



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research  
Vol. 9, Issue, 3(G), pp. 25139-25142, March, 2018

**International Journal of  
Recent Scientific  
Research**

DOI: 10.24327/IJRSR

## Research Article

# ROLE OF ULTRASONOGRAPHIC EVALUATION IN COMPARING THE EFFICACY OF CORTICOSTEROID AND PLATELET RICH PLASMA IN LATERAL EPICONDYLITIS

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DOI: <http://dx.doi.org/10.24327/ijrsr.2018.0903.1799>

### ARTICLE INFO

#### Article History:

Received 25<sup>th</sup> December, 2017

Received in revised form 18<sup>th</sup>

January, 2018

Accepted 14<sup>th</sup> February, 2018

Published online 28<sup>th</sup> March, 2018

#### Key Words:

Tennis elbow, lateral epicondylitis, PRP, corticosteroid, ultrasonography.

### ABSTRACT

**Introduction:** Lateral epicondylitis is a common musculoskeletal disorder of the common extensor tendon, pathophysiology of which is not well understood. Recently biological agents (PRP) have showed favorable long-term outcome. In this study our aim was to evaluate the changes observed on ultrasonography to establish the efficacy of autologous PRP Versus Steroid injection in the treatment of chronic lateral epicondylitis.

**Material and Methods:** 72 patients aged 18 to 60 years were diagnosed with lateral epicondylitis. Patients were randomised to receive PRP (n=36) or CS (n=36) injection. Group A patient received 1 ml of local autologous PRP injection whereas; group B patients were injected with 1 ml (40 mg/ml) local methylprednisolone. Ultrasonographic and Clinical parameters including VAS and Oxford elbow score were reassessed in follow up at 2 weeks, 4 weeks, 3 months and 6 months.

**Result:** Ultrasonographic features and clinical parameters including VAS and Oxford elbow score and hand grip strength all improved significantly from pre-injection to the 6-month follow-up in the PRP and CS groups. However, in the CS group, the scores generally peaked at about 3 months and then deteriorated at 6 months indicating recurrence of symptoms. At 6 months, the number of patients positive for ultrasonographic findings generally decreased.

**Conclusion:** Ultrasonography finds a very important role in assessing the lateral epicondylitis and its follow up, this study concludes that PRP appeared to enable long term and biological healing of the lesion, whereas CS appeared to provide short-term, symptomatic relief but resulted in recurrences and tendon degeneration.

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## INTRODUCTION

Tennis elbow is a condition occurring at the common extensor tendon that originates from the lateral epicondyle. It is known by various names like lateral epicondylitis, elbow tendinosis etc. it is a common complaint among tennis players but even more common in non-players who perform similar activities involving strong gripping and repetitive wrist extension.

The incidence of TE is reported between 1 to 3% among non-athlete population. Typically TE affects individuals greater than 40 years of age with a history of repetitive activity aggravating the extensor tendon of the forearm. It affects both sexes equally and is more frequent in the dominant arm.

Lateral epicondylitis occurs initially through microlesions at the origin of the extensor musculature of the forearm, and most frequently affects the short radial extensor tendon of the carpus, which is located below the long radial extensor of the carpus.

The use of ultrasonography has been increased recently in musculoskeletal diseases because it being a noninvasive and inexpensive technique providing high resolution and dynamic imaging. Ultrasonography accurately demonstrates the morphology and echogenicity of common extensor tendon and its origin. Ultrasonography also allows the assessment of severity and location of the injury and can be used to confirm the diagnosis in cases with clinically equivocal cases. Ultrasonography can demonstrate well the features of lateral epicondylitis. It could also be helpful to show the extent of the disease.

The introduction of platelet rich plasma (PRP) as a possible adjunct to conservative and operative treatment has motivated significant research. PRP is promoted as an ideal autologous biological product, which contains a more concentrated amount of platelets (minimum twice) than does whole blood. PRP injections are prepared from one to a few tubes of the patient's own blood with strict aseptic technique. After being centrifuged, the activated platelets are injected into the

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abnormal tissue, releasing alpha granules and growth factors (VEGF and TGF- $\beta$ ) that recruit and increase the proliferation of reparative cells. The side effects of PRP injections are very limited as the patients are utilizing their own blood, which they should have no reaction to. On the other hand, intralesional steroids are comparatively faster acting but resulted in limited improvement over extended periods of time. More so ever, long term steroids injections are associated with various adverse effects.

This prospective study evaluated the changes in the ultrasonography and clinical parameters after injecting PRP or CS in tennis elbow patients.

### **Aims and Objectives**

To study the role of ultrasonography IN comparING the outcome and efficacy of intralesional autologous PRP injection VERSUS intralesional corticosteroid in treatment of lateral epicondylitis

### **MATERIAL AND METHODS**

The study was carried out at Department of Radio-diagnosis, M.G.M. Medical College and M.Y. Hospital, Indore. Patients referred to our department between Sept 2015 and Sept 2017, suspected clinically as chronic (>6 months) lateral epicondylitis, were subjected to ultrasonography.

#### **USG changes observed in both the groups (6 months follow up), Pre and Post- Treatment.**

| Assesment            | USG Findings                   |                |                                     |                |   |                |                          |                |  |                |
|----------------------|--------------------------------|----------------|-------------------------------------|----------------|---|----------------|--------------------------|----------------|--|----------------|
|                      | Tear of Common Extensor Tendon |                | Edema of the Common Extensor Tendon |                | Reduced Thickness of Common Extensor Tendon |                | Probe Induced Tenderness |                | Cortical Erosion at the Lateral Epicondyle |                |
|                      | Pre-injection                  | Post injection | Pre-injection                       | Post injection | Pre-injection                               | Post injection | Pre-injection            | Post injection | Pre-injection                              | Post injection |
| Prp group            | 0                              | 0              | 28                                  | 04 (86%)       | 10  | 2              | 30                       | 08 (73%)       | 08   | 08             |
| Corticosteroid group | 0                              | 0              | 26                                  | 10 (62%)       | 8   | 6              | 32                       | 14 (56%)       | 04   | 04             |

The ultrasonographic features of lateral epicondylitis in common extensor tendon including focal hypoechoic area, heterogeneity, focal areas of calcification, increase or decrease in thickness, partial or complete tear, peritendinous fluid collection and enthesophyte were investigated. 72 patients aged 18 to 60 years were diagnosed with lateral epicondylitis. Patients were randomised to receive PRP (n=36) or CS (n=36) injection. Group A patient received 1 ml of local autologous PRP injection whereas; group B patients were injected with 1 ml (40 mg/ml) local methylprednisolone. Ultrasonographic and Clinical parameters including VAS and Oxford elbow score were reassessed in follow up at 2 weeks, 4 weeks, 3 months and 6 months and results were recorded in the study proforma during each visit.

### **RESULTS**

There was a female predominance in both the study groups compared to male subjects. There were 16 males and 20 females in PRP group, and, 12 males and 24 females in the Corticosteroids group. Both the study groups demonstrated right sided predominance of the disease; with 67% patients affected on the right side in PRP group and 56% patients affected on the right side in Corticosteroids group. Both the groups showed significant improvement in the VAS score post treatment, but the difference was greater for PRP group as compared to Corticosteroid group.

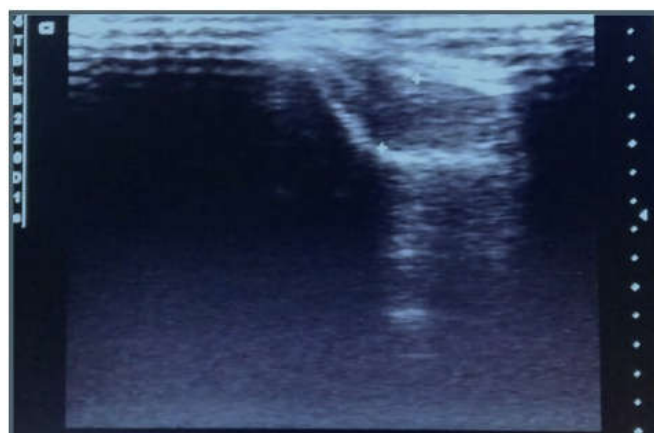
We found that after 6 months follow up, the functional outcome of majority of the patients improved. Compared to pretreatment state, both groups demonstrated significant improvement.

The USG changes observed are summarized in the following table.

#### **Result of Fischer exact test between pre-treatment and post-treatment 6 month follow up value of tendon edema, probe induced tenderness, restricted range of motion and tenderness**

|                               | PRP           |                | CS            |                | P-Value  |
|-------------------------------|---------------|----------------|---------------|----------------|----------|
|                               | Pre treatment | Post treatment | Pre treatment | Post treatment |          |
| Tendon edema                  | 28            | 02             | 26            | 10             | 0.28696  |
| Probe induced tenderness      | 30            | 08             | 32            | 14             | 0.457794 |
| Restricted ROM                | 18            | 0              | 12            | 04             | 0.205882 |
| Moderate to severe tenderness | 32            | 02             | 30            | 06             | 0.602597 |

As this study was limited by smaller follow up time, relative small sample size and lack of randomized placebo group. The result shows that both the groups improved in terms of outcome, but the difference between the two groups were not significant ( $p < 0.05$ ).



**A. Pre-treatment USG (Extensor tendon thickness = 6mm)**



**B. Post-treatment USG(Extensor tendon thickness = 3.2mm)**

**Figure 1** 41 years old male, right elbow affected, 8 months duration of Symptoms, registered in PRP group.



**A. Pre-treatment USG (Extensor tendon thickness = 4.7mm)**



**B. Post-treatment USG (Extensor tendon thickness = 2.9mm)**

**Figure 2** 45 years old female, right elbow affected, 5 months duration of Symptoms, registered in Corticosteroid group.

## DISCUSSION

Corticosteroids has anti-inflammatory effect via inhibiting Phospholipase A2, while PRP inhibits inflammation at first, appears to enable biological healing of the lesion at later stages by local release of cytokines and growth factors. After six months of treatment, intra-lesional PRP has showed better prognosis than corticosteroid. The functional improvement as measured by VAS score and Oxford elbow score, was better in PRP group. Post injection, PRP results in increased tendon vascularity and improved tendon morphology as evaluated by USG studies.

At the end of 6 months number of patients with positive findings in USG decreased in both the groups; however PRP group demonstrated better result. None of the patient showed improvement in cortical erosion at the end of 6 month follow up. Resolution of extensor tendon edema was observed in 86% (out of those affected) in PRP group as compared to 62% in CS group. Similarly for probe induced tenderness 73% (out of those affected) in PRP patients benefitted as compared to 53% in CS group.

The thickness of the common extensor tendon on was reduced in 80% of the patients in PRP group on 6 month follow up, while in corticosteroid group initially (3 months follow up) the thickness decreased in patients having thickened extensor tendon but later on, in 6 months follow up the thickness increased in 75% of the patients, representing the recurrences of the disease in CS group. Baseline tendon tear was not observed in any patient on ultrasonography.

## CONCLUSION

Ultrasonography is a practical method in the demonstration of lateral epicondylitis and could be more commonly used in daily practice. Our results suggest that high resolution Ultrasonography Can Demonstrate Changes In Morphology, internal architecture and echogenicity of common extensor tendon in patients with lateral epicondylitis. Intralesional PRP could replace the corticosteroids, as the primary treatment for chronic tennis elbow cases as indicated by our study. Ultrasonography can be used as a primary imaging method in lateral epicondylitis which confirm the clinical diagnosis, extent of the disease, treatment response, and follow up Evaluation.

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**How to cite this article:**

Amaresh Kumar Shukla., Alka Agrawal and Amit Shankhwar.2018, Role of Ultrasonographic Evaluation in Comparing the Efficacy of Corticosteroid and Platelet Rich Plasma in Lateral Epicondylitis. *Int J Recent Sci Res.* 9(3), pp. 25139-25142. DOI: <http://dx.doi.org/10.24327/ijrsr.2018.0903.1799>

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