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Efficacy of local platelet rich plasma in tennis elbow–15 case series

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Abstract
Lateral epicondylitis is the most common overuse syndrome and related to excessive wrist extension, that usually resolves with nonoperative treatments. When these measures fail, however, patients are interested in an alternative to surgical intervention. This study was carried out to assess the effectiveness of PRP injection in improving pain and function in patients with lateral epicondylitis.
Material and Methods: This study included 15 patients with lateral epicondylitis (more than 3 months) between 25 and 55 years of age. All patients were subjected to assessment of history, clinical examination, functional assessment by Mayo elbow score.
Results: Eight weeks after the treatment, Patients noted 60% improvement in their visual analog pain scores, at 6 months, 81% improvement, at final 1 year follow-up 93% reduction in pain. Mean Mayo elbow performance score improved from 55 to 95 at final follow up in all patients.
Conclusion: PRP injection relieves pain in lateral epicondyltits on long term with improvement of daily activities level. It can be a good alternative to surgery for failed conservative management patients.

Keywords: lateral epicondylitits, platelet rich plasma, mayo elbow score, visual analog score

Introduction
Lateral epicondylitis is the most frequent type of myotendinosis. It is a painful condition affecting the tendinous tissue of the origins of the wrist extensor muscles at the lateral epicondyle of the humerus, leading to loss of function of affected limb. Therefore, it can have a major impact on a patient's social and professional life. This injury predominantly involves the origin of the short radial extensor muscle of the carpus, in which microtears develop as a result of excessive and abnormal use, with formation of immature repair tissue. The symptoms of lateral epicondylitis of the elbow are generally self-limited and may vary in duration from a few weeks to months. However, in some cases, there is no spontaneous resolution of the symptoms, and this invariably leads to a chronic condition. The treatment options range from relative rest in association with immobilization, physiotherapy, application of botulinum toxin, acupuncture, shock wave therapy, use of oral non-steroidal anti-inflammatory drugs, steroid injections and, most recently, use of platelet rich plasma. Surgical procedures are only recommended when the symptoms last for more than six months and/or if other non-surgical treatment options have failed. Platelet-rich plasma (PRP) is blood plasma with an increased concentration of autologous platelets. PRP can potentially enhance tendon healing and tissue regeneration by delivering various growth factors and cytokines, thereby affecting cell proliferation, chemotaxis, cell differentiation, and angiogenesis. Among these growth factors are platelet derived, transforming, vascular endothelial, epidermal, and fibroblast. The theory is that application of PRP intratendinously will stimulate the repair mechanisms and promote tendon healing.

Material and Methods
Patient data
Patients included in the study had pain on the lateral side of the elbow for more than 3 months, and tenderness at the lateral epicondyle on direct palpation and during resisted dorsiflexion of the wrist. Age group included in the study is from 25 to 55 years of age. This study includes 12 males and 3 females. Assessment of medical history and thorough clinical examination were performed; the visual analogue scale (VAS) was used for pain: It is a numeric scale, with 0 representing no pain and 10 representing the worst pain imaginable. Functional assessment of the elbow joint was performed using Mayo elbow performance score.

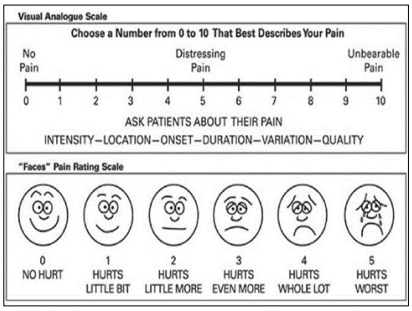

Fig 1: Visual Analog Scale

Table 1: Mayo Elbow Performance Score

Function	Point	Definition (point)
Pain	45	None (45) Mild (30) Moderate (15) Severe (0)
Motion	20	Arc $>100^{\circ}$ (20) Arc $>50^{\circ}$-100° (15) Arc $<50^{\circ}$ (5)
Stability	10	Stable (10) Moderate instability (5) Gross instability (0)
Function	25	Comb hair (5) Feed (5) Perform hygiene (5) Done shirt (5) Done shoe (5)
Total	100	

Classification: Excellent >90; Good 75-89; Fair 60-74; Poor <60.

PRP Preparation & Application

10 ml of blood has been taken from patient in tubes that contained sodium citrate. These tubes were then subjected to two cycles of centrifugation. Two thirds of the original volume (platelet-poor plasma) was discarded in this method. Only one third of the original blood sample consisted of PRP.

Finger pressure was applied locally to the patients so thatthey could identify the region of greatest pain. Approximately 1 ml of PRP was injected directly into the area of maximum tenderness.

Postprocedure Protocol

Immediately after the injection, the patient was kept in a supine position without moving the arm for 15 minutes. Patients were sent home with instructions to limit their use of the arm for approximately 24 hours. The use of NSAIDS was prohibited. After 24 hours, patients were given a standardized stretching protocol to follow for 2 weeks. At 4 weeks after the procedure, patients were allowed to proceed with normal sporting or recreational activities as tolerated. Patients were followed up at 1,2,3,6 & 12 months. Visual analog pain score & Mayo elbow performance score were assessed in all patients.

Results

The follow up period ranged between 10 months and 14 months with an average of 12.4 months. The average VAS improved from 8.4 to 2.1 and the average Mayo elbow performance score improved from 55 to 95 at final follow up. There were no complications reported in this study. There were no recurrence at 1 year follow up and no patients needed surgery.

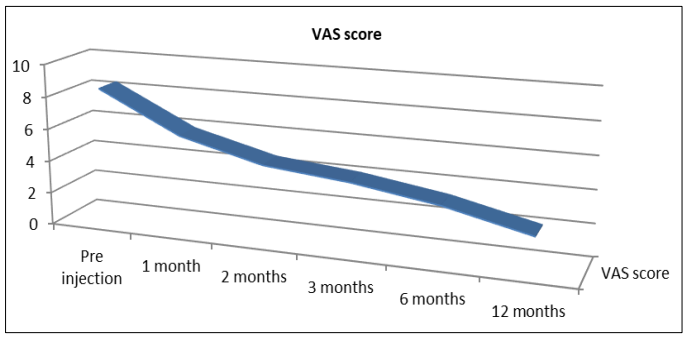

Fig 1

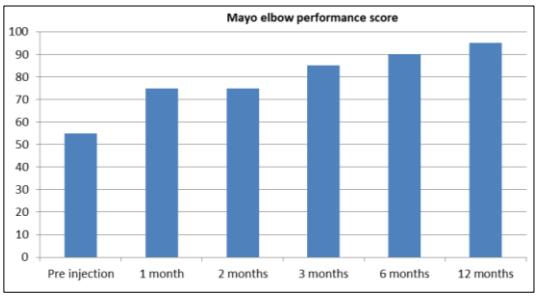

Fig 2

Fig 3

Discussion

Lateral Epicondylitis is a common problem with many possible treatments. Quick cessation of symptoms is important to patients and is economically advantageous. 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. The pathological process mainly involves the origin of the extensor carpi radialis brevis but can involve tendons of the extensor carpi radialis longus and the extensor digitorum communis.

PRP is increasingly being used in the treatment of chronic nonhealing tendon injuries including the elbow, patella, and the Achilles.

Studies suggest that PRP can affect inflammation and soft tissue healing as platelets contain an abundance of growth factors and cytokines that are essential for soft tissue healing and bone mineralization.

Many articles have studied the use of PRP in treatment of lateral epicondylitis in the past few years.

Mishra and Pavelko (2006) [7] 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.

Hechtman *et al*., (2011) 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.

Peerbooms *et al*., (2010) compared the results of two groups of patients suffering from lateral epicondylitis. The first group (n = 51) treated by PRP injection and the second group (n = 49) treated by corticosteroid injection. The results showed 73% success rate

in the PRP group compared to 51% success rate in the corticosteroid group after 1 year follow up.

Thanasas *et al*. (2011) treated two groups of patients with lateral epicondylitis the first group included 14 patients treated by PRP injection and the second group included 14 patients treated by injection of autologous blood and concluded that PRP treatment is superior to autologous blood concerning short term results but no statistically significant difference in the elbow function at follow up.

Conclusion

PRP leads to a reduction in pain intensity and functional disability in daily life activities, we recommend its use after failed conservative therapy. Moreover, it has a longer duration of action and enables greater healing.

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