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The effect of platelet-rich plasma injection on lateral epicondylitis following failed conservative management

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Abstract

Introduction: Pain from the lateral aspect of the elbow was first described in 1873, and has since then been given different names such as tennis elbow, lateral epicondylitis, epicondylitis, epicondylalgia and lateral elbow pain. The etiology and pathogenesis of tennis elbow is not known, but the condition is considered to be an overuse injury of degenerative nature (Jozsa and Kannus, 1997 *et al.*). The pathology found in tennis elbow is addressed to the extensor carpi radialis brevis (ECRB) muscle origin (Nirschl and Pettrone, 1979)

Materials and Methods: 50 patients in the age group of 20 to 70 years of either sex presenting pain on the lateral epicondyle of either elbow after being clinically diagnosed as suffering from Lateral Epicondylitis / Tennis Elbow after having ruled out other possible causes of pain in this region presenting after 7 days of onset of pain with failed conservative management for 2 weeks attending OPD/emergency of the Post Graduate department of Orthopaedics, GMC Jammu were included in this study. The response to treatment was graded using Oxford elbow score.

Observations: In the present study of 50 patients there were 26 males and 24 females. In the present study of 50 patients the mean age was 43.98 years (Range between 22 to 74 years). In this study it was observed that the pretreatment mean oxford elbow score was 38.32 (20.83-56.24) which improved to 46.73 (20.83-66.65) at 1 month, 58.60 (33.32-81.23) at 3 months and 70.15 (35.41-87.48) at 6 months.

Discussion: Nonoperative treatment is successful in 95% of patients with tennis elbow. There have been several randomized controlled trials (RCTs) that have compared autologous whole blood with PRP injection, autologous whole blood with steroid injection and PRP with steroid injection. However, results as to whether PRP, autologous whole blood or corticosteroids is more beneficial are still unclear.

Conclusion PRP: improves pain and function in patients suffering from LE where conservative management has failed.

Keywords: platelet-rich plasma injection, lateral epicondylitis, conservative management

Introduction

Pain from the lateral aspect of the elbow was first described in 1873, and has since then been given different names such as tennis elbow, lateral epicondylitis, epicondylitis, epicondylalgia and lateral elbow pain. The most frequently used term is probably tennis elbow, implying a relationship with repetitive mechanical load while using a forceful grip, as in playing tennis (Shiri *et al.*, 2006) ^[1]. However, the majority of patients with this condition are not tennis players. The prevalence of tennis elbow is 1-2 %, and the condition is mainly seen among middle aged people (Verhaar, 1994; Palmer *et al.*, 2001; Walker-Bone *et al.*, 2003) ^[2, 3]. The etiology and pathogenesis of tennis elbow is not known, but the condition is considered to be an overuse injury of degenerative nature (Jozsa and Kannus, 1997 *et al.*) ^[4]. The pathology found in tennis elbow is addressed to the extensor carpi radialis brevis (ECRB) muscle origin (Nirschl and Pettrone, 1979) ^[5].

There are systematic reviews from the Cochrane Library for treatments of tennis elbow using shock wave therapy (ESWT), acupuncture, orthotic devices, deep transverse friction massage, surgery and non-steroidal anti-inflammatory drugs (NSAIDs) (Brosseau *et al.*, 2002; Buchbinder *et al.*, 2002; Green *et al.*, 2002a, b; Struijs *et al.*, 2002) ^[6]. Most reviews conclude little scientific evidence for the treatment due to small sample sizes and differences in study designs; patient selection, follow-up periods and different outcome measure. There is little evidence for or against good effects of any treatment.

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Materials and Methods

50 patients in the age group of 20 to 70 years of either sex presenting with pain on the lateral epicondyle of either elbow after being clinically diagnosed as suffering from Lateral Epicondylitis / Tennis Elbow after having ruled out other possible causes of pain in this region presenting after 7 days of onset of pain with failed conservative management for 2 weeks attending OPD/ emergency of the Post Graduate department of Orthopaedics, GMC Jammu were included in this study

Inclusion criteria

Patients who do not respond to conservative management for 2 weeks and ≥3 of the following clinical positive tests were included in the study:

1. Tenderness elicited just distal and anterior to the lateral epicondyle,
2. Pain with resisted wrist extension with an elbow in full extension,
3. Coffee cup test
4. Chair test
5. Thomson test
6. Cozens test
7. Mill’s Test

Exclusion criteria

1. Refusal of consent,
2. Patients suffering from elbow pain due to other causes like rheumatoid Arthritis, osteochondritis dissecans, crystal arthropathies like gout, radial tunnel syndrome, shoulder cervical radiculitis, neoplastic lesion and dermatomyositis.
3. Previous trauma around elbow,
4. Patients previously treated surgically for lateral epicondylitis,
5. Patients who had received steroid injection within 3 months,

Technique

PRP injection. 55 ml of blood would be taken from the patients and added to a centrifuge vial preloaded with 3 mg of anticoagulant citrate dextrose and the blood centrifuged at 700 rpm for 20 min. The plasma again centrifuged at 1750 rpm for 15 min to yield 4 ml of PRP.

Procedure

Initially, we would give a local field block in the form of 1 ml of 2% xylocaine. We would use 3ml of PRP without any activator with a 22 gauge needle attached to a 5cc syringe at the site of maximum tenderness (or lateral epicondyle) and in the vicinity (around the origin of ECRB). This technique would involve a single skin portal and then five penetrations of the common extensor origin including the ECRB tendon. After the injection for pain relief paracetamol/paracetamol with tramadol will be used and elbow would be kept in sling for comfort. After 24 hours, patients would be taught a standardized stretching protocol to follow for 2 weeks. Forearm strengthening program would be initiated after this stretching. At 3 weeks after the procedure, patients would be allowed to proceed with normal sporting or recreational activities as per tolerance and routine of the patient.

Evaluation

Patients were reassessed at 7th day, 15th day, 21st day, 2

month, 3 month, 5 month and 6 months for the following:

1. The response to treatment shall was graded under Oxford elbow score
2. Local tenderness,
3. Pain on wrist extension,
4. Elbow swelling

The Oxford Elbow Score

The Oxford Elbow Score has 12 items (questions) with 5 response options each. Each item response is scored 0 to 4, with 0 representing greater severity. Underlying the 12 items are 3 domains (sub-scales): Elbow pain, Elbow function and Social-psychological domain. Scores for each domain are calculated as the sum of each individual item score within that domain, which is then converted to a metric of 0 — 100 (lower score representing greater severity).

$$\text{Conversion to metric score} = \frac{100}{\text{maximum possible domain score}} \times \text{Actual score}$$

Table 1

grade	Actual Oxford Elbow Score	Metric Oxford Elbow Score
SEVERE	0-19	0-39.57
MODERATE	20-29	41.66 – 60.40
MILD	30-39	62.49 – 81.23
NORMAL	40-48	83.32 – 100



Fig 1

1 ml of 2% xylocaine being given as a field block



Fig 1

3 ml of PRP being injected with a 22 gauge needle attached to a 5cc syringe at the site of maximum tenderness (or lateral Epicondyle) and in the vicinity (around the origin of ECRB).

In this technique a single skin portal was made and then five penetrations of the common extensor origin including the ECRB tendon was

Observations

The male to female ratio was 1:1.083. In the present study of 50 patients there were 26 males and 24 females. In the present study of 50 patients the mean age was 43.98 years (Range between 22 to 74 years). Maximum number of patients were in the age group of 41- 50 years i.e. 22(44%) patients, followed by 13 (26%) patients in the age group between 31 – 40 years. In the present study of 50 cases, 34 (68%) patients had involvement of the dominant right side

whereas left side was involved in 16 (32%) patients. People with sedentary occupation were more affected i.e. 30 (60%) patients than people with non-sedentary occupation i.e. 20 (40%) patients. All the 50 (100%) patients in the present study had localised tenderness over lateral epicondyle area before and 1 month after PRP injection. At 3 months post PRP injection, 31 (62%) patients and at 6 months only 5 (10%) patients had localised tenderness present.

In this study it was observed that the pretreatment mean oxford elbow score was 38.32 (20.83-56.24) which improved to 46.73 (20.83-66.65) at 1 month, 58.60 (33.32-81.23) at 3 months and 70.15 (35.41-87.48) at 6 months.

Table 1: Distribution of Patients based on Mean Oxford Elbow score

	Mean Oxford Elbow Score	Max Oxford Elbow Score	Min Oxford Elbow Score
Pre Treatment Mean Oxford Elbow Score	38.32	56.24	20.83
Post prp mean oxford elbow score at 1 month	46.73	66.65	20.83
Post Prp Mean Oxford Elbow Score At 3 Months	58.60	81.23	33.32
post prp mean oxford elbow score at 6 months	70.15	87.48	35.41

It was seen that the most common complication post PRP injection was decreased active R.O.M. that lasted for more than 1 week but subsided mostly by 2nd week seen in 13 patients. There was a single case which relapsed at 6 months after initial improvement and 2 cases had no improvement.

Discussion

Nonoperative treatment is successful in 95% of patients with tennis elbow. The treatment of lateral epicondylitis includes rest, nonsteroidal anti-inflammatory medication, bracing, physical therapy, extracorporeal shock wave therapy and botulinum toxin injection. Injection of corticosteroids (once the gold standard but now considered controversial), whole blood and platelet rich plasma (PRP), and various types of surgical procedures have also been recommended. Injection with corticosteroids has been used since the 1950s and has been the treatment of choice for many years.

There have been several randomized controlled trials (RCTs) that have compared autologous whole blood with PRP injection, autologous whole blood with steroid injection and PRP with steroid injection. However, results as to whether PRP, autologous whole blood or corticosteroids is more beneficial are still unclear. Hechtman *et al.*, (2011) [7] in a similar study using PRP, treated 31 patients with epicondylitis not responding to conservative treatment for 6 months. Two cases elected surgery 1 month post-injection and 29 cases continued follow up. The overall success rate was 90% (28 of 31 elbows). Patient satisfaction improved from 5.1 ± 2.5 at 1 month to 9.1 ± 1.9 at last follow up.

Alisara Arirachakaran *et al.* (2015) [8] did a systematic review and network meta-analysis of randomized controlled trials, conducted with the aim of comparing relevant clinical outcomes between the use of PRP, autologous blood and corticosteroid injection. They concluded that the network meta-analysis provided additional information that PRP injection can improve pain and lower the risk of complications, whereas autologous blood injection can improve pain, disabilities scores and pressure pain threshold but has a higher risk of complications. The level of evidence of the study was Level I evidence.

The result of the present study was that PRP injection significantly improves Oxford elbow score.

In this study after 6 months of PRP injection, when asked about overall subjective satisfaction among the patients of

tennis elbow. 34 (68%) patients were satisfied 14 (28%) patients were satisfied with reservation and 2 (4%) patients were not satisfied. The results of this study were consistent with Peerbooms *et al.*, (2010), Hechtman *et al.*, (2011) [7] and Mishra and Pavelko (2006).

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