

# Study to Evaluate the Outcome of Autologous Blood and Corticosteroid Injection to Treat Lateral Epicondylitis of the Elbow

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## ABSTRACT

**Objective:** Tennis elbow, sometimes called lateral epicondylitis, is a common cause of elbow pain on the lateral side. The purpose of this study was to evaluate the outcomes of autologous blood (AB) injection and local corticosteroid injection for the treatment of lateral epicondylitis of the elbow

**Materials and Methodology:** This was a randomized, single-blinded prospective study conducted at Muhammad Medical College and Hospital Mirpurkhas, Pakistan from May 2020 to May 2021. A total of 80 subjects were divided into 2 groups, each with 40 participants: Group A patients received AB(2ml), whereas those in Group B were injected with 80 mg methyl Prednisolone acetate. Patients were assessed at baseline and after one month, three months, and six months using the Nirschl stages and VAS score.

**Results:** No significant difference in demographic characteristics were observed in both groups. The mean VAS scores and Nirschl stages in groups A and B were similar before the injection, with a mean VAS score of  $6.19 \pm 0.67$  in group A and  $6.32 \pm 0.87$  in group B with a P-value of 0.64, and a mean Nirschl stage of 6.04 0.77 in group A and 6.15 0.91 in group B with a P-value of 0.54. In comparison to group A, group B received significant pain relief one month following surgery. At three months and six months of patient follow-up, the VAS score and Nirschl stage in group A began to fall; however, in group B, the average VAS pain level increased from  $1.52 \pm$

$0.87$  to  $1.91 \pm 1.18$ , and the Nirschl stage increased from  $1.51 \pm 0.66$  to  $1.76 \pm 0.41$ .

**Conclusion:** Autologous blood injection is a simple, affordable, and effective treatment for lateral epicondylitis with few adverse effects and a low recurrence rate.

**Keywords:** lateral epicondylitis, autologous blood injection, Corticosteroid Injection, VAS, Nirschl stage

## INTRODUCTION

With an incidence of 1% to 3%, lateral epicondylitis, sometimes referred to as tennis elbow, is a principal reason for lateral elbow pain in society rather than tennis players. Tennis elbow affects both men and women equally, and it commonly appears in the late forties and fifties<sup>1,2</sup>. Tennis elbow is most typically diagnosed in manual laborers and those who do a lot of physical work, but it's now affecting a growing number of software engineers and people who work on computers. The condition develops as a result of overuse of the wrist extensors, which causes micro-damage to the muscles. The most common symptoms are pain on the lateral part of the elbow and a loss of grip strength, which can cause significant impairment in daily tasks<sup>3</sup>. Even though tennis elbow can be easily identified based on clinical history and examination, the best management regimen is not yet decided<sup>4,5</sup>. Previously, it was believed that it is an inflammatory condition<sup>6</sup>. However, later on, it is found that this condition is mainly a degenerative disease<sup>7</sup>.

Tennis elbow appears to affect people of all ages and ethnic backgrounds equally<sup>8</sup>. In prospective studies, the incidence in working populations ranged from 0.9 to 4.9 per 100 worker years<sup>9</sup>. Because of work-related absenteeism and health-care utilization, the societal impact is enormous. Architecture, manufacturing, and wholesale/retail are the three industries with the highest incidence rates of Tennis elbow, which is categorized as an occupational disease<sup>10</sup>.

For the treatment and management of lateral epicondylitis, different surgical and non-surgical treatment modalities are available. It can be treated with a number of different options. Botulinum toxin, corticosteroids, platelet-rich plasma (PRP) or AB Injections and prolotherapy are a few examples of treatments that are now routinely utilized in clinical practice. These injectable are made via various mechanisms and have been demonstrated to stimulate growth.

The use of local corticosteroid injection is a popular treatment for tennis elbow among orthopedic surgeons. However, according to some studies, short-term pain alleviation following a

local steroid injection and physio is not associated with any long-term benefits<sup>11-14</sup>. AB delivers vital growth factors to the illness location, aiding in the recovery of the tennis elbow<sup>15</sup>. A few studies have looked at corticosteroids' treatment outcomes against AB injection in the treatment of lateral epicondylitis, although these investigations are rare.

This prospective randomized control s was performed to analyze the findings of AB injection versus corticosteroid in the treatment and management of lateral epicondylitis.

## MATERIALS AND METHODOLOGY

The prospective randomized control study done in hospital, our study included patients over 20 diagnosed with lateral epicondylitis elbow. Patients who complained of pain in the lateral elbow region in the outpatient department underwent a history and clinical examination, including the Cozen's test and the Mill's maneuver<sup>15</sup>.

After talking history, patients were evaluated clinically and radiographically. Where required, MRI and nerve conduction tests were performed to exclude any other possible issue related to lateral elbow pain. Patients above 20 years with no history of tennis elbow treatment were included. Patients with a previous elbow, previous lateral epicondylitis treatments, Patients who were on steroids for any other medical condition within the last 12 weeks before the beginning of the study, patients with medical co-morbidities such as tumors, autoimmune illnesses, and bleeding tendencies and any other elbow problems that cause lateral elbow pain were excluded.

Following the receipt of informed consent, 80 patients who met the inclusion criteria were distributed into two groups of 40 patients each. Patients in Group A were treated with AB Injection, while those in Group B were treated with Steroid Injection. To ensure equal distribution, a computer-generated randomization algorithm was applied. At any point during the trial's run, patients were offered the choice to withdraw from the study.

Patients in Group A received 2 mL AB taken from the same or opposite upper limb was mixed with 1 mL 2 percent lignocaine

solution. Patients in Group B received 80 mg of methylprednisolone acetate with 1ml of lignocaine 2 percent injection. Same orthopedic surgeon administered injections to all of the patients under strict aseptic settings. With a 24-gauge needle, a puncture was made near the lateral epicondyle, and the needle was forwarded to the undersurface of the extensor carpi radialis brevis. The patient was kept supine, with his elbow in 90° flexion and his palm facing the ground, while the content was administered. In order to keep the wound clean, a sterile dressing was applied. In addition, the patient was directed to refrain from engaging in strenuous upper-limb activities for at least two weeks after receiving upper-limb rest for no more than 48 hours. Once the irritation had eased, passive stretching of the extensor muscles was indicated to relieve the tightness.

Patients were evaluated before the treatment, at four weeks, three months, and six months which was the final follow-up. The result and assessment were carried out to determine the amount of pain and the degree of handicap. The Visual Analogue Scale (VAS) was used to quantify pain, and Nirschl staging was used to determine impairment<sup>16</sup>. As it was a single-blinded study, an independent observer performed the outcome and evaluation.

The baseline findings of the groups were compared using the Chi-square test. The serial analysis of groups was done with the Independent Sample t-test. Statistical significance was defined as a P value of less than 0.05.

## RESULTS

Baseline parameters and demographic characteristics were compared in both groups. No significant difference was observed in age, gender duration of symptoms, etc. ( $p > 0.05$ ). (Table 1)

There were 33 men and 47 females among the 80 patients; Group A had 18 males and 22 females with a mean age of 46.33 years (22-66); Group B had 15 males and 25 females with an average age of 46.86 years (21-63). All of the patients in groups A and B were right-handed, with the right side of the body being involved in all of them. (Table 1)

Table 1: Demographic Characteristics of the study participants

Variable	Group A	Group B	Chi. Square, P Value
Gender			
Males (n=33)	18	15	$X^2 = 0.4642$ , $P = 0.49$
Females (n= 47)	22	25	
Mean Age			
Mean Age in Years	46.33 ± 4.65	46.86 ± 5.67	$X^2 = 0.76$ , $P = 0.98$
Duration of Symptom (In months)	33.45 ± 7.86	34.19 ± 4.56	$X^2 = 0.118$ , $P = 0.87$

We observed no significant difference in mean VAS score and Nirschl stages in both groups at baseline ( $P > 0.05$ ). We observed that Group A outperformed group B at three month and 6-month follow-ups, with the mean VAS pain scores of  $0.81 \pm 1.13$  and  $0.58 \pm 0.76$  at three months and 6-month, respectively, compared to  $1.48 \pm 0.71$  and  $1.69 \pm 1.18$  in group B. After one month, the VAS pain score in AB Group continued to decline, however in another group, the score climbed from  $1.52 \pm 0.87$  to  $1.91 \pm 1.18$ . At six months, we observed a VAS score,  $0.58 \pm 0.76$  in Group A and  $1.69 \pm 1.18$  in Group B. This difference is highly significant ( $P < 0.001$ ). (Table 2)

Table 2: VAS pain scores in both groups

VAS pain score	Group A	Group B	P Value
Before Injection	6.19 ± 0.67	6.32 ± .87	0.64
1 Month	3.01 ± 0.96	1.52 ± 0.87	<0.001
3 Months	0.81 ± 1.13	1.68 ± 0.71	<0.01
6 Months	0.58 ± 0.76	1.91 ± 1.18	<0.001

The mean Nirschl stages showed no significant difference before injection in groups A and B. ( $P > 0.05$ ). A similar trend was observed in the Nirschl stage as the VAS pain score. The mean

Nirschl stage in groups A and B was  $6.04 \pm 0.77$  and  $6.15 \pm 0.91$ , respectively, with a P-value of 0.54. After one month, the Nirschl stage in group A continued to decline; however, in group B, the Nirschl stage increased from  $1.51 \pm 0.66$  to  $1.76 \pm 0.41$  at three months and six months. (Table 2)

Table 3: Nirschl stage in both groups

Nirschl Stage	Group A	Group B	P Value
Before Injection	6.04 ± 0.77	6.15 ± 0.91	0.54
1 Month	2.51 ± 0.54	1.51 ± 0.66	<0.01
3 Months	0.55 ± 0.76	1.64 ± 0.89	<0.01
6 Months	0.29 ± 0.55	1.76 ± 0.41	<0.001

## DISCUSSION

Our research found AB was more successful than corticosteroids in terms of pain relief and functional recovery even six months after the injection.

The current study exhibited no difference among the gender and age in both groups. Our participants' mean age and other studies regarding tennis elbow showed similarities in age<sup>13</sup>. This problem mainly develops during the fourth or fifth decade of life<sup>2</sup>.

A growing number of software engineers and individuals who work on computers suffer from tennis elbow, which is most commonly diagnosed in manual laborers and those who do a lot of physical labor<sup>17</sup>. The condition arises due to excessive usage of the wrist extensors, which results in micro-damage to the wrist muscles. There is pain on the lateral side of the elbow and a decrease of grip strength, which are the most prevalent symptoms. These symptoms can cause significant impairment in daily tasks. According to a recent study conducted in Pakistan to determine the prevalence of upper limb disorders, it was discovered that 16 percent of the chefs had this condition. Similarly, the architecture in Lahore, Pakistan, is experiencing difficulties<sup>18,19</sup>.

Previous randomized controlled studies that compared AB injection and corticosteroid injection for the management and treatment of lateral epicondylitis found that corticosteroid injection relieved pain earlier, however, only for a short time. In contrast, patients treated with AB injection had slower and more sustained pain relief<sup>12-14</sup>. Similar findings are reported in the current study.

Our study findings are in agreement with the findings of a study performed in Pakistan on 99 patients. This study also stated that AB injection is a highly efficient treatment option in individuals with epicondylitis of the elbow, particularly in refractory cases<sup>20</sup>.

Another study, similar to ours, compared the usage of AB versus steroid injection. In the six weeks, the VAS score reduced from  $5.88 \pm 1.83$  to  $1.52 \pm 1.26$ , and the Nirschl staging decreased from  $4.52 \pm 1.23$  to  $1.40 \pm 1.22$  in patients treated with autologous blood. The researchers also concluded that AB injection was superior to corticosteroid injection in symptom alleviation<sup>21</sup>.

In contrast to the finding of our study, a recent study reported that at the 12-week follow-up, both AB and corticosteroid injections were equally beneficial in the treatment of Tennis elbow<sup>22</sup>. The underlying lesion in lateral epicondylitis was initially thought to be inflammatory, and steroids were given to reduce the inflammation<sup>23</sup>. Later research revealed that the term "lateral epicondylitis" was a misnomer, as the histological examination of the tendons revealed no indications of inflammation but rather a neovascularization and fibroblastic degeneration. Angiofibroblastic hyperplasia is characterized by an excess of fibroblastic activity and neovascularization, as revealed by microscopy<sup>24-26</sup>.

Corticosteroid injection reduces these neuropeptides, which may explain dramatic pain relief. However, because corticosteroids do not address the underlying pathology of lateral epicondylitis, they have superior short-term results but low intermediate and long-term results to AB injection<sup>27</sup>.

Injecting AB in a reasonably painless method triggers the inflammatory cascade, which aids in the healing of a degenerative process. It is also investigated that ultrasonographic indications of

tendon repair after AB injection for lateral epicondylitis, including fewer interstitial clefts and anechoic foci inside the tendon and decreased pathological vascularity<sup>28,29</sup>

Studies have proven that injection of AB for lateral epicondylitis had greater long-term results than corticosteroid injection, according to the current literature and our current investigation<sup>29,30</sup>. Post-injection discomfort, infection, tendon rupture, local skin atrophy, post-injection flare, face flushing, hyperglycemia, and hypersensitivity reactions are documented side effects of steroid injection<sup>11,31</sup>

Small sample size and single-center study is the main limitation. Moreover follow-up period of our study is short. In the future, studies with long-term follow-up should be carried out.

## CONCLUSION

Compared to corticosteroid injection, the administration of autologous blood resulted in a significant reduction in pain and improved clinical performance at six months. Autologous blood injections are a successful treatment option for lateral epicondylitis.

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