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Original Research Article

A COMPARATIVE STUDY OF EFFICACY BETWEEN PLATELET RICH PLASMA (PRP) VERSUS LOCAL CORTICOSTEROID INJECTION IN THE TREATMENT OF LATERAL EPICONDYLITIS (TENNIS ELBOW)

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ABSTRACT

Introduction: Orthopaedicians treats the patients with local injection of corticosteroid (CS) will get the short term pain relief after, not for the long term. Platelet-rich plasma (PRP) injection for lateral epicondylitis (LE) reduces pain and induces healing of the common extensor tendon injury and vascularisation of the diseased tendon. Currently this study evaluates the treatment outcome results of the PRP injection when compared with CS in the treatment of LE.

Materials and Methods: Study was conducted at orthopedic department of Birds hospital, Tirupathi, Chitoor, A. P., with 40 patients of 20 cases in each group, Group A patients were injected with 2 ml of PRP was injected and In Group B 2 ml of methyl prednisolone (40 mg/ml) was injected at the most tender point over the lateral epicondyle of the humerus using the peppering technique and evaluation was carried out to assess the amount of the pain and the amount of disability in the pre-injection phase, and on subsequent consultations at 4 weeks, 12 weeks & 6 months (the final follow up). The pain was assessed by using the Visual Analogue scale (VAS) and the disability was assessed by Nirschl staging.

Results: Pre-injection, the mean VAS scores for pain and Nirschl stages were similar in group A and group B with P value of 0.74, mean Nirschl stage in group A and group B was 5.84 and 6.05 respectively with P value of 0.45. There was significant difference between the groups in VAS score (0.56 versus 1.88) and Nirschl stage (0.32 versus 1.84) at 6 months of follow up. At the six-month follow-up 90% patients had complete pain relief in group A in comparison to only 45% in group B. Seven out of 20 (35%) patients had recurrence of pain at 6 months of follow up in group B but none of patients reported recurrence of pain or disability in group A.

Conclusion: PRP appeared to enable biological healing of the lesion, whereas CS appeared to provide short term, symptomatic relief but resulted in tendon degeneration.

KEY WORDS: Corticosteroid, Lateral epicondylitis, Platelet-rich plasma, Tennis Elbow.

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BACKGROUND

1% to 3% of tennis players (male and females) are affected equally with lateral epicondylitis (LE) is a common reason for lateral elbow pain also called as tennis elbow it's less commonly seen in the general population, and it is fourth and fifth decade of life [1,2]. Not only in the manual laborers and people involved with extensive physical work but recently more number of software engineers and people working with desktops are affected by tennis elbow. The disorder arises as a result of repeated

movements of the wrist extensors because of over usage causing micro trauma to the muscles. Symptoms mainly consist of pain over the lateral aspect of elbow, reduced grip strength which may result in considerable disability in routine activities [3]. It can be diagnosed with ease just based on clinical history & examination but there has been no consensus regarding the ideal treatment protocol [4,5]. Formerly, the lesion in tennis elbow was considered to be inflammatory in nature, but now it has been shown that the disease is primarily degenerative and microscopically evident neovascularization and fibroblastic degeneration within the substance of extensor tendons, particularly affecting the extensor carpi radialis brevis [6,7].

Extensor carpi radialis brevis is more frequently involved than extensor carpi radialis longus and extensor digitorum communis [8].

Orthopaedicians treats the patients will get the short term pain relief after local injection of corticosteroid (CS) [9], not for the long term [11,12]. Platelet-rich plasma (PRP) enhances healing by delivering high concentrations of alpha-granules containing biologically active moieties (such as vascular endothelial growth factor and transforming growth factor-â) to the areas of soft-tissue damage [13,14]. In PRP, platelet count increases 2- to 8-fold, and different growth factors increase 1- to 25-fold [15]. PRP injection for LE reduces pain and induces healing of the common extensor tendon injury and vascularisation of the diseased tendon [16,17]. Currently there are only few studies which compare the outcome results of CS with PRP injection hence this prospective randomized study was taken up to evaluate the treatment outcome results of the PRP injection when compared with CS in the treatment of lateral epicondylitis.

MATERIALS AND METHODS

Study was conducted at orthopedic department of Birds hospital, Tirupathi, Chitoor, A. P. After obtaining informed consent, 40 patients fulfilling criteria for inclusion and exclusion were deputed sequentially into two parallel groups, A (PRP injection) and B (CS Injection), of 20 cases in each group. Equal randomization was done using computer generated randomization. Each patient presenting with complaint of pain in the lateral elbow region to OPD were assessed with history and clinical examination including Cozen's test and Mill's maneuver [12]. Patients aged more than 20 years and diagnosed with lateral epicondylitis elbow and No previous history of treatment for tennis elbow were enrolled in our study. No patient had bilateral involvement. Pregnant patients or patients with symptoms of carpal tunnel syndrome or cervical radiculopathy or systemic disorders (diabetes, rheumatoid arthritis, or hepatitis) were excluded, as were those who had undergone surgery or local CS injection in the past 6 months. All the patients were thoroughly evaluated with history, clinical examination and investigations like X ray, Magnetic Resonance imaging and nerve conduction studies whenever required to rule other causes for lateral elbow pain like osteochondritis dessicans, synovitis of radiohumeral joint, radiocapitetuller arthitis, posterior interosseous nerve syndrome, cervical radiculopathy, instability in varus.

20 ml of blood was collected in an acid citrate dextrose vacutainer and centrifuged at 1500 rpm for 15 minutes to separate the blood into layers of red blood cells, buffy-coat of leucocytes, and plasma. The platelet counts for PRP and unprocessed blood were calculated. Group A patients were injected with 2 ml of PRP was injected and In Group B 2 ml of methyl prednisolone (40 mg/ml) was injected at the most tender point over the lateral epicondyle of the humerus using the peppering technique. After injection, patients rested for 30 minutes and were advised against massage or hot fomentation. Ice packs or paracetamol were advised for discomfort rather than non-steroidal anti-inflammatory drugs, as the latter may interfere with platelet function.

Outcome and Evaluation: The outcome and evaluation was carried out to assess the amount of the pain and the amount of disability in the pre-injection phase, and on subsequent consultations at 4 weeks, 12 weeks & 6 months (the final follow up). The pain was assessed by using the Visual Analogue scale (VAS) and the disability was assessed by Nirschl staging [18]. Outcome and evaluation assessment was carried out by an independent observer, who was blinded to the type of intervention received by

the individual patient.

Stastical Analysis: Chi square test was utilized to compare the pre injection baseline pattern of both the groups. Paired t test was used for serial analysis of groups and unpaired t test was used for comparing the groups. P value of < 0.05 was considered to be statistical significant.

Baseline characteristics: Baseline data like age, gender, side of involvement, dominance of limb, duration of symptoms before injection, and mean pre injection VAS and Nirschl stage were compared in both the groups. After application of statistical tests, the difference in the two groups was found to be non significant.

Table 1: Showing the VAS pain score in both Groups.

VAS pain score	PRP injection	CS Injection	P Valve
Pre injection	7.37(0.90)	7.47(1.07)	0.74
4 weeks	3.32(1.06)	1.62(0.67)	<0.001
12 weeks	0.78(1.0)	1.68(0.66)	<0.01
6 Months	0.56(0.81)	1.88(1.08)	<0.001

Table 2: Showing the Nirschl Stage in both Groups.

Nirschl stage	PRP injection	CS Injection	P Valve
Pre injection	5.84(0.90)	6.05(0.78)	0.45
4 weeks	2.47(0.90)	1.58(0.75)	<0.01
12 weeks	0.48(0.96)	1.50(0.93)	<0.01
6 Months	0.32(0.45)	1.84(0.37)	<0.001

DISCUSSION

Out of 40 patients, 25 were male and 15 female; Group A had 13 males and 7 female patients having an average age of 44.3 years (24-64); Group B comprised of 12 males and 8 females and average age of 43.8 years (22-63). All the patients in group A and group B were right hand dominant, with involvement of right side in all patients and majority of patients in both groups being employed as manual laborers in farms or for construction work.

Pre-injection, the mean VAS scores for pain and Nirschl stages were similar in group A and group B.(Group A mean-7.37 & Group B mean-7.47) with P value of 0.74, mean Nirschl stage in group A and group B was 5.84 and 6.05 respectively with P value of 0.45. VAS score and Nirschl stage at pre injection, 4 weeks, 12 weeks and 6 months were as in table I and table II. Group B had better pain relief at 4 weeks after injection in comparison to group A, as evident in table 1 and 2. But at 12 weeks & 6 months follow up group A fared better than group B with average VAS pain score of 0.78 & 0.56 at 12 weeks and 6 months respectively in comparison to 1.68 &1.88 in group B; Nirschl stage also followed the similar pattern as of VAS pain score. After 4 weeks VAS pain score and Nirschl stage continued to decrease in group A, but to the contrary in group B average VAS pain score raised from 1.68 to 1.88 and Nirschl stage too increased from 1.50 to 1.84 at 12 weeks & 6 months of follow up respectively. There was significant difference between the groups in VAS score (0.56 versus 1.88) and Nirschl stage (0.32 versus 1.84) at 6 months of follow up. At the six-month follow-up 90% patients had complete pain relief in group A in comparison to only 45% in group B. Seven out of 20 (35%) patients had recurrence of pain at 6 months of follow up in group B but none of patients reported recurrence of pain or disability in group A. None of patients in neither group A nor group B had any untoward complications.

CS injection used to be the treatment of choice for LE. CS suppresses the immune system by suppressing the pro-inflammatory proteins. Its potential side effects include lipodystrophy, skin pigmentation changes, and tendon atrophy/ ruptures. PRP is an increasingly popular treatment for LE. It increases expression of the collagen gene and production of vascular endothelial growth factor and hepatocyte growth factor in human tenocytes, [19,20] and type-I collagen [21]. PRP initially inhibits the inflammatory process and then stimulates proliferation and maturation of the healing process. It enhances stromal and mesenchymal stem cell proliferation [22] and prevents the fibrous scar tissue healing that occurs with macrophage mediated tendon-to-bone healing [23]. PRP may also suppress macrophage proliferation and interleukin-1 production within the first 72 hours [24,25]. PRP injection is superior to CS injection for chronic LE (Table 2) [25]. The recurrence rate and need for repeated injection or surgery are higher in the CS than PRP group [26,27].

CONCLUSION

The outcome of the study is CS with PRP injection hence this prospective randomized study was taken up to evaluate the treatment outcome results of the PRP injection when compared with

and improved the pain scores clinical function when compared to corticosteroid injection at six months follow up, even though there was initial drastic improvement in pain scores after corticosteroid injection at four weeks but many patients had recurrence. So PRP injection is efficient treatment modality for lateral epicondylitis, which is simple, cheap, with less side-effect and minimum recurrence rate.

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