

Prospective comparative study of local steroid and autologous blood injection in the treatment of lateral epicondylitis

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Abstract

Background: Tennis elbow (Lateral epicondylitis) frequently encountered myotendinosis affecting around 3 -5 % of population. It's an ECRB insertion overuse injury at the lateral epicondyle of humerus affecting dominant arm. Non-operative treatment is successful in 80% of patients with tennis elbow. Recent research papers indicate autologous blood injection at the insertion of ECRB proved to be effective in decreasing pain in intermediate and long-term period

Methods: This was a randomized control study done in Rajarajeshwari medical college and hospital, Bengaluru to compare the effectiveness of steroid and autologous blood local injection in terms of controlling pain and disability in short term. Total no. of 40 patients, divided in to 2 groups. One group injected at the site of lateral epicondyle with steroid (methyl prednisolone acetate-40mg) and another group with autologous blood (2ml of venous blood). Patients were followed up at 1st, 4th, and 12th week, pain and disability assessed with visual analogue scale (VAS) and Nirschl staging.

Results: At 1st week corticosteroid injection group (Group I) recorded a statistically significant decrease in pain (VAS Score) compared to autologous blood injection group. At 4th week both group patients had decrease in pain and disability but statistically not significant when compared to each other. At 12th week review, autologous blood injection group (Group II) recorded statistically significant decrease in pain (P-0.0146) and disability (P-0.0001) compared to corticosteroid injection group.

Conclusion: Since autologous blood injection at the lateral epicondyle on OPD basis showed significant improvement in pain and disability, we recommend using same for the treatment of tennis elbow.

Keywords: tennis elbow, elbow pain, tendinopathy.

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How to site this article: Kerakkanavar S, Raghavendra V. Prospective comparative study of local steroid and autologous blood injection in the treatment of lateral epicondylitis. OrthopJMPC 2017;23(2):22-27.

Introduction

Tennis elbow (Lateral epicondylitis) frequently encountered myotendinosis affecting around 3 -5 % of population [1]. It's an Extensor Carpi Radialis Brevis (ECRB) insertion overuse injury at the lateral epicondyle of humerus affecting dominant arm. Pathogenesis involves angiofibroblastic

hyperplasia or non-inflammatory degeneration of (ECRB) or common extensor origin [2]. Patient presents with pain at the lateral aspect of elbow, decreased grip strength due to pain, tenderness at the lateral epicondyle, Mill's and Cozen's test will be positive. Non-operative treatment is successful in 80% of patients with tennis elbow [3]. Treatment involves activity modification, rest, stretching

exercises, NSAID, steroid injection [4], extracorporeal shock wave therapy [5], laser treatment [6], botulinum injection [7], arthroscopic debridement [8], acupuncture therapy.

Recent research papers indicate autologous blood injection at the insertion of ECRB proved to be effective in decreasing pain in intermediate and long-term period. The Platelet derived growth factor and transforming growth factor present in blood induce fibroblastic mitosis, trigger stem cells and angiogenesis, probably stimulate production of collagen by tendon sheath fibroblasts [9]. Autologous blood injection is minimal invasive, can be done as outpatient procedure, it has no potential complications like skin atrophy and tendon tears associated with corticosteroid injection [1]. Our purpose is to study the role and efficacy of autologous blood injection in tennis elbow comparing to corticosteroid injection.

Materials and Methods

This was prospective study done from February 2015 to March 2017, involving total 40 (22 male and 18 female) patients of age 21- 39 years. The written informed consent from the patients and institute ethics committee approval taken for the study. All patients who complain of lateral elbow pain with tenderness on lateral epicondyle of humerus and positive Mill's and cozen's test enrolled in the study. The detailed history regarding pain, restriction of daily activities, standard elbow antero-posterior and lateral X rays obtained to rule out other pathologies. Patients with typical symptoms of tennis elbow with no previous treatment and normal X ray are included in the study.

Patients were divided in to two groups and patients were allotted to the groups on computer generated table basis.

Group I - methyl prednisolone acetate (40mg) was used along with 1ml of 2% lignocaine solution.

Group II- 2 ml of venous blood, drawn from the contralateral upper limb and was injected locally after mixing with 1 ml of 2% lignocaine solution.

The procedure was done at outpatient department under all aseptic precautions by the same author. Lateral epicondyle was palpated, needle was introduced just proximal and injected in to the undersurface of the extensor carpi radialis group of muscles. Patients were prescribed commercially available tennis elbow brace and advised to restrict activities involving repetitive movements of the wrist and elbow during first 4 weeks after injection. As the pain permitted, passive stretching exercises of extensor muscles started.

Patients were followed up at 1, 4 and 12 weeks, assessed with Visual Analogue scale (VAS) for the pain and by Nirschl staging for the disability [10]. Paired t test was used for serial analysis in both groups and unpaired t test for comparison between the two groups. The chi-squared test was used to compare categorical variables between the groups. A p-value < 0.05 is considered statistical significance.

Results

In our study total 40 patients, divided in to two groups on alternative basis were evaluated. A baseline VAS scores and Nirschl staging of the pain at lateral epicondyle was recorded. Group I patients assigned as control, were treated with local corticosteroid injection and group II patients with autologous blood injection. Both patients were prescribed tennis elbow brace and advised to wear it day time and remove at night for 4 weeks. Patients were advised to report immediately if any increase in pain and were followed up at 1 week, 4 weeks, 12 weeks interval after the intervention.

Analgesics were prescribed for pain and advised to take only if there is severe pain. In group I, one patient lost follow up after 1 week and in group II, 2 patients were lost to follow up, one after 4th week and one after 12th week.

Comparison of clinical and demographic data done (Table 1). The two groups were demographically comparable.

Table 1. Base line demographic data

	Group I	Group II	P value
Mean age	36.4 (4.2)	35.2 (3.8)	0.3494 (NS)
Sex Ratio M/F	11/9	11/9	1.0000 (NS)
Laterality (R\L)	15/5	16/4	1.0000 (NS)
Mean duration of symptoms (weeks)	6.2 (2.6)	6.8 (2.1)	0.4270 (NS)
Mean VAS score (Pre-treatment)	6.1 (1.5)	6.4 (1.6)	0.5444 (NS)
Mean Nirschl stage (Pre-treatment)	4.5 (1.2)	4.7 (1.3)	0.6161 (NS)

NS- Not significant

In group I, pre-injection phase mean VAS score was 6.1 ± 1.5 . The pain decreased to a mean VAS of 3.4 ± 0.9 after 4th weeks of steroid injection. The mean VAS at 12 weeks of follow up was 2.1 ± 0.8 . Similarly,

the Nirschl stage before administration of steroid in Group I was 4.5 ± 1.2 . The mean Nirschl stage at 4th week and 12th week follow up was 2.40 ± 0.9 and 1.80 ± 0.6 respectively. (Table 2)

Table 2: Mean VAS score at baseline, 1 week, 4th week and 12th week follow up

Follow up	Group I			Group II			P value
	Number	Mean VAS	SD	Number	Mean VAS	SD	
pre injection	20	6.1	1.5	20	6.4	1.6	0.5444 (NS)
1 st week	19	5	1.1	20	5.9	1.2	0.0197 (S)
4th week	19	3.4	0.9	19	3.8	0.8	0.1563 (NS)
12th week	19	2.1	0.8	18	1.5	0.6	0.0146 (S)

NS- Not significant, S- Significant

In group II the mean VAS scores in the pre-injection phase was 6.4 ± 1.6 . The pain decreased to a mean VAS of 4.8 ± 0.8 after 4th weeks of autologous blood injection. The mean VAS at 12 weeks of review was 1.5 ± 0.6 . Similarly, the Nirschl stage in Group II was 4.7 ± 1.1 before the use of

corticosteroid injection. The mean Nirschl stage at 4th week and 12th week follow up was 2.2 ± 0.6 and 0.9 ± 0.4 respectively.

There is significant difference in P value at 12 weeks between group I and II in both VAS score and Nirschl stage. (Table 2 & 3).

Table 3: Mean Nirschl stage at baseline, 1 week, 4th week and 12th week follow up

Follow up	Group I			Group II			P value
	Number	Mean Nirschl	SD	Number	Mean Nirschl	SD	
Pre injection	20	4.5	1.2	20	4.7	1.3	0.6161 (NS)
1 st week	19	3.6	1.0	20	3.9	0.9	0.3307 (NS)
4th week	19	2.4	0.9	19	2.2	0.6	0.4738 (NS)
12th week	19	1.8	0.6	18	0.9	0.4	0.0001 (S)

NS- Not significant, S- Significant

Discussion

Lateral epicondylitis was first described by Runge in 1873 [11]. In a study done by Bishai S.K. et al 5- 10% of tennis players present with lateral epicondylitis [12]. In our series, 56% cases were manual workers, 26% were house wives and 18 % in others mostly in teachers.

In spite of various modalities there is no optimal treatment protocol for lateral epicondylitis. Most of the patients (70-80%) get relieved of symptoms within one year, with or without treatment [3]. First line of treatment usually is conservative like activity modification, rest, non-steroidal anti-inflammatory drugs, if conservative line of management fails corticosteroid local injection is commonly followed. However, Bisset et al studied that corticosteroid is effective only in short term, in long term follow up this treatment yielded poorer results than physiotherapy [13]. Another study done by Plazcek et al showed that Botulinum A toxin injection offered significant pain relief, but few patients had weakness in fingers as a complication [7]. Pulsed low intensity ultrasound therapy trial done by D'Vaz concluded that no significant benefit comparing to placebo [14].

Recent trials have documented that use of autologous blood or platelet concentrates as a local injection has beneficial role in the treatment probably by the effect of growth factors present in platelets. Mishra and colleagues conducted a study using platelet rich plasma and reported significant improvement in pain in patients with complaints less than 6 weeks [15]. Similar study conducted by Edwards et. al documented relief in symptoms using autologous blood in 28 patients [9]. Same treatment methods used in other tendinopathy like plantar fasciitis showed autologous blood injection has limited application [16,17]. The difference in results may be due to change in the mechanical

and healing properties of non-weight bearing and weight bearing tendons.

Comparison between the steroid and autologous blood groups in our study showed that not much difference in both pain (VAS score) and disability (Nirschl stage) at 4 weeks, but there was a significant difference in both values at 12 weeks of follow up. In our short-term study statistical analysis ($p < 0.0001$) showed that autologous blood was better than local corticosteroid injection in the follow up of tennis elbow patients. Study done by Edwards et al reported maximal pain relief after injection of autologous blood was achieved at 3 weeks [9]. Kazemi et al also reported in their trial, that autologous blood injection is more beneficial comparing to local corticosteroid injection [18].

The exact mechanism of action of both autologous blood and platelet rich plasma is not known but there are theories attributed to platelets releasing growth factors like transforming growth factor β , platelet derived growth factor, epithelial growth factor, vascular derived endothelial growth factor, hepatocyte growth factor and insulin like growth factor which play a role in tissue healing, neovascularization and regeneration [19]. Platelets concentration varies from 2.5 to 5 times more compared to blood in platelet rich plasma (PRP). Logically PRP is more effective than blood due to higher concentration of growth factors per unit volume and also been proved in one clinical trial to be better than autologous blood. Disparity in the efficacy of autologous blood and corticosteroid attributed to the relative difference in the quantity of growth factors delivered to the degenerated tendon. However PRP preparation requires specialized equipment which is both expensive and time consuming. Autologous blood injection is easy, does not use any specialized

expensive equipment and it can be done on OPD basis.

The mechanism of action of steroid remains unknown. Balasubramaniam et al postulated that the beneficial effects of steroid injection result from the bleeding caused by forcing fluid through tissue planes at high pressures [20].

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Conclusion

This study concludes that in treatment of lateral epicondylitis steroid injection gives faster control of pain whereas autologous blood injection gives good long-lasting pain control and improved function. Research with large sample size and longer follow up is required to recommend superiority of autologous blood in treatment of Lateral epicondylitis.

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