



STERIOD INJECTION AND PLATELET RICH PLASMA INJECTION IN THE TREATMENT OF TENNIS ELBOW: A COMPARATIVE STUDY.

Orthopaedics

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ABSTRACT

The aim of this study was to compare the therapeutic effects of corticosteroid injections and platelet-rich plasma (PRP) injections in the treatment of tennis elbow. The study group comprised of 50 patients divided into two equal groups. In the corticosteroid group (Group A; n=25), 2 ml of methylprednisolone (40 mg/ml) was injected. In the PRP group (Group B; n=25), PRP was obtained from the patients own blood and injected in a single dose. Visual Analog Scale (VAS) and Disabilities for Arm, Shoulder and Hand (DASH) score was used to calculate the results pre injection and post injection. Patients enrolled in the study were followed at 1 week and 12 weeks time period. There were no complaints of any side-effects to the administered corticosteroid or platelet-rich plasma. No infection or any other complications were reported at the end of 12 weeks. On final follow up, the outcome between the 2 groups was comparable in terms of VAS and DASH scores. It was found that PRP therapy proves to be more effective in relieving pain than corticosteroid injections in treatment of tennis elbow.

KEYWORDS

corticosteroid, growth factor, elbow pain, tennis elbow, platelet-rich plasma

INTRODUCTION

Tennis elbow predominantly involves the origin of the short radial extensor muscle of the carpus, in which micro tears develop as a result of excessive and abnormal use, with formation of immature repair tissue [1-4]. Tennis elbow is the most common cause of elbow pain in orthopaedic practice. It is most commonly seen in the age group of 40-50 years with a slight female sex preponderance. These patients usually are engaged in activities that involve repetitive extension movements at the wrist [5-7]. It is also known as lateral epicondylitis, however, inflammatory cells are not found in the affected tissue. A typical patient complains of pain along the lateral epicondyle of the elbow that sometimes radiates along the entire lateral aspect of the forearm. Although it has been described as a self limiting condition, many patients do not show spontaneous resolution of symptoms leading to a chronic condition [8, 9]. A large number of treatment options have been considered in treating tennis elbow including Non-steroidal anti-inflammatory drugs (NSAIDs), physiotherapy ultrasonic therapy, stretching exercises, tennis elbow braces and customized support bands and Extracorporeal shock-wave lithotripsy (ESWL). Corticosteroid injections have also been used over the past. Recently, platelet-rich plasma (PRP) injections have also been used with promising results [10-12].

MATERIALS AND METHODS

The study includes 50 consecutive patients diagnosed with tennis elbow between June 2018 to May 2018. The diagnosis was done clinically by the same orthopaedic team as characteristic pain lateral elbow pain with a positive Cozen's test lasting for more than a period of 6 months. All the patients had symptoms non-responsive or recurrence of symptoms following conservative and physical therapy. Patients with previous history of fracture or surgery on the affected elbow, those with previous history of steroid injections, infections or systemic diseases, arthritis, radiculopathy and patients on anti-platelet medication and oral steroids were excluded from the study. All patients were instructed to stop taking NSAIDs 3 weeks prior to procedure. Patients were randomly divided into two groups. The study was explained to every patient and informed consent was obtained from them prior to the procedure. Patients in Group A were administered steroids whereas in Group B were subjected to PRP therapy. The procedure was performed in the operative room under all sterile aseptic precautions. The patient was made to lie supine with the elbow flexed and hands lying over the patients abdomen. The injection site was cleaned with povidone iodine and normal saline. In Group A, 5cc syringe containing 2 ml of Methylprednisolone (40mg/ml) was injected. The maximally tender spot on the lateral aspect of the elbow was identified by palpation. In Group B, 20 ml of patients' blood was withdrawn and inserted into pre-packed PRP kits (Tricell) along with 5 ml of anticoagulant 10% sodium citrate. The PRP sample was

prepared by a double centrifugation process. The first centrifuge was done at 3200 rpm for 4 mins. The cellular component was separated from the fluid component and a second centrifuge was then performed at 3300 rpm for 3mins. Following this, approximately 2 ml was obtained. Injection was done with the same technique. Pre-procedure and on final follow-up, patients were assessed for their symptoms using Visual Analog Scale (VAS) and Disabilities of Arm, Shoulder and Hand (DASH) score.

RESULTS

The study included 50 patients equally divided into two groups. The mean age of patients in Group A was 33.96 years and in Group B was 37.00 years. Group A had 10 males and 15 females, whereas Group B comprised of 11 males and 14 females, comprising a total of 21 males (42%) and 29 females (58%). In Group A, the right elbow was affected in 15 patients whereas the left elbow was affected in 10 patients, whereas in Group B, the right elbow was involved in 17 patients and the left elbow was involved in 8 patients, comprising a total right elbow involvement in 32 patients (64%) and left elbow involvement in 18 patients (36%). Table 1 illustrates the demographic distribution of the patients in this study. At the end of 12 weeks follow-up, There were no complaints of any side-effects to the administered corticosteroid or platelet-rich plasma. No infection or any other complications were reported at the end of 12 weeks. Important fact to note that while all patients in Group B showed steady decline in symptoms, 7 patients from Group A showed initial improvement in the first 4 weeks, and then later on the symptoms showed recurrence, however not as debilitating as in pre-procedure records. VAS and DASH score was significantly improved in group A patients when compared with group B.

S.No	Group A [Corticosteroid]			Group B [Platelet rich plasma]		
	Age	Sex	Side affected	Age	Sex	Side affected
1	34	F	R	20	F	L
2	32	F	L	30	M	R
3	30	M	R	42	F	R
4	52	F	L	51	M	L
5	54	F	R	22	M	R
6	29	M	R	33	M	R
7	26	M	R	34	M	R
8	37	F	R	39	F	L
9	42	M	R	42	F	L
10	40	M	L	40	F	R
11	47	M	R	50	F	R
12	39	F	R	62	F	R
13	23	F	L	20	F	R
14	51	F	L	26	M	L

15	23	F	L	37	F	R
16	26	M	R	42	M	L
17	52	F	R	54	F	R
18	40	M	R	28	M	R
19	34	F	L	34	M	R
20	32	M	R	44	F	L
21	42	F	L	42	F	R
22	30	F	R	29	F	R
23	20	F	L	30	F	R
24	44	M	R	33	M	L
25	44	F	L	41	M	R

DISCUSSION

Efficacy of corticosteroid versus platelet-rich plasma in treatment of tennis was studied. In our study, we found significant differences between both groups relative to VAS, DASH scores before and 12 weeks after treatment. The etiopathology of tennis elbow is debatable; histologic findings have suggested an etiology of degenerative changes, subsequent to repetitive micro-trauma due to overuse injuries causing subsequent micro-tears and degeneration. Nirschl *et al.* coined the term "Angiofibroblastic tendinosis" to describe this condition, as histological studies from the affected tissue reveals both an excess of fibroblasts and blood vessels that are consistent with neo-angiogenesis [13]. Recent studies by Ljunget *et al.* showed sensory fibres containing substance-P and CGRP (calcitonin gene-related peptide) like immune reactivity in the origin of the ECRB, implying the possibility of neurogenic inflammation as a cause of the perceived pain [14]. Corticosteroid injections have been in use for a long time in treating chronic lateral epicondylitis. A study performed by Smidt *et al.* showed early success with corticosteroid treatment in reduction of pain and grip strength [15]. These benefits did not persist and there was a high recurrence rate in the injection group. Coombes *et al.* reviewed 41 RCTs to assess efficacy and safety of corticosteroids and other injections in lateral epicondylopathy. They concluded that while corticosteroids were superior to other treatment methods in the short-term non-steroidal injections are of more benefit in the long term [16]. Platelet-rich plasma has been used to treat tennis over the last decade. PRP, being rich in growth factors and platelets, has been hypothesized to help in healing of the tissue [17-20]. Evandro *et al.* performed a study on 60 patients diagnosed with chronic lateral epicondylitis treated with PRP having significant improvement in 81.7% of the patients [21]. Raeissadat *et al.* performed a study using PRP and AWB (autologous whole blood), both leading to significant improvement in pain, function and pain pressure threshold in patients with chronic lateral epicondylitis [22]. Muto *et al.* performed a study on the effect of PRP and corticosteroids on human rotator-cuff derived cells. In their study, they showed that while PRP and corticosteroids both show a progressive decrease in inflammatory markers on target tissue, corticosteroids have shown to have an increase in degenerative markers in contrast to PRP which shows a decrease in the degenerative markers on the target tissue [23].

This may explain the predisposition of corticosteroids to rupture of the target fascia and also to recurrence of symptoms. Treatment with PRP has not known to have any significant long-term complications nor incidences of relapse or recurrences. In our study, 5 patients from the corticosteroid group had given a history of recurrence of symptoms 4 weeks after the procedure. This could be consistent to the findings of Muto *et al.* with a subsequent increase in the degenerative markers and decrease in overall therapeutic effect. Our study had a few limitations. First, we did not have a control group. Second, we did not use ultrasound guidance to administer the injections, hence we were not aware of the preprocedure pathological tear dimension of the common extensor tendon. Hence, there were no definite guidelines to the dose of the steroid to be administered. Third, with the use of PRP, we did not measure the pre-centrifuge and post centrifuge platelet concentration in any of the samples, hence no standard dose of administration could be quantified. And finally, our study had a short follow up period of 12 weeks. Hence, the long-term effects therapeutic effect as well as drawbacks of the therapy could not be studied. Another notifiable drawback of our study was the exclusion of patients previously treated with corticosteroids.

CONCLUSION

Our study showed that corticosteroid and PRP both have significant therapeutic effect in treating chronic tennis elbow, however PRP has been proven to be superior to corticosteroid.

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