

# Effectiveness of Autologous Blood and Steroid Injection in Tennis Elbow Based on Visual Analog Score Pain Score and Nirschl Stage

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## ABSTRACT

**Introduction:** Lateral epicondylitis or Tennis elbow is one of the most common causes of lateral elbow pain. Local steroid injection is a time tested treatment for providing symptomatic relief. Local injection of autologous blood in a case of lateral epicondylitis provides pain relief due to its cellular and humoral factor and triggers a healing cascade. **Aim:** This study aims to compare the outcomes of the autologous blood injection and local corticosteroid injection in the treatment of tennis elbow. **Methods:** This is a Hospital based study on conducted in the Department of Orthopedics at Nepalgunj Medical College from July 2018 to June 2019. 42 patients with unilateral tennis elbow were divided into two groups-Group A-21 patients (Autologous Blood Injection) and Group B-21 patients (Steroid Injection). Group A received 2 ml of autologous venous blood and mixed with 1 ml of 2% lignocaine solution; Group B patients received 80 mg (in 2 ml) of methyl Prednisolone acetate and 1ml of 2% lignocaine solution. Visual Analogue Scale pain score and Nirschl stage of patients were evaluated before injection and at 2, 6, and 12 weeks of injection were noted and analyzed. **Results:** Preinjection mean VAS pain score was - 7.48±0.75, 7.52±0.68 in Group A, and Group B respectively while the Nirschl stage was 5.62±0.59 and 5.6±0.5 in group A and B, these scores among two group was not statistically significant. At 2 weeks follow up both groups showed improvement without any significant difference between two groups (p=0.84 and 0.549), while group A had better improvement in VAS pain score at 6 weeks (p=0.001). At 12 weeks follow-up within each group, there was significant VAS pain and Nirschl stage improvement (p=0.001) but there was no significant difference between the two groups. **Conclusion:** Injection of autologous blood and corticosteroid injection is equally effective in the treatment of Tennis elbow at 12 weeks final follow-up.

**Keywords:** Autologous Blood Patch, Lateral Epicondylitis, Steroid, Tennis Elbow

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## INTRODUCTION

Lateral epicondylitis or tennis elbow is a common cause of lateral elbow pain, with a prevalence of 1% to 3% in the general population.<sup>1,2</sup> It is considered a degenerative process (rather than an inflammatory process.<sup>3</sup> Histopathology shows-neovascularization (angiofibroblastic hyperplasia) and fibroblastic degeneration within the substance of extensor tendons, particularly affecting the extensor carpi radial is brevis<sup>4</sup>. Despite short term pain relief after local injection of steroid,<sup>5,6</sup> it provides no advantage over exercise and physiotherapy in the long term.<sup>7</sup> Recent studies have shown that Autologous blood injection is effective in the treatment of tennis elbow as it provides necessary growth factors to the site of disease which helps in the healing of local degenerative changes.<sup>8,9</sup> Autologous blood injection is cost effective and safer compared to steroid injection. There are few studies that compares there outcomes in treatment of tennis elbow. So we

designed this prospective study to compare and evaluate their effectiveness in our study.

## METHODS

This is a Hospital based study on the treatment outcome of tennis elbow conducted in the Department of Orthopedics at Nepalgunj Medical College from July 2018 to June 2019.

Patient with complaints of lateral elbow pain was diagnosed with tennis elbow based on the presence of all there signs.<sup>10,11</sup>

1. Tenderness on palpation of the lateral epicondyle and the Common Extensor Origin.
2. Tenderness in the Common Extensor Origin during resisted extension of the wrist or the third Finger.
3. Tenderness on maximum gripping strength.

Patients with a clinical diagnosis of tennis elbow with age more than 20 years and without a history of previous treatment for this condition were included in the study. Exclusion criteria were: (1) Bilateral tennis elbow case. (2) Previous intervention for tennis elbow. (3) History of significant trauma to the elbow. (4) High blood sugar level. (5) Presence of other elbow ailments causing lateral elbow pain. Written informed consent was taken for all eligible cases and proforma was filled taking details of age, sex, occupation, duration of symptoms, Visual Analogue scale (VAS) pain score, and degree of disability by Nirschl stage of tennis elbow<sup>12</sup> was recorded and entered in excel sheet. Patients with unilateral tennis elbow were allotted to two groups on alternate case basis (case 1 autologous blood injection group, case 2 steroid injection group, and so on) Group A-Autologous Blood Injection group and Group B-Steroid Injection group.

Group A patient - with aseptic precautions 2 ml of autologous venous blood drawn from the antecubital vein, mixed with 1 ml of 2% lignocaine in solution 3 cc syringe. It was then injected locally at the point of maximum tenderness over the lateral epicondyle. Group B patient-with aseptic precautions 80 mg (in 2ml) of methyl Prednisolone acetate and 1ml of 2% lignocaine solution prepared in 3cc syringe was locally injected at a maximal tender point in lateral epicondyle. After the procedure patient was advised to take Tab. Paracetamol 500mg PO SOS on day one and restrain from activities involving repetitive movements

of the wrist and elbow during the initial 2 weeks after injection. Follow up visit was arranged at 2, 6, and 12 weeks. In each visit, the VAS pain score and Nirschl stage were recorded.

Statistical analysis was done using SPSS V.19 software, continuous and categorical variables were compared using the Student's t-test and Chi-square test, respectively. Within-group differences were compared using the paired sample t-test and a p-value of <0.05 was considered statistically significant.

**RESULTS**

Group A and Group B patients were found similar in age, sex distribution, and laterality- thus two groups were homogenous. There was no statically significant difference in the VAS pain score and the Nirschl stage between these two groups. (Table I)

In Group A patient's VAS pain score improved from 7.48±0.75 to 0.95±0.74 at the final follow-up in 12 weeks. The Nirschl stage also improved from 5.62±0.59 to 1.19±0.64 at the final follow-up in 12 weeks. These were statistically significant (p=0.0001). (Table II)

In Group B patients VAS pain score improved from 7.52±0.68 to 0.71±0.64 at 12 weeks follow-up. Nirschl stage improved from 5.62±0.59 to 1.29±0.46 at 12 weeks follow-up. There was statistically significant (p=0.0001). (Table II)

Both groups showed improvement in symptoms after injection but while comparing between these two groups, there was no statistically significant difference except at 6 weeks follow-up Group A had significantly better improvement on VAS pain score compared to Group B(p=0.0001). (Table 3)

Age	Mean =37.62±6.15	Mean =34.9±6.43	0.12
Sex	Male/female=9/12	Male /female=11/10	0.35
Laterality	right/left=13/8	right/left=12/9	0.753
VAS pain	mean=7.48±0.75	7.52±0.68	0.89
Nirschl stage	mean=5.62±0.59	5.62±0.59	1

**Table I: Comparison of Pre-injection demography, laterality, VAS pain score and Nirschl stage between Group A and Group B**

Group A	7.48±0.75	5.14±0.727	3.68±0.75	0.95±0.74	<b>0.0001</b>
VAS pain	5.62±0.59	4.67±0.65	3.19±0.69	1.19±0.64	
Nirschl stage					
Group B	7.52±0.68	5.1±0.76	2.95±0.66	0.71±0.64	<b>0.0001</b>
VAS pain	5.62±0.59	4.52±0.87	2.86±0.91	1.29±0.46	
Nirschl stage					

**Table II: Comparison of VAS pain score and Nirschl Stage in Pre-injection and at 2, 6 and 12 weeks follow-up in Group A and Group B**

VAS pain (2 weeks)	5.14±0.72	5.1±0.768	0.84
Nirschl stage (2weeks)	4.67±0.65	4.52±0.87	0.549
VAS Pain (6 weeks)	3.68±0.75	2.95±0.66	0.001
Nirschl stage (6 weeks)	3.19±0.81	2.86±0.91	0.25
VAS pain (12 weeks)	0.95±0.74	0.71±0.64	0.289
Nirschl stage (12 weeks)	1.19±0.40	1.29±0.463	0.474

**Table III : Comparison of VAS pain and Nirschl Stage improvement after injection between two groups.**

**DISCUSSION**

Tennis elbow or Lateral epicondylitis is a common cause of lateral elbow.<sup>1,2</sup> It was initially assumed to be an inflammatory process, and thus corticosteroid injection was used.<sup>13</sup> However, histological studies have demonstrated non-inflammatory angiofibroblastic tendinosis, neovascularization, and mucoid degeneration in lateral epicondylitis specimens.<sup>14,15</sup> The presence of substance P, calcitonin gene-related peptide, and Neurokinin 1-receptors in tendon insertions may be related to pain.<sup>14</sup>

The reduction of these neuropeptides by corticosteroid injection can reduce the pain dramatically.<sup>15</sup> The mechanism of action of both autologous blood and platelet-rich plasma (PRP) is attributed to the degranulation of α granules of platelets releasing growth factors that play a role in tissue healing and regeneration.<sup>16</sup> However, the preparation of platelet concentrates requires specialized equipment which is both expensive and time-consuming. Autologous blood has a far easier and prompt application than PRP.<sup>16</sup>

In our study, autologous blood injection (Group A) and steroid injection (Group B) showed significant improvement

in pain and functional disability based on the VAS pain score and Nirschl stage in the follow-up. However, there was no significant difference between these two groups in at 2 weeks after injection, while the autologous blood group showed more marked improvement in VAS pain score at 6 weeks compared to the steroid injection group. The final outcome at 12 weeks follow-up was similar in both groups.

In a study by Naveen PR, autologous blood injection was found to be more effective than corticosteroid in terms of pain reduction & functional recovery at 6 months after injection, with 90% relieved of pain in the autologous blood group compared to only 45% in the corticosteroid group.<sup>17</sup> In 2003 Edwards and Calandruccio<sup>18</sup> reported 79% recovery after injecting autologous blood, in their prospective case series study. Karimi Mobarakeh et al.<sup>19</sup> had 85% good results with autologous blood injection. Connell et al.<sup>20</sup> in 2006 injected autologous blood for tennis elbow under ultrasonography guidance and had a 94.2% success rate in pain relief using VAS and Nirschl stage parameters. Thus in contrast to our study, most of the other studies show that autologous blood injection is more effective than steroid injection in tennis elbow.

#### LIMITATION

Limitation of our study was small sample size (n=42), short duration of follow-up -12 weeks post injection and lack of true randomization to match the two groups. Multicentric study with larger randomized sample and longer duration of follow-up can be carried out in our setup in future to validate results.

#### CONCLUSION

There is no statistically significant difference in VAS pain score and Nirschl stage in the final follow-up at 12 weeks between those patients who received autologous blood injection or steroid injection for tennis elbow. Thus autologous blood injection can be used as simple, cost-effective and safe method of treatment in tennis elbow in our setting.

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