

Original Research Article

Autologous blood injection technique in the treatment of refractory lateral elbow tendinopathy

M. A. Q. Ansari^{1*}, M. Nayeemuddin², M. M. Farhan²

¹Associate Professor, ²Resident, Department of Orthopaedics, KBN Institute of Medical Sciences, Gulbarga, Karnataka, India

Received: 24 November 2016

Accepted: 24 December 2016

*Correspondence:

Dr. M. A. Q. Ansari,

E-mail: dransari.ortho@yahoo.co.in

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Lateral elbow tendinopathy is a very common clinical condition whose management by the consultant often shifts from one to another modality. This study was conducted to know the efficacy of a minimally invasive technique of autologous blood injection in patients who were resistant to more conservative methods.

Methods: This is a randomized prospective study of forty-eight patients (median age, 37 to 40 years), presenting with lateral elbow symptoms for a duration of more than six weeks and failed to respond to other methods of conservative treatment. Patients were consecutively grouped into treatment with autologous blood injections (Group I, n = 24) and control group with injection of normal saline (Group II, n = 24). 1 ml of autologous blood was drawn from dorsal venous arch and injected into the site of maximum tenderness over lateral aspect of the elbow under all aseptic precautions for all patients in group I. Similarly 1 ml of normal saline was injected at the site of maximum tenderness for patients in group II. Results were evaluated based on severity of the elbow complaints, tenderness and Cozen's test at the end of follow-up of twenty weeks.

Results: The incidence of this condition was more in the third decade 39.6% (n=19), with female preponderance 58.3% (n=28) and the dominant arm being more commonly involved 58.3% (n=28). Excellent results were found in group I in n=15 (62.5%) whereas poor results were more in group II in n=14 (58.3%). Group I had poor result only in n=03 (12.5%) of patients who later were given another dose of autologous blood or were treated surgically.

Conclusions: Injection of autologous blood is a very efficacious minimally invasive procedure with satisfactory results in patients of lateral elbow tendinopathy who do not respond to other conservative methods of treatment.

Keywords: Autologous blood injection, Lateral elbow tendinopathy, Elbow pain

INTRODUCTION

Lateral elbow tendinopathy commonly referred to as lateral epicondylitis is one of the common causes of elbow pain in our population. Nearly half of persons who used to play tennis regularly develop lateral elbow pain at some point of time during their life. Its specific cause is still not very clear. The historical description of this condition was more than a century ago. It was called "lawn-tennis arm" by Major because of its association with this sport.¹ Men and women are equally affected, with symptoms more often seen in the dominant hand. The onset of this disease is attributed to overexertion of

the elbow with repeated wrist extension and alternating forearm rotation. Risk factors for this include manual labour working with heavy tools and significant stress while doing repetitive tasks.² We report a series of prospective cases of forty-eight patients who did not respond to oral therapy, where we evaluated the effectiveness of local Autologous blood injection technique.

METHODS

This study is a randomized prospective study conducted on forty-eight patients who presented to us at KBN

teaching and general hospital during the period between March 2016 to November 2016 with complaints of pain in elbow for a period ranging from six to twenty weeks. The most common and consistent complaint was that of elbow pain leading to difficulty in daily activity. All the patients were previously treated by some form of local nonsurgical treatment like massage, icing, splinting, nonsteroidal anti-inflammatory drugs and some had received local steroid. All patients were explained about the treatment and various options available to them, their advantages and disadvantages. Informed consent was taken from all the participants.

Inclusion criteria

Patients having pain on the lateral aspect of the elbow that increased with pressure on lateral epicondyle, Cozen’s test positive and treated earlier conservatively with either oral analgesic anti-inflammatory drugs, local application of ointment, brace, physiotherapy or local steroid injection were selected for the study. The Cozen’s test was performed by making the patient to hold his limb with elbow in semiflexion and forearm pronated and then dorsiflexing the wrist against resistance. Severe pain felt at the lateral aspect of elbow is taken as a positive test and diagnosis confirmed.

Exclusion criteria

The study does not include patients who were never treated before for the same complaints, had history of blood disorders, elbow deformities, fracture, dislocation or tendon ruptures near the elbow, neurological and musculoskeletal disorders.

Type of randomisation

Every alternative case included in the study was assigned to group I and group II.

Management

Group I, study group (n=24): Lateral aspect of the elbow and dorsum of the hand were painted as seen in Figure 1 and under aseptic precautions 1 ml of venous blood was drawn from the dorsal venous arch of hand as in Figure 2 and was injected into the site of maximum tenderness on the lateral aspect of the elbow as shown in Figure 3.



Figure 1: Painting of the site.



Figure 2: Withdrawal of venous blood.



Figure 3: Autologous blood injection.

Group II, Control group (n=24): All the patients were similarly painted but instead of blood 1 ml of normal saline was injected into the site of maximum tenderness on the lateral aspect of the elbow.

Follow-up

All the patients were followed up and re-examined at the end of two, eight and twenty weeks. Results were evaluated at the end of twenty weeks based on the criteria as depicted in Table 1.

Table 1: Evaluation criteria.

Result	Pain	Tenderness	Cozen’s test
Excellent	No	No	negative
Good	No	Deep	negative
Poor	positive/negative	Superficial	positive

RESULTS

This study comprised of a total of forty eight patients of which 20 (41.7%) were male patients and 28 (58.3%) were female as given in Table 2. The study population shows that the condition is more common in the age group of 30-39 years followed by 40-49 years, indicating high prevalence of it in third and fourth decade. Side distribution of the condition shows its preponderance on right side 58.3% (n=28) and on left side in 41.7% (n=20)

of cases as in Table 3. This fact may be explained by the study population being right handed usually use their right hand more often than their left for daily activities. Results were evaluated at the end of twenty weeks and reveal excellent results in n = 15 (62.5%) of group I (study group) patients, and only n = 03 (12.5%) were excellent in control group II. n = 06 (25.0%) had good results and only n = 03 (12.5%) had poor results in group I, whereas n = 14 (58.3%) had poor outcome from group II as seen in Figure 4 and were treated by other modalities including a second injection of Autologous blood.

Table 2: Distribution of age and sex.

Age (years)	Male	Female	Total
<30	05	02	07
30-39	08	11	19
40-49	05	11	16
≥50	02	04	06
Total	20 (41.7%)	28 (58.3%)	48 (100%)

Table 3: Side distribution.

Side	Male	Female	Total
Right	12	16	28
Left	08	12	20
Total	20	28	48

Complications

There were no major complications during this procedure and the minor complication included pain at the injection site, reported by three patients and it subsided within two-three days with analgesics.

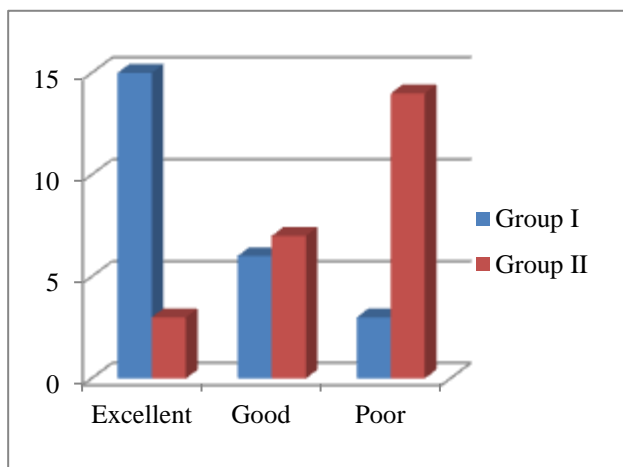


Figure 4: Results at the end of the study.

DISCUSSION

Lateral epicondylitis is a common cause of morbidity in the general population. The name ‘tennis elbow’ seems to

be too restricted title since this condition can occur very commonly in people who have never played tennis. It occurs as a result of the stress of overuse and overload. The repeated rotation movement of pronation-supination is apparently more causative than the strength used in the movement. Most of the patients with this condition will improve with time. About 80% of patients report symptomatic relief at one year of follow-up.³ Factors with poor prognosis include long duration of symptoms, manual labour and involvement of dominant arm.⁴

Anatomy

The lateral epicondyle is a pyramid shaped bony prominence. The common extensor tendinous origin is a composite of the extensor carpi radialis brevis (ECRB) and extensor digitorum communis (EDC). Their origins lie on its anterior surface. The anconeus muscle originates from its posterior surface. The extensor carpi radialis longus (ECRL) and brachioradialis originate more cephalad along the anterior aspect of the supracondylar ridge.

The lateral collateral ligament complex originates from the apex of the epicondyle. This complex is composed of the lateral ulnar collateral ligament, the radial collateral ligament, and the annular ligament.

The radial nerve divides into its terminal branches, the superficial radial nerve and the posterior interosseous nerve (PIN), at the level of the radial head. The PIN then enters the supinator muscle or radial tunnel, where compression has been implicated in cases of refractory lateral epicondylitis.⁵

Etiology

There are various sources of pain generation in lateral epicondylitis. Both intra and extra-articular structures may be responsible for symptoms.

Electromyographic evaluation of patients with lateral epicondylitis demonstrates increased ECRB activity compared with asymptomatic controls.⁶ Biochemical analysis has demonstrated neurokinin 1 (substance P) receptors within the extensor origin and increased levels of the excitatory neurotransmitter glutamate in patients with lateral epicondylitis.⁷ These findings provide a mechanism for neurogenic pain generation and offer one potential explanation for the relief provided by steroid injections in these cases.

An intraarticular source of pain, such as a plical fold or synovitis, is another plausible cause of lateral elbow pain as suggested by cases treated surgically.⁸⁻¹⁰

Histopathology

Histologic study demonstrate noninflammatory angiofibroblastic tendinosis with neovascularization, a

disordered collagen scaffold, and mucoid degeneration; all features suggestive of repetitive microinjury and healing attempts.¹¹ A poorly vascularised area presents an incomplete healing response. A cyclically applied cumulative tendon injury leads to degeneration. There are no features of acute inflammation, hence the term ‘tendinopathy’ is preferred to the more common ‘tendinitis’.

Clinical features

Symptoms include pain over the lateral aspect of the elbow increased by active wrist extension or with passive wrist flexion with extended elbow (Cozen’s test). Maximum tenderness is present anterior and distal to the lateral epicondyle. It is usually not associated with inflammatory signs.

Tomsen test

ECRB and ECRL are tested by forced extension of the wrist with the shoulder flexed at 60°, elbow extended, forearm in pronation and wrist at 30° flexion, when pressure is exerted on the second and third metacarpal bones, in a flexed and a ulnar direction.

Chair test

The patient is asked to lift a chair with the shoulder flexed at 60°, elbow extended and forearm pronated.

Coffee-cup test

Grasping or pinching with the wrist in extension reproduces the pain at the point of maximum tenderness.

Lidocaine injection test

Injection at the origin of the ECRB gives pain relief.

Differential Diagnosis

Radial tunnel syndrome as given in Table 4 is a compressive neuropathy of the posterior interosseous nerve caused by any of four different anatomical structures in the radial tunnel, including

- Fibrous band near the anterior aspect of the radial head,
- Vascular leash of the recurrent radial artery,
- Distal ECRB tendon margin, or
- Supinator margin at the arcade of Frohse.

Several other conditions which produce features similar to tennis elbow include – cervical radiculopathy, shoulder peri-arthritis, osteochondritis dissecans of capitellum, posterolateral elbow instability, lateral compartment arthritis, radial head arthrosis, posterolateral elbow plica and bone tumor.

Table 4: Differentiating features from radial tunnel syndrome.

Clinical features	Tennis elbow	Radial tunnel syndrome
Max. tenderness	1cm anterior & distal	3-4 cm anterior & distal
Resisted wrist extension	Painful	Not painful
Resisted thumb/index finger extension	Not painful	Painful
Resisted forearm supination	Not painful	painful

Investigations

- A plain radiograph occasionally shows calcifications within the extensor mass origin or intra-articular pathology like elbow osteoarthritis.
- Magnetic resonance imaging may demonstrate edema and thickening of the extensor origin in 90% of symptomatic patients. ECRB origin can be separated, thinned, or partially or completely torn.¹²
- Ultrasound examination in lateral epicondylitis identifies focal hypoechoic areas, intrasubstance tears, peritendinous fluid, and thickening of the common extensor origin.

Management

The various modalities of therapy available for its management include the following

Rest and nonsteroidal anti-inflammatory drugs

NSAIDs relieve pain of synovitis or acute inflammation in the nearby supportive adipose, muscle and connective tissue.¹³ Rest is required for healing of affected tendon.

Physical therapy

Its goals are to increase forearm strength, flexibility, and endurance by isometric and concentric strengthening exercises. Stretching of the extensor origin by bringing the wrist into flexion with the elbow extended and the forearm pronated. Eccentric strengthening efficiently causes hypertrophy of the musculotendinous unit and increases its tensile strength, thereby reducing strain on the tendon and hence has a positive treatment effect.¹⁴ Ultrasound, iontophoresis, electrical stimulation, soft-tissue mobilization, friction massage are other various modes of physical therapy.

Orthoses

Their goal is to reduce tension at the extensor origin, allowing time for this area to heal. Forearm bands

(counterforce braces) limit muscle expansion and create a new origin, effectively redirecting muscle force. Cock-up wrist splints are meant to prohibit contraction of the wrist extensors, thereby providing mechanical rest to the tendinous origin.¹⁵

Local steroid injection

Studies evaluating the results of local steroid injection have shown better symptom control for short time but not on long term follow-up.¹⁶⁻¹⁹ Adverse reactions include skin depigmentation and decrease in tenocyte replication and collagen production.²⁰ Another serious adverse effect include rupture of common extensor tendon.²¹

Autologous blood injection

An injection of autologous blood at the site of pathology provides all the mediators from the blood which are needed for healing of the lesion.²²

Other modalities

Platelet rich plasma (PRP) injection, botulinum toxin injection, cyriax manipulations- forceful manipulation of the lateral elbow, to convert a partial tear of the extensor origin into a complete tear to allow for healing in an elongated state, extracorporeal shock wave therapy, cryotherapy, acupuncture, arthroscopic debridement and surgical debridement- the ECRB may be released percutaneously or endoscopically.²³⁻²⁵ If needed epicondylar resection is done for chronic lateral epicondylitis. Complications include iatrogenic posterolateral rotatory instability of elbow, neuroma of the posterior cutaneous nerve of the forearm and reactive bone formation.^{26,27}

CONCLUSION

This study of injecting autologous blood is a very efficacious minimally invasive procedure which addresses the root cause of this condition and provides satisfactory results in patients who do not respond to other conservative methods of treatment.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Major HP. Lawn-tennis elbow. *BMJ*. 1883;2:557.
2. Haahr JP, Andersen JH. Physical and psychosocial risk factors for lateral epicondylitis. A population based case-referent study. *Occup Environ Med*. 2003;60:322-9.
3. Binder AI, Hazleman BL. Lateral humeral epicondylitis: A study of natural history and the

- effect of conservative therapy. *Br J Rheumatol*. 1983;22:73-6.
4. Haahr JP, Andersen JH. Prognostic factors in lateral epicondylitis: A randomized trial with one-year follow-up in 266 new cases treated with minimal occupational intervention or the usual approach in general practice. *Rheumatol (Oxford)*. 2003;42:1216-25.
5. Roles NC, Maudsley RH. Radial tunnel syndrome: Resistant tennis elbow as a nerve entrapment. *J Bone Joint Surg Br*. 1972;54:499-508.
6. Kelley JD, Lombardo SJ, Pink M, Perry J, Giangarra CE. Electromyographic and cinematographic analysis of elbow function in tennis players with lateral epicondylitis. *Am J Sports Med*. 1994;22:359-63.
7. Ljung BO, Alfredson H, Forsgren S. Neurokinin 1-receptors and sensory neuropeptides in tendon insertions at the medial and lateral epicondyles of the humerus: Studies on tennis elbow and medial epicondylalgia. *J Orthop Res*. 2004;22:321-7.
8. Nirschl RP, Pettrone FA. Tennis elbow: The surgical treatment of lateral epicondylitis. *J Bone Joint Surg Am*. 1979;61:832-9.
9. Baker CL Jr, Murphy KP, Gottlob CA, Curd DT. Arthroscopic classification and treatment of lateral epicondylitis: Two-year clinical results. *J Shoulder Elbow Surg*. 2000;9:475-82.
10. Ruch DS, Papadonikolakis A, Campolattaro RM. The posterolateral plica: A cause of refractory lateral elbow pain. *J Shoulder Elbow Surg*. 2006;15:367-70.
11. Kraushaar BS, Nirschl RP. Tendinosis of the elbow (tennis elbow): Clinical features and findings of histological, immunohistochemical, and electron microscopy studies. *J Bone Joint Surg Am*. 1999;81:259-78.
12. Mackay D, Rangan A, Hide G, Hughes T, Latimer J. The objective diagnosis of early tennis elbow by magnetic resonance imaging. *Occup Med (Lond)*. 2003;53:309-12.
13. Nirschl RP, Ashman ES. Elbow tendinopathy: Tennis elbow. *Clin Sports Med*. 2003;22:813-36.
14. Martinez-Silvestrini JA, Newcomer KL, Gay RE, Schaefer MP, Kortebein P, Arendt KW. Chronic lateral epicondylitis: Comparative effectiveness of a home exercise program including stretching alone versus stretching supplemented with eccentric or concentric strengthening. *J Hand Ther*. 2005;18:411-9.
15. Van De Streek MD, Van Der Schans CP, De Greef MH, Postema K. The effect of a forearm/hand splint compared with an elbow band as a treatment for lateral epicondylitis. *Prosthet Orthot Int*. 2004;28:183-9.
16. Hay EM, Paterson SM, Lewis M, Hosie G, Croft P. Pragmatic randomized controlled trial of local corticosteroid injection and naproxen for treatment of lateral epicondylitis of elbow in primary care. *BMJ*. 1999;319:964-8.

17. Lewis M, Hay EM, Paterson SM, Croft P. Local steroid injections for tennis elbow: Does the pain get worse before it gets better? Results from a randomized controlled trial. *Clin J Pain.* 2005;21:330-4.
18. Altay T, Günel I, Oztürk H. Local injection treatment for lateral epicondylitis. *Clin Orthop Relat Res.* 2002;398:127-30.
19. Verhaar AN, Walenkamp GHM, Van Mameren H, Kester ADM, Van Der Lind AJ. Local corticosteroid injection versus Cyriax-type physiotherapy for tennis elbow. *J Bone Joint Surg (Br).* 1996;78:128-32.
20. Wong MW, Tang YY, Lee SK, Fu BS, Chan BP, Chan CK. Effect of dexamethasone on cultured human tenocytes and its reversibility by platelet derived growth factor. *J Bone Joint Surg Am.* 2003;85:1914-20.
21. Smith AG, Kosygan K, Williams H, Newman RJ. Common extensor tendon rupture following corticosteroid injection for lateral tendinosis of the elbow. *Br J Sports Med.* 1999;33:423-5.
22. Edwards SG, Calandruccio JH. Autologous blood injections for refractory lateral epicondylitis. *J Hand Surg [Am].* 2003;28:272-8.
23. Wong SM, Hui AC, Tong PY, Poon DW, Yu E, Wong LK. Treatment of lateral epicondylitis with botulinum toxin: A randomized, double-blind, placebo-controlled study. *Ann Intern Med.* 2005;143:793-7.
24. Cyriax JH. The pathology and treatment of tennis elbow. *J Bone Joint Surg.* 1936;18:921-40.
25. Dunkow PD, Jatti M, Muddu BN. A comparison of open and percutaneous techniques in the surgical treatment of tennis elbow. *J Bone Joint Surg Br.* 2004;86:701-4.
26. Dellon AL, Kim J, Ducic I. Painful neuroma of the posterior cutaneous nerve of the forearm after surgery for lateral humeral epicondylitis. *J Hand Surg [Am].* 2004;29:387-90.
27. Shapiro GS, Weiland AJ. Reactive bone formation after surgery for lateral epicondylitis. *J Shoulder Elbow Surg.* 2002;11:383-5.

Cite this article as: Ansari MAQ, Nayeemuddin M, Farhan MM. Autologous blood injection technique in the treatment of refractory lateral elbow tendinopathy. *Int J Res Orthop* 2017;3:220-5.