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A comparative study between platelet rich plasma and corticosteroid injections in treatment of lateral epicondylitis

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Abstract: *The aim of the study was to access effectiveness of corticosteroid injections and Platelet rich plasma (PRP) injections in treatment of lateral epicondylitis using visual analogue scale (VAS), Disability of arm, shoulder and hand (DASH) score, painfree grip strength. Our study was conducted on 60 patients who attended orthopaedic opd with lateral epicondylitis which were randomly assigned to PRP group (n=30) and corticosteroid group (n=30). Patients were followed up for two years. Success was defined as a 25% reduction in VAS or DASH score and 25% increase in painfree grip strength. Both groups significantly improved across time. When baseline VAS, DASH score and painfree grip strength were compared with scores at two year followup, the DASH score and painfree grip strength of corticosteroid group was returning to baseline scores, while those of PRP group significantly improved. The PRP group was more often treated successfully than the corticosteroid group (p<0.0001). There was no complication related to the use of PRP. Therefore to conclude that treatment of patient with lateral epicondylitis with PRP reduces pain and increases function significantly and is more effective than corticosteroid injections.*

Keywords: *lateral epicondylitis, platelet rich plasma, corticosteroid injections*

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I. Introduction

Lateral Epicondylitis (LE) or "Tennis elbow" is a soft tissue lesion of the musculotendinous origin of the wrist extensor muscles that results in lateral elbow pain. It has been referred by other common names such as epicondylagia, lateral elbow pain, periostitis in the past literature. Its primary clinical features includes discomfort over the lateral elbow, pain and tenderness at or slightly distal to the lateral epicondyle and tenderness of proximal muscle mass. [1]A clinical diagnosis is often confirmed by appropriate history and pain reproduced by resisted extension of wrist and middle finger.[2]While the term epicondylitis or tendinitis are commonly used to describe this condition, histopathological studies have shown that tennis elbow is not an inflammatory condition as implied by 'itis', rather it is a degenerative process characterized by fibroblast proliferation, vascular dysplasia and disorganized collagen, collectively termed as angiofibroblastic hyperplasia.[3,4]Cyriax (1936) first noted that the primary site of injury in Lateral Epicondylitis is the origin of Extensor carpi radialis brevis and that one third of patients also have involvement of Extensor digitorum communis.[5]The microtearing of the extensor tendon origin along with the subsequent failed healing response alters the normal musculotendinous biomechanics leading to the onset of lateral elbow pain.[6,7]Lateral Epicondylitis is aggravated by wrist and hand movements and can severely restrict job performance, activities of daily living and leisure pursuits.[7]

Clinical studies have shown that pain production around the elbow takes place as a result of dynamic stabilization around the wrist [8] and repetitive loading of the extensor tendons that generates a force transmitted via the muscles to their origin on the lateral epicondyle.[9] Additionally, studies on forearm muscle fatigue during gripping in healthy individuals have reported that larger fatigue effects existed in the extensor group as compared to flexor group during gripping action. This observation was also suggested by the authors to be contributing to the patho-physiology of tennis elbow. [10] Many patients also complain of weaker or painful grasp [11],due to weakness of forearm muscles as a result of long standing pain. In few cases, symptoms associated with Lateral Epicondylitis can persist, becoming chronic and resistant to treatment [12],which negatively affects the person's ability to participate in meaningful occupations or recreational activities.In such patients, the other important concern is work disability especially among young and middle aged individuals.[13]Work disability, as defined by LERNER D et al[14] is the partial or total inability of a working individual to perform his job roles considered normative or expected of that person, as a result of a chronic health condition and/or its treatment. The aim of the study was to access effectiveness of corticosteroid

injections and Platelet rich plasma (PRP) injections in treatment of lateral epicondylitis using visual analogue scale (VAS), Disability of arm, shoulder and hand (DASH) score, painfree grip strength.

II. Materials And Methods:

Study was conducted on 60 patients who attended orthopaedic opd rims with clinical presentation of lateral epicondylitis from January 2017 to December 2018. Both male and female patients were included in the study. The selection criteria is patients presenting clinically with the symptoms and signs of lateral condylitis in the age group ranging from 20 – 75 and the exclusion criteria is patients presenting with Recent limb trauma, Recent surgery at elbow joint, patients with Metal implants, Chronic illness, Pregnancy and Lactating Mothers, Platelet dysfunction syndrome and other Coagulopathies, patients suffering with recent febrile illness and infectious disease. The Patients was assigned into two groups. Group A and Group B. The Patients in group A received corticosteroid injections and The Patients in group B received platelet rich plasma injections. For Platelet Rich Plasma injections, after getting informed consent, 50 ML of blood was taken from the Patients and 7ml of Citrate phosphate dextrose adenine(CPDA) was added to it ,and then the collected blood bag was put in a blood component separator and 5-10 ml of Platelet rich Plasma was prepared, With full aseptic precaution, 5ml Platelet rich Plasma was injected in the area of maximum tenderness using a 22 gauge needle with a single skin portal and five penetration of the tendon, the elbow was kept in sling for comfort. After 24 hours patients was taught a standardized stretching protocol to follow for 2 weeks. After this forearm strengthening exercises was started, and then patients were allowed to proceed with sporting or normal recreational activities as tolerated. After the Procedure patient can take narcotic pain medication, can apply cold compress to area after the procedure, and can follow the standard range of motion and strengthening exercises as advised. Patient should not take anti-inflammatory medication for several weeks after the procedure. And for patient in group B with Corticosteroid injections, after getting informed consent, Corticosteroid injections(inj. methyl prednisolone 40 mg) was given at the area of maximum tenderness using a 22g needle under full aseptic precautions, the arm was kept in a sling for comfort, after 24 hours patients were started on a standard stretching protocol to follow for 2 weeks, then forearm strengthening exercises was taught, after 3 weeks patients were allowed to return to normal sporting or recreational activities as tolerated. After the injection, patient can follow the standard range of motion and strengthening exercises, and they should not over use the injected arm.

III. Results

From January 2017 to Decembver 2018 a total of 60 patients with lateral epicondylitis were assorted into either corticosteroid group or platelet rich plasma group.after giving the injections the patient was followed up for 1year and their visual analogue scale score and disabilities of the arm,shoulder and hand scale score was recorded. The mean age of the patients in corticosteroid group was 38 and mean age in platelet rich plasma group was 45,there were 21 male patients in corticosteroid group and only 9 male patient in platelet rich plasma group.

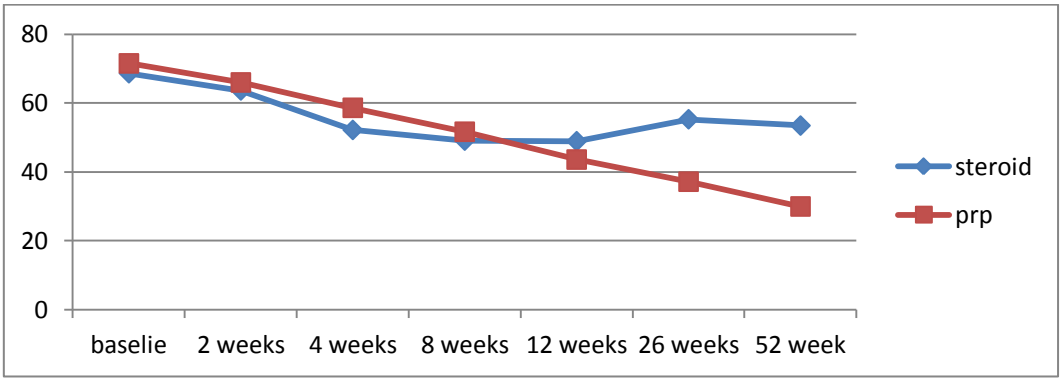
The baseline charecteristics of the patient are as follows.

variables	measures	Corticosteroid group	PRP group	P value
age	Mean ± sd	38.63± 12.31	45.20±9.95	0.027
sex	Male %	21(61.8%)	13(38.2%)	0.37
sex	Female	9(34.6%)	17(65.4%)	0.35
Baseline vas score	Mean ±sd	68.67±8.14	71.53±6.86	0.146
Baseline DASH score	mean±sd	49.70±6.60	56.80±8.10	0.000

The PRP group scored significantly higher baseline DASH score than the corticosteroid group(p<0.001).
At the end the one year followup both the groups VAS score nd DASH score are as follows

Time	Intervention	DASH		VAS	
		mean±sd	p value	mean±sd	p value
0 week (baseline)	Corticosteroid	49.70±6.60	P<0.001	68.67±8.14	P=0.14
	PRP	56.80±8.10		71.53±6.86	
2 week	Corticosteroid	45.73±6.17	P<0.001	63.67±8.69	P=0.242
	PRP	53.07±8.18		66.00±6.42	
4 week	Corticosteroid	39.60±7.51	P=0.002	52.20±10.74	P=0.008
	PRP	46.17±8.26		58.47±6.32	
8 week	Corticosteroid	35.27±7.01	P=0.009	49.10±8.93	P=0.274
	PRP	40.20±7.15		51.37±6.83	
12 week	Corticosteroid	38.50±6.81	P=0.001	48.93±8.34	P=0.009
	PRP	31.87±7.85		43.60±6.73	
26 week	Corticosteroid	42.30±6.17	P<0.001	55.30±8.16	P<0.001
	PRP	27.47±8.86		37.17±7.59	
52 week	Corticosteroid	43.73±5.91	P<0.001	53.47±8.35	P<0.001
	PRP	24.03±9.93		29.97±10.94	

Course of VAS pain scores

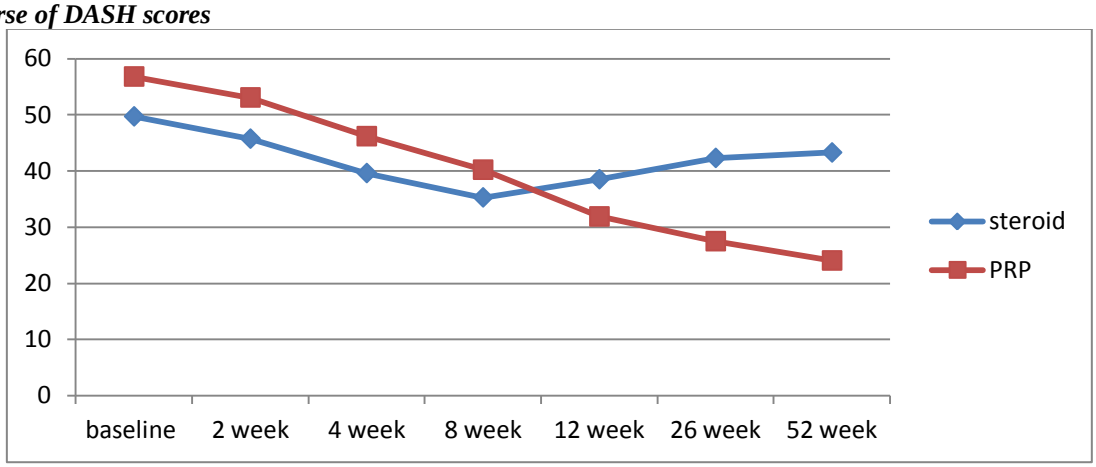


As shown in the graph the VAS scores of the PRP group gradually decreased during the follow up period,in contrast the VAS scores of the patient treated with corticosteroid injections gradually decreased till 8 weeks then got significantly worse during 26 and 52 weeks,at final follow up the VAS scores of the corticosteroid group was found to be returning to baseline values,

At final follow up 28 out of 30 patients in PRP group had more than 25%reduction in their VAS scores.but only 8 out of 30 patients in corticosteroid group had more than 25% reduction in their VAS scores.

Patients in the PRP group was more often successfully treated than the patients in the corticosteroid group (p<0.001)on comparing VAS scores.

Course of DASH scores



As shown in the graph the DASH score of the patients in the PRP group decreased gradually During the follow up for 1 year,but the DASH score of the patients in the corticosteroid group was gradually decreasing till 8 weeks .then it got significantly worse during 12 ,26 ,52 weeks,at the end of 1 year follow up the DASH scores of the corticosteroid group was found to be returning to baseline values. At the final follow up 28 out of 30 patients in PRP group had more than 25% reduction in their final DASH scores,but only 5 patients had more than 25 % reduction in the corticosteroid group. Patients in the PRP group was more often successfully treated than the patients in the corticosteroid group($p<0.001$) on comparing DASH scores. None of patients in our study had any complications related to the PRP or corticosteroid injections. All 60 patients came for follow-ups regularly.

IV. Discussion

The foregoing hypothesis is that upon activation by the collagen in tendon,the platelets release high concentration of vascular endothelial growth factors, platelet derived growth factors,which enhance tendon healing,wound healing and also bone healing.in addition PRP also posseses antimicrobial properties that may contribute to the prevention of infections.[15] During the first two days after injection,an inflammatory process is is initiated by migration of neutrophils and subsequently macrophages to the degenerative tissue site,inturn activated macrophages release PDGF,TGF-α,TGF-β,Interleukin-1 and Fibroblast growth factors.[15] Shortly after day 3,angiogenesis and fibroplasia occurs.[15] From day 5,collagen synthesis starts,this process leads to an early increase in TENDON BREAKING STRENGTH,which is the most important tendon healing parameter,followed by epithelialization and remodeling.[15]

Corticosteroid injections(inj.methyl prednisolone 40 mg) works by reducing the inflammatory process in the tendon,thereby providing pain relief.

V. Conclusion

The results revealed that the long term efficacy of PRP treatment is better. Therefore, we concluded PRP injection as a superior treatment option than corticosteroid injection in cases of lateral epicondylitis.

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