

Original Research Article

A study on management of tennis elbow by local platelet rich plasma injection

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ABSTRACT

Background: Lateral epicondylitis (tennis elbow), a familiar term used to describe myriad symptoms around the lateral aspect of the elbow can occur during activities that require repetitive supination and pronation of the forearm with the elbow in near full extension. This condition can cause severe discomfort to the patient resulting in debilitation and impairment of routine activities. The purpose of this study was to evaluate the effectiveness of local autologous platelet rich plasma injection in the treatment of tennis elbow.

Methods: This was a prospective observational study conducted on 50 patients of either sex with an average age of 45.92 years, presenting to the Orthopaedic OPD of SHKM Government Medical College Hospital, Nalhar, NUH, Haryana between November 2016 and February 2018, with a diagnosis of lateral epicondylitis. All the patients were treated with local platelet rich plasma injection and the results were analysed through the assessment of visual analog score (VAS) and disability of arm shoulder and hand (DASH) score. The patients were followed up for a period of 6 months after the local injection of platelet rich plasma.

Results: Majority of the patients had significant relief with this method. The VAS and DASH score improved from the pre-treatment values of 8.7 and 74.6 to 2.6 and 29.8 respectively, which was found to be statistically significant ($p < 0.001$).

Conclusions: Thus results of our study demonstrate that the local injection of platelet rich plasma is a safe and effective method of treatment of lateral epicondylitis.

Keywords: Tennis elbow, Lateral epicondylitis, Platelet rich plasma

INTRODUCTION

Lateral epicondylitis also known as tennis elbow, is one of the most common overuse syndromes related to excessive wrist extension. It occurs more frequently in non-athletes than athletes, with a peak incidence in the early fifth decade and a nearly equal gender incidence. This condition was first described by Runge in 1873.¹ Although originally described as an inflammatory process, the current consensus is that lateral epicondylitis is initiated as a microtear, most often within the origin of the extensor carpi radialis brevis. Microscopic findings

show immature reparative tissue that resembles angiofibroblastic hyperplasia.² The pathological process mainly involves the origin of the extensor carpi radialis brevis, but can involve the tendons of the extensor carpi radialis longus and the extensor digitorum communis.³ This condition can cause severe discomfort and restriction of activities to the patient, resulting in functional impairment.

The treatment of tennis elbow has evolved over the years, with the conservative modalities of treatment being effective in majority of the cases.^{4,5} The various

conservative modalities of treatment include rest, ice, injections, and physical therapy with ultrasound, iontophoresis, electrical stimulation, manipulation, soft-tissue mobilization, friction massage, stretching and strengthening exercises, and counterforce bracing. Some patients who don't respond to above mentioned modalities have been treated successfully by local steroid or autologous blood injections.^{6,7} Patients who don't respond to conservative treatment and local injections are managed by several surgical procedures.⁸⁻¹⁰

Platelet rich plasma has found its application in various orthopaedic conditions like tendonopathies, osteoarthritis and osteonecrosis of femoral head. It has been found to enhance wound, bone, and tendon healing through the release of various platelet-derived bioactive factors such as vascular endothelial growth factor (VEGF), transforming growth factor (TGF)-b1, insulin-like growth factor (IGF) and platelet derived growth factor (PDGF).¹¹⁻¹⁴ Platelets present in PRP function as a tissue sealant, initiating wound repair. PRP platelets are initially activated by thrombin and collagen, releasing growth factors that attract undifferentiated cells into the newly formed matrix and trigger cell division.¹⁵ PRP can inhibit cytokine release from macrophages, improving tissue healing and regeneration by limiting the inflammation, can promote new capillary growth, and can accelerate epithelialization in chronic wounds.^{12,16,17}

In the present study, we evaluated the effectiveness of local autologous platelet rich plasma injection in the treatment of tennis elbow, through the assessment of visual analog score (VAS) and disability of arm shoulder and hand (DASH) score.

METHODS

After approval by the institutional ethics committee and informed written consent, the study was started. This was a prospective observational study conducted on 50 patients of either sex with an average age of 45.92 years presenting to the Orthopaedic OPD of SHKM Government Medical College Hospital, Nalhar, NUH, Haryana. between November 2016 and February 2018, with a diagnosis of lateral epicondylitis. The sex distribution was 27 females and 23 males.

Inclusion criteria

Inclusion criteria were age greater than 18 years; pain and tenderness over the lateral aspect of the elbow; one of the following tests being positive: wrist extension (Cozen's test), Mill's maneuver, jar lifting test, wringing test, broom, or stir frying test; History of failed conservative treatment, received in the form of analgesics and physical therapy.

Exclusion criteria

Exclusion criteria age less than 18 years; patients with history of anaemia (hemoglobin <7.0 g/dl) and

thrombocytopenia (platelets <150000/ul); pregnancy, local malignancy, rheumatoid arthritis and diabetes mellitus; no trial of conservative treatment given; history of local steroid injection in the previous one month, history of previous surgery in elbow.

Before the procedure, all the patients were thoroughly examined and proper history was taken. VAS and DASH score were measured. Complete blood count was done. The procedure was explained to the patients in detail and informed consent was taken.

Procedure

The platelet rich plasma was prepared in a standard fashion, around 15 ml of blood was taken from the patient and centrifugation was done in two spins. The patient was placed in supine position on the operating table. The area of maximal tenderness was identified. Under strict aseptic precautions local anaesthetic (2% xylocaine) followed by 2 to 3 ml of PRP was injected into the affected site with an 18-gauge needle. After the procedure the elbow was immobilized in an arm sling for 5 days and the patient was advised to avoid weight lifting with the affected extremity. The patients were prescribed oral antibiotics for 5 days. After 5 days the sling was removed and the patients were allowed to perform routine daily life activities. The patients were followed up monthly for 6 months. At the end of 6 months, the VAS and DASH score were again measured, and the data collected was subjected to analysis.

Statistical methods

The data was analysed with SPSS version 17.0 software. The demographic variables were assessed by number and percentage. Simple arithmetic mean was used for the description of the values of VAS and DASH score. A decrease in values of both scores from the pretreatment period to the follow up period was indicative of relief from the symptoms of the disease. A p<0.05 was taken to be statistically significant.

VAS

This score was assessed by a scale ranging from 0 to 10, with 0 representing no pain at all, while 10 representing the worst possible unbearable pain.

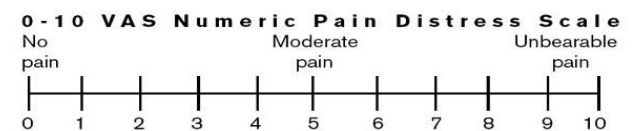


Figure 1: Visual analogue score for assessment of pain.

DASH score

This score was calculated by a questionnaire, 30 items related to various activities performed by upper limb

were asked to the patients and scored from 1 to 5, with 1 representing no difficulty in the respective activity while 5 representing inability to perform the activity. At least 27 of the 30 items must be completed for this score to be calculated. The values for all completed responses were summed and averaged, producing a score out of 5. The value was then transformed to a score out of 100 by subtracting 1 and multiplying by 25. The score was thus converted to a 0-100 scale with higher score indicative of greater disability.

$$\text{DASH score} = \frac{\text{sum of n responses}-1}{n} \times 25$$

where n is equal to the number of completed responses.

RESULTS

This was a prospective observational study. Most of the patients in our study had a significant improvement of their symptoms with the local autologous platelet rich plasma injection. The mean value of the VAS improved from pretreatment value of 8.7 to 2.6 at follow up, while the mean value of DASH score improved from a treatment value of 74.6 to 29.8 at follow up. Both of these changes were found to be statistically significant ($p < 0.001$). Three patients did not have any improvement with the injection, two of them had improvement with repeat injections, while one patient did not improve and required surgery.

Table 1: Age distribution.

Age in years	No. of patients	Percentage(%)
21-30	3	6
31-40	10	20
41-50	22	44
51-60	11	22
61-70	4	8
Total	50	100

Table 2: Sex distribution.

Gender	No. of patients	Percentage (%)
Male	23	46
Female	27	54
Total	50	100

Table 3. Depiction of the results of the study by the change in the values of DASH and VAS Scores.

Parameter.	Mean value of the parameter before treatment.	Mean value of the parameter at 6 months follow up.	P value
VAS	8.7	2.6	<0.001
DASH score	74.6	29.8	<0.001

DISCUSSION

Lateral epicondylitis, also known as tennis elbow is a painful tendinopathy of the common extensor origin of the elbow. The tendon most commonly involved in this condition is external carpi radialis brevis. This condition is caused by overuse of the tendons, initiated as a microtear and is associated with angiofibroblastic degeneration and collagen disarray.¹⁸ Tennis elbow is a very painful condition associated with severe limitation of activities of daily routine. This condition can be managed conservatively in the majority of the patients with oral anti-inflammatory medications and physical therapy. A minority of patients who don't respond to these modalities, are managed by local injections of steroids or autologous blood products like platelet rich plasma. The local injection of PRP provides significant relief of pain and improvement in function in these patients. The proposed mechanism of action of autologous PRP is improvement of early neotendon properties and improvement of tissue healing by enhancing cellular chemotaxis, proliferation and differentiation, removal of tissue debris, angiogenesis and laying of extracellular matrix.^{19,20}

In the present study, we evaluated the effectiveness of the local autologous platelet rich plasma injection in the management of lateral epicondylitis, through the assessment of VAS (Figure 1) and DASH score, with a decrease in both the scores indicative of relief from the symptoms. This was a prospective observational study conducted on 50 patients of either sex (Table 1) with an average age of 45.92 years (Table 2). All the patients were treated with local autologous platelet rich plasma injection and were followed up for a period of 6 months. The VAS and DASH score were measured before treatment and at follow up. Most of the patients in our study had a significant improvement of their symptoms with the local autologous platelet rich plasma injection. The mean value of the VAS improved from pretreatment value of 8.7 to 2.6 (Table 3) at follow up, while the mean value of DASH score improved from a treatment value of 74.6 to 29.8 (Table 3) at follow up. Both of these changes were found to be statistically significant ($p < 0.001$). There were no major complications in our study, three patients did not have any improvement with the injection, two of them had improvement with repeat injections, while one patient did not improve and required surgery.

The results of our study are quite comparable to other studies, done about this technique.²¹⁻²³ In the study by Mishra and Pavelko, although the sample size was larger with 140 patients, the improvement in VAS score is quite comparable to our study.²¹ In the study by Peerbooms et al, the PRP group included 51 patients which is quite comparable to our study and the improvements in DASH and VAS scores after 1 year are quite comparable to our study.²² In the study by Gupta and Bandari, 60 patients of tennis elbow were included and the values of DASH and VAS scores improved from 72 to 33.6 and 8.1 to 2.9

respectively at 3 month follow up, which compares quite favorably to our study.²³

CONCLUSION

From the above analysis, we can infer that the local injection of autologous platelet rich plasma is a safe and highly effective modality of treatment for tennis elbow.

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Conflict of interest: None declared

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

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