On comparing PRP with triamcinolone, PRP was slight better than the triamcinolone injection and results were better maintained for long term in PRP group.

Conclusion: Lateral epicondylitis or tennis elbow is a painful debilitating condition of elbow, which creates disturbance in functional activities. A single injection of PRP at the site of the elbow pain resulted in relief of pain in patients for longer duration as compared to local steroids or other conservative treatments.

Keywords: Tennis elbow, Platelet rich plasma, Triamcinolone, Lateral epicondylitis

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Introduction

Lateral epicondylitis commonly known as tennis elbow is cause due to overuse or repetitive micro-trauma resulting in a primary tendinosis of common extensor origin [1]. Treatment of tennis elbow by use of NSAIDS, steroid injections and physiotherapy have provided varied results and only short term relief [2,3]. Recently, intra-lesional injection of platelet rich plasma (PRP), which is 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, has found to be effective for treatment of this painful & disabling condition [4]. The mechanism of action of PRP therapy in chronic tendinopathies is varied and hypothesized to include angiogenesis, increase in growth factor expression and cell proliferation, increase the recruitment of repair cells and tensile strength.

Studies on lateral epicondylitis treated with PRP treatment have yielded inconclusive results [5-7]. Hence, we conducted this comparative to evaluate the efficacy of intralesional injection of PRP & corticosteroid in terms of pain relief as assessed by Oxford elbow score.

Material and Methods

This single blind randomized study is conducted at our centre in a period of two years from August 2015 to September 2017 on 60 patients of tennis elbow. Before the study, written informed consent from the patients and ethical clearance from the institution ethical committee was obtained.

Patients of age group 20 to 40 years with pain and tenderness at lateral epicondyle and positive cozen test were diagnosed as lateral epicondylitis and were included in the study. Patients suffering from elbow pain due to other causes like rheumatoid arthritis, osteochondritis dissecans, crystalline arthropathies like gout, radial tunnel syndrome, cervical lesions, shoulder pathology etc were excluded from the study. Patients with history of previous injection, surgery or any local skin pathology at elbow were also excluded.

Patients were randomized using lottery method into two groups consisting 30 patients each, based on which the type of injection was given, group one patients received 2 ml autologous PRP whereas group two received 2 ml of Triamcinolone injection into the most tender point at elbow by peppering technique.

Autologous PRP preparation:

Autologous PRP was prepared using the platelet separation system in accordance with the manufacturer guideline. With an 18 G needle, 10 ml of venous blood collected from the participant's cubital vein and transferred into a 50 ml syringe primed with 6 ml of anticoagulant citrate dextrose solution. The collected blood was transferred into the disposable separation tube and spun using a centrifuge at 3200 rpm at room temperature for 15 minutes. Centrifugal force separates the blood components into three distinct layers based on their particular densities. The

heaviest particles, the red blood cells sunk at the bottom of the tube, the least dense constituents the platelet-poor plasma (PPP) move to the top of the tube, while the platelet-rich plasma (PRP) remained at the centre. The whole PPP was extracted into a 30 ml syringe and discarded. Following this, PRP was extracted into a 10 ml syringe. Since an acidic anticoagulant (anticoagulant citrate dextrose solution – solution A [ACD-A]) was added during the collection of venous blood, collected PRP is buffered to increase the pH to normal physiological levels, just before injection. This is accomplished by adding 8.4% sodium bicarbonate solution in a ratio 0.05 ml of sodium bicarbonate to 1 ml of PRP. No activating agent was added to the PRP before administration. The time taken to prepare PRP was about 30 minutes.

After the injection, all patients were given paracetamol / paracetamol with tramadol for the three day, following which elbow range of motion exercises started. Patients were followed by regularly at 2, 6, 12 and 24 weeks Oxford elbow score was calculated at each visit and used for assessment.

Results

60 patients of tennis elbow with mean age of 31.45 years (range 20 to 39 years), with mean duration of symptoms was 7.7 months (range 3 to 12 months) were included in the study. The dominant limb was predominantly involved in 41 cases (68.3%) while, the non-dominant was involved in 19 cases (31.3%) out of 60. All patients in both the groups reported temporary mild pain immediately after the injection.

In group I (PRP group), 12 (40%) of the patients has pain caused by the injection, subsided within 2 days, in the other 18 patients (60%), the mean duration of pain was 4+2 days. Discoloration at the injection site was detected in one patient (3.33%). The pre-injection mean oxford elbow score of 27.4 improved to 32.9, 37.1 and 41.3 at 6 week, 3 months and 6 months post injection respectively. The difference was statistically significant ($p < 0.001$) (table 1).

In group II (triamcinolone group), after the first injection pain disappeared within 2 days

in 18 patients (60%) and lasted for 3 days in 12 patients (40%) respectively. The pre-injection mean oxford elbow score of 26.6 improved to 31.2, 35.1 and 39.4 at 6 week, 3 months and 6 months post injection respectively. The difference was statistically significant ($p < 0.001$) (table 1).

No patient developed infection or other complication.

Discussion

Lateral epicondylitis (LE) or tennis elbow, with an incidence of 4 to 7 per 1000 patients per year, have a substantial impact on daily living [9-12]. Many treatment regimens are available with inconsistent results. NSAIDs and corticosteroids, used in traditional medicine are found to be ineffective in long term. Physiotherapy had shown some improvement though a sub-cohort of patients remains refractory [1-3]. Other options include extracorporeal shock wave, laser treatment, botulinum toxin injection and local steroid injection. Prolotherapy or autologous whole blood or PRP injection therapies have reported promising outcomes for LE and in other sports related tendinopathies [13].

PRP consists of activated platelets which discharge bioactive signalling molecules, including adhesion molecules and several growth factors [14]. We compared the efficacy of intralesional injection of PRP and corticosteroids in 60 patients of tennis elbow in comparable groups with no significant differences between the groups in gender, age and patient profile. Our series has average age of patients 31.45 years, female

predominance and mean duration of symptoms of 7.69 months, which was comparable with known series [6,15-21].

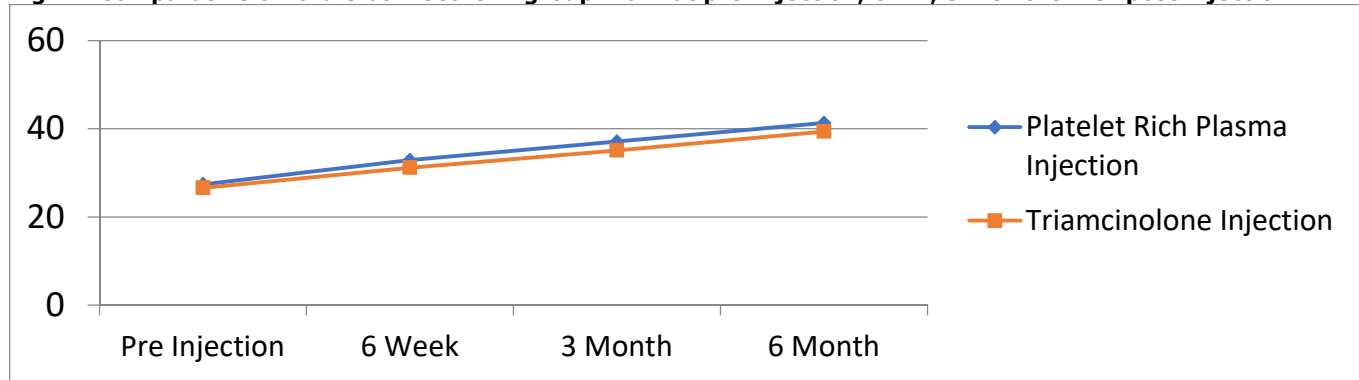
Our study depicted improvement in mean Oxford Elbow Score for both PRP injection group and in triamcinolone group at 6 weeks, 3 month and 6 month improved from pre injection score with p-value less than 0.001, thus stating that both PRP and triamcinolone injections works very well. On comparing PRP with triamcinolone, we found that PRP was slight better than the triamcinolone injection and was better maintained in long term in PRP group. This superior effect of PRP was also demonstrated by Bisset et al, who found that the long term results of steroid injection are worse as compared to physiotherapy alone or wait and watch policy [22].

The reported complication in literature by triamcinolone injection are transient pain, skin discolouration tendon ruptures and with the PRP injection complications reported are temporary pain and mild stiffness [6,15-22]. But in both groups, except of transient pain we did not report any other complications.

The effect of corticosteroid for pain relief is by virtue of its anti-inflammatory effect, whereas PRP acts by hitting the area of pathology. Intralesional injection of PRP provides the necessary cellular and humoral response to induce a healing cascade by growth factors in angiofibroblastic degeneration of the common extensor origin at lateral epicondyle [6,23]. Our study is limited by difficult to blind either patient or investigator in regard to withdrawing blood and injecting PRP made from it.

Table 1 - Oxford elbow score in group 1 & group 2 at pre-injection, 6 week, 3 month & 6 month post injection

	Platelet Rich Plasma Injection				Triamcinolone Injection			
	Mean	% increment	P-Value	T-Value	Mean	% increment	p value	T value
Pre-Injection	27.4	-	<0.001	0.404	26.6	-	<0.001	0.404
6 Week	32.9	20.07	<0.001	0	31.2	17.29	<0.001	0
3 Month	37.1	35.40	<0.001	0.007	35.1	31.95	<0.001	0.007
6 Month	41.3	50.72	<0.001	0.17	39.4	48.12	<0.001	0.17

Fig 1 – Comparative oxford elbow score in group 1 & 2 at pre-injection, 6 wk, 3 mth & 6 mth post injection

Conclusion

Our study demonstrates the advantages of PRP injection for the treatment of lateral

epicondylitis. Its application being minimal traumatic, reduced risk of immune mediated rejection, simple to acquire and prepare and inexpensive are the main advantages.

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