ORIGINAL ARTICLE

Comparison of Platelet Rich Plasma Concentrate and Corticosteroid in Treatment Oflateral Epicondylitis

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ABSTRACT

Lateral epicondylitis (LE), also known as Tennis Elbow is the commonest causes of musculoskeletal pain around the elbow which involves common extensor origin of the forearm. The disorder is a result of repetitive manual work which involves overexertion of extensors of wrist and finger and causes significant disability in terms of quality of daily life activities. Corticosteroid injection has been used as the treatment of choice for LE and platelet rich plasma (PRP) is an increasingly popular treatment for LE.

Objectives: To compare the outcome of platelet rich plasma (PRP) and corticosteroid (CS) in treatment of Lateral Epicondylitis (LE).

Study design: Randomized controlled trial

Setting: Orthopaedic Department Mayo Hospital Lahore.

Duration of study with dates: This study was conducted over a period of 12 months from 05-05-2014 to 04-05-2015.

Subjects and methods: A total of 100 patients (50 in each group) were included in this study. Group-A and Group B received PRP and corticosteroid injection respectively through a peppering needling technique.

Results: Mean age of the patients was 39.38±10.58 and 43.00±8.04 year in group-A and B, respectively. VAS pain score at baseline was in group-A 7.38±1.38 and 7.62±1.42 in group-B (p=0.395), at 2 weeks 6.70±1.05 in group-A and 6.28±1.37 in group-B (p=0.080), at 4 weeks 4.78±1.18 in group-A and 5.58±1.66 in group-B (p=0.007), at 6 weeks 3.88±1.02 in group-A and 4.54±1.48 in group-B (p=0.011) while pain score at 8 weeks was 2.60±1.08 in group-A and 3.28±1.65 in group-B (p=0.017). DASH score at baseline was 78.70±7.20 in group-A and 79.52±9.08 in -B (p=0.594), at 2 weeks 65.40±8.99 in group-A and 64.90±8.11 in group-B (p=0.771), at 4 weeks 53.20±8.58 in group-A and 54.00±7.82 in group-B (p=0.627), at 6 weeks 42.10±7.95 in group-A and 43.50±7.37 in group-B (p=0.364) while DASH score at 8 weeks was 28.80±6.41 in group-A and 34.50±7.96 in group-B (p<0.001). Repeated measure ANOVA was applied and presented in Table 6 and 7. ANOVA with stratification for age, gender and education also carried out.

Conclusion: PRP group revealed significantly lower pain (VAS) at 4th, 6th and 8th and improved functional activities using DASH score at 8th week.

Key words: Lateral epicondylitis, Corticosteroid injection, Platelet rich plasma

INTRODUCTION

Lateralepicondylitis is also known as tennis elbow originally described as a consequence of racket sports; tennis elbow has been shown to be associated with gripping and repetitive lifting activities[1]. Tennis elbow is most common at the age of 40–60 years and usually affect women more frequently than men. The prevalence of tennis elbow, for the general populations, is approximately 1.0-1.3% in men and 1.1-4.0% in women[2].

Risk factors including age, body mass index (BMI)>25, strenuous physical exertion combined with elbow flexion &extension >2 hr/day, wrist bending >2 hr/day and low social support (only for men) are said to be causative for lateral epicondylitis[3]. One recent study showed that risk factors like rotator cuff injuries, de Quervain's disease, carpal tunnel syndrome (CTS),oral corticosteroid therapy, and smoking are also significantly associated with incidence of tennis elbow[4].

Various treatment options for this common condition are available[5,6]. Initially conservative treatment is done. Usually advocated methods to treat tennis elbow include rest, anti-inflammatory medications, bracing, physical therapy, etc. Injections of corticosteroids (CS), doing dry needling and other surgical techniques can be incorporated[6,7]. The recent advancement in its treatment is platelet Rich Plasma (PRP) i.e. a high concentration of blood platelets is made from the patient's own blood and then injected into the area of maximum tenderness. The idea is that the complex mixture of growth factors within the platelets can stimulate the healing process of the tendon[8,9].

One comparative study in literature regarding effectiveness of platelet rich plasma as compared to the corticosteroid injection is controversial. That study suggested that mean DASH (Disabilities of arm, shoulder and hand) score was significantly better at 4 weeks in PRP groups as compare to corticosteroid group i.e. 31.2±20.8 vs. 43.1±21.6, p-value 0.005. Mean pain on VAS (Visual analogue score) was also higher in PRP group as compared to corticosteroid group i.e. 44.3±26.3 vs.55.7±24.1, p-value 0.023[10]. They also reported that at 8th week mean DASH and Pain (VAS) scores were statistically same in both study group i.e. DASH score in corticosteroid group was 28.3±22.2 while in PRP group was 37.2±24.7, p-value 0.060. Mean pain (VAS)score in corticosteroid group was 48.4±28.9 while in PRP group was 47.7±25, p-value 0.411[10].

While another study reported that the mean VAS in corticosteroid was higher at 6th week i.e. 4.3±2.1 as compared to in PRP group 3.8±1.9, p-value < 0.05. They also reported that the mean DASH score in corticosteroid was higher at 6th week i.e. 20.2±14 as compared to DASH score in PRP group 19.9±12.9, p-value < 0.05[11].

No local study is available yet and international literature supports PRP at 6th weeks[11] and Corticosteroid at 4th week [10] in terms of pain reduction and improved DASH score but at 8th week PRP and corticosteroid are equally effective in terms of VAS and DASH score[10]. So the role of PRP is unclear as per above cited literature[10,11]. After this study, we will be able to know the exact role of PRP in better and more clear terms. We will implement PRP if we get lower pain (VAS) and improved functional activities using DASH score at 8th week. As Platelet-rich plasma (PRP) continues to increase in popularity as a biologic regenerative therapy option and is being applied to an ever-expanding array of indications across numerous disciplines and it will help us to develop standard operating procedures and better treatment protocol for the patients.

Methodology

it was randomized controlled trial conducted in Department of Orthopaedic Mayo Hospital Lahorefrom 05-05-2014 to 04-05-2015.A total of 100 cases (50 cases in each groups) were included in the study using non-probability consecutive sample. Patients aged 18-60 of either gender with clinically diagnosed cases of Tennis elbow/ LE (based on the site of tenderness and pain elicited with resisted and active extension of the wrist in pronation and elbow in extension),duration of symptoms more than 3 months and severity of pain with a minimum score of 5/10 on Visual Analogue Score (VAS).Patients with infection at the site of the procedure or any recent episode of feveror infectious disease, having any platelet dysfunction syndrome (Critical thrombocytopenia i.e. platelet count < 150,000 /mm3) or any other coagulopathies (such ashypofibrinogenemia, ≤ 1.5 g/L) were excluded from the study.100 patients were included in this study after getting approval from the ethical committee. These cases were divided into 2 groups of 50 patients each. Patients were enrolled through OPD of orthopaedic department unit II. After an informed consent, patient's contact information, demographic data and contact details were obtained. Both treatments were given randomly using random numbers table by a senior consultant of Orthopaedic. Patients were divided into two groups, Group-A and Group-B. Group - A and Group - B received PRP and corticosteroid injection respectively through a peppering needling technique. In Group - A, blood, sample (5-10ml) was taken from the patient was sent to the laboratory for centrifugation, PRP was prepared and injected at the site of maximum tenderness under aseptic measures using a 22G needle by a peppering technique spreading in a clock-wise manner to achieve a more evenly distributed zone of delivery.While in Group B, corticosteroid (depomedrol 40mg mixed with lignocaine) injected into the area of maximum tenderness using a 22G need. Pain on VAS and DASH was calculated at baseline and 2, 4, 6 and 8 weeks after treatment. All data was collected on a prescribedproforma. The data was analyzed through SPSS version 20.

Descriptive statistics like age, pain and DASH score was presented as mean ± standard deviation. Qualitative data like gender was presented in form of percentage. ANOVA-test was used to compare mean Pain and DASH score in both study groups at 2,4,6 and 8th week follow up. Data was stratified for age, gender and educational status to overcome effect modifier. Post stratified ANOVA test was applied to compare stratified data. A p-value of< 0.05 was taken as significant.

RESULT

A total of 100 patients (50 in each group) were included in this study. Group-A and Group B received PRP and corticosteroid injection respectively through a peppering needling technique.Mean age of the patients was 39.38±10.58 and 43.00±8.04 year in group-A and B, respectively.In group-A there were 10 (20%) and in group-B 20 (40%) were males while 40 (80%) females were in group-A and 30 females (60%) were in group-B.

Distribution of cases by education was as follows: In group-A 24 were illiterates (48%) and 18 illiterates (36%) were in group-B. In group-A 6 patients (12%) and 2 patients in group-B were having primary education. 5 patients (10%) in group-A and 4 patients (8%) in group-B were having education middle. In group-A 15 patients (30%) and 26 patients (52%) in group-B were matriculate and above.

VAS pain score at baseline in group-A was 7.38±1.38 and 7.62±1.42 in group-B (p=0.395), at 2 weeks in group-A 6.70±1.05 and 6.28±1.37 in group-B (p=0.080), at 4 weeks 4.78±1.18 in group-A and 5.58±1.66 in group-B (p=0.007), at 6 weeks 3.88±1.02 in group-A and 4.54±1.48 in group-B (p=0.011) while pain score at 8 weeks was 2.60±1.08 in group-A and 3.28±1.65 in group-B (p=0.017) (Table-1).

DASH score at baseline in group-A was 78.70±7.20 and 79.52±9.08 in group-B (p=0.594), at 2 weeks 65.40±8.99 in group-A and 64.90±8.11 in group-B (p=0.771), at 4 weeks 53.20±8.58 in group-A and 54.00±7.82 in group-B (p=0.627), at 6 weeks 42.10±7.95 in group-A and 43.50±7.37 in group-B (p=0.364) while DASH score at 8 weeks was 28.80±6.41 in group-A and 34.50±7.96 in group-B (p<0.001) (Table-2).

Repeated measure ANOVA was applied and presented in Table 3and 4. ANOVA with stratification for age, gender and education also carried out and presented in Table 5 & 6.

Table-1: Mean pain score (visual analogue score)

Scores	Group-A Platelet rich plasma (PRP)		Group-B (Corticosteroid injection)		P value
	Mean	SD	Mean	SD	
Pain score at baseline	7.38	1.38	7.62	1.42	0.395
Pain score at 2 weeks	6.70	1.05	6.28	1.37	0.089
Pain score at 4 weeks	4.78	1.18	5.58	1.66	0.007
Pain score at 6 weeks	3.88	1.02	4.54	1.48	0.011
Pain score at 8 weeks	2.60	1.08	3.28	1.65	0.017

Table-2: Mean DASH score

Scores	Group-A Platelet rich plasma (PRP)		Group-B (Corticosteroid injection)		P value
	Mean	SD	Mean	SD	
DASH score at baseline	78.70	7.20	79.52	9.08	0.594
DASH score at 2 weeks	65.40	8.99	64.90	8.11	0.771
DASH score at 4 weeks	53.20	8.58	54.00	7.82	0.627
DASH score at 6 weeks	42.10	7.95	43.50	7.37	0.364
DASH score at 8 weeks	28.80	6.41	34.50	7.96	<0.001

Table-3: Repeated measure ANOVA (DASH Score)

Source	Type iii Sum Of Square	Df	Mean Square	F	p - value
DASH score	118612.388	3.022	39248.411	1019.530	P<0.001
Group*DASH score	317.068	3.022	104.917	2.725	0.044
Error	11401.344	296.165	38.497		

Table-4: Repeated measure ANOVA (Visual Analogue Score)

Source	Type iii Sum of Squares	Df	Mean Square	F	p -value
Pain score	990.228	2.104	470.564	567.552	P<0.001
Group*Pain score	6.788	2.104	3.226	3.891	0.020
Error	170.984	206.226	0.829		

Table-5: ANOVA with stratification for age, gender and education (Visual Analogue Score)

Source	Type iii Sum of Squares	df	Mean Square	F	p -value
Corrected Model	11.656[a]	4	2.914	1.406	0.238
Intercept	49.609	1	49.609	23.941	0.000
Gender	4.112	1	4.112	1.984	0.162
Education	.134	1	.134	.065	0.800
Age	.018	1	.018	.009	0.926
Group	4.880	1	4.880	2.355	0.128

Table-6: ANOVA with stratification for age, gender and education (DASH score)

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	119.510[a]	4	29.878	.433	.785
Intercept	3897.269	1	3897.269	56.453	.000
Gender	1.162	1	1.162	.017	.897
Education	2.270	1	2.270	.033	.856
Age	1.182	1	1.182	.017	.896
Group	94.029	1	94.029	1.362	.246

DISCUSSION

The commonest overuse syndrome related to excessive and repeated wrist extensionis commonly referred to as tennis elbow (TE), although it is more common in people who do not play tennis. Typically, TE affects the individuals of age more than 40 years with a usual history of repetitive activity of the extensor tendons of the forearm. It is commonly known as “Lateral epicondylitis”, but this is a misnomer because, microscopic evaluation of the extensor tendons does not show any signs of inflammation, rather it showsangiofibroblastic degeneration and collagen disarray. Histological examination on light microscopy shows an excessive of fibroblasts and blood vessels formation that are consistent with neo angiogenesis[12]. The extensor tendons are relatively hypo-vascular proximal to their insertion. This hypo-vascularity predispose the extensor tendon to hypoxic tendon degeneration and has

been implicated in the development of tendinopathies[14].

The Platelet Rich Plasma (PRP) has been introduced as a possible adjunct to conservative and operative treatment has initiated significant research in the topic [15]. PRP is considered as an ideal autologous, biological, blood-derived product, which can be easily extracted and exogenously injectedinto various tissues where it releases high concentrations of platelet derived growth factor that enhancestissue healing [13].

In the past corticosteroid (CS) injection was considered to be the treatment of choice for LE. Corticosteroids suppress the immune system by suppressing the pro-inflammatory proteins. Its potential side effects include lipodystrophy, skin pigmentation, and tendon atrophy and ruptures.

PRP is an increasingly getting popular treatment for Lateral epicondylitis. It increases the expression of the collagen gene and vascular endothelial growth factor and hepatocyte growth factor production intenocytes[16] and type-I collagen[17].

Initially PRP inhibits the inflammatory process and stimulates proliferation and maturation of the tissue healing process. It enhances proliferation of stromal and mesenchymal stem cell[18] and prevents the fibrous\scar tissue healing that happens with macrophage mediated tendon-to-bone healing[19].

PRP may also suppress interleukin-1 production and macrophage proliferation within the first 72 hours[20]. PRP injection has proved to be superior to CS injection for chronic LE. The recurrence rate is lower in PRP injection while need for repeated injection or surgery are higher in case of CS injection[21].

PRP group revealed significantly lower pain (VAS) at 4th, 6th and 8th and improved functional activities using DASH score at 8th week. Our results are comparable with the results obtained byGosens et al[10].

Present study demonstrates a greater incidence of females in PRP group (80%) and corticosteroid injection group (60%). Shaik (2000)[22] and Haswell (2002)[23] found higher incidence of female patients which is similar to current study.

CONCLUSION

Our study concludes that treatment of patients of chronic lateral epicondylitis with PRP injection resulted in reduced pain and significantly improved function, exceeding the effect of corticosteroid (CS) injection with a significant decrease in complication rate as compared to CS injection. In future decision for application of PRP for lateral epicondylitis should be confirmed by continued follow-up of patients in this trial.

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