

A Comparative Study of Efficacy of Intra-lesional Dry Needling, Platelet Rich Plasma and Corticosteroid in Lateral Epicondylitis

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Abstract

Background: Lateral epicondylitis (LE) or Tennis Elbow (TE) is a common cause of musculoskeletal pain involving common extensor origin of the forearm with various treatment options available ranging from conservative, intra-lesional injection to surgical.

Material & Methods: 147 cases of recalcitrant Lateral Epicondylitis treated with intra-lesional dry needling (n=50), platelet rich plasma (PRP) (n=49) or corticosteroid (n=48) injections were compared for VAS and DASH score.

Results: The mean pre-injection VAS score in needling, PRP and steroid group improved from 67.48, 68.00 and 67.39 to 38.50, 36.37 and 36.85 at 24 weeks' post-injection respectively which was statistically significant ($p < 0.05$). The mean pre-injection DASH score in needling, PRP and steroid group improved from 57.72, 56.96 and 56.19 to 32.04, 31.37 and 31.17 24 weeks' post-injection respectively, which was statistically significant with paired t test p value < 0.05 .

Conclusion: All three procedures, intra-lesional dry needling, PRP and corticosteroid were equally effective in treating lateral epicondylitis, with improvement in both the functional as well as pain scores in long term, but immediate post procedural relief was found better in the corticosteroid group.

Keywords: Lateral epicondylitis, Tennis elbow, Corticosteroid, PRP, Needling.

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How to cite this article:

Jain P, Maheshwari M, Jain RK, Prajapati R. A Comparative Study Of Efficacy Of Intra-lesional Dry Needling, Platelet Rich Plasma And Corticosteroid In Lateral Epicondylitis. Ortho J MPC. 2020;26(2): 81-85

Available from:
<https://ojmpc.com/index.php/ojmpc/article/view/123>



Introduction

Lateral epicondylitis or Tennis Elbow is a common cause of musculoskeletal pain involving common extensor origin at elbow, thought due to overuse of the Extensor Carpi Radialis Brevis (ECRB) muscle by repetitive micro trauma, which results in its primary tendinosis, with or without involvement of the Extensor Digitorum Communis (EDC) and Extensor Carpi Radialis Longus (ECRL) [1]. It is common in people whose occupation requires frequent rotatory motions of the forearm (plumbers, carpenters, tennis players)[2]. Clinically, a patient with tennis

elbow has pain around the lateral elbow and forearm, which radiates toward the extensor region. Rotation, extension of forearm and grasp is reduced. Clinical testing reveals painful resistance against dorsiflexion of the wrist. The diagnosis of tennis elbow is mainly clinical and special tests like Cozen's test, Mill's maneuver or investigations like ultrasound, radiographic examination, MRI and electro-myophysiological testing are indicated when there is difficulty in establishing diagnosis, which can be helpful in identifying other causes of lateral elbow pain [3,4].

The condition is usually a self-limiting condition which resolves in 6–12 months regardless of treatment, but sometimes complaints may last longer [5]. There has been no consensus on the optimal management strategy for the condition and various modalities including the newer modalities like local injection of Platelet Rich Plasma (PRP), autologous blood, dry needling, prolotherapy and extracorporeal shockwave therapy are used with varied results [6-10].

Local steroid injection has been proven to provide consistent and predictable short term pain relief, but long term results are inconsistent [7]. Tennis elbow, an angio-fibroblastic degenerative and inflammatory condition of the tendon, is benefitted by autologous PRP as it is a healing agent containing growth factors that build up reparative processes by angiogenesis, increase in growth factor expression, cell proliferation and increases the recruitment of repair cells and tensile strength [11-13]. Dry Needling is used to treat myofascial pain and dysfunction, by deactivating the myofascial trigger points and releasing the taut band of muscle [14,15]. We evaluated and compared the short term effects of intra-lesional injection of dry needling, autologous platelet rich plasma and corticosteroid in patients of recalcitrant lateral epicondylitis.

Material and Methods

This prospective study was conducted at our center in patients of resistant lateral epicondylitis after proper patients consent and institutional ethical committee approval. Patients with clinical pain and tenderness at lateral epicondyle, with restriction of forearm rotation and positive Cozen and Mill's tests were diagnosed as cases with lateral epicondylitis. All these patients were initially given conservative treatment with analgesics, anti-inflammatory drugs and physiotherapy. Patients with resistant lateral epicondylitis between age 18 to 70 years not responding to conservative treatment for 3 months were included in the study. All patients with age less than 18 years and more than 70 years or had a chronic inflammatory disease like rheumatoid arthritis, uncontrolled diabetes,

systemic hypertension, history of trauma to the elbow, prior history of injection at elbow or with infection at the injection site were excluded from the study.

Patients were sequentially randomized into three groups for intra-lesional corticosteroid injection, PRP injection and dry needling as 1st patient was given corticosteroid injection, 2nd was given PRP injection, 3rd patient underwent dry needling and 4th patient underwent corticosteroid injection and so on.

All injections were done using strict sterile precautions, with no touch technique with sterile needles. Area was cleaned with povidone iodine followed with chlorhexidine solution and point of maximum tenderness was marked using sterile marker. Injection was given on this point of maximum tenderness using peppering technique i.e. single skin entry, partially withdrawing the needle without emerging the skin, slightly redirecting and reinserting.

- a. Corticosteroid injection - 40 mg triamcinolone (Kenacort) mixed with 2 ml of 2% lidocaine was used.
- b. Platelet Rich Plasma injection - 27 ml of autologous blood was taken with 3ml of sodium citrate in a vacutainer, which was centrifuged for 15 min at 3200 revolutions per minute. The plasma portion of the centrifuged mixture was discarded and the PRP portion so harvested was buffered with 8.4% sodium bicarbonate, to increase the pH to normal physiological levels. 2 ml of PRP was obtained and injected at most tender point.
- c. Dry Needling - Five 0.25 × 25-mm stainless steel needles in the trigger point regions were inserted, directed through the skin and fascia to the bone (3–5 mm). They were rotated three to four times and left in place for ten minutes. Applications were repeated twice per week for a total of five sessions.

Post injection, all the patients were given ice fomentation, non-steroidal anti-inflammatory drugs and advised against massage or hot fomentation. Clinical outcome was measured by Disabilities of the Arm, Shoulder and Hand

(DASH) score and Visual analog scale (VAS) score.

Results

Total of 183 patients (61 patients in each group) enrolled for the study, but finally only 147 patients of lateral epicondylitis formed the cohort since rest of the patients were lost to follow up. Out of these 48 patients were treated with corticosteroid injection, 49 with platelet rich plasma injection and 50 patients with dry needling. The demographic features of the patients are given in table no.1.

The mean pre-injection VAS score in needling, PRP and steroid group improved from 67.48, 68.00 and 67.39 to 38.50, 36.37 and 36.85 at

24 weeks post-injection respectively. There was a statistically significant decrease in the mean VAS score from pre-procedure level to 24 weeks in the Needling group, PRP group and Steroid group ($p < 0.05$). The mean pre-injection DASH score in needling, PRP and steroid group improved from 57.72, 56.96 and 56.19 to 32.04, 31.37 and 31.17 24 weeks' post-injection respectively, which was statistically significant with paired t test p value < 0.05 (table no. 2). There was a statistically significant decrease in the mean DASH score from pre-procedure level to 24 weeks in the Needling group, PRP group and Steroid group ($p < 0.05$). No significant statically difference was found in comparison of the group's results.

Table 1 - Demographic features of patients in needling, PRP and steroid groups (N=147)

Characteristics	Needling Group (n=50)	PRP Group (n=49)	Steroid Group (n=48)
Mean age(range)in years	43.40 ± 8.38(30-67)	45.32 ± 8.31(30-67)	44.76 ± 6.41(33-65)
Gender - Female / Male	32(64%)	26(54%)	34(72%)
	18(36%)	23(46%)	14(28%)
Side - Left / Right	17(34%)	8(16%)	17(34%)
	33(66%)	41(84%)	31(66%)
Mean duration of symptoms± SD (Range) in months	4.43 ± 1.27 (2-8)	4.60 ± 1.33 (2-7)	4.44 ± 1.15 (2-8)

Table 2 - Comparison of mean VAS score and DASH score between different group

		Time Interval	Mean ± SD	t' value	P value
Needling group (50)	VAS score	Pre procedure	67.48 ± 3.73	51.527, df=49	0.001*
		24 weeks	38.50 ± 3.18		
	DASH score	Pre procedure	57.72 ± 5.95	27.825, df=49	0.001*
		24 weeks	32.04 ± 3.59		
PRP Group(49)	VAS score	Pre procedure	68.00 ± 5.05	30.552, df=48	0.001*
		24 weeks	36.37 ± 5.11		
	DASH score	Pre procedure	56.96 ± 5.83	23.088, df=48	0.001*
		24 weeks	31.37 ± 4.73		
Steroid group (48)	VAS score	Pre procedure	67.39 ± 6.26	33.118, df=47	0.001*
		24 weeks	36.85 ± 4.54		
	DASH score	Pre procedure	56.19 ± 7.03	18.926, df=47	0.001*
		24 weeks	31.17 ± 4.88		

Discussion

Lateral epicondylitis (Tennis elbow) remains one of the most perplexing disorders of musculoskeletal system, which is due to overuse or repetitive micro-trauma resulting in a primary tendinosis of common extensor origin, with pain and tenderness at lateral epicondyle along with limitation of elbow movements[1-3]. Various treatments ranging from non-operative by rest, anti-inflammatory

drugs, brace, physical therapy or by local intralesional injections or by surgical techniques, have been tried with varied results [6-10,16,17]. But there has been lack of knowledge regarding efficacy comparing different intralesional injections done for recalcitrant lateral epicondylitis. Hence we compared the outcome of intra-lesional dry needling, PRP and corticosteroid in 147 patients of resistant tennis elbow in almost comparable groups in terms of mean age (44

years), mean duration of symptoms (4.4 month), laterality (right preponderance) and gender (female preponderance), which was also almost same as with others studies by Raman et al, Sukumar et al, Madhuram et al [18-20].

In our series, mean pre-injection VAS score in needling, PRP and steroid group was from 6.74 ± 3.73 , 6.8 ± 0.5 and 6.739 ± 0.62 respectively, while in Raman et al series it was 7.6 in PRP group and 7.7 in steroid group and 4.6 ± 0.94 in PRP group and 3.1 ± 1.09 in steroid group in Madhuram et al series [18,20]. 24 weeks' post-injection, the VAS in our series improved to 3.85 ± 3.18 , 3.67 ± 5.11 and 3.68 ± 4.54 in needling, PRP and steroid group respectively while Raman et al had 1.6 in PRP group and 2.8 in steroid group and Madhuram et al had 1.15 ± 0.81 in PRP group and 0.90 ± 1.1 in steroid group, respectively [18,20].

DASH score in our study at the time of presentation was 57.20 ± 6.02 in PRP group, 56.70 ± 7.34 in steroid group and 57.72 ± 5.95 in needling group while Raman et al had 58.4 in PRP and 59.3 steroid group and Madhuram et al had 57.64 ± 6.34 in PRP group and 53.69 ± 5.62 in steroid group. DASH score at 24 weeks was 31.37 ± 4.73 in PRP group, 31.17 ± 4.88 in steroid group and 32.04 ± 3.59 in needling group while Raman et al had 34.16 in PRP group and 44.33 in steroid group and Madhuram et al had 31.95

± 2.65 in PRP group and 31.79 ± 1.67 in steroid group [18-20].

In our study, all three procedures were equally effective in treating lateral epicondylitis, with improvement in both the functional level as seen by improvement in DASH score as well as significant decreases in the pain as seen by significant improvement in VAS score. This improvement was comparable to other studies. Since none of other studies had compared dry needling with intralesional corticosteroid and PRP, we on compared the results of dry needling, PRP and corticosteroid and found no major statistical difference in all 3 groups, with all the procedures equally effective at final outcome. But immediate post procedural relief was found better in the corticosteroid group as the VAS and DASH score reduced more as compared to the other two groups. However, small cohort and lesser duration of follow-up are short comings of our study and long term studies are required for choosing the best modality.

Conclusion

Tennis elbow is primarily a condition common in middle aged patients with female preponderance and all three procedures, intralesional corticosteroid, dry needling and PRP were equally effective in treating lateral epicondylitis, with improvement in both the functional as well as pain scores in long term, but immediate post procedural relief was found better in the corticosteroid group.

References

1. Harrington JM, Carter JT, Birrell L, Gompertz D. Surveillance case definitions for work related upper limb pain syndromes. *Occup Environ Med.* 1998;55:264-71.
2. Morris M, Jobe FW, Perry J, Pink M, Healy BS. Electromyographic analysis of elbow function in tennis players. *Am J Sports Med* 1989;17:241-7.
3. Pomerance J. Radiographic analysis of lateral epicondylitis. *J Shoulder Elbow Surg* 2002;11:156-7.
4. Aoki M, Wada T, Isogai S, Kanaya K, Aiki H, Yamashita T. Magnetic resonance imaging findings of refractory tennis elbows and their relationship to surgical treatment. *J Shoulder Elbow Surg* 2005;14:172-7.
5. Hudak PL, Cole DC, Haines AT. Understanding prognosis to improve rehabilitation: the example of lateral elbow pain. *Arch Phys Med Rehabil* 1996;77:586-93.
6. Labelle H, Guibert R, Joncas J, Newman N, Fallaha M, Rivard CH. Lack of scientific evidence for the treatment of lateral epicondylitis of the elbow. An attempted meta-analysis. *J Bone Joint Surg.* 1992;74(B):646-51.

7. Tonks JH, Pai SK, Murali SR. Steroid injection therapy is the best conservative treatment for lateral epicondylitis: a prospective randomized controlled trial. *Int J Clin Pract.* 2007;61(2):240-6.
8. Smith MA, Smith WT. Emerging techniques in orthopaedics: platelet-rich plasma. *Orthop Nurs.* 2011;30:260-3.
9. Behrens SB, Deren ME, Matson AP, Bruce B, Green A. A review of modern management of lateral epicondylitis. *Phys Sports med.* 2012;40(2):34-40.
10. Childress MA, Beutler A. Management of chronic tendon injuries. *Am Fam Physician.* 2013;87(7):486-90.
11. Mishra A, Pavelko T. Treatment of chronic elbow tendinosis with buffered platelet-rich plasma. *Am J Sports Med.* 2006;34(11):1774-8.
12. Mishra A, Collado H, Fredericson M. Platelet-rich plasma compared with corticosteroid injection for chronic lateral elbow tendinosis. *PMR.* 2009;1(4):366-70.
13. 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;18(6):12-6.
14. Simons DG, Travell JG, Simons LS. Myofascial pain and dysfunction: the trigger point manual. 2nd ed. Williams & Wilkins; Baltimore:1999.
15. Dommerholt J, Shah JP, Ballantyne JC, Rathmell JP, Fishman SM. Myofascial Pain Syndrome. 4th ed. Williams & Wilkins; Baltimore: 2010.
16. Jain S, Kelkar R, Banodha L, Gautam V. Treatment of lateral epicondylitis with autologous platelet rich plasma injection. *Int J Orthop Sci.* 2018;4(2):437-41.
17. Martinelli N, Marinozzi A, Carni S, Trovato U, Bianchi A, Denaro V. Platelet-rich plasma injections for chronic plantar fasciitis. *Int Orthop.* 2013;37(5):839-42.
18. Yadav R, Kothari SY, Borah D. Comparison of Local Injection of Platelet Rich Plasma and Corticosteroids in the Treatment of Lateral Epicondylitis of Humerus. *J Clin Diagn Res.* 2015; 9(7):5-7.
19. Sukumar S, Mathias L, Rai S. Early effects of dry needling and low level laser therapy in chronic tennis elbow- an experimental study. *Int J Health Sci Res.* 2015;5(1):187-96.
20. Chowdry M, Gopinath KM, Kumar BNR, Kanmani TR. Comparative Study of Efficacy between Platelet-rich Plasma vs Corticosteroid Injection in the Treatment of Lateral Epicondylitis. *J Med Sci.* 2017;3(1):1-5.