

ORIGINAL RESEARCH

A Comparative Analysis Of Using Additional Prp Injection In Lateral Epicondylitis (Tennis Elbow) Patient's Undergoing Conventional Conservative Treatment

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ABSTRACT

Background: Lateral Epicondylitis also known as Tennis elbow is a very prevalent condition of our country frequently involving the low socio-economic profile population of laborers in males and housewife in females. The study was conducted to evaluate for additional effects of Platelet rich plasma over usual conventional conservative therapy in these patients.

Materials and method: A prospective analytical study, of total 56 patients of age between 18 -60 years were included in the study and all the patients were given the usual conventional conservative therapy of Rest, hot fomentation, NSAIDs, physiotherapy and orthoses. These were grouped randomly (systematic random sampling) into 2 groups with patients presenting at ODD numbers (1,3,5 and so on) receiving an additional single injection of PRP. All the patients were followed up at 1st, 2nd, and 3rd month by measuring the VAS Pain score and DASH functional score. Paired and Unpaired T-tests were used for statistical analyses at every follow up.

Results: 37 male & 19 females of total 56 patients, with a mean duration of 3 months presented to us, where PRP was given in 1 group of 28 patients along with conventional conservative therapy, contrary to the other group of 28 patients who received only conventional conservative therapy. Both, the PRP and conservative groups had individually significant result with time in terms of VAS & DASH score improvement, at all the 3 monthly follow up. On comparison between the groups, highly statistically significant pain relief and functional improvement in PRP group was observed in all follow ups with nil side effect profile.

Conclusion: Over a short term follow up of 3 months, an additional injection of PRP when given along with usual conventional conservative therapy gives better pain relief and functional improvement in the patients of lateral epicondylitis.

Key words: Lateral epicondylitis, platelet-rich plasma, usual conventional conservative therapy, tennis elbow, VAS & DASH Score

INTRODUCTION

Lateral epicondylitis is diagnosed as a common entity of the elbow, affecting 1-2 % of the population¹ with no gender predilection, mainly in the 4th decade of life. In women of age 40-50 years, the prevalence of tennis elbow is about 10%. Runge² first described this clinical entity in 1873. It is common in people whose occupation requires frequent rotary motion of the forearm (repetitive supination and pronation of forearm with elbow in near full extension) like carpenter, gardener, computer workers and knitting workers with a larger chunk contributed by housewives in Indian settings. In majority of cases of lateral epicondylitis, cause remains idiopathic. Extensor carpi radialis brevis (ECRB)³, is the most commonly affected muscle, followed by tendons of Extensor carpi radialis longus and extensor digitorum communis. Lateral epicondylitis was previously considered as a form of tendinitis, that is inflammation of the tendon, contrary to that, the current consensus suggests that Lateral Epicondylitis initiates as a microtear, most often within the origin of the tendon. On Histopathological analysis, paucity of inflammatory cells such as neutrophils and macrophage were seen. So, “fibroblasts hypertrophy, abundant collagen disorganization, vascular elements hyperplasia, and apoptosis leading to breakdown of extracellular matrix” summarizes it. The term given to the pathology of Lateral Epicondylitis is “Angio fibroblastic degeneration”⁴ which is actually a tendinosis with a fibroblastic and vascular response. Lateral Epicondylitis is usually treated by the usual conventional conservative therapy⁵. Time and rest confer benefit to majority of patients rendering them pain and symptom free. Usual Conventional therapy includes Rest, NSAIDS (Non-steroidal anti-inflammatory drugs), Hot fomentation, Physiotherapy (rehabilitative resistance exercises) with Orthosis (arm band) use. The other extreme of the treatment is the surgical options available for the recurrent and resistant and non-responsive patients, including debridement of ECRB diseased tissue with decortication of lateral epicondyle. Other such non operative therapies included injection of Corticosteroid, botulinum toxin, hyaluronic acid with chondroitin sulfate injections, autologous blood injections and PRP (platelet rich plasma) therapy. Platelet rich plasma (PRP)⁷ is obtained from the patients’ blood by first collecting it in an anticoagulant coated container and centrifuging it at appropriate rpm to yield us a supernatant plasma. This plasma also known as platelet rich plasma is rich Platelets about 2.5 to 8 times the concentration of blood. Alpha granules of these platelets contains various growth factors⁶ such as, platelet-derived growth factor, platelet-derived angiogenesis factor, vascular endothelial growth factor, insulin-like growth factor, fibronectin, transforming growth factor, platelet factor interleukin and epidermal growth factor. The use of this PRP has been found very useful in various tendinopathies, specifically Lateral epicondylitis. This study is conducted to compare the effects of additional PRP injection in patients of lateral epicondylitis receiving usual conventional conservative therapy.

MATERIALS AND METHODS

The study was a Prospective analytical study and was conducted in Pt. J.N.M. Medical college and Dr. B.R.A.M. Hospital, Raipur (Chhattisgarh) from a period of March to November 2022 where all the patients presenting to Orthopaedics OPD (50) with pain in lateral epicondyle, diagnosed after examination as lateral epicondylitis (tennis elbow), after thorough explanation of the study and after obtaining willingness of the patient by written consent, were included. Proper scientific and Ethical considerations were taken before the beginning of the study. The study included patients with age more than 18 years, duration of pain for one month or more and a minimum Pre-injection VAS (Visual Analog Scale) and DASH (Disability of arm shoulder and hand) score of 50. Any skin changes or dermatological lesion at injection site. Patients with history of obtaining any surgery or injection (steroid injection, botulinum, PRP, autologous whole blood, dry needle), pregnancy,

bony or articular lesions at elbow, comorbidity and patients on anti-platelet drugs were excluded from the study. The sample size came out to be 56 where patients were randomized by systematic randomized sampling, that is, every ODD (no. 1, 3, 5, 7, 9,55) were given the PRP injection with usual conventional conservative therapy while the EVEN (no. 2,4,6,8,.....56) patient were given only usual conventional conservative therapy. PRP is obtained from a sample of patients' own blood, where under all aseptic precautions, 30 cc venous blood is drawn yielding about 3-5 cc of PRP depending on the baseline platelet count of an individual, the device used, and the technique employed. The blood draw occurs with the addition of an anticoagulant, such as 3ml CPDA or 3.2% sodium citrate to prevent platelet activation prior to its use. Then 2 centrifugations soft spin (the first at 2500 rpm for 7 minutes) to separate erythrocytes and a hard spin (second at 3200 rpm for 15 minutes) to concentrate platelets produced a unit (i.e. 3ml) of PRP. Patient was made to lie supine on the Minor OT table, maximum tender point of lateral epicondyle is identified after clinical examination and marked under sterile technique. 3 ml platelet rich plasma is injected using a "peppering" technique in a clock wise manner to better cover the affected area of lateral epicondyle and sterile dressing was done. Since the patients may experience acute pain and discomfort at the site of the injection for up to two days, they are advised to have cold fomentation over the injection site along with all the attributes of the usual conventional conservative therapy like rest, limb elevation, activity modification and Tab Diclofenac sodium 50 mg for pain relief along with gentle physiotherapy. Patients on the 1st visit are subjected to these scores VAS8 and DASH9, to know their baseline complaint severity and to further use it to assess the effect of our PRP injections in these patients in subsequent follow ups of 1, 2 and 3 month. At the first visit, and every subsequent visit VAS and DASH scores were calculated yielding us a series of 4 VAS scores (VAS at 1st visit, 1 month follow up, 2 month follow up and 3 month follow up) and similarly 4 DASH scores. These results obtained were entered in the master chart in MS- EXCEL software. Finally mean VAS and DASH scores were calculated and comparison was done using SPSS software-1st visit to 1st,2nd and 3rd month follow up- tells us the effectiveness of PRP or conventional conservative therapy with time. Intergroup comparison (conventional conservative therapy with PRP) tells us the difference in results of outcome within both the groups at 1,2 and 3 months.

RESULTS

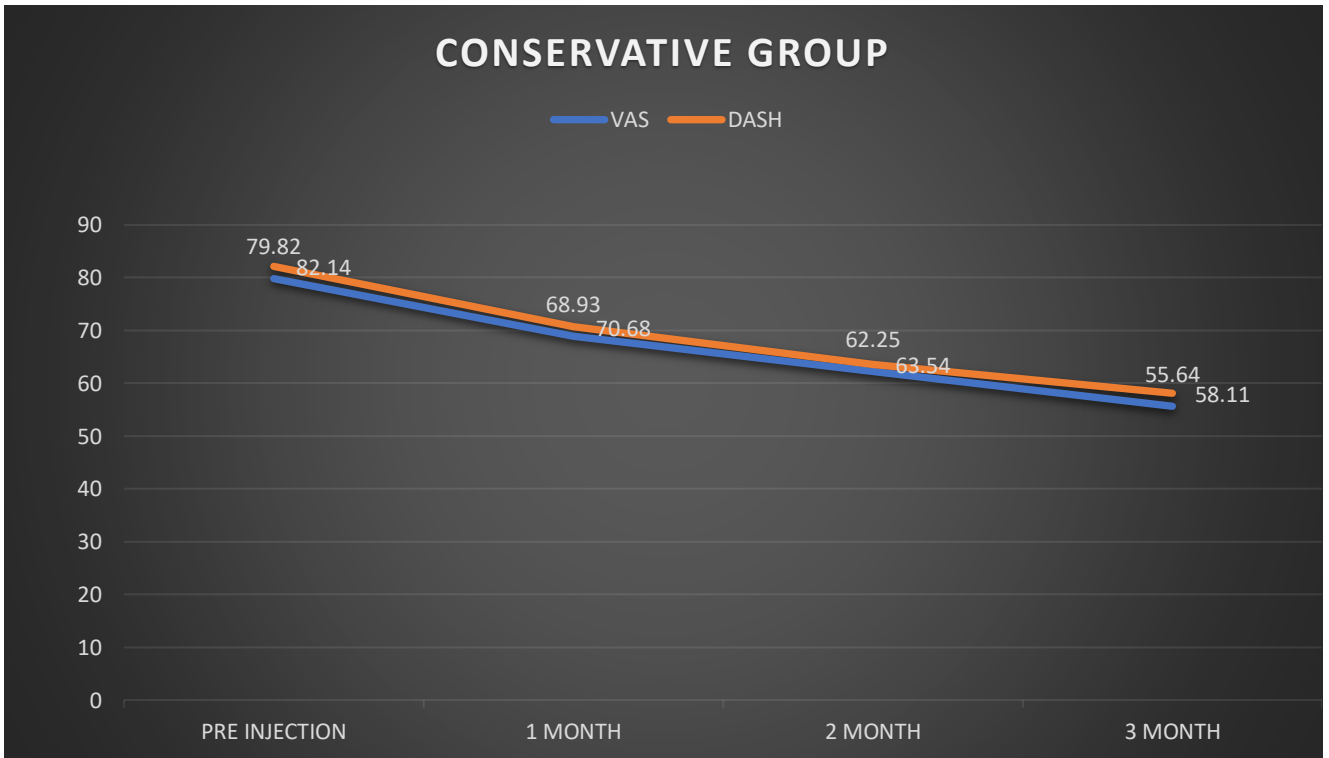
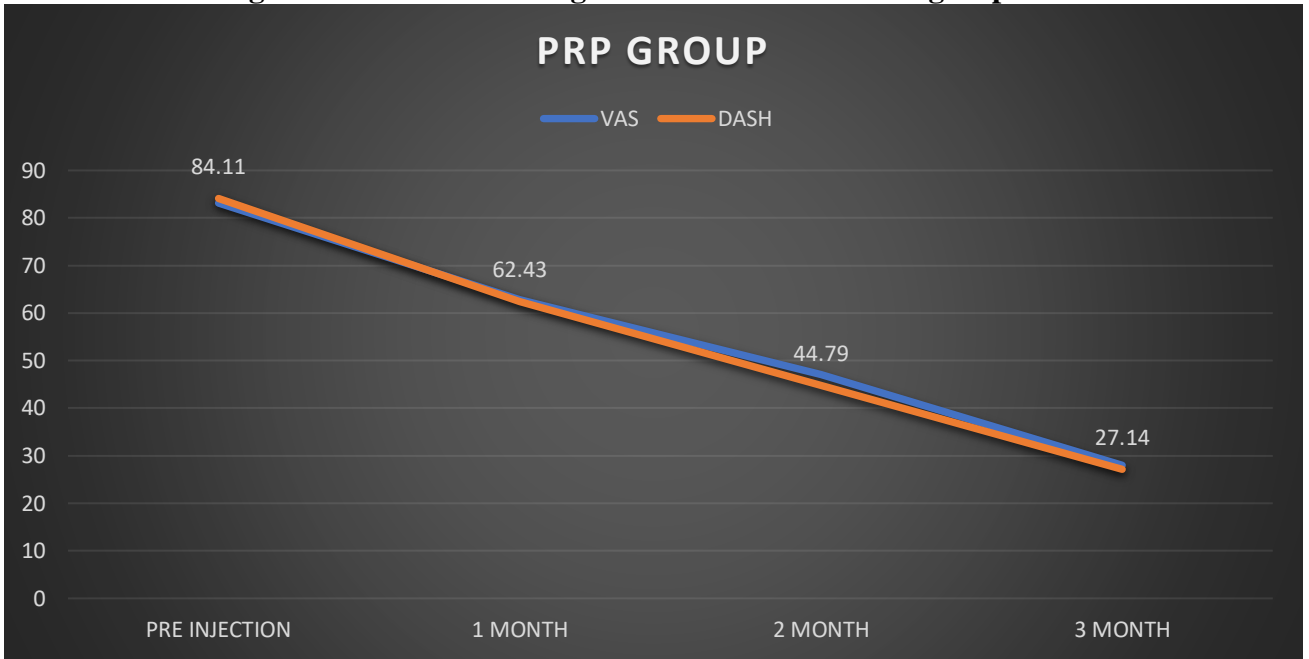
A total of 56 patients were included in the study with 66% male and 34 % female with a mean duration of pain of 3.1 month \pm 1.14 month. The dominant hand involvement was around 54 % (right elbow) and age ranged from 19-58 years with (35.7 %) lying between 30-40 years of age and a mean of 37.1 years.

Table 1: Describes the Mean VAS and DASH scores with their standard deviations calculated at day zero and every subsequent follow up

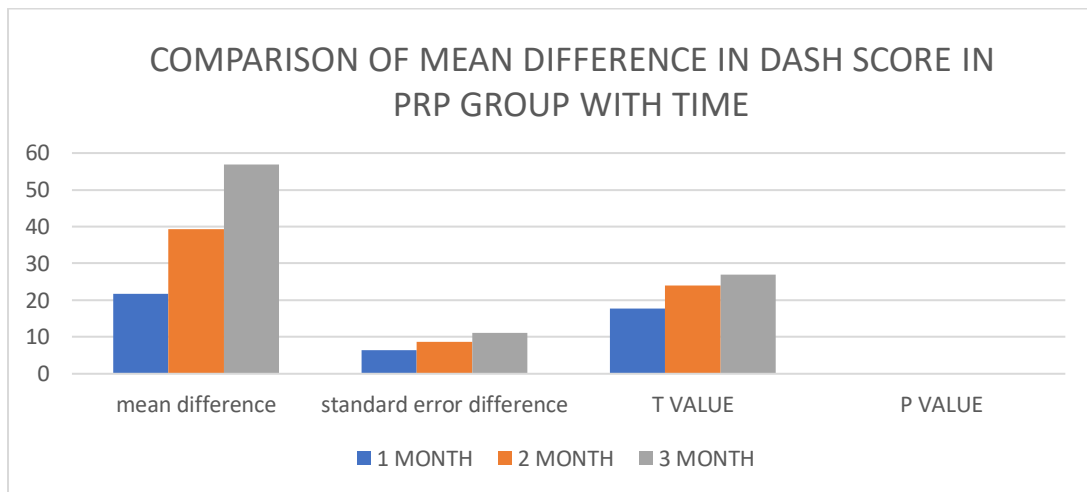
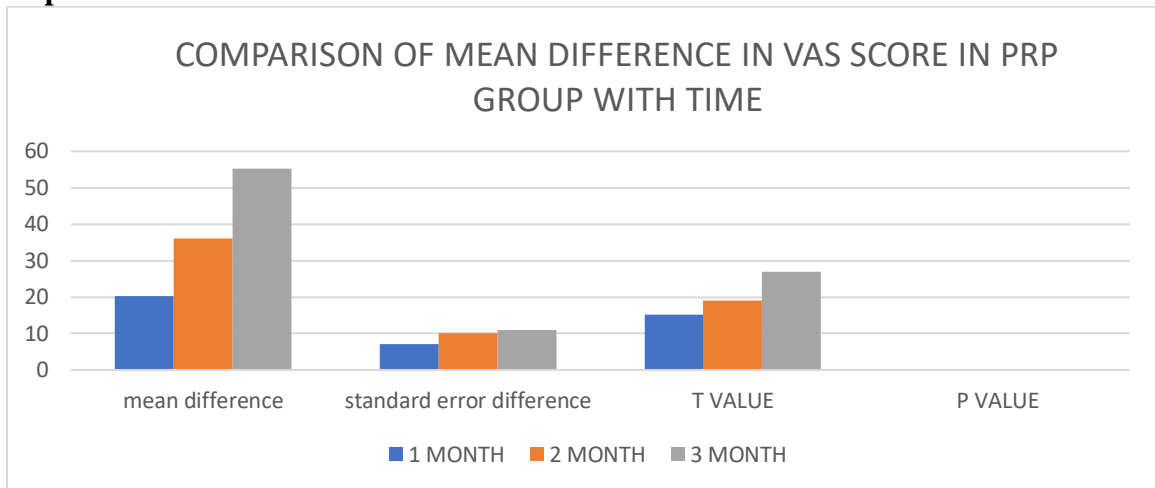
	Pre injection score		Post injection score at 1 month		Post injection score at 2 months		Post injection score at 3 months	
	VAS	DASH	VAS	DASH	VAS	DASH	VAS	DASH
MEAN	83.14	84.11	62.86	62.43	47.02	44.79	28.00	27.14
S.D.	6.317	4.902	6.587	5.859	8.548	7.554	9.588	7.554
	Pre-treatment scores		1st follow up score at 1 month		2nd follow up score at 2 months		3rd follow up score at 3 months	
	VAS	DASH	VAS	DASH	VAS	DASH	VAS	DASH
MEAN	79.82	81.14	68.93	70.68	62.25	63.54	55.64	58.11

S.D.	7.991.	6.964	9.657	8.727	10.105	9.735	10.133	11.364
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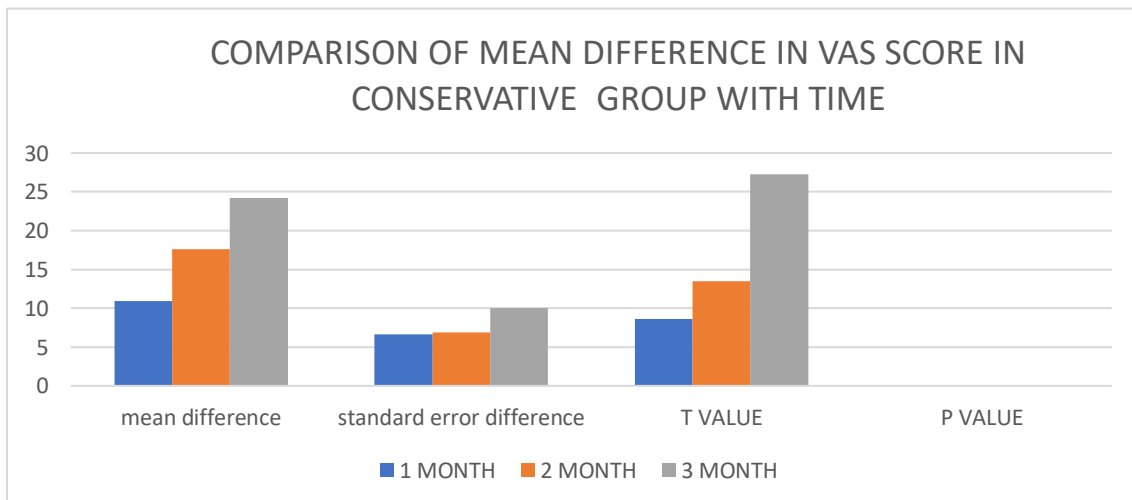
Graph 1: Shows the mean VAS and DASH score, pre-treatment and at every follow-up and Curve showing the trend of decreasing VAS and DASH in both groups

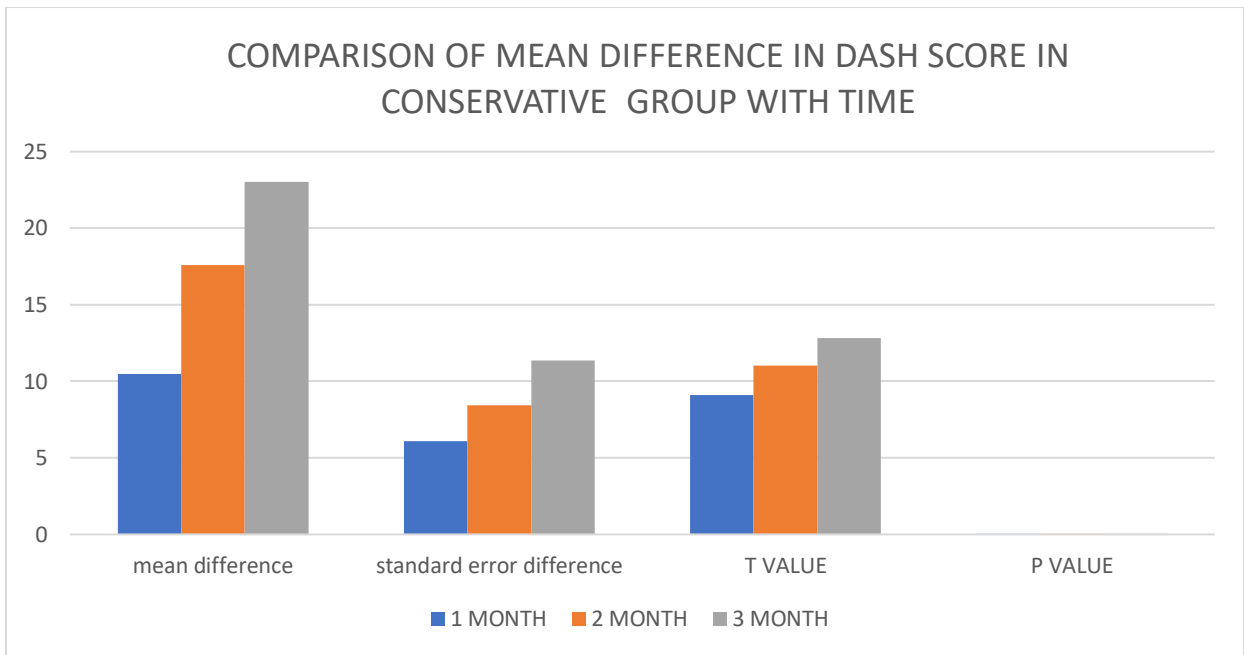


Graph 2: Shows the comparison of Mean difference in VAS and DASH score in PRP group with Time

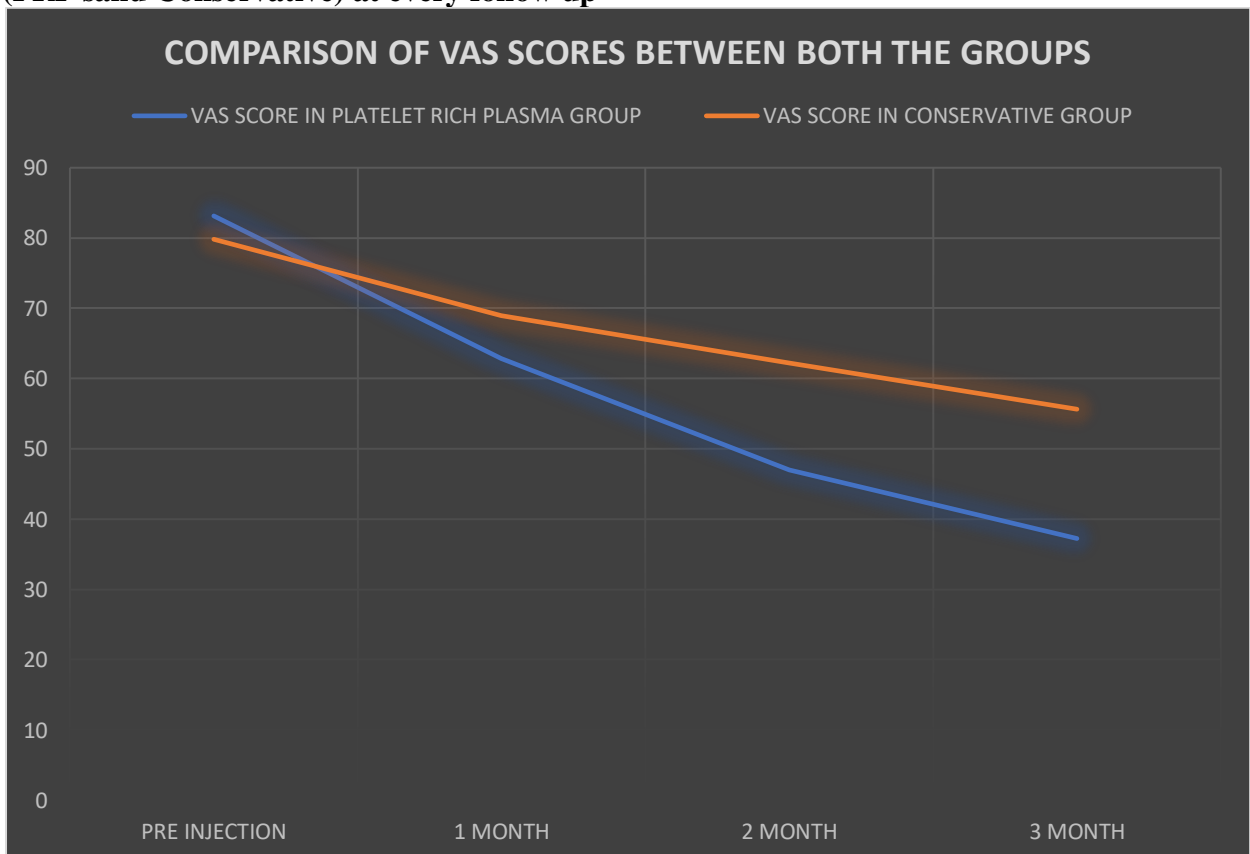


Graph 3: Shows the comparison of Mean difference in VAS and DASH score in Conservative group with Time





Graph 4: Shows the comparison of VAS and DASH scores between both the groups (PRP sand Conservative) at every follow up



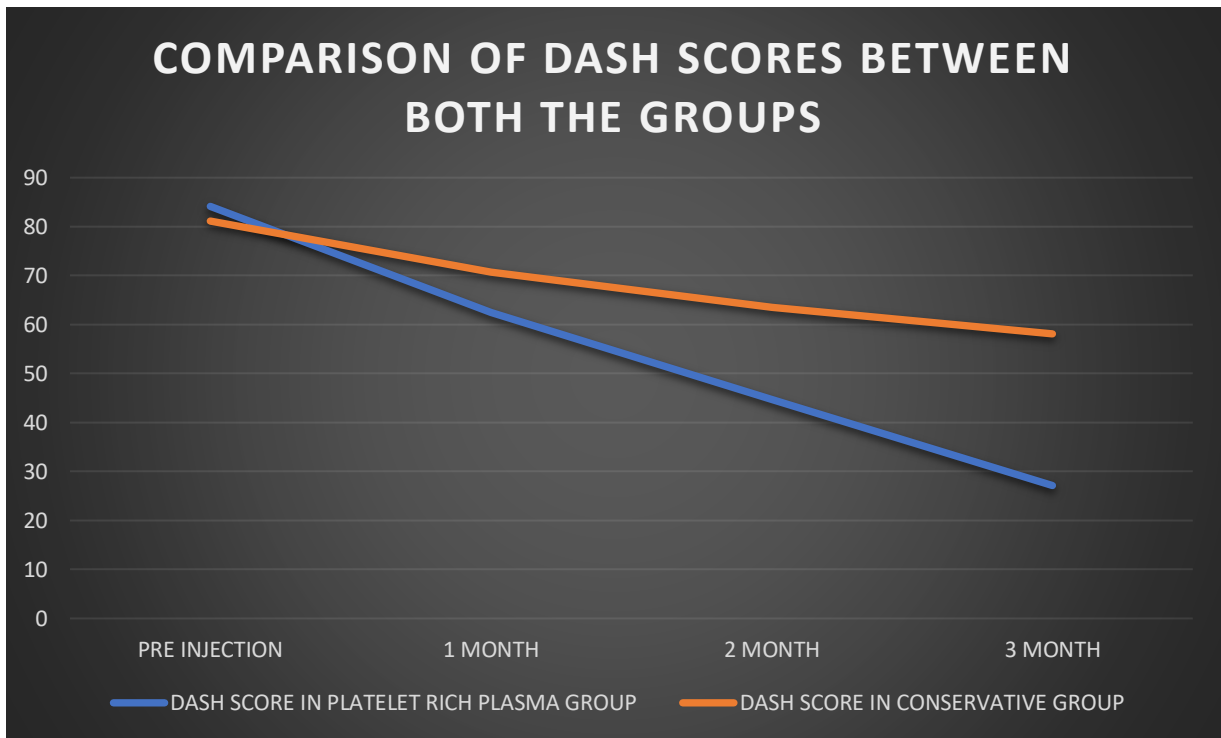


Table 2: Comparison of VAS scores between both the groups, PRP injection and conventional conservative therapy, using independent T- test

Time	Prp group			Conservative Group			t	P	Inference
	No	MEAN	S.D.	No	MEAN	S.D.			
Pre-Treatment	28	83.14	6.317	28	79.82	7.991	1.725	>0.05	Non-significant
1 Month	28	62.86	6.587	28	68.93	9.657	2.748	0.008	Moderately significant
2 Month	28	47.04	8.548	28	62.25	10.105	6.082	<0.001	Highly significant
3 Month	28	28	9.588	28	55.64	10.133	10.48	<0.001	Moderately significant

Table 3: Comparison of DASH scores between both the groups, PRP injection and conventional conservative therapy, using independent T- test

Time	Prp Group			Conservative Group			t	P	Inference
	NO	MEAN	S.D.	NO.	MEAN	S.D.			
Pre-Treatment	28	84.11	4.902	28	81.14	6.964	1.842	>0.05	Non-significant
1 Month	28	62.43	5.859	28	70.68	8.727	13.13	<0.001	Highly significant
2 Month	28	44.79	7.554	28	63.54	9.735	8.052	<0.001	Highly significant
3 Month	28	27.14	8.960	28	58.11	11.36	11.32	<0.001	Highly significant

DISCUSSION

There are various modalities of treatment available for lateral epicondylitis. The usual conventional conservative therapy is the mainstay treatment for most of the patients providing them with significant symptom improvement. The usual conventional conservative therapy includes RICE therapy (rest, activity modification, cold fomentation), non-steroidal anti-inflammatory drugs, orthoses (counterforce braces), physiotherapy, laser treatment, extracorporeal shockwave treatment, acupuncture, & ultrasound treatment. Local Injections of corticosteroids, botulinum toxin A, autologous blood and platelet rich plasma are also a well discussed treatment option for tennis elbow patients where corticosteroids were thought to be the gold standard treatment in lateral epicondylitis previously. At present, platelet rich plasma (PRP) is considered as an ideal biological autologous blood derived component giving positive results since recent times. There are a smaller number of studies regarding the benefits of platelet rich plasma injection adjuvant to conservative therapy over usual conventional conservative therapy only. Therefore, for lateral epicondylitis, this study helps in filling the voids in the literature available. The main outcome parameters considered in our study, were pain in the terms of VAS score and functional outcome of elbow in the terms of DASH score. Most of the studies compared the use of PRP injection with corticosteroid in a short and long term follow up interval. The results obtained in the PRP group of these can be compared to the results obtained by us. Christos Thanasas et. Al (2010) 10 compared the single injection of autologous blood with PRP injection and found significant mean difference of VAS score at 6 weeks, similarly our study too had a statistically significant mean improvement of VAS at 1,2 and 3 months. Our study is supported by the results of Taco Gosen, Peerbooms et al (2010) 11, where a randomized trial in tennis elbow patients, treated with platelet rich plasma versus steroid injection was done. The study concluded that, according to the visual analog scale scores, 37 out of the 51 subjects (73%) in the platelet rich plasma group were treated successfully, which was statistically significant, similar to our study, reducing high pain and improving the functional outcome. Our study strongly oppose the results of De Vos RJ, et al (2014) 12, where they stated that there is strong evidences against the use of PRP in tennis elbow as our results were highly significant in each follow up. Yadav R, et al (2015) 13 conducted comparisons of Local Injection of Platelet Rich Plasma and Corticosteroids in the Treatment of Lateral Epicondylitis. Their sample size was 65 (total 60, 5 lost to follow up) was similar to our study of 56 patients. The mean age in our study was 37.1 years comparable to 36.6 years in their study. The mean duration of pain was about 2.1 months similar to our study mean of 3.14 months. The mean VAS in PRP group improved from 7.6 to 4.6 at 1 month, to 1.6 at 3 months, comparable to our VAS of 83.14 to 62.86 at 1 month and to 28 at 3 months. Similarly, in their study qDASH was used instead of DASH score and the results changed from 82 at baseline to 62.5 at 1 month, and to 34.16 at 3 months. Our study also showed similar improving results of DASH score of baseline, 84.11 to 62.43 at 1 month and to 27.14 at 3 months. Both the studies had a p value <0.05, at both 1st and 3rd month follow up which was statistically significant. VK Gautam, et al (2015) 14 conducted a study of 30 patients where 15 patients received PRP injection and the other 15 corticosteroid. In the 15 PRP patients, the baseline pretreatment VAS of 7.1 improved to 4.5 at 2 weeks, 2.7 at 6 weeks and 1.8 at 3 months, almost corresponding to VAS score of 83.14 to 62.86 at 1 month, 47.04 at 2 months and to 28 at 3 months. DASH score was 69.7 pretreatment to 51.6 at 2 weeks, 38.6 at 6 weeks and 33.6 at 3 months while in our study, it was 84.11 to 62.43 at 1 month, 44.79 at 2 months and to 27.14 at 3 months. Our study corresponds to the largest meta-analysis by Arirachakaran A, et al (2016) 15 which provided additional information that PRP injection can improve pain and lower the risk of complication. Hastie G, et al (2018) 16 conducted retrospective study of cases from the 1st January 2008 to 31st December 2015 eyeing for the need of surgery in the patients who

receive PRP with those without it. Like our results though, less follow up was observed, in not even a single patient open surgery was required, there was statistically significant decrement in the patient's undergoing surgery after receiving PRP injection. In the study by Jain Saurabh, et al IJO (2018)17 - 30 patients of tennis elbow were studied where the mean pain VAS Score improved from 7.7 before injection to 5.4 after 2 weeks, 4.1 after 6 weeks, 3.2 at 12 weeks of injection and 1.8 at final follow up i.e., after 6 months post injection, respectively. Our results complement this study with similar trend of decreasing VAS scores at every follow-up. In the KS Sandhu et. al, (2019)18 study, 50 patients with chronic lateral epicondylitis were included in the study and randomized into 2 groups, 1 treated with PRP and other with corticosteroid. Outcome was measured in the terms of VAS score and NIRSCHL score, where pre-treatment VAS score was 7.08 and follow up at 3 weeks was 5.62, at 6 week was 2.08, 1.73 at 4 months and about 1.24 at 8 months. Our study too had a similar pattern of results with pre-treatment VAS of 83.14 coming down to 62.86 at 1 month, 47.04 at 2nd month and 28 at 3rd month. Ahmad Z et al (2013)19, in their meta-analysis, highlighted the limited but evolving evidence for the use of PRP in lateral epicondylitis; however, further research is required to understand the concentration and preparation that facilitate the best clinical outcome. Our study clearly showed that all the patients with tennis elbow are responding well to the usual conventional conservative therapy and data obtained from the conservative group was statistically significant in itself in reducing the pain and improving the functional outcomes of the patients but the group who along with this conservative therapy were given a single additional injection of PRP, showed results which were exceptionally better. The patients with a VAS and DASH score of about ~80, very significant pain profile and a very high functional disability (there were patients who couldn't even lift a glass of water, or open a lock), those patients when given the PRP regimen were extraordinarily happy at 1st follow and even more happy and content at subsequent 2nd and 3rd follow up with reduced pain and decreasing functional disability. These patients had their VAS and DASH in the range of ~20s, thereby giving them the confidence to sleep better and to lead a healthy social life. Moreover, PRP being autologous, is a very cost-effective option with almost nil side-effects and is extremely biological in nature.

CONCLUSION

In conclusion, there was statistically significant improvement in elbow pain and functional outcome in both the groups with time, that is the patients receiving usual conventional conservative therapy and patients with additional Platelet rich plasma along with conventional conservative therapy which means both the interventions are separately significant in reducing pain and improving the functional status of the patient. When comparison between the groups were done, the study showed that a single injection of autologous platelet rich plasma with conventional conservative therapy improves elbow pain and functional activities more effectively than those with only conventional conservative therapy in lateral epicondylitis. There is synergistic effect ($1+1 >1$) of PRP injection and conventional conservative therapy in the tennis elbow patients. These improvements were maintained over follow up period of 1 month, 2 month and 3 months without any complications and without affecting the pocket of the patient (cost-effective). Long term follow-up with a greater number of patients is needed to evaluate long lasting benefits of platelet rich plasma injection for pain relief and functional improvement, and to look for any possible long-term side-effects, if any, in patients of lateral epicondylitis.

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CASE ILLUSTRATIONS



PRP Machine

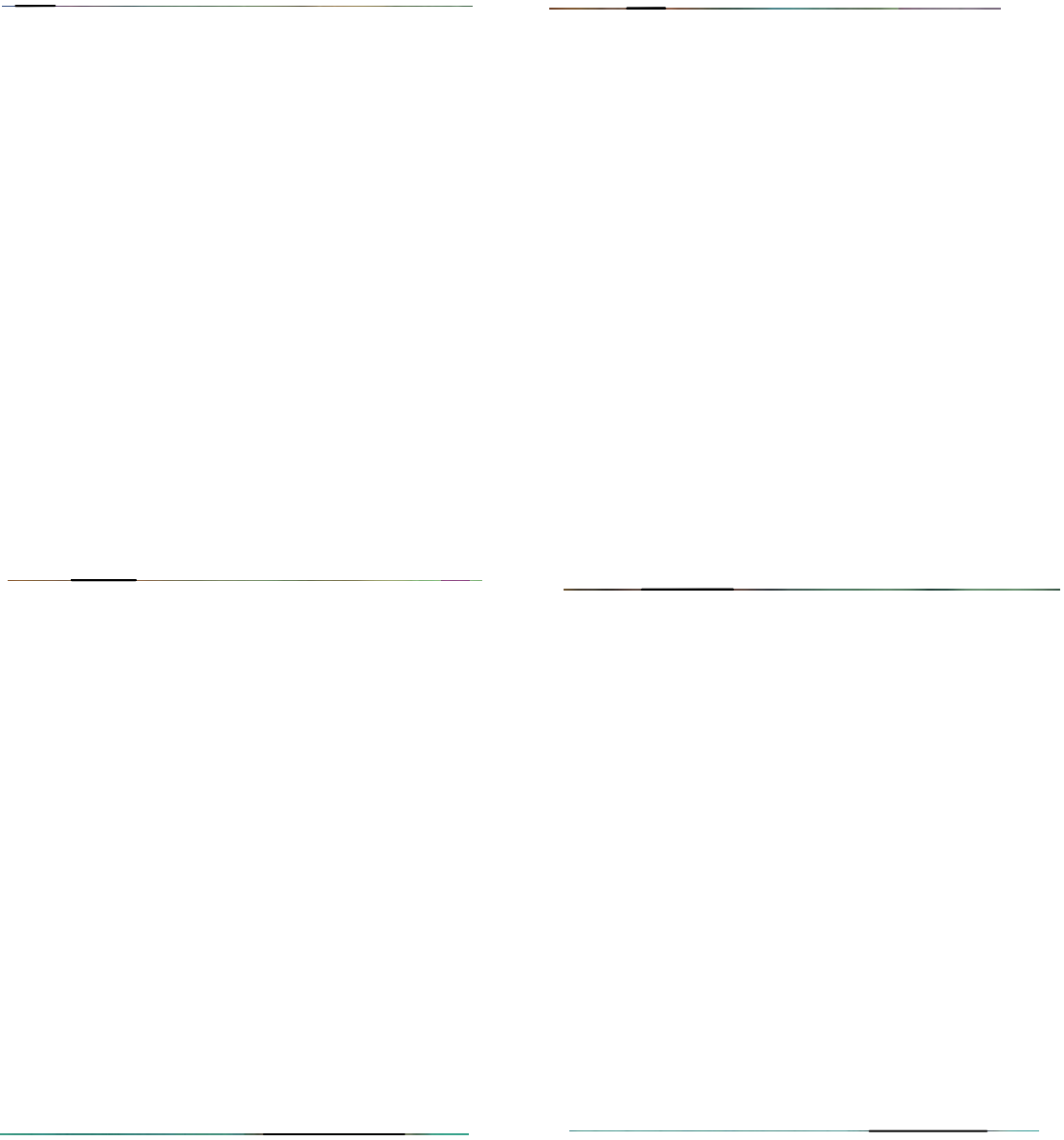




PLATELET RICH PLASMA INJECTION



CASE - 1



CASE - 2





CASE - 3

