ORIGINAL ARTICLE

Comparison of The Short-Term Results of Single Injection of Autologous Blood with Steroid Injection in Lateral Epicondylitis

Ghias Ud Din Jan[1], Saeed Ullah[2], Fazal Mahmood[3], Rizwan Hamid Malik[4]

Author`s Affiliation

[1]Assistant professor, Department of Orthopedics surgery and trauma, Pakistan institute of medical sciences, Islamabad.
[2,3]Postgraduate Resident, Department of Orthopedics surgery and trauma, Pakistan institute of medical sciences, Islamabad.
[4]Associate professor, Department of Orthopedics surgery and trauma, Pakistan institute of medical sciences, Islamabad.

Author`s Contribution

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[2]Active participation in methodology, interpretation and discussion, writing of manuscript,
[3]Data collection, data entries and data analysis
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Address of Correspondence
Dr. Ghias Ud Din Jan
ghiasjan16@gmail.com

ABSTRACT

Objective: To compare the short term results of single injection of autologous blood with steroid injection in lateral epicondylitis.

Methodology: This study was conducted at Department of Orthopaedic Surgery, PIMS Islamabad. Study design was randomized controlled trial. Duration of study was one year (28-1-16 to 28-1-17). In this study a total 94 (47 in each group) patients were observed Patients who were previously untreated and had no other identifiable cause of lateral elbow pain, those reporting with the typical symptoms of tennis elbow and having no radiographic cause of pain were included. All the patients were divided in two groups randomly on basis of lottery method. In Group-A patients were given 40mg of methyl prednisolone acetate mixed with 1ml of 2% lidocaine injection. In Group-B patients were given 2ml of autologous venous blood drawn from either of the upper limbs mixed with 1ml of 2% lidocaine. Pain evaluation was done via Visual Analogue Scoring at 6th week OPD follow and the pain was evaluated on visual analogue score.

Results: The age of the patients ranged from 15 years to 80 years with a mean of 42.84±15.80 years. 55 (58.5%) patients were aged between 15-45 years while 39 (41.5%) patients were aged between 46-80 years. There were 37 (39.4%) male and 57 (60.6%) female patients with a male to female ratio of 1:1.5. Both the groups were comparable in terms of mean age (p=0.801) and age (p=0.834) and gender (p=0.833) group distribution. At 6thweek follow-up, the mean VAS score for pain was significantly lower in patients treated with methyl prednisolone (2.09±0.91 vs. 3.47±1.12; p<0.001) as compared to those treated with autologous blood and this difference was significant across all age and gender groups.

Conclusion: Steroid injection was found to be superior to autologous blood injection in terms of significantly lower mean VAS score for pain after 6 weeks of injection in patients presenting with tennis elbow.

Key Words: Tennis Elbow, Lateral Epicondylitis, Steroid Injection, Autologous Blood Injection

Introduction

Lateral epicondylitis also known as Tennis elbow is a degenerative process of the common extensor origin of the forearm.[1] It is the second most frequently diagnosed neck and upper limbs musculoskeletal disorder in patient presenting to a primary health care setup.[2] Mainly involves the working age group having peak incidence in age 35 to 54, with mean age of 42 years affecting 1-3% of the population.[1,3] It causes a significant disability affecting both quantity and quality of work as grip strength

particularly in elbow extension is significantly weakened.[1,2]

Lateral epicondylitis is caused by injury due to repetitive strain and overuse of the extensors of the wrist.[4] Clinically there is pain and tenderness at lateral epicondyle of humerus. Resisted dorsiflexion at wrist or middle finger aggravates pain.[5] Condition is most common in dominant arm [5]. Pathophysiology of the injury involves microscopic or macroscopic tears in the tendons of the wrist extensors originating from the lateral epicondyle.[5] Condition in most cases involves fibrotic tissue and angiogenesis which leads to a belief that it is not an inflammatory problem and thus tendinosis is a more suitable term.[5] However, recently a study has found the evidence of reduced hyperemia on colour Doppler after treatment with corticosteroid injection which suggests an inflammatory component of the condition as well.[6] Still many aspects of the condition in terms of pathophysiology, diagnosis and therapeutic options are under investigation.[7] Most of the cases are self-limiting and healing occurs in 3 months. Up to one third have persistent course and about 17% have symptoms even after one year.[8]

There are different modalities of treatment ranging from conservative to surgical options. Conservative options include wait and watch, rest, modification of activities, wearing a brace, physical therapy, extracorporeal shockwave therapy, NSAIDS, and different local injections.[9,12] However the inherent property of poor healing of tendon because of poor vascularization limits the effectiveness of these traditional therapies. Surgical options include release of extensor origin which is either open, percutaneous or arthroscopic, lateral epicondyle debridement or denervation as both and anconeus rotation.[9] As much as 80% of patients have improvement of symptoms over a one-year period of conservative treatment and surgical intervention is required in less than 10% cases.[10] Corticosteroids plus local anaesthetics injection is the most common modality of treatment and while it shows short term benefits, in the long term it more likely causes harm as shown by a meta-analysis done by Aspenberg.[9,5] Autologous blood injection provides necessary blood borne humoral and cellular mediators like platelets derived growth factors that stimulate process of regeneration within the injured tendon. [2,9,11]

More recent data as collected by different studies indicates that autologous blood injection is therapeutically more effective in the treatment of lateral epicondylitis as compared to local corticosteroid injections both in short term and long term outcomes.[11,12] Rationale of my study is to compare efficacy of the treatment with steroid injections and autologous blood injection on a 6 weeks follow up in terms of pain relief.

Methodology

This study was conducted at Department of Orthopaedic Surgery, PIMS Islamabad. Study design was randomized controlled trial. Duration of study was one year (28-1-16 to 28-1-17). In this study a total 94 (47 in each group) patients were observed by using WHO formula for sample size in which level of significance was 5%, Power of the test was 80%, Population standard deviation was 1.10, Population variance was 1.21, Test value of the population mean was 5.88 and anticipated population mean was 6.2. more over non-probability, consecutive sampling technique was used for sample collection. Patients who were previously untreated and had no other identifiable cause of lateral elbow pain, those reporting with the typical symptoms of tennis elbow and having no radiographic cause of pain were included while previously treated patients, radiographic evidence of any pathology, History of acute trauma were excluded. Study was started after approval from the concerned authorities and ethical committee. Patients with history of pain on lateral aspect of elbow joint presenting in Out Patient Department were included in the study. Selected patients gave written informed consent. Patients were divided in two groups randomly on basis of lottery method. In Group-A patients were given 40mg of methyl prednisolone acetate mixed with 1ml of 2% lidocaine injection. In Group-B patients were given 2ml of autologous venous blood drawn from either of the upper limbs mixed with 1ml of 2% lidocaine. Pain evaluation was done via Visual Analogue Scoring at 6th week OPD follow and the pain was evaluated on visual analogue score. All the collected data was entered and analyzed through SPSS version 20.0. Numerical variables; age and VAS score have been presented by mean ±SD. Independent samples t-test has been applied to compare the mean VAS score

between the two groups taking p value ≤0.05 as statistically significant. Categorical variable i-e gender were presented by frequency and percentage. Data was stratified for age and gender to address effect modifiers. Post- stratification independent sample t-test was applied taking p value ≤0.05 as statistically significant.

Results

The age of the patients ranged from 15 years to 80 years with a mean of 42.84±15.80 years.55 (58.5%) patients were aged between 15-45 years while 39 (41.5%) patients were aged between 46-80 years. There were 37 (39.4%) male and 57 (60.6%) female patients with a male to female ratio of 1:1.5. (Table I). Both the groups were comparable in terms of mean age (p=0.801) and age (p=0.834) and gender (p=0.833) group distribution (Table II). At 6th week follow-up, the mean VAS score for pain was significantly lower in patients treated with methyl prednisolone (2.09±0.91 vs. 3.47±1.12; p<0.001) as compared to those treated with autologous blood and this difference was significant across all age and gender groups (Table III).

Table I: Baseline Characteristics of Study Sample

Characteristics	**Participants (n=94)**
Age (years)	42.84±15.80
Age Groups	
• 15-45 years	55 (58.5%)
• 46-80 years	39 (41.5%)
Gender	
• Male	37 (39.4%)
• Female	57 (60.6%)

Table.1: Baseline Characteristics of Study Groups

Characteristics	**Methyl Prednisolone (n=47)**	**Autologous Blood (n=47)**	**P value**
Age (years)	42.43±13.65	43.26±17.84	0.801
Age Groups			
• 15-45 years	27 (57.4%)	28 (59.6%)	0.834
• 46-80 years	20 (42.6%)	19 (40.4%)	
Gender			
• Male	19 (40.4%)	18 (38.3%)	0.833
• Female	28 (59.6%)	29 (61.7%)	

Independent sample t-test and chi-square test, observed difference was statistically insignificant

Table.2 Comparison of Mean VAS Score for Pain between the two Study Groups at 6th week Follow-up

		n	**VAS Score for Pain at 6thFollow-up Week (mean±sd)**		**P value**
			Methyl Prednisolone	**Autologous Blood**	
Over all		47/47	2.09±0.91	3.47±1.12	<0.001*
Age	15-45 years	27/28	2.07±0.92	3.32±1.16	<0.001*
	46-80 years	20/19	2.10±0.91	3.68±1.06	<0.001*
Gender	Male	19/18	1.95±0.85	3.39±1.15	<0.001*
	Female	28/29	2.18±0.95	3.52±1.12	<0.001*

Independent sample t-test, * observed difference was statistically significant

Discussion

Lateral epicondylitis also known as Tennis elbow is a degenerative process of the common extensor origin of the forearm.[1] Lateral epicondylitis is caused by injury due to repetitive strain and overuse of the extensors of the wrist. [4] There are different modalities of treatment ranging from conservative to surgical options. Conservative options include wait and watch, rest, modification of activities, wearing a brace, physical therapy, extracorporeal shockwave therapy, NSAIDS, and different local injections.[9,12] More recent data as collected by different studies indicated that autologous blood injection was therapeutically more effective in the treatment of lateral epicondylitis as compared to local corticosteroid injections both in short term and long-term outcomes. [1,2,11] However there was controversy among the existing studies while there was no such local published material which necessitated the present study.

This study involved 94 patients of both genders aged between 15-80 years presenting with lateral epicondylitis. These patients were divided into two groups using lottery method. Group-A (n=47) received methyl prednisolone acetate injection while Group-B (n=47) received injection of autologous blood. Outcome variable was mean VAS score for pain which was noted and compared between the two groups after 6 weeks of treatment. A written informed consent was obtained from every patient.

In the present study, the age of the patients ranged from 15 years to 80 years with a mean of 42.84±15.80 years.

There were 37 (39.4%) male and 57 (60.6%) female patients with a male to female ratio of 1:1.5.Ahmed et al. (2016) reported similar female predominance with a male to female ratio of 1:1.6 in such patients presenting at Ayub Teaching Hospital Abbottabad with a similar mean age of 40.91±8.21 years.[13] however reported male predominance among such patients presenting at Liaquat University of Medical and Health Sciences Jamshoro with a male to female ratio of 3:1 and mean age of 42±6.7 years.[14] Amin et al.[15] also observed male predominance (5.5:1) with a mean age of 3.91±10.23 years among such patient presenting at Ghurki Trust Teaching Hospital, Lahore.

Dojode et al.[2] reported similar mean age of 42.9±10.7 years in Indian population with a male to female ratio of 1:1.5 comparable to the present study. Singh et al.[16] reported male predominance among such patients in Indian population with a male to female ratio of 1.2:1. Shivakumar et al.[17] also reported similar mean age of 44.6±8.9 years with a male predominance; male to female ratio of 9:1.

A much higher female predominance has been reported by Raeissadat et al[4] in Iranian population with a male to female ratio of 1:4 and mean age of 47.2±6.3 years. Arik et al.[9] also observed similar mean age of 43.7±7.8 years and much higher female predominance with male to female ratio of 1:3 in Turkish such patients.

At 6thweek follow-up, the mean VAS score for pain was significantly lower in patients treated with methyl prednisolone (2.09±0.91 vs. 3.47±1.12; p<0.001) as compared to those treated with autologous blood and this difference was significant across all age and gender groups. Dojodeet al.[2] also observed significantly lower mean VAS score for pain with steroid injection (1.0±1.6 vs. 2.2±1.6; p=0.003) as compared to autologous blood after 4 weeks however the effect of steroids declined over time such that the mean VAS score for pain was significantly higher with steroids (1.2±1.4 vs. 0.36±1.3; p=0.006) as compared to autologous blood after 6 months of treatment. Ariket al.[9] also observed similar significantly lower mean VAS score for pain at 6 weeks of treatment with steroid (2.5±1.1 vs. 3.6±1.2; p=0.0001) as compared to autologous blood injection. They too however observed similar phenomenon such that after 6 months of treatment, mean VAS score for pain was significantly higher in the steroid group (2.7±2.9 vs. 0.6±1.3; p=0.0001) as compared to autologous blood injection claiming autologous blood injection to be better in the long term. Singh et al.[16] however didn't observed any significant difference between the two modalities at 6 weeks follow-up (24.53±4.71 vs. 24.46±4.58; p=0.960).

Thus, the hypothesis established at the start of study couldn't be proved and steroid injection was found to be superior to autologous blood injection in terms of significantly lower mean VAS score for pain after 6 weeks of injection in patients presenting with tennis elbow. As discussed above, the reason behind this conflict from existing studies can be the short follow-up of 6 weeks at which steroids has been found superior by other studies as well. However, studies with long term follow-up report decline in steroid response with time which may be the reason for conflicting results. Thus there is need to repeat this study with longer follow-up to further confirm the results and determine more appropriate treatment.

Conclusion

Steroid injection was found to be superior to autologous blood injection in terms of significantly lower mean VAS score for pain after 6 weeks of injection in patients presenting with tennis elbow.

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