

Role of PRP Injection in Tennis Elbow

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Abstract: *Background:* Platelet rich plasma (PRP) is defined as a volume of the plasma fraction of autologous blood having a platelet concentration above baseline. Platelets contain bioactive proteins responsible for attracting macrophages, mesenchymal stem cells, and osteoblasts which not only promote removal of necrotic tissue, but also enhance tissue regeneration injection is used to introduce platelets into tissue to stimulate a supra-physiologic release of growth factors in an attempt to start healing in chronic injuries and reduce pain. In this prospective study, we evaluated the results of PRP in the treatment of tennis elbow. *Materials and Methods:* During August 2019 to January 2020, 20 patients with tennis elbow who visited our center with failed conservative treatment were treated with PRP, and results were evaluated with VAS, DASH scores. *Results:* Among 20 patients with tennis elbow (11 males and 9 females) post-PRP injection significant differences were observed between VAS and DASH score at baseline and after 4th week and 8th week ($P < 0.05$). *Conclusions:* PRP when given with good care appears to be helpful in tennis elbow It is safe and a significant, improvement has been observed in VAS and DASH scores for tennis elbow.

Keywords: Platelet Rich Plasma (PRP), Platelets, Elbow joint, Tennis elbow

1. Introduction

Tennis elbow is a painful condition, affecting the tendinous tissue of the wrist extensor muscles at the lateral epicondyle of the humerus which leads to decrease functions of the affected elbow joint.¹ There is increased risk of epicondylitis in association with strenuous exercises.² Lateral epicondylitis is caused by degenerative and non-acute inflammatory changes, it's a degenerative tendinopathy with degeneration of collagen tissue called Angiofibroblastic tendinosis of the extensor carpi radialis brevis tendon.³

Platelet-rich plasma (PRP), a blood derivative that has a higher platelet concentration than whole blood, after activating releases a group of biologically active proteins that bind to the transmembrane receptors of their target cells, promoting cellular recruitment, growth, morphogenesis, and modulating inflammation as well.⁴

Platelet rich plasma was activated by addition of 0.5ml of a 5% solution of CaCl₂ in PRP tube. The gelation was determined by the visualization of the clot and the gel remaining attached to the tubes after turning it upside down.⁵

Growth factors released from platelet includes platelet-derived growth factor i.e. PDGF, epidermal growth factor i.e. EGF, insulin-like growth factor i.e. IGF-I, transforming growth factor β -I i.e. TGF β -I, vascular endothelial growth factor i.e. VEGF, hepatocyte growth factor (HGF), and basic fibroblast growth factor i.e. bFGF, which provide stimulus for the healing of tissues through interaction with specific cells.^{6,7}

The active secretion of growth factors by platelets begins within 10 min after activation with 10% calcium chloride in lateral epicondylitis with more than 95% of the pre-synthesized growth factors secreted within 1 hour.⁸

Lateral epicondylitis is associated with an inflammatory process that occurs in the tendon with other changes. Therefore, PRP due to its high content of various growth factors may be more effective as a healing agent. However, studies on lateral epicondylitis with PRP treatment have yielded results.⁹⁻¹¹ A recent review of common growth factors suggested PRP may be useful for tendon and ligament healing in vivo.¹² It is a simple, low cost and very minimally invasive way to obtain a concentration of many growth factors.¹³

2. Objectives

To evaluate pain following autologous platelet rich plasma (PRP) injection among adults with Tennis Elbow in a tertiary care center.

3. Material and Methods

A Hospital based non – randomized trial (NRT) was conducted among 20 adults (18 – 60 years) who presented with lateral epicondylar pain to the outpatient department of Orthopedics at GSL Medical College, Rajahmundry, for a period of five months (August 2019 to January 2020)

3.1 Inclusion Criteria

- Patients above age 18 years with complaints of lateral epicondylar pain with failed conservative management of at least 2 weeks duration.
- One of the following tests being positive: wrist extension (Cozen's test), Mill's maneuver, Chair test.
- Patients of either sex
- Age between 18 years to 60 years

3.2 Exclusion Criteria

- Patient with known case of Diabetes Mellitus,

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- Infection or ulcer at the injection site
- Elbow pain due to other causes like rheumatoid Arthritis, osteochondritis dissecans, crystal arthropathies like gout, radial tunnel syndrome.
- Previous trauma around elbow.
- Patients previously treated surgically for lateral epicondylitis.
- Patients who had received steroid injection within 3 months
- Refusal of consent

4. Data Collection

All the patients who presented to the orthopedic OPD and satisfied the inclusion criteria were considered for the study. A total of 26 cases of Tennis elbow came to Orthopedic OPD during the study period, among which 6 of them did not give consent for treatment with injection PRP. Hence, data for study was collected from 20 patients.

5. Procedure

5.1 Initial Assessment

Patients were assessed clinically; a thorough history and clinical examination was carried out. The subjective symptoms and objective signs were recorded in a pre-designed proforma. This was followed by routine investigations as well as an X-ray of the elbow and other causes that cause lateral epicondylar pain. Once the diagnosis of Tennis Elbow was established, PRP injection was given to the patient. Then the patients were followed up for a period of 4 months. Assessment of functional outcome was done using Visual Analogue Scale (VAS) scores and DASH scores recorded before treatment and follow up at 1st month, 2nd month and 4th month based on following criteria.

5.2 Injection of PRP

Under aseptic precautions, 2ml PRP was injected initially over the maximum tender point and needle was partially withdrawn and multiple punctures were made in the surrounding tissue (peppering technique). Patients were advised to avoid strenuous activities for 2 weeks. No aggressive movements were allowed. At 4 weeks after the procedure, patients were allowed to proceed with normal recreational activities as tolerated. They were followed up at 1st, 2nd month. The outcomes of VAS and DASH scores were compared with previous visits at each follow-up.

6. Statistical Analysis

Data extraction and analysis was done using Microsoft Excel 2007 and SPSS version 20. Results were expressed as percentages for categorical variables.

Continuous variables were expressed as mean and standard deviation. Paired 't' test was applied to compare the mean scores at every follow-up. A 'P' value of <0.05 is considered as statistically significant.



Figure 1: PRP injection tray



Figure 2: Injection PRP

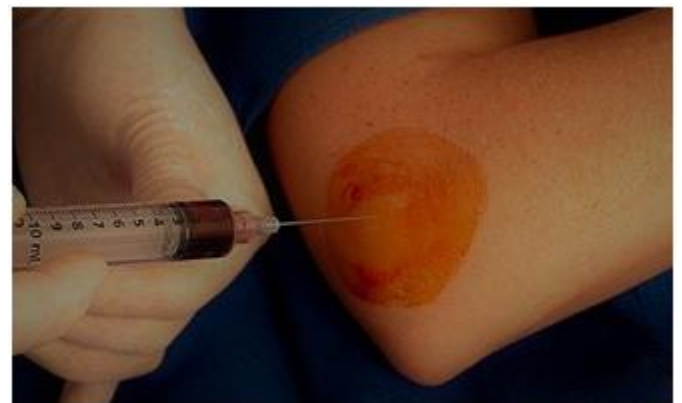
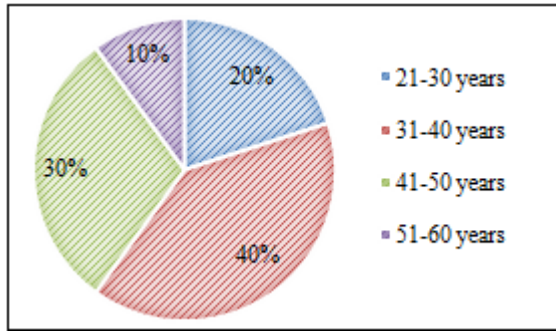


Figure 3: Injection of PRP at point of max tenderness

7. Results and Discussion

A total of 20 patients of Tennis Elbow were evaluated. About 4 (20%) belonged to 21 – 30 years age group, 8 (40%) belonged to 31 – 40 years age group, 6(30%) belonged to 41 – 50 years age group, while only 2 (10%) belonged to 51 – 60 years age group. Males constituted majority, 11 (55%) while females were 9 (45%). Mean age of the study subjects in this study was 34.4 years \pm 12.4 Mean age of the patients in PRP group in a study by Sandhu et al¹⁴ is 44.2 years, while in a study by Mohd Irfan Banday the mean age was 43.98 years and participants' age ranged between 22 to 74 years¹⁵. In the present study, majority 13(65%) of the subjects were aged 31 – 50 years and 5

(25%) were below 30years. Right side was predominantly involved with 13 (65%) of subjects and 7 (35%) on left side.



Age wise distribution of study subjects (n = 20)

Table 1: Mean VAS score at pre and post injection at different follow up visits

Variables	Mean	Standard deviation	P Value
At the time of injection	8.25	0.71	-
1 st month	5.2	0.83	0.02
2 nd month	2.55	0.68	0.01

Table 2: Mean DASH score at Pre and Post injection at different follow up visit

Variables	Mean	Standard deviation	p Value
At the time of injection	56.7	4.51	-
1 st month	33.5	2.92	0.016
2 nd month	3.3	0.61	0.005

Results of the present trial as mentioned in table 1 & 2 based on VAS & DASH scores which we can see significant change & injecting PRP decrease pain and improve functional limitations of the patient in our study.

8. Conclusions

The findings of this study show that platelet rich plasma injection is an effective mode of treatment for patients with tennis elbow. Though many modalities of treatment are available, Autologous PRP injection is also a safe and useful modality for treatment of tennis elbow. The response of patients with tennis elbow to PRP injection was found to be good with highly significant results.

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