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Comparative Assessment of Autologous Blood and Corticosteroid Injection for Lateral Epicondylitis of Elbow

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Abstract

Background and Aim: Tennis elbow also known as lateral epicondylitis is one of the frequent reasons for in the lateral side of elbow. When there is application of the local injection of autologous blood in case of tennis elbow, it provides humoral and cellular factors at the site of the lesion and provides a healing environment. Present study was done with the aim to evaluate the effects of the local corticosteroid injection and autologous blood injection in the management of the elbow. *Materials & Methods:* A randomized control study was performed on 40 patients; they were divided into two groups A & B with 20 patients in each group. Group A were given 2 ml of Autologous blood injection and group B were given 80 mg Steroid injection (methyl prednisolone). Follow up of the patient was done at regular intervals of 4 weeks, 12 weeks and 6 months. *Results:* After 4 weeks VAS pain score and Nirschl stage sustained to reduce in group A, but to the opposing in group B average VAS pain score raised from 1.68 to 1.88 and Nirschl stage too improved from 1.50 to 1.84 at 12 weeks & 6 months of follow up correspondingly. There was significant difference between the groups in VAS score (0.56 versus 1.88) and Nirschl stage (0.32 versus 1.84) at 6 months of follow up. At the six-month follow-up 90% patients had total pain release in group A in contrast to only 45% in group B. Seven out of 20 (35%) patients had reappearance of pain at 6 months of follow up in group B but none of patients reported reappearance of pain or disability in group A. *Conclusion:* Injection of autologous blood is a well-organized management modality for lateral epicondylitis, which is easy, not expensive, with fewer side-effects and smallest recurrence rate.

Keywords: Autologous; Lateral Epicondylitis; Steroid; Tennis Elbow.

Introduction

Tennis elbow; word used for description of the lateral elbow pain is more frequently seen in the universal population than in tennis players that accounts of 1% to 3% of occurrence rate. It is typically seen in the fourth and fifth decade of life and male & females are equally affected [1,2]. Individuals who are concerned with the wide range of physical work and manual labor are the group of population who are mostly affected. In addition new group of public sector that includes working with desktops and number of software engineers are affected by tennis elbow. There is micro trauma to the muscle owing to the over handling and frequent actions of wrist extensors, which leads to such disorders. Symptoms that's signify the tennis elbow are pain over lateral aspect of elbow and abridged grip strength that affects the disability in routine activities [3].

Just on the basis of clinical history and physical examination the diagnosis of tennis elbow can be made but there is no ideal treatment protocol for it

[4,5]. There is apparent fibroblastic degeneration and neovascularization within the body of extensor tendons, when it is seen microscopically [6,7]. Extensor carpi radialis brevis is more recurrently occupied than extensor carpi radialis longus and extensor digitorum communis [8].

Local injection of steroid makes short term pain release however on long term basis it does not show any benefits over physiotherapy and exercise [9-12]. However, local corticosteroid injection in the management of tennis elbow is a preferred among orthopaedicians [13,14,15].

Autologous blood provides essential growth factors to the site of illness which assists in the healing of tennis elbow. At present there are merely a small number of studies which evaluate the outcome results of corticosteroid with autologous blood injection therefore this study was taken up to assess the treatment outcome results of the autologous blood injection when compared with corticosteroid in the treatment of lateral epicondylitis.

Materials and Method

Present prospective study was single blinded randomized study, and ethical approval was taken by institutional ethical committee. Patients aged further than 20 years and diagnosed with lateral epicondylitis elbow were registered in study. All the patients were methodically assessed with history, clinical examination and investigations like X ray, Magnetic Resonance imaging and nerve conduction studies every time necessary to rule other causes for lateral elbow pain like osteochondritis dessicans, synovitis of radiohumeral joint etc.

Inclusion Criteria were Age extra than 20 years, No earlier history of treatment for tennis elbow.

Exclusion Criteria were History of previous injury to elbow, Earlier interventions for lateral epicondylitis, Patients receiving steroid injections (local or systemic) for any other medical illness during last three months of starting of the study, Associated medical co morbidities.

Each patient presenting with complaint of pain in the lateral elbow region to OPD were assessed with history and clinical examination including Cozen's test and Mill's maneuver [12]. After gaining informed consent, 40 patients rewarding criteria for inclusion and exclusion were deputed successively into two parallel groups, A (Autologous Blood Injection) and B (Steroid Injection), 20 cases of each in the group. Identical randomization was done by computer generated randomization. Patients were given the right to pull out from the study at any time of the study.

Interventions: Group A patients were injected with 2 ml of autologous blood mixed with 1 ml of 2% lignocaine solution haggard from the same or contralateral upper limb. In Group B patients were injected with 80 mg of methyl Prednisolone acetate & 1ml of 2% lignocaine. All the patients were injected in the OPD under austere aseptic safety measures by a single orthopaedician. Patient was kept in supine position with elbow in 90° flexion and the palm was made to face the ground, bony points were identified; then a 24 Gauge needle was introduced proximal to the lateral epicondyle and was forwarded to the under surface of the extensor carpi radialis brevis, peppering technique was followed while injecting the content. A small sterile dressing was applied. Upper limb rest for not extra than 48 hours was advised and patient was asked to keep away from strenuous activities of the upper limb for at least 2 weeks. Passive stretching of the extensor muscles was counseled as rapidly as the pains subside.

Outcome and Evaluation: The result and assessment was carried out to evaluate the amount of the pain and the amount of disability in the pre-injection phase, and on successive consultations at 4 weeks, 12 weeks & 6 months (the final follow up). The pain was assessed by using the Visual Analogue scale (VAS) and the disability was assessed by Nirschl staging.

Statistical Analysis

Qualitative data will be expressed as percentages and proportions. Quantitative data will be expressed as mean and standard deviation. The differences between two groups with respect to continuous variables will be analysed using t-test while categorical variables will be analysed using chi-square test. All the statistical tests will be performed in SPSS version 15 software. P value <0.05 will be considered as statistically significant while P value <0.01 will be considered as statistically highly significant.

Results

Out of 40 patients, 25 were male and 15 female; Group A had 13 males and 7 female patients having an common age of 44.3 years (24-64); Group B comprised of 12 males and 8 females and average age of 43.8 years. All the patients in group A and

group B were right hand overriding, with participation of right side in all patients and greater part of patients in both groups being working as manual laborers in farms or for building work.

Pre-injection, the mean VAS scores for pain and Nirschl stages were similar in group A and group B. with P value of 0.74, mean Nirschl stage in group A and group B was 5.84 and 6.05 correspondingly with P value of 0.45.

VAS score and Nirschl stage at pre injection, 4 weeks, 12 weeks and 6 months were as in table II and table III. Group B had improved pain relief at 4 weeks after injection in contrast to group A, as obvious in table 2 and 3. But at 12 weeks & 6 months follow up group A fared superior than group B with standard VAS pain score of 0.78 & 0.56 at 12 weeks and 6 months correspondingly in comparison to 1.68 &1.88 in group B; Nirschl stage also followed the comparable pattern as of VAS pain score.

After 4 weeks VAS pain score and Nirschl stage sustained to reduce in group A, but to the opposing in group B average VAS pain score raised from 1.68 to 1.88 and Nirschl stage too improved from 1.50 to 1.84 at 12 weeks & 6 months of follow up correspondingly.

There was significant difference between the groups in VAS score (0.56 versus 1.88) and Nirschl stage (0.32 versus 1.84) at 6 months of follow up. At the six-month follow-up 90% patients had total pain release in group A in contrast to only 45% in group B. Seven out of 20 (35%) patients had reappearance of pain at 6 months of follow up in group B but none of patients reported reappearance of pain or disability in group A.

Table 1: VAS pain score among study participants

VAS pain score	ABI (SD)	Steroid Injection	P Valve
Pre injection	7.37(0.90)	7.47(1.07)	0.74
4 weeks	3.32(1.06)	1.62(0.67)	<0.001
12 weeks	0.78(1.0)	1.68(0.66)	<0.01
6 Months	0.56(0.81)	1.88(1.08)	<0.001

Table 2: Nirschl Stage among study participants

Nirschl stage	ABI (SD)	Steroid Injection	P Valve
Pre injection	5.84(0.90)	6.05(0.78)	0.45
4 weeks	2.47(0.90)	1.58(0.75)	<0.01
12 weeks	0.48(0.96)	1.50(0.93)	<0.01
6 Months	0.32(0.45)	1.84(0.37)	<0.001

Discussion

Autologous blood was found to be more effective as compared to corticosteroid for pain reduction and fracture handling. In our present study; at the end of 6 months follow up, the 90% of the total individuals who had received autologous blood were relieved from pain whereas only 45% in the other group who received corticosteroid were relieved from pain. In the study done by Edwards & Calandruccio [16] in 2003 conducted the study with autologous blood. They concluded that 79% of the total individual recovered after receiving autologous blood. In the year 2013, Karimi Mobarakeh et al [20], concluded that 85% of the individuals recovered after receiving the autologous blood injection. Connell et al [21] in 2006, with the guidance of ultrasonography injected autologous blood in tennis elbow and achieved 92% of result as respite by VAS and Nirschl stage parameters.

The reason for injecting steroids in tennis elbow is that it was believed that lateral epicondylitis is inflammatory in nature and steroids were injected to oppose the inflammation [14]. Later on in the histological confirmation it was found that tendon did not showed any sign of inflammations, fibrotic degeneration and relative neovascularization and so word lateral epicondylitis was a misnomer. Microscopic features showed surplus of neovascularisation and fibroblastic activity, mixture is called as angio fibroblastic hyperplasia [22,23,24].

There is presence of watershed zone as well as zone of hypovascularity distal to ythe attachment of ECRL tendon and ECRB. In casue of frequent injury what happens is that it cause formation of micro strain and rip in tendon leading to disturbance in the normal healing reaction. This results in formation of tendinosis and tendinopathy [25,26].

Ljung BO et al [27,28] concluded that in the patient with lateral epicondylitis, due to increase level of calcitonin gene related peptide, neurokinin 1 – receptor and substance P in the tendon insertion may be associated with pain. Corticosteriod injection can diminishes the neuropeptides and can cause temporary pain relief for short duration but for longer duration of relief autologous blood injection is recommended [29].

Chemical mediators like PDGF, TGF-beta, and FGF signalling are important for differentiation and growth of mesenchymal stem cells [30,31]. When the autologous blood is injected in atraumatic way than it will begin the inflammatory flow and aids in healing. The result of platelet rich plasma delvier similar result in respect ot pain reduction and functional improvement to as of autologous blood [32-35]. However, the drawback of PRP injection is costly, not obtainable at minor set ups and its time-consuming.

Conclusion

Injection of autologous blood considerably abridged the pain and enhanced the pain scores clinical function when compared to corticosteroid injection at six months follow up. So autologous blood injection is competent treatment modality for lateral epicondylitis, which is easy, inexpensive, with less side-effect and least amount of recurrence rate.

Sources of funding

Nil.

Conflict of Interest

None declared.

References

1. Allander E. Prevalence, incidence, and remission rates of some common rheumatic diseases or syndromes. Scand J Rheumatol. 1974;3:145–53.
2. Shiri R, Viikari-Juntura E, Varonen H, Heliövaara M. Prevalence and determinants of lateral and medial epicondylitis: a population study. Am J Epidemiol 2006;164:1065–74.
3. Dorf ER, Chhabra AB, Golish SR, et al. Effect of elbow position on grip strength in the evaluation of lateral epicondylitis. J Hand Surg [Am]. 2007;32:882–886.
4. Labelle H, Guibert R, Joncas J, et al. Lack of scientific evidence for the treatment of lateral epicondylitis of elbow. An attempted meta-analysis. J Bone Joint Surg Br 1992;74(5):646–651.
5. Eli T. Sayegh BS, Robert J. Strauch MD Does Nonsurgical Treatment Improve Longitudinal Outcomes of Lateral Epicondylitis Over No Treatment? A Meta-analysis. Clin Orthop Relat Res 2015; 473:1093–1107 DOI 10.1007/s11999-014-4022-y.
6. Nirschl RP: Tennis elbow tendinosis: pathoanatomy, nonsurgical and surgical management. In Repetitive motion disorders of the upper extremity. Edited by Gordon SL, Blair SJ, Fine LJ. Rosemont, IL: American Academy of Orthopaedic Surgeons; 1995:467–479.
7. 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.
8. Ljung BO, Lieber RL, Fridén J. Wrist extensor muscle pathology in lateral epicondylitis. J Hand Surg Britain. 1999;24:177-183.
9. Tonks JH, Pai SK, Murali SR. Steroid injection therapy is the best conservative treatment for lateral epicondylitis: a prospective randomised controlled trial. Int J Clin Pract 2007;61:240–246.
10. Maffulli N, Longo UG, Denaro V. Novel approaches for the management of tendinopathy. J Bone Joint Surg Am. 2010;92:2604–2613.
11. Bisset L, Beller E, Jull G, et al: Mobilisation with movement and exercise, corticosteroid injection, or wait and see for tennis elbow: randomized trial. BMJ 2006;333:939–944.
12. Smidt N, van der Windt DA, Assendelft WJ, et al. Corticosteroid injections, Physiotherapy, or a wait-and-see policy for lateral epicondylitis: a randomised controlled trial. Lancet 2002;359:657–662.
13. Nirschl RF, Sobel J. Conservative treatment of tennis elbow. Phys Sports Med 1981;9:43–54.
14. Baily RA, Brock BH. Hydrocortisone in tennis elbow: a controlled series. Proc R Soc Med 1957;50:389–390.
15. Leadbetter WB. Corticosteroid injection therapy in sports injuries. In: Leadbetter WB, Buckwalter JA, Gordon SL, eds. Sports-induced inflammation. Rosemont: American Academy of Orthopaedic Surgeons, 1990:527–545.
16. Edwards SG, Calandruccio JH. Autologous blood injections for refractory lateral epicondylitis. J Hand Surg Am 2003;28-A:272–278.
17. Nirschl RP. Elbow tendinosis/tennis elbow. Clin Sports Med 1992;11:851–870.
18. Muto T, Kokubu T, Mifune Y, et al. Temporary inductions of matrix metalloprotease-3 (MMP-3) expression and cell apoptosis are associated with tendon degeneration or rupture after corticosteroid injection. J Orthop Res. 2014;32(10):1297-1304.

19. Osborne H. Stop injecting corticosteroid into patients with tennis elbow, they are much more likely to get better by themselves! J Sci Med Sport. 2010;13(4):380-381.
20. Karimi Mobarakeh M, Nemati A, Fazli A, Fallahi A, Safari S. Autologous blood injection for treatment of tennis elbow.Trauma Mon 2013;17:393–5.
21. Connell DA, Ali KE, Ahmad M, Lambert S, Corbett S, Curtis M. Ultrasound-guided autologous blood injection for tennis elbow. Skeletal Radiol 2006;35:371–7.
22. Iwasaki M, Nakahara H, Nakata K, et al. Regulation of proliferation and osteochondrogenic differentiation of periosteum-derived cells by transforming growth factor-B and basic fibroblast growth factor. J Bone Joint Surg [Am] 1995;77-A: 543–554.
23. Ahmad Z, Siddiqui N, Malik SS, et al. Lateral epicondylitis: a review of pathology and management. Bone Joint J. 2013;95(9):1158-1164.
24. 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.
25. Altan L, Kanat E. Conservative treatment of lateral epicondylitis: comparison of two different orthotic devices. Clin Rheumatol. 2008 Aug;27(8):1015-9.
26. 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.
27. 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.
28. Ljung BO, Forsgren S, Friden J. Substance P and calcitonin gene-related peptide expression at the extensor carpi radialis brevis muscle origin: implications for the etiology of tennis elbow. J Orthop Res 1999;17:554–9.
29. Krogh TP, Bartels EM, Ellingsen T, Stengaard-Pedersen K, Buchbinder R, Fredberg U, et al. Comparative effectiveness of injection therapies in lateral epicondylitis: a systematic review and network meta-analysis of randomized controlled trials. Am J Sports Med 2013;41:1435–46.
30. Gelberman R, An K-N, Banes A, Goldberg V. Tendon. In: Woo SL-Y, Buckwalter JA, eds. Injury and Repair of the Musculoskeletal Soft Tissues. Park Ridge, IL: American Academy of Orthopaedic Surgeons, 1988.p.1–40.
31. Hildebrand KA, Woo SL-Y, Smith DW, Allen CR, Deie M, Taylor BJ, et al. The effects of platelet-derived growth factor-BB on healing of the rabbit medial collateral ligament. An in vivo study. Am J Sports Med 1998;26:549–554.
32. Thanasas C, Papadimitriou G, Charalambidis C, Paraskevopoulos I, Papanikolaou A. Platelet-rich plasma versus autologous whole blood for the treatment of chronic lateral elbow epicondylitis: a randomized controlled clinical trial. Am J Sports Med 2011;39:2130–4.
33. Creaney L, Wallace A, Curtis M, Connell D. Growth factor-based therapies provide additional benefit beyond physical therapy in resistant elbow tendinopathy: a prospective, single-blind, randomised trial of autologous blood injections versus platelet-rich plasma injections. Br J Sports Med 2011;45:966–71.
34. Gottlieb NL, Riskin WG. Complications of local corticosteroid injections. JAMA 1980;243:1547–1548.
35. Haslock I, MacFarlane D, Speed C. Intra-articular and soft tissue injections: a survey of current practice. Br J Rheumatol 1995;34:449–452.