

Autologous platelet rich plasma therapy in Lateral Epicondylitis of Elbow

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Abstract:

Background- Platelet rich plasma (PRP) extract has shown to be a general stimulation for repair and currently used widely in various sports injury. A prospective observational study was done to assess the efficacy of autologous PRP injection in lateral epicondylitis of elbow.

Materials and Methods: The study comprised a total of 40 patients (25 females and 15 males) of lateral epicondylitis treated from July 2013 to June 2014. The mean age was 37.5yrs (range 25-50yrs). Predominantly right side (30 patients had right side and 10 patients had left side). Minimal follow up is 6 months (with maximal follow up till 1 yr.)

Patient outcomes were followed for up to 24 weeks

Results: At the end of 3rd week more than 95% (VAS- 1) improvement in their pain scores.

Conclusions: Treatment of patients with lateral epicondylitis with a single injection of concentrated autologous platelets improves pain and function more effectively. These improvements were sustained over with no reported complications.

Key words: Lateral epicondylitis, platelet rich plasma injection, visual analog scale

Introduction

Lateral epicondylitis is the most commonly diagnosed condition of the elbow and affects approximately 1% to 3% of the population .[1] The condition mostly occurs in patients whose activities require strong gripping or repetitive wrist movements. Individuals between the ages of 25 and 50 years are at high risk.[2,3] The dominant arm is most frequently affected. The cause of lateral epicondylitis is unknown. It is thought that lesions occur in the common origin of the wrist and finger extensors on the lateral epicondyle of humerus because of a combination of mechanical overloading and abnormal micro vascular responses .[3]

Numerous methods have been advocated for treating elbow tendinosis, including rest, nonsteroidal anti-inflammatory medication, bracing, physical therapy, and extracorporeal Shockwave therapy.[4,5] Injection of corticosteroids, which was considered to be the gold standard [6] before but is actually currently controversial, and various types of surgical procedures have also been recommended.

PRP (platelet rich plasma) is the plasma fraction of

autologous blood which has a platelet concentration above baseline. The normal platelet count in whole blood in a healthy individual is between $1.5-4.5 \times 10^5/\mu\text{L}$. To be labelled as PRP, a platelet count of 4-5 times of the baseline should be present in the platelet concentrate. [7]

The aim of this study was to determine the effectiveness of PRP injections in patients with chronic lateral epicondylitis of elbow.

Material & Methods

The study was conducted in Sushrut medical care and research society's Hardikar hospital Pune between July 2013 to June 2014. 40 Patients between 20 and 50 years of age who presented with lateral epicondylitis of elbow and have taken treatment in the form of oral medications and bracing for more than 2 months, but not relieved of symptoms were included.

Diagnosis was confirmed with tenderness at distal anterior to lateral epicondyle (Fig 1) and Cozen's test-flex elbow and extended wrist against resistance .[8] X-ray of elbow AP and lateral views taken in all patients to rule out other pathologies.

Patients with rheumatoid arthritis of elbow, cervical radiculopathy, infective pathology, and patients who had received steroid injection within 3 months were excluded from this study. The treatment options were discussed with patients and close relatives. An informed consent was taken for nonrandomized prospective study. The study was approved by institutional ethical

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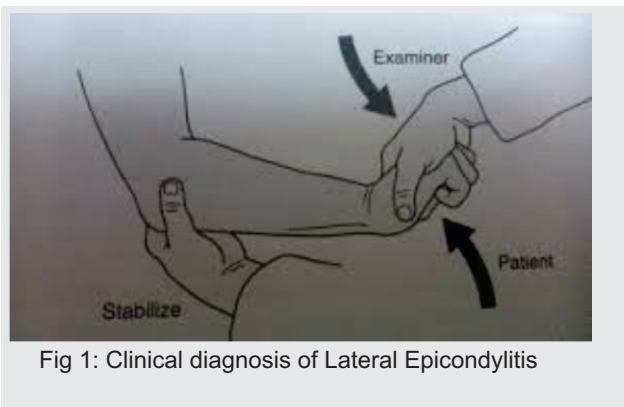


Fig 1: Clinical diagnosis of Lateral Epicondylitis

committee and scientific committee.

Technique: PRP injection -100 ml of blood was taken from the patients. Centrifuge vial was preloaded with 3 mg of anticoagulant citrate Dextrose-A. The blood was then prepared by gravity separation method instructions to yield 10 ml of PRP at the junction of plasma and red blood cell concentrate. This blood was centrifuged at 700 rpm for 20 min. The plasma was again centrifuged at 1750 rpm for 15 min to yield PRP at the bottom and one ml of this PRP was sent to the laboratory for analysis of platelet concentration (the



Figure 2: Injection site, prepared and injected

total number of platelets per millilitre in the PRP.

Local anaesthesia was given at the site of entry in skin (1 ml of 2% xylocaine). We used 5 ml of PRP injected with a 22 gauge needle in a 5cc syringe at the site of maximum tenderness (or lateral epicondyle) and in the vicinity (around the tendon of ECRB) (Fig. 2). This technique involved a single skin portal and then 5-7 penetrations of the tendon. The elbow was kept in sling for 24 h for comfort. One dose of oral antibiotic and analgesic (diclofenac – sustained release) once daily for 3 days are given for all patients.

Evaluation : All patients were assessed at the interval of one week for first 3 weeks and then every month for next 6 months. Clinical outcomes are evaluated with “visual

analog scale for pain” (Fig 3).[9] Patients with VAS of 7-9 (pre-treatment) are included in our study. Post injection VAS of patients showed 1-2 at the end of 3rd week.

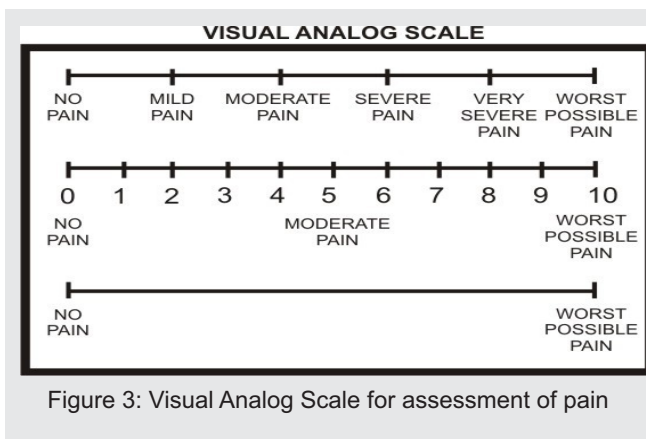


Figure 3: Visual Analog Scale for assessment of pain

Results

The study comprised a total of 40 patients (25 females and 15 males) of lateral epicondylitis treated between July 2013 to June 2014. The mean age was 37.5yrs (range 25-50yrs). Predominantly right side (30 patients had right side and 10 patients had left side). Minimal follow up is 6 months (with maximal follow up till 1 yr).

Patient outcomes were followed for up to 24 weeks. At the end of first week patients reported an improvement of 60% (VAS – 3) in their pain scores. At the end of 2nd week 80% (VAS-2) and at the end of 3rd week more than 95% (VAS- 1) improvement in their pain scores.

No adverse or allergic reactions noted during or after procedure in any of patients. 38 patients are successfully treated without any reintervention in follow up period. 2 patients underwent surgery after 4 months - even though initially they got good pain relief but there was recurrence with severe intensity after 3 months of injection.

Discussion

Our study showed positive results for using of PRP for lateral epicondylitis with 95% success rates. (Pre injection VAS pain scores 7-9 reduced to post injection VAS scores 1-2).

Lateral elbow pain is a frequent cause of disability in patients and most commonly it is diagnosed as lateral epicondylitis or tennis elbow. The fact that there is more than one type of treatment options available in treatment suggests that no single procedure is effective in all patients.[10] The most commonly recommended treatment is physical therapy and corticosteroid injections. Corticosteroids have a high frequency of relapse and recurrence, probably because intratendinous injection may lead to permanent adverse changes within the structure of the tendon and because patients tend to overuse the arm after injection as a

Authors	Study type	Patients studied	Controls	Results
Peerbooms ¹⁴ et al	RCT	51 cases vs. 49	cortisone	Improvement in VAS-PRP 53% vs. cortisone 24% at 6 months and 63% vs. 24% at 1 year
Gosens ¹⁵ et al	Continued study of Peerbooms et al			
Mishra ¹⁶ et al	Cohort study	15 cases vs. 5	Bupivacaine	81% reduction in pain in PRP group at 6 months
Tonk G ¹⁷ et al		39 cases vs 42	Laser therapy	Mean Nirschl pain score decreased significantly from baseline in PRP when compared with low level laser therapy at 2 yrs
Creaney ¹⁸ et al.	Prospective randomised trial	80 cases vs. 70	Autologous blood	Improvement in PRTEE at 6 months 35.8 in PRP and 46.8 in ABI group with higher conversion to surgery in ABI group
Thanasas ¹⁹ et al.	RCT	14 cases vs. 14	Autologous blood	70.8% improvement in PRP group and 57.8% in the autologous blood group at 6 months
Our study	Prospective Nonrandomised trial	40 patients	-----	95% successful results at 6 months

Table -1, Summary of studies using PRP for resistant lateral epicondylitis

result of direct pain relief.[11]

PRP is applied in an unactivated form that becomes activated by the collagen within connective tissue. The PRP then releases its growth factors and cytokines. These bioactive proteins in turn stimulate local stem cells and enhance extra cellular matrix gene expression.[12] Recruitment of reparative cells from the local circulation or bone marrow then occurs. Simultaneously, PRP inhibits excess inflammation, apoptosis, and metalloproteinase activity. These interactive pathways may result in the restoration of tendon or muscle tissue, which can withstand loading with work or sports activity, thereby diminishing pain.[13] PRP may also modulate the microvascular environment or alter efferent or afferent neural receptors.

Peerbooms et al[14] conducted a Randomised control trial with 100 patients, 51 of whom received PRP injection and 49 received corticosteroid injections and reported better improvement with PRP over a period of 1 year. Gosens et al [15] followed up these patients for the subsequent year and reported a sustained improvement with PRP use in comparison to corticosteroids. Mishra et al [16] evaluated the clinical value of tendon needling with PRP in patients with chronic tennis elbow compared with an active control group and of opinion that clinically meaningful improvements were found in patients treated with leukocyte-enriched PRP compared with an active control group. Tonk G et al [17] in comparing treatment of lateral epicondylitis with low laser therapy versus PRP, concluded that the low level laser therapy is better in short term period but in long term follow up, PRP therapy is better than laser therapy

Creaney et al [18] reported similar improvements in pain and function scores with PRP and Autologous

blood injection, but noted a lesser rate of conversion to surgery among patients receiving PRP injections. Thanasas et al[19] have also shown encouraging results for PRP use compared to autologous blood injection in resistant lateral epicondylitis patients.

The limitations of our study include lack of a randomized control group and the small number of patients. We could not measure concentration of different growth factors present in the PRP. And cost for preparation of PRP is very high compared to regular

steroid injections. However, further research is required to understand the concentration and preparation that facilitate the best clinical outcome. Future decisions for application of PRP for lateral epicondylitis should be confirmed by further follow-up from this trial and should take into account possible costs and harms as well as benefits.

Conclusion

Treatment of patients with lateral epicondylitis with a single injection of concentrated autologous platelets improves pain and function more effectively. These improvements were sustained over with no reported complications.

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