

# Effectiveness of local injection of autologous blood versus corticosteroid in treatment of tennis elbow

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## Abstract

**Background:** Tennis elbow or lateral epicondylitis is characterised by pain and tenderness at the lateral epicondyle of humerus. There are various treatment modalities recommended, but there is no universally accepted therapeutic modality yet.

**Objectives:** To compare the functional outcomes of local injection of corticosteroid versus autologous whole blood for tennis elbow.

**Methods:** This was a non-randomised trial conducted from May 2020 to January 2021 after ethical clearance. Patients attending orthopaedic surgery outpatient department, Kathmandu Medical College with lateral epicondylitis of the humerus were included by convenience sampling into corticosteroid group or autologous blood injection group based on whether they presented on odd or even calendar days respectively. There were 38 patients in corticosteroid group and 36 patients in autologous blood group. The visual analogue scale (VAS) and Nirschl staging system were calculated before injection, and then at one week, six weeks, and six months after injection.

**Results:** Patients in both groups showed statistically significant decrease in pain from preinjection scores on both VAS and Nirschl scale at all follow-ups. There was no statistically significant difference between the two groups up to six weeks. At six months, autologous blood injection group showed statistically significant decrease in pain compared with corticosteroid injection group on both scoring systems.

**Conclusion:** Both groups showed comparable improvement up to six-week follow-up. Autologous blood injection group had significantly better improvement at six months. Autologous blood injection was more effective than corticosteroid injection at midterm follow-up, and had lower recurrence rate.

**Key words:** Autologous blood; Corticosteroid; Tennis elbow.

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## INTRODUCTION

Tennis elbow is characterised by pain and tenderness at the lateral epicondyle of humerus, and is frequently found in patients involved in activities requiring repetitive wrist extension. General practitioners encounter this condition in 4-7 per 1000 patients.<sup>1</sup>

Although lateral epicondylitis was previously attributed to tendon inflammation, histopathologic studies have shown absence of inflammatory cells.<sup>2</sup> It has been suggested that incomplete healing of microtears in the extensor carpi radialis brevis tendon is the main cause.<sup>3</sup>

The problem is usually self-limiting, lasting 12-18 months without treatment.<sup>4</sup> Many treatment modalities from analgesics, physiotherapy, to surgery, have been suggested.<sup>4</sup> Local injection of corticosteroids is an established treatment method.<sup>5</sup> However, as corticosteroids reduce pain by reducing inflammation, theoretically the main pathology is not addressed.

Hence, methods that emphasise healing of microtears are being sought. Among them, platelet rich plasma (PRP) and autologous blood injections have been used recently with promising results.<sup>6</sup> It is suggested blood and blood products like PRP release growth factors that help heal the tendinosis.<sup>1</sup> Although several studies have shown good results of these injections, this is not universally accepted.<sup>1,6,7</sup>

This study compares the functional outcome and pain relief in tennis elbow patients receiving injections of corticosteroids versus autologous blood.

## METHODOLOGY

This non-randomised trial was conducted from May 2020 to January 2021 in the outpatient department (OPD) of Orthopaedic Surgery, Kathmandu Medical College Teaching Hospital (KMCTH), Kathmandu, Nepal. The study was done after approval from the Institutional Review Committee of the college (Ref. 2604202004) and patients were enrolled in the study by convenience sampling after obtaining informed consent.

Patients attending Orthopaedic Surgery OPD were included in this study after diagnosis of lateral epicondylitis was made clinically with positive Cozen and Mill's Manoeuvres. The X-rays of affected elbow were obtained before injection to exclude any other pathology. Patients coming on the odd days of the calendar were assigned to corticosteroid injection group, and the patients presenting on the even days of the calendar were assigned to autologous whole blood injection group. In corticosteroid injection group, Depot 80 mg methylprednisolone (2 ml) and 1 ml of 2% xylocaine mixed in single syringe was injected in and around most tender point on the lateral epicondyle on the undersurface of extensor carpi radialis brevis tendon. In autologous blood injection group, 2 ml of autologous blood was drawn from contralateral upper limb vein, mixed with 1 ml of 2% xylocaine and was injected with identical technique. The visual analogue scale (VAS) and Nirschl staging system score were calculated before injection, then at one week, six weeks, and six months after giving injection either in OPD or via telephone by one of the investigators.

Considering confidence interval of 95% and power of 80%, assuming that the mean VAS difference between the two groups would be at least 1.5, and standard deviation of 1.3 (taken from the previous published

literature), the sample size calculated using PS Power and Sample size program was 28 patients in each group. Since rank test was used for analysis, increment of the sample size by 10%, results in 31 patients per group. Assuming that four patients would be lost to follow-up in each group, the final sample size was calculated to be 35 in each group.

The data obtained were compiled and analysed using standard statistical analysis. Microsoft Excel Sheet 2013 and IBM SPSS Statistics for Windows, version 21 (IBM Corp., Armonk, N.Y., USA) were utilised for data analysis and presentation.

## RESULTS

There were 80 patients enrolled in the study. Out of these, six (7.5%) patients were lost to follow-up. Thirty-eight (51%) patients were included in the corticosteroid injection group and 36 (49%) patients in autologous blood injection group. There were 24 men and 14 women (with mean age of  $44.92 \pm 11.22$  years) in the corticosteroid injection group and, 17 men and 19 women (with mean age of  $42.97 \pm 10.89$  years) in autologous blood injection group. Right elbow involvement was more common (38 patients, 51%) than left (36 patients, 49%). Most of the cases (58, 78%) were right side dominant. There was no statistically significant difference between the side of pain and the side of dominance. Mean duration of pain in the whole study population was  $8.14 \pm 4.34$  weeks. Mean duration of pain in corticosteroid injection group was  $9.39 \pm 6.02$  weeks, whereas in autologous blood group it was  $6.81 \pm 3.00$  weeks. Baseline demographic and clinical characteristics of the two groups were similar (Table 1).

Both the corticosteroid and autologous injection groups showed statistically significant decrease in pain in both VAS and Nirschl scale at one week, six weeks, and at six months ( $p < 0.001$ ) compared to preinjection score. There was no statistically significant difference between corticosteroid and autologous injection group in both VAS and Nirschl scale at the first week and sixth week follow-ups. However, at six months, autologous blood injection group showed statistically significant decrease in pain compared with corticosteroid injection group in both VAS ( $p = 0.0001$ ) and Nirschl scale ( $p = 0.001$ , Table 2). At six months follow-up, 11 (29%) patients in corticosteroid injection group and 23 (64%) patients in autologous blood injection group were completely relieved of pain.

**Table 1: Baseline characteristics of both autologous and corticosteroid injection groups**

Variables	Autologous blood injection (N = 36)	Corticosteroid injection (N = 38)	p-value
Age (years)	42.97 ± 10.89	44.92 ± 11.22	0.451
Number of male:female	17:19	24:14	0.168
Number of right:left side involvement	16:20	22:16	0.247
Number of dominant:non-dominant side involvement	29:7	29:9	0.658
Duration of symptoms (weeks)	6.81 ± 3.00	9.39 ± 6.02	0.023

**Table 2: Comparison of visual analogue scale and Nirschl phase rating scale between autologous and corticosteroid injections at different time periods**

	VAS for elbow pain (Mean ± SD)			Nirschl scale for elbow pain (Mean ± SD)		
	Autologous blood injection	Corticosteroid injection	p-value	Autologous blood injection	Corticosteroid injection	p-value
Preinjection	7.28 ± 1.75	7.39 ± 1.42	0.753	5.69 ± 0.82	5.66 ± 0.71	0.838
1 week	5.94 ± 1.45	5.95 ± 1.43	0.993	4.47 ± 0.87	4.47 ± 0.89	0.994
6 weeks	2.36 ± 1.51	2.13 ± 1.61	0.531	2.13 ± 0.76	2.18 ± 0.84	0.795
6 months	0.74 ± 1.03	2.44 ± 1.67	0.001	1.23 ± 0.83	2.57 ± 1.16	0.001

## DISCUSSION

The mean age of the patients included in this study was  $43.97 \pm 10.91$  years that ranged from 22 years to 60 years, with a peak incidence in the fourth decade. A study by Hamilton included a population with age ranging between 14 years and 78 years with a mean age of 45 years.<sup>8</sup> Other studies have reported mean ages of approximately 42 years.<sup>9-11</sup>

In this study, both corticosteroid injection group and autologous blood injection group had significant decrease in pain in both VAS and Nirschl scale at one week and six weeks compared to preinjection score. A similar study has showed a decrease in VAS score and Nirschl stage at one and four weeks which was significantly more in corticosteroid group compared with autologous blood injection group.<sup>1</sup>

At six months follow-up, the authors of this study found that significantly more patients receiving autologous blood injection had complete resolution of symptoms as compared to those in the corticosteroid injection group (64% vs 29%). The findings were similar to the study conducted by Dojode where more of autologous blood injection group had complete relief of pain compared with corticosteroid injection group (90% versus 47%,  $p < 0.001$ ).<sup>1</sup> Similarly in another study conducted by Edwards and Calandruccio, it was seen that 22 of 28 (79%) patients were relieved completely of pain after autologous blood injections.<sup>6</sup>

At six months follow-up, 18 (47.36%) cases of this study in the corticosteroid injection group experienced recurrence of pain, whereas only two (5.55%) of cases experienced recurrence of pain in autologous blood injection group. In comparison, in the study conducted by Dojode, 37% of cases had recurrence of pain by final follow-up at six months.<sup>1</sup> Similarly, in another study done by Bisset et al., recurrence rate of 72% was found after corticosteroid injection after three to six weeks on longer follow-up.<sup>12</sup>

Limitations of this study were that this was a single-centre study with small sample size where neither the physician nor the patients were blinded to the treatment modality. Blinding was difficult as blood sample had to be drawn in the autologous blood injection group, but not in steroid injection group. Also, the injections and evaluations were performed by multiple physicians, and the level of physical activity and profession of the patients were not taken into account. This may also have been a source of bias.

## CONCLUSION

Both the corticosteroid and autologous blood injection group showed statistically significant decrease in pain at one and six weeks. However autologous blood injection group had significantly less pain compared to corticosteroid injection group at six months. It can be concluded that autologous blood injection was more effective than corticosteroid injection over a long period,

was more likely to result in complete resolution of symptoms, and had a lower recurrence rate. The authors of this study, strongly advocate autologous blood injection for the treatment of tennis elbow.

**Conflict of interest:** None

**Source(s) of support:** None

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