



TENNIS ELBOW; COMPARISON OF PLATELET RICH PLASMA WITH STEROID INJECTION IN TREATMENT

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ABSTRACT... Introduction: Lateral epicondylitis, also called as Tennis Elbow is the primary cause of musculo-skeletal ache including extensor origin of forearm. Repetitive movements are considered to be the root cause of this disorder. This disorder involves overexertion of fingers and wrist extensors that causes significant disability ultimately affecting the quality of life. The basis for diagnosing lateral epicondylitis is very clear clinically. The strategy of injecting steroid locally has proven to dispense predictable and consistent transient relief of pain. Recent treatment involve Platelet Rich Plasma (PRP) administration locally. **Study Design:** Prospective study. **Period:** 01-07-2014 to 30-06-2016. **Setting:** Department of Orthopedic Surgery Allied /DHQ Hospital Faisalabad. **Subject and Methods:** Total of 38 patients aging 25-60 years belonging to either gender with Lateral Epicondylitis who met inclusion criteria were enrolled in this study and divided in two (2) groups A and B. The group which was treated with steroid injection was labeled as A and group B comprised of patients which were treated with prepared PRP injection. Outcome was analyzed on the basis of Visual Analogue Scale of pain and functional outcome using qDash scores at baseline, 6 weeks and 12 weeks. **Results:** In Group A, baseline VAS was 7.3 ± 2.1 and q DASH was 83 ± 1.2 . At 6 weeks and 12 weeks VAS was 5.3 ± 3.1 and 6.1 ± 1.2 respectively. qDash scores were 78 ± 4.2 and 63 ± 1.6 at 6 and 12 weeks respectively. In Group B VAS was 7.2 ± 2.2 , 5.3 ± 1.3 , 3.2 ± 1.2 at baseline, 6 weeks and 12 weeks. While qDash Scores were 81 ± 3.2 , 74 ± 3.7 , 58 ± 1.2 at baseline, 6 weeks and 12 weeks respectively. **Conclusion:** Steroid and PRP are effective equally for treating lateral epicondylitis. According to this study, PRP is ranked superior to steroid for its long term effectiveness in controlling pain and improve functional outcome.

Key words: Platelet Rich Plasma, Lateral Epicondylitis, Methylprednisolone.

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INTRODUCTION

An alternative name of Lateral epicondylitis is Tennis Elbow which is the primary cause of musculo-skeletal aches including extensor origin of forearm. Repetitive movements are considered to be the root cause of this disorder. This disorder involves overexertion of fingers and wrist extensors that causes significant disability ultimately affecting the quality of life. The basis for diagnosing lateral epicondylitis is very clear clinically. The technique of injecting steroid locally has proven to provide predictable and consistent transient relief of pain. Recent treatment choices involve injecting (PRP) Platelet Rich Plasma locally.¹

PRP is formed by concentrating platelets

from the blood of the patient. Platelets in PRP are formed of various processes and growth factors. PRP therapy in chronic disorders is characterized by elevated expression of growth factors, angiogenesis and proliferation of cells. LE (Lateral epicondylitis) may accompany many inflammatory processes and signaling pathways. PRP may be more efficacious as a healing aid because it consists of high percentage of various growth factors. However, literature on lateral epicondylitis with PRP management gives conflicting and contrasting outcomes.²⁻⁸

This study aimed to highlight the effect of (PRP) platelet rich plasma in the tennis elbow patients. Current project was designed to elaborate the effect of injectable PRP versus steroids in relief

of aches.

Functional outcome was measured using quick Shoulder and Hand scale (qDASH) at baseline, disabilities of the Arm and in follow up visits. The qDASH is a short version of the DASH Outcome Measure. Any complication reported by the patients was also noted. We used mean visual analogue score of pain to determine the effect of pain at 6 and 12 weeks.

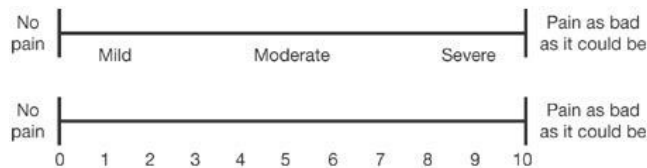


Figure-1. Visual analogue pain scale

MATERIALS AND METHODS

This prospective Randomized controlled study was conducted at the Department of Orthopedic Surgery at Allied and DHQ Hospital, Faisalabad from 1-07-2014 to 30-06-2016. Non-probability consecutive sampling technique was used. Total of 38(19 in each group) were included in this study. All patients included will be from 25 years of age to 60 years of either gender having clinical diagnosis of Lateral epicondylitis of humerus. Exclusion criteria were patients received local steroid injection within 6 months, Had previous surgery of the elbow, Previous fracture to lateral condyle or Having other associated diseases of Upper limb (vascular insufficiency, Diabetic, neuropathy, and elbow joint disorder). Approval from the hospital ethical committee was sought. All the patients with diagnosis of Lateral epicondylitis of humerus fulfilling the inclusion criteria were enrolled in the study after informed written consent. The qualifying patients were informed of the risk and benefits of each operation and asked to sign a detailed informed consent in their respective native language. Group A patient received treatment with steroids and Group B patient with manually prepared PRP.

PRP was manufactured and was administered following the method of Anitua et al.⁹ Peripheral blood (30 cc) was drawn from the antecubital vein. 3.2% sodium citrate was added to PRP.

Blood samples were spun at centrifuge machine (1800 rpm) for a time period of 8 min at 25-37°C temperature. 1 ml of PRP was sent to the laboratory for platelet count and bacteriological testing. 2.5 ml of this containing 5.5% (CaCl₂) (50 µl of CaCl₂ in 1 ml of PRP) after activation was injected to the lateral side of the lateral epicondyle to the area of maximum tenderness. This was done with palpation under sterile conditions.

In group A, 40mg/ml mixture of methylprednisolone and 1 ml of lidocaine was administered. All patients received standard strength of the dose. Evaluation was done clinically at three intervals; before treatment, at the 6th week and then 3 months follow-up. The clinical evaluation was performed using Quick disabilities of Arm, Shoulder and Hand (QDASH)¹⁰ and the visual analog scale (VAS). Using q-DASH scale functional evaluation was done. Both the groups were assessed in terms of gradual improvement of q-DASH score. Statistically significant improvements were found in all the follow up visits in group A and B. Other parameters also showed significant improvements (p<0.001) with reference to functional outcome measure (qDASH) [Table-II]. Both the groups showed considerable improvements (p<0.05) in each parameter from baseline values at 6 weeks and then 3 month follow up. However, in comparison of both groups, the group B showed significant result (p<0.05) and marked response than group A at 6 weeks and a period of 3 month follow up. No adverse effects were investigated among both groups. All relevant information was filled on predesigned Performa. Post treatment pain was noted and scored at baseline, 6 weeks and 12 weeks in the ward by each patient on a visual analogue scale (VAS), a 10-cm horizontal line without graduations varying from “no pain at all” to “unbearable pain”.¹¹

DATA ANALYSIS

Data were analyzed using SPSS computer software version-20. Continuous variables like age and pain were analyzed using means, standard deviation and compared by using independent t-test. Categorical variables like Gender were analyzed using frequencies and percentages and compared by using chi-square

test. Statistical significance was set at p value of less than or equal to 0.05. Effect modifier like age and gender was be controlled by stratification. Post stratification independent t-test was applied.

RESULTS

Among demographic parameters gender, age, side and initial qDASH and VAS scores similar results were observed (Table-I). Statistically no comparable difference was observed between these two groups. Mean platelet count/mL in the PRP group was 201,870 \pm 51,272 before centrifugation and 660,519 \pm 111,223 after ($p < 0.001$).

In Group A baseline VAS was 7.3 \pm 2.1 and qDASH was 83 \pm 1.2. At 6 weeks and 12 weeks VAS was 5.3 \pm 3.1 and 6.1 \pm 1.2 respectively (Table-I) qDash scores were 78 \pm 4.2 and 63 \pm 1.6 at 6 and 12 weeks respectively (Table-II).

In Group B VAS was 7.2 \pm 1.9, 5.3 \pm 1.3, 3.2 \pm 1.2 at baseline, 6 weeks and 12 weeks (Table-I) While qDash Scores were 81 \pm 3.2, 74 \pm 3.7, 58 \pm 1.2 at baseline, 6 weeks and 12 weeks respectively (Table-II).

Platelet rich plasma group had notable improved mean qDASH and VAS scores at follow-up than the steroid group ($p < 0.001$) (Table-II).

	Steroid (n= 19)		PRP (n=19)		p-value
	N	Mean \pm SD	N	Mean \pm SD	
Age		43 \pm 12		47 \pm 61	≥ 0.05
Male/ Female	11/8		13/6		≥ 0.005
Qdash		83 \pm 1.2		81 \pm 3.2	≥ 0.05
VAS		7.3 \pm 2.1		7.2 \pm 1.9	≥ 0.05

Table-I. Comparison of both groups at baseline:

	Steroid group (n=19) Mean \pm SD	PRP group (n=19) Mean \pm SD	P	p-value (Differences in scores)
qDASH				
Baseline	83 \pm 1.2	81 \pm 3.2	≥ 0.05	0.005 (6th week vs. baseline)
6th weeks	78 \pm 4.2	74 \pm 3.7	≤ 0.001	0.002 (3 month vs. baseline)
12 weeks	63 \pm 1.6	58 \pm 1.2	< 0.001	≥ 0.05 (3 month vs. 6th week)
VAS				
Baseline	7.3 \pm 2.1	7.2 \pm 1.9	≥ 0.05	< 0.001 (6th week vs. baseline)
6th weeks	5.3+ 3.1	5.3 \pm 1.3	< 0.001	< 0.001 (3 month vs. baseline)
12 weeks	6.1+ 1.2	3.2+ 1.2	< 0.001	≥ 0.05 (3 month vs. 6th week)

Table-II. Comparison of both groups at baseline, 6 weeks & 3 months:

DISCUSSION

Among disorders of musculoskeletal system Lateral epicondylitis is considered to be the most complicated. Also known as Tennis elbow (TE), it is thought to result from repeated trauma which results in tendinosis of extensor carpi radialis brevis muscle. The most common causative factors are repeated dorsiflexion or pronation and supination.

Some studies have reported that this disorder is more prevalent in female population. Shiri R et al., described that lateral epicondylitis is independent of gender (M/F).¹² Chard MD and Hazelman BL elaborated that LE was pronounced in the arm.

These findings are in accordance with present outcomes of study.¹³

Much non-invasive and conservative management have been practiced with conflicting results. Nirschl et al., described vascular invasion and fibro-elastic tissue as "angiofibroblastic tendinosis".¹⁴ Topical administration of steroid provides transient relief only and other strategies must be outlined for cure and relief of the pain. Hence PRP may be considered a better management option.

Topical administration of corticosteroid is invasive interventions with satisfactory outcomes and

hence it is considered as the gold standard method in comparison to new treatment strategies. Altay et al., described that steroid injection is effective in relieving pain.¹⁵ Contrary to it, an ideal autologous PRP that produce high percentage of growth factors mostly derived from platelets. Cytokines and growth factors in PRP include Transforming Growth Factor beta (TGF- β 1, TGF- β 2), Platelet Derived Growth factors (PDGF- $\alpha\alpha$, PDGF- $\beta\beta$, PDGF- $\alpha\beta$), Fibroblast growth factor (FGF), Vascular Endothelial Growth Factor (VEGF), Keratinocyte Growth Factor, Connective Tissue growth factor. Platelets release 95% of pre-synthesized growth factors after activation.^{16,17,18}

The present project was designed to compare the efficacy of corticosteroid versus PRP. Effectiveness and comparison the of PRP to steroid treatment for lateral epicondylitis was done by Gosens T et al., suggesting significant improvement in pain and function Current findings of this research work showed better response with local steroid injection in the initially, however the improvement was statistically significant in PRP group.

The efficacy of steroid injections was stated by Aziza Sayed Omar, et al. According to her study the effect of PRP is more pronounced as compared to steroids, indicating that steroid lasts for three months and PRP injections last for six months.²⁰

Current results are parallel with findings of Gosens T et al., and Kazemi et al., which suggested that PRP is more effective and its effects last for a longer period of time than corticosteroids.^{19,21} However, there is possibility that PRP provides a positive response on the affected tendon. The difference in the efficiency may be due to altered quantity and time lapse in administration.

CONCLUSION

Current findings unveiled that PRP is superior to any other treatment regime. Conclusively this research suggests that PRP is a better treatment strategy in case of this disorder. Various restrictions to current study involve limited sample size and period of follow up. Present study, although has given a certain direction, is non-conclusive and

needs further exploration. In our study longer follow up studies are recommended to further support these results.



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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
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2	Talha Bind Saeed	Data collection	
3	Sundus Tariq	Data collection	