Chronic Tennis Elbow Treated by Platelet-Rich Plasma Versus Steroid Injections: A Comparative Study

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ABSTRACT

Background: Painful elbow joint over the lateral epicondyle especially with resisted wrist extension are common signs of lateral epicondyle tendinopathy, also called tennis elbow.

Objective: To evaluate the clinical outcome of local platelet rich plasma (PRP) injection in patients with chronic tennis elbow compared with a steroid (Depomedrol 40 mg) injection.

Methods: A total of 88 patients with chronic tennis elbow were treated at Al-Kindy Teaching Hospital and private clinics. All patients had chronic pain for about 24 weeks or more and had failed first line treatment. The patients dividing into two groups, Group A injected with PRP (n = 44), and group B injected with depomedrol 40 mg (n = 44). A good clinical result was demarcated as 25% or more progress on the visual analog scale for pain. All patients followed for 6 months in both group for clinical successful result.

Results: At three months (n = 44), in group A reported a perfection of 58.2% in their pain scores while 49.3% in the group B (N = 44). At 6 months follow up, the group A informed a perfection of 74.3% in their pain scores while 58.4 % in the group B. The local elbow tenderness recording at three months was 37.4% in the group A, while in the group B was 48.4%. At six months, 16.1% versus 30.2% recounted major elbow tenderness (P = .009) in groups (A and B) respectively.

The clinical improvement rates at three months revealed no changes between both groups while it showed more significant clinically changes in group A (87.1%) than in group B (70.1 %) with P value = 0.008 after six months follow up.

Conclusion: No important changes were found at 3 months in both groups, but at 6months, clinical significant perfections in patients treated with PRP group (group A)

Keywords: platelet-rich plasma, steroid, tennis elbow.

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Received at 28/7/2019
Accepted at 4/9/2019

INTRODUCTION

Tennis elbow is chronic lateral epicondylar tendinopathy, patient complaining of pain and tenderness over the lateral epicondyle, due to minor tear in the extensor carpi radialis brevis muscle with subsequent fibroblastic dysplasia [(1)] or due to neuro-genic causes [(2,3)] or recently due to vascular response abnormality in the muscle [(4)].

Lateral epicondylitis described in 1883 [(5)], and any lines of treatment for this tenopathy were described. The first line includes activity reduction, non-steroidal anti-inflammatory drugs, physiotherapy and rest by bracing. When these measure fail second line treatment by steroid injection, platelet-rich plasma (PRP) injections, and lastly surgery when these measures fail as third line which account about 10-15 % of cases. This include debridement, open or arthroscopically and tendon release with 85% success rate [(6)].

Platelets contain about 300 cytokines and growth factors that aid organize cellular communication [(7)]. Platelets also discharge vasoactive ingredients such as histamine, calcium, and serotonin [(8, 9)] also PRP improves tendon cell production, differentiation, and maturation. [(10, 11, 12)]

Platelets is activated by thrombin and/ or calcium to started discharge of the granules insides and promotes a good healing response [(13)].

The clinical outcome of local PRP injection in patients with chronic tennis elbow was compared with a steroid (Depomedrol 40 mg) injection to assess its effect.

METHODS

A prospective study conducted in Al-Kindy Teaching Hospital and private clinics consisting of 88 patients,between 18 and 50 years old, with chronic lateral epicondylitis dividing randomly into two groups: group A, 44 patients treated with PRP and group B, 44 patients with local steroid (depomedrol 40 mg) injection.

All patients had failure in conservative treatment for at least 3 months duration including NSAID, physiotherapy and rest.

The following exclusion criteria were considered:

1. Pregnancy
2. History of anemia
3. History of blood diseases.
4. Cervical radiculopathy
5. Chronic diseases (diabetes, rheumatoid arthritis)
6. Previous surgery for elbow tendinosis
7. Fracture around the elbow

A written informed consent was taken from each study participant. The study continues for two years from March 2017 to March 2019. PRP Preparation was done after blood taken from a peripheral vein of the patient (about 20 mL). Then mix an anticoagulant with aspirated blood and collect in a sterile centrifuge tube. Then the tube was centrifuge for 15 minutes at 3200 rpm. Then final platelet rich plasma about 2 ml was injected into the extensor carpi radialis brevis tendon and surrounding area using a peppering procedure, this procedure involved of multiple infiltrations of the tendon.

The second group was injected with one ml of local anesthesia (xylocain) after mixing with 40 mg depomedrol using the same peppering procedure.

The follow up measure include the visual analog scale with resisted wrist extension. Patients revealed their pain score on a 100-mm visual analog scale. A positive outcome was demarcated as 25% or more perfection in this score related to initial record. This score applied to the patients at 1, 2, 3, and 6 months post injection to demonstrate the amount of effectively treated patients.

In both groups no variances between the two groups regarding sex, weight, and age. The mean age in the group A 39.4 years while 41.4 years in the group B. X-ray of the elbow was performed to all patients.

Successful treatment was recorded as decrease in pain when more than or equivalent to 25% of the visual analog pain score compared to initial record.

RESULTS

Our results demonstrated no significant differences regarding the improvement in the clinical pain score in both groups in follow up period one, two, and three months. After one month in group A was 40% while in group B was 35% (P = 0. 335). At two months 55.8% in group A and 40.4% in group B (P = 0.23). While at three months was 58.2%in group A and 49.3% in group B (P = 1.63).

There is significant improvement at 6 months follow up in group A 74.3% as compare with group 58.4% (P = 0.019). (Table 1)

Regarding local pain and tenderness , no significant differences of local tenderness after wrist extension in the 1,2,and 3 months after injected follow up , but there is great differences at 6 months after treatment (P = .009) (table 2). Regarding the clinical improvement rates at three and six months, there were no changes between both groups in clinical improvement rates (group (A) 65.4% and 57.0% in group (B) during three months follow up were analyzed for 25% decrease in pain score related to initial reading record.

Estimating the 88 patients after six months of injection showed significant clinically changes in group (A) was 87.1% and 70.1 % for group (B) with P value = 0.008. (Figure1).

No complication or signs of infection was notice in both groups apart from skin hypopigmentation in group (B) over the lateral epicondyle in seven patients (15.1%)

Table 1: Mean percentage improvement in visual analog score

	Baseline (%)	4 wks. (%)	8wks (%)	12wks (%)	24wks (%)
Group A	32	40	55.8	58.2	74.3
Group B	31	35	40.4	49.3	58.4
P Value	0.42	0.335	0.23	1.63	0.019

Table2: Mean tenderness at lateral epicondyle

Tenderness	Baseline (mean)	4 wks. (mean)	8wks (mean)	12wks (mean)	24wks (mean)
Group A	60.8	42.6	35.5	27.8	16.1
Group B	57.9	44.8	34.7	28.3	30.2
P Value	0.23	0.15	0.23	0.09	0.009

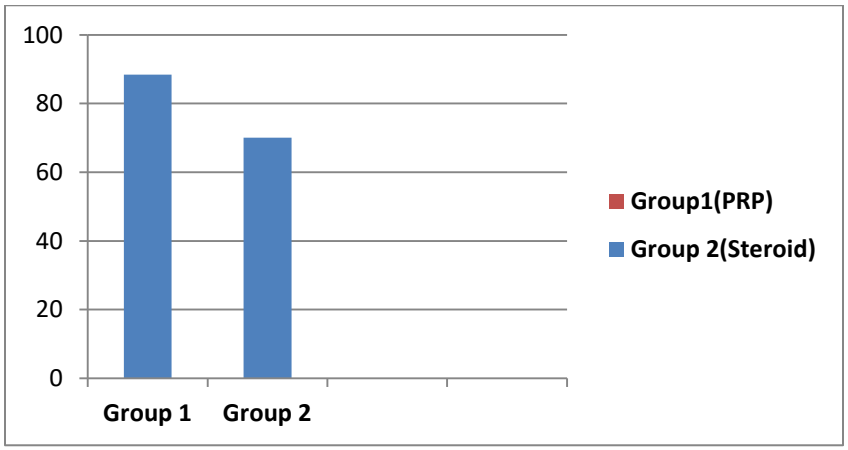

Figure 1: Clinically success change

DISCUSSION

Chronic tennis elbow is a common disorder seen by family medicine, rheumatologist, and orthopedic surgeons. It is usually self-limiting or treated by nonoperative methods such as decrease daily activity, anti-inflammatory drugs, physiotherapy ,and daily life adjustment. Exercise movement also important in the cooperative patients by strength and stretching exercise. In about 10% to 15% of patients progress to chronic tennis elbow.

In our study there are significant alterations in clinical follow up in group with platelet rich plasma injected than in the steroid-treated patients group at 6 months follow up as more pain decrease in the PRP group. This comparable to other studies by Gosens et al [14]. Peerbooms et al [15] , Krogh et al [16] , and Mishra et al [17].

In our study seven patients (15.9%) developed skin pigmentation at site of injection at lateral epicondyle in group (B) and this parallel to study of Lindenhovius et al [18]. This approves that local steroid injections are not benign.

In this study better outcomes were notice with PRP injection. The PRP improves pain by hypothesized that the bioactive fragments in the PRP increase or progress the tendon physiology in a way that lets for improve the function and deduce pain, other recommended by ultrasound that

platelet rich plasma can increase the morphological features of the tendon [19]. Pain improvement may also be the consequence of certain modification in neural pain reactions or substance P metabolism. Also, PRP may increase the blood flow in the tendon vasculature system and surrounding muscle, therefore deducing pain. [13] Recently advocate that an local injection in the tendon by platelet rich plasma leading to a systemic raise of vascular endothelial growth factor for numerous days.[20] and thus increase the blood flow to the tendon and adjacent muscle. Several disorders can treated by PRP like rotator cuff disease.[21-25], management of patellar and Achilles tendinitis , and knee derangement .[26-31] In this study, we depend on improvement clinically when reach to 25% or more in visual analog scale pain which was not statistically important at three months but significant success rate in the six months results. (P = .019), elbow tenderness (P = .009), and success rates if the minimum improvement is set at 50% (P = .008). Our result were similar to the study of Gosens et al [14] and Mishra and Pavelko [17] .

Recommendation

Treatment of chronic tennis elbow by PRP with good clinical successful rate after 6 months post injection and the patient should be informed that the result may take long period of time until the result appear.

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