ISSN: 2091-2889 (online)
2091-2412 (print)

Received: 04 Jun 2024
Accepted: 28 Oct 2024
Published: 30 Dec 2024

DOI: 10.54530/jcmc.1508

Short term outcome of autologous whole blood injection in untreated tennis elbow

Prakash Dware[1], Mahendra Paudel[1], Pemba lama[1], Shiva Chandra Amatya[1], Mangesh Bjracharya[2]

[1]Lecturer, Department of Orthopedics, Peoples Dental College and Hospital, Kathmandu, Nepal

[2]Associate Professor, Department of Anatomy, Peoples Dental College and Hospital, Kathmandu, Nepal

Abstract:

Background: Tennis elbow is a condition characterized by pain and tenderness around the lateral side of elbow joint. Autologous blood injection has been reported for the treatment as it contains various growth factors. The aim of the study is to evaluate the short-term outcome and effectiveness of autologous blood injection in untreated tennis elbow.

Method: This prospective case study conducted from Mar 2022 to May 2023 after ethical clearance. Patient attending orthopedics outpatient department, People's Dental College and Hospital with tennis elbow not treated previously and visual analogue scale pain score more than 40 were included by convenience sampling. The pain scores and Nirschl staging were calculated before autologous whole blood injection and subsequently at 2 weeks, 4 weeks and 3 months after injection. Data analysis was carried out using SPSS version 20. Pre- and post-injection pain score and Nirschl stages were compared. A $p<0.001$ was considered statistically significant.

Result: In study of total of 28 patients, the median pain score before autologous blood injection and 3 months after injection was 80 (Q1-Q3, 70- 80) and 10 (Q1-Q3, 10-20) respectively with $p<0.001$. Similarly, the Nirschl stage before autologous blood injection and 3 months after injection was 6 (Q1-Q3, 5.3-6.8) and 2 (Q1-Q3, 1-3) respectively with $p<0.001$.

Conclusion: The findings of the study shows that autologous whole blood injection significantly decreased the pain and can be considered an effective treatment option for untreated tennis elbow.

Keywords: Autologous whole blood, Lateral epicondylitis, Tennis elbow

How to cite

Dware P, Paudel M, lama P, Amatya SC, Bjracharya M. Short term outcome of autologous whole blood injection in untreated tennis elbow. Journal of Chitwan Medical College. 2024;14(50):15-20.

Correspondence

Dr. Prakash Dware, Assistant professor, Department of Orthopaedic, Peoples Dental College and Hospital, Sorakhutte, Kathmandu, Nepal. Email: dware1.bp@gmailcom, Telephone: +977 9841171531

Introduction

Pain and discomfort surrounding the lateral side of the elbow joint are common symptoms of lateral epicondylitis, also known as tennis elbow. Tennis elbow can result in a substantial loss of grip strength, especially when the elbow is extended, which can interfere with daily tasks.[1] It most commonly affects the tendon of the extensor carpi radialis brevis.[2] Other tendons in the extensor bundle, such as the extensor digitorum communis, may also be involved in approximately 30% of cases.[3]

Repetitive injury creates micro stress and tears in the tendon, and hypo vascularity prevents the normal healing process, resulting in tendinosis or tendinopathy.[4,5] Histologic findings in chronic cases show tendinosis is not an acute inflammatory condition but rather the result of angiofibroblastic degeneration-related failure of the normal tendon repair mechanism.[6] Activity modifications, non-steroidal anti-inflammatory drugs, physiotherapy exercises, bracing, and ultrasound provide symptomatic treatment. Operative intervention is required in approximately 4-11% of the patients who don't benefit from conservative treatment and local injections. [7]

Good results of autologous blood injection in the treatment of resistant tennis elbow have been reported in studies, possibly because blood includes growth factors, humeral and cellular mediators that initiate an inflammatory process in the injured tissue and lead to healing.[8]

The aim of the study was to evaluate the short-term outcome and efficacy of autologous whole blood injection for untreated tennis elbow in People's Dental College and Hospital.

Method

This prospective study was carried out from March 2022 to May 2023 in the outpatient department (OPD) of People's Dental College and Hospital, Kathmandu, Nepal. Ethical clearance was obtained from the Institutional Review Committee (IRC) of Peoples Dental College and Hospital (IRC Ref No 21.2078/2079). The patients were informed about the tennis elbow and the plan of treatment. Enrollment in the study was voluntary, and written consent to participate was obtained after discussing it with them and their subsequent acceptance.

The evaluation and clinical diagnosis of 33 consecutive patients with tennis elbow who presented to the outpatient department were based on the presence of pain and tenderness at the lateral epicondyle.

Prior to receiving an injection, participants were asked to rate their level of discomfort on a visual analogue scale ranging from zero to 100, where zero represented no pain, and 100 represented the worst agony. The Nirschl staging was used for functional scoring,[9] with phase 1 denoting the highest functional score and phase 7 the lowest, Table 1.

Table 1. Nirschl staging of tennis elbow for the degree of disability[9]

Stage	Disability
Phase 1	Mild pain after exercise; resolves within 24 hours
Phase 2	Pain after exercise; exceeds 24 hours
Phase 3	Pain with exercise and does not alter activity
Phase 4	Pain with exercise and alters activity
Phase 5	Pain with heavy activities of daily living
Phase 6	Pain with light activities of daily living and intermittent pain at rest
Phase 7	Constant pain at rest; disrupts sleep

The study employed convenient sampling, selecting patients with a Visual Analogue Scale (VAS) score above 40 who had not received prior treatment. This criterion was based on the observation that most patients presenting to the orthopaedics outpatient department (OPD) with tennis elbow had VAS scores exceeding 40. Patients with VAS scores below 40 were typically hesitant to undergo injection therapy, preferring to manage their condition with oral medications and a wait-and-see approach. Exclusion criteria included known pregnancy, rheumatoid arthritis, cervical radiculopathy, and hepatitis.

The patient was placed in a supine position, after a hypersensitivity reaction test of lignocaine; under aseptic condition 1 ml of 2% plain lignocaine injected in lateral epicondyle at the point of maximum tenderness, and then 2 ml of whole blood was drawn with 23-gauge needle from contralateral median cubital vein. The 23-gauge needle was replaced with an 18-gauge needle, and then whole blood was injected at the site of maximum tenderness. Following injection, patients were recommended to apply local ice packs for the first two days and were prescribed Paracetamol one gram per oral twice a day for 5 days, along with the use of a tennis elbow band for 2 weeks. Patient re-evaluation for VAS and Nirschl score was done at 2 weeks, 4 weeks and 3 months. Five participants out of the total cases were difficult to reach for follow-up physically because they lived very far from Kathmandu, so one of the Researchers Dr Prakash Dware, called three of the participants via mobile and two of them on WhatsApp to ask about pain and elbow movements (for interpretation on VAS pain score and Nirschl score) in the 2nd weeks, 4th weeks and 3 months at evening.

On the day of the injection, they received counselling regarding the date, time and method of communication for follow-up regarding their issue, VAS and Nirschl score. The remaining 28 participants followed up physically.

Result

There was a total of 28 cases for final analysis. Initially, a total of 33 cases of tennis elbow who came to the hospital were included in this study. We lost follow-up of 5 cases and were excluded.

The age of the patients ranged from 28 to 60 years, with a median of 44.68 years. Sixteen patients were males (57.1%) and 12(42.9%) females. Twenty-one patients were right-handed (75%) and seven left-handed (25%). Twenty-three patients had right tennis elbow (82.1%), and five had left tennis elbow (17.9%).

The median VAS before autologous blood injection and 3 months after injection was 80 (Q1-Q3, 70- 80) and 10 (Q1-Q3, 10-20) respectively with p<0.001, which is significant, Table 2. The Nirschl stage before autologous blood injection and 3 months after injection was 6(Q1-Q3, 5.3-6.8) and 2(Q1-Q3, 1-3) with p<0.001 which is significant, Table 3. The data do not follow normality. Hence, a non-parametric test (Wilcoxon sign) was done to compare pre- and post-injection VAS and Nirschl stages.

Table 2. Pain score (VAS) for Tennis elbow before and after injection of autologous whole blood, n=28

VAS	Median	Q1	Q3	p-value
Pre injection	80.0	70.0	80.0	
2 weeks	60.0	50.0	60.0	<0.001
4 weeks	35.0	30.0	40.0	<0.001
12 weeks	10.0	10.0	20.0	<0.001

Table 3. Functional score (Nirschl stage) for Tennis elbow before and after injection of autologous whole blood, n=28

Nirschl stage	Median	Q1	Q3	p-value
Pre injection	6.0	5.3	6.8	
2 weeks	5.0	5.0	6.0	<0.001
4 weeks	4.0	4.0	5.0	<0.001
12 weeks	2.0	1.0	3.0	<0.001

Discussion

In our study, patients who received autologous blood injections showed a significant reduction in pain (VAS score, p<0.001) and disability (Nirschl score, p<0.001). The patient experienced the maximum effect at 4 weeks, and after 4 weeks, both the VAS and the Nirschl score improved. The result of our study is in concordance with the other studies.[10,11]

The pathophysiology of tendinopathy includes recurrent cyclic strain, oxidative stress, apoptosis, and cartilage gene activation. This increases metalloproteinase activity, repair and degeneration, vascular infiltration, and nerve regeneration.[12] Histopathological studies of chronic lateral epicondylitis show focal hyaline degeneration and non-inflammatory vascular growth.[6] This could explain why rest and anti-inflammatory are not effective treatment. In the treatment of tendinopathy, biological therapy modalities such as autologous whole blood injections (ABIs), platelet-rich plasma (PRP) injections, and stem cell therapy have become more popular recently.[13]

The blood contains mitomorphogenic chemicals, such as fibroblast growth factor (FGF), Platelets derived growth factor (PDGF), and transforming growth factor (TGF), which are chemical regulators of cellular activity.[8] Blood-borne cellular and humoral mediators are delivered by autologous blood injection to promote healing. This explains why whole blood and platelet-rich plasma injections work well for tendinopathy. Studies found that PRP injection was equally effective as whole blood injection at a 12-month follow-up in terms of reducing pain and enhancing function.[14] Preparing platelet concentrates necessitates specialised equipment, is costly, and is time-consuming, whereas autologous blood can be easily drawn and injected. This finding shows patients benefited from whole blood injections with a significant reduction in VAS and Nirschl score.

In a randomised controlled trial comparing the effectiveness of autologous blood injection versus steroid injection found that at long-term follow-up, autologous blood injection demonstrated statistically significant lower pain compared to the corticosteroid injection.[15] Similarly, in another study, autologous blood was more effective in the short term compared to corticosteroid injection.[16] Present study shows a similar effective outcome in treatment with autologous whole blood injection for tennis elbow. Another study for autologous whole blood injection for recalcitrant lateral epicondylitis found considerably improved VAS, Nirschl score and grip strength at one year follow-up after injection.[17] Up to the third year, Nirschl and VAS scores continued to improve.

So, this treatment method can be recommended because it is inexpensive and have fewer adverse effects. With evidence of long-term success and a minimal risk of recurrence as shown in the literature is convincing that this treatment will be helpful for patients residing in rural areas who have trouble keeping up with follow-up.

The limitations of our study include a small sample size, a short period of follow up and a lack of histological evidence of healing.

Conclusion

The present study of autologous whole blood injection significantly improved pain scores and functional outcomes without side effects in untreated cases of tennis elbow So Autologous Whole blood injection is an effective treatment option for untreated cases of tennis elbow which is cheap, simple and safe.

Author contribution

Concept and design: PD; Literature review: PD; Data collection and analysis: All; Draft: PD and MP; Revision: PD; Final manuscript and accountability: All authors have read and agreed to the final version of the manuscript.

Acknowledgment

Sincere thanks to the hospital director and Mrs Amrita Pradhan for their kind cooperation and co-ordination for the study. The participants in the research conducted at People's Dental College and Hospital are greatly appreciated by the authors.

Conflict of interest

None

Funding

None

Supplementary material

The data and supplementary material that support the findings of this study are available from the corresponding author upon reasonable request.

References

1. Dorf ER, Chhabra AB, Golish SR, McGinty JL, Pannunzio ME. Effect of elbow position on grip strength in the evaluation of lateral epicondylitis. J Hand Surg Am. 2007 Jul-Aug;32(6):882-6. DOI PubMed Google Scholar Full Text
2. Nirschl RP, Pettrone FA. Tennis elbow: The surgical treatment of lateral epicondylitis. J Bone Joint Surg Am. 1979 Sep;61(6A):832-9. DOI PubMed Google Scholar Full Text
3. Taylor SA, Hannafin JA. Evaluation and management of elbow tendinopathy. Sports Health. 2012 Sep;4(5):384-93. DOI PubMed Google Scholar Full Text
4. Altan L, Kanat E. Conservative treatment of lateral epicondylitis: comparison of two different orthotic devices. Clin Rheumatol. 2008 Aug;27(8):1015-9. DOI PubMed Google Scholar Full Text
5. Jafarian FS, Demneh ES, Tyson SF. The immediate effect of orthotic management on grip strength of patients with lateral epicondylosis. J Orthop Sports Phys Ther. 2009 Jun;39(6):484-9. DOI PubMed Google Scholar Full Text
6. Regan W, Wold LE, Coonrad R, Morrey BF. Microscopic histopathology of chronic refractory lateral epicondylitis. Am J Sports Med. 1992 Nov-Dec;20(6):746-9. DOI PubMed Google Scholar Full Text
7. Calfee RP, Patel A, DaSilva MF, Akelman E. Management of lateral epicondylitis: current concepts. J Am Acad Orthop Surg. 2008 Jan;16(1):19-29. DOI PubMed Google Scholar Full Text
8. Edwards SG, Calandruccio JH. Autologous blood injections for refractory lateral epicondylitis. J Hand Surg Am. 2003 Mar;28(2):272-8. DOI PubMed Google Scholar Full Text
9. Nirschl RP, Ashman ES. Nirschl phase of pain staging for tennis elbow tendinopathy: tennis elbow. Clin Sports Med. 2003 Oct;22(4):813-36. DOI PubMed Google Scholar Full Text
10. Monreal R, Severiche Y, Osinaga G, Monreal E. Treatment of lateral epicondylitis with autologous blood injection. Orthop Rheumatol Open Access J. 2017;7(4):92-5 DOI Google Scholar Full Text
11. Shivakumar GV, Krishna Kumar MS, Naveen PR. Functional outcome after autologous blood injection for tennis elbow. Int J Res Orthop. 2016;2(4):251-5. DOI Google Scholar Full Text
12. Xu Y, Murrell GA. The basic science of tendinopathy. Clin Orthop Relat Res. 2008 Jul 1;466(7):1528-38. DOI PubMed Google Scholar Full Text
13. Ahmad Z, Brooks R, Kang SN, Weaver H, Nunney I, Tytherleigh-Strong G, et al. The effect of platelet-rich plasma on clinical outcomes in lateral epicondylitis. Arthroscopy. 2013 Nov;29(11):1851-62. DOI PubMed Google Scholar Full Text
14. Raeissadat SA, Rayegani SM, Hassanabadi H, Rahimi R, Sedighipour L, Rostami K. Is Platelet-rich plasma superior to whole blood in the management of chronic tennis elbow: one year randomized clinical trial. BMC Sports Sci Med

Rehabil. 2014 Mar 18;6:12. DOI PubMed Google Scholar Full Text
15. Dojode CM. A randomised control trial to evaluate the efficacy of autologous blood injection versus local corticosteroid injection for treatment of lateral epicondylitis. Bone Joint Res. 2012 Aug 1;1(8):192-7. DOI PubMed Google Scholar Full Text
16. Kazemi M, Azma K, Tavana B, Rezaiee Moghaddam F, Panahi A. Autologous blood versus corticosteroid local injection in the short-term treatment of lateral elbow tendinopathy: a randomized clinical trial of efficacy. Am J Phys Med Rehabil. 2010 Aug;89(8):660-7. DOI PubMed Google Scholar Full Text
17. Bostan B, Balta O, Aşçı M, Aytekin K, Eser E. Autologous Blood Injection Works for Recalcitrant Lateral Epicondylitis. Balkan Med J. 2016 Mar;33(2):216-20. DOI PubMed Google Scholar Full Text