

Original Research Article

To evaluate the efficacy of platelet rich plasma injection in chronic lateral epicondylitis (tennis elbow)

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Received: 02 March 2017

Accepted: 21 March 2017

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ABSTRACT

Background: Platelet-rich plasma helps in repair because of its growth factor. Platelet-rich plasma has been used in humans for its healing properties. Increased concentration of growth factors and secretory proteins may increase the process of healing on a cellular level. The PRP increases the incorporation of cells, proliferation, and differentiation in tissue regeneration of the cell involved. This study was done to check the effectiveness of PRP injections in patients with chronic lateral epicondylitis or tennis elbow.

Methods: This study was done on the patients visiting the orthopaedic OPD at MGM medical college and hospital, Kamothe, Navi Mumbai. Total number of patients for this study was 40 out of which 32 were male and 8 were females. The mean age of the patients was 48.1 years (range 17-82 years). Study period was 3 months. Statistical tool used is visual analog score.

Results: Successful treatment was taken as more than 20% reduction i.e. (24 out of 40 patients) in visual analog score after 3 months. The mean VAS score was decreased from 6.98 to 4.91 after 3 months in males. While in females, mean VAS score was decreased from 6.66 to 5.22 after 3 months of PRP injection in lateral epicondylitis.

Conclusions: Treatment of patients with PRP with chronic lateral epicondylitis or tennis elbow with PRP reduces pain and increases function of the affected elbow joint.

Keywords: Lateral epicondylitis, Tennis elbow, Platelet rich plasma

INTRODUCTION

Tennis elbow is a painful condition, affecting the tendinous tissue of the wrist extensor muscles at the lateral epicondyle of the humerus which leads to decrease functions of the affected elbow joint.¹ There is increased risk of epicondylitis in association with strenuous exercises.² Lateral epicondylitis is caused by degenerative and non-acute inflammatory changes, is a degenerative tendinopathy with degeneration of collagen tissue called angiofibroblastic tendinosis of the extensor carpi radialis brevis tendon.³

Platelet-rich plasma (PRP), a blood derivative that has a higher platelet concentrate than whole blood, after activating releases a group of biologically active proteins that bind to the transmembrane receptors of their target cells, promoting cellular recruitment, growth, morphogenesis, and modulating inflammation as well.⁴ Platelet rich plasma was activated by addition of 0.5ml of a 5% solution of CaCl₂ in PRP tube. The gelation was determined by the visualization of the clot and the gel remaining attached to the tubes after turning it upside down.⁵

Growth factors released from platelet include platelet-derived growth factor i.e. PDGF, epidermal growth factor

i.e. EGF, insulin-like growth factor i.e. IGF-I, transforming growth factor β -I i.e. TGF β -I, vascular endothelial growth factor i.e. VEGF, hepatocyte growth factor (HGF), and basic fibroblast growth factor i.e. bFGF, which provide stimulus for the healing of tissues through interaction with specific cells.^{6,7}

The active secretion of growth factors by platelets begins within 10 min after activation with 10% calcium chloride in lateral epicondylitis with more than 95% of the pre-synthesized growth factors secreted within 1 hour.⁸

Lateral epicondylitis is associated with an inflammatory process that occurs in the tendon with other changes. Therefore, PRP due to its high content of various growth factors may be more effective as a healing agent. However, studies on lateral epicondylitis with PRP treatment have yielded results.⁹⁻¹¹

A recent review of common growth factors suggested PRP may be useful for tendon and ligament healing in vivo.¹²

PRP injection is one of the many newer curative options that have been used in many clinical fields, including dermatology, plastic surgery, sport medicine, dentistry and orthopaedic surgery. It is a simple, low cost and very minimally invasive way to obtain a concentration of many growth factors.¹³

METHODS

This study was conducted on the patients coming to orthopaedic OPD at MGM medical college and hospital, Kamothe, Navi Mumbai. Total of 40 patients included in this study. Patient with lateral epicondylitis/tennis elbow were treated with PRP injection using a peppering technique.

Study period

The study period in this was 3 months.

Inclusion criteria

Patients suffering from chronic lateral epicondylitis/Tennis Elbow. Age between 15 years to 90 years. Patient of either sex. Mild to moderate pain. Failure of conservative management (e.g. NSAIDs and exercise) Unilateral/Bilateral

Exclusion criteria

Patients suffering from elbow pain due to other causes like rheumatoid arthritis, osteochondritis dissecans, and crystal arthropathies like gout, radial tunnel syndrome, cervical lesions and shoulder pathology. Patients already treated with steroid injection. Patients who have already undergone surgical intervention. Any local skin pathology at injection site.

Pre-injection data

Name Of The Patient, Age, Sex, Side, Site, VAS Score.¹⁴

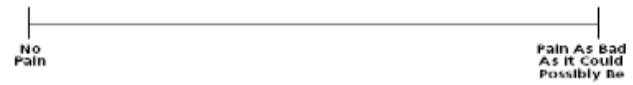


Figure 1: VAS score.

Post-injection data

Complications. Outcome assessment with help of VAS scores.

Injection technique: peppering technique.

Materials needed

Gloves – sterile. Alcohol swabs and providone - iodine scrub. 5ml syringe

Injectate

5-ml of prp with 0.5ml of 10% calcium chloride

Technique / procedure steps

Scrubbing of the affected elbow site skin was done thoroughly with betadine scrub and as many alcohol swabs was used(usually 1-2 is needed)

Patient position

In Supine with elbow extended

Local injection given by peppering technique. The peppered-injection technique was used with penetration of the skin at the area of maximum tenderness. The needle was advanced to the bone and then withdrawn a few millimetres. The needle was withdrawn without removing it from the skin and then redirected with deposition of fluid (PRP+CaCl₂). A crepitation or cracking sensation may be felt, and redirection should be continued until this sensation ceases.¹⁵ Withdrawal of the needle was done and apply tincture benzoin was applied. No local anaesthetic or steroid should be used along with PRP.¹⁶ 0.5ml Calcium chloride (10%) is mixed with 5ml of PRP for activation.¹⁷



Figure 2: Pre injection preparation.



Figure 3: Intraarticular injection in elbow.



Figure 4: Application of tincture benzoin.

Post-injection care

Rest (sling) for a few days to a week. Slow stretching exercises. No stressful activities until. No rest pain. Minimal tenderness. Return of full motion

Follow up

Patients were followed for a period of 3 months (for second week, and after that on 3 months).

VAS score was used to assess severity of pain.

RESULTS

Total of 40 patients were included in this study .The mean age of the patients was 48.1years [range 17-82 years] .There are 32 men and 8 women in the study. There are patients with 25 right tennis elbow and patients with 12 left tennis elbow/chronic lateral epicondylitis. There are 3 patients with bilateral tennis elbow/chronic lateral epicondylitis. This is assessed by visit to the clinic pre-injection, and at 2 weeks, 1 month and at the three month final follow-up. The mean VAS score for pre injection was 6.91, for 2nd week was 6.12, for 1st month was 5.76, and after 3 months were 4.91. In males VAS score for pre injection was 6.98, at 2nd week was 6.12, after 1 month was 6.84 and after 3 months was 4.91. In females VAS score for pre injection was 6.66 for second week was 6.19, after 1 month was 5.86, and after 3 months was 5.22. Out of 40 patients 24 had 20% reduction in VAS score after the prp injection in which 2 were females and 22 were males. In age group of 18-25 years there were 7 males and no females the mean pre injection vas score was 7.83 which decreased to 5.83 after a follow up of 3 months that shows 20% reduction in vas score. In age group of 26 to 40 years there were 6 males and 2 females the pre injection vas score was 6.91 and 6.75 which decreased to 4.5 and 5 respectively that shows 24.10% decrease in males and 17.5% in females. In the age group of 41 to 60 there were 7 males and 6 females the mean vas score on pre injection was 7.07 and 6.91 which decreased to 4.9 and 5.25 after 3 months which showed 21.70% and 16.6% decrease in vas score in males and females respectively. In the age group of more than 60 years there were only 12 males the mean vas score for pre injection was 6.55 and after 3 months of follow up was 4.83 that showed a 17.20% decrease in vas score.

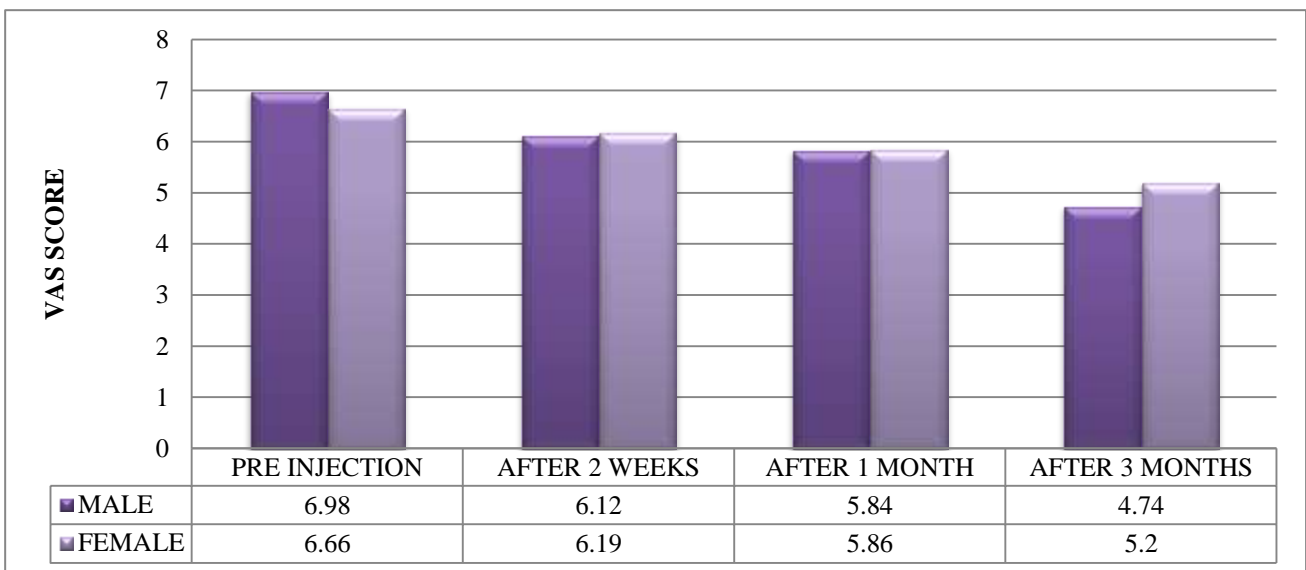


Figure 5: Graph plot mean vas score v/s follow up time period.

Table 1: Demographic data.

	Mean Age	Total	Pre Injection		2 nd Week		After 1 Month		After 3 Months	
Male	46.1	32	6.91		6.12		5.84		4.74	
Female	41.7	8	6.66		6.19		5.86		5.22	
Total	48.1	40	6.91		6.12		5.76		4.91	
Age group	Sex		Pre Injection		2 nd Week		After 1 Month		After 3 Months	
	M	F	M	F	M	F	M	F	M	F
18-25	7	0	7.83		7.08		6.58		5.83	
25-40	6	2	6.91	6.75	5.91	6	5.58	5.75	4.50	5
41-60	7	6	7.07	6.91	6.14	6.2	5.78	5.85	4.92	5.25
Above 60	12	0	6.95		6.20		5.83		4.83	

DISCUSSION

Mishra and Pavelko (2006) treated 140 patients with chronic lateral epicondylitis by injection of platelet rich plasma and at final follow up (mean 25.6 months; range 12 - 38 months) they reported 93% reduction in pain compared with before treatment.¹⁸ Creaney et al., (2011) compared the results of two groups of patients suffering from lateral epicondylitis.¹⁹ The results showed 66% success rate in the PRP group compared to 72% success rate in the autologous blood injection group after 6 months follow up.

The amount of platelet infused in this study were between 6 lacs–10 lacs, 3–6 fold higher than the baseline value, a number similar to that used in many studies and it was also within the recommended range. This study had certain limitations. The absence of a control group and the relatively small patient number with short follow up time were the main limitations of this study.

CONCLUSION

Platelet-rich plasma has emerged as a good, but not proven, treatment option for joint, tendon, ligament, and muscle injuries. In vitro basic science studies and in vivo animal studies have helped elucidate some of the effects PRP has on a cellular level to improve tissue repair. Platelet-rich plasma is autologous is administered in a simple fashion, and has an excellent safety profile but requires a complete sterile facility like a blood bank for its preparation and its prepared in labs equipped with such facilities. PRP is a cost effective non-surgical treatment for lateral epicondylitis or tennis elbow but with limitations. Well-designed prospective randomized trials are necessary to better understand the clinical results of PRP injection in tennis elbow treatment.

ACKNOWLEDGEMENT

I would like thank my head of department, my guide, colleagues for their constant support and helping hands in making the study successful.

I also like to thanks blood bank department for their support in making the qualitative prp showing beneficial effects to the patients

Funding: No funding sources

Conflict of interest: None declared

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

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Cite this article as: Kadam R, Pandey S, Chhallani A, Pandhare S, Gupta A, Sawant R. To evaluate the efficacy of platelet rich plasma injection in chronic lateral epicondylitis (tennis elbow). *Int J Res Orthop* 2017;3:375-9.