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RESEARCH ARTICLE

PLATELET RICH PLASMA (PRP) IN TREATMENT OF PLANTER FASCIITIS-FUNCTIONAL OUTCOME AND RESULTS: A PROSPECTIVE CLINICAL STUDY

Deepak Chaudhary[1*] and Ravi Gupta [2]

[1]Orthopaedics Eras Lucknow Medical College Lucknow, India
(Fellow Sports Injury Government Medical College & Hospital (GMCH-32) Chandigarh, India)
[2]Orthopaedics GMCH-32 Chandigarh, India

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ABSTRACT

Objective: To assess functional outcome & results of injection of platelet rich plasma (PRP) in plantar fasciitis.
Design: Prospective clinical study with 3 months of follow-up.
Methods: Clinically proven fifteen patients of planter fasciitis participating in study included in study according to inclusion and exclusion criteria on OPD basis after getting written and informed consent, treated by 3 mL of autologous PRP injection at the point of maximum tenderness by single author[1], evaluation of functional outcome and results done by American Orthopaedic Foot And Ankle Society's (AOFAS) Ankle-Hindfoot Scale (100 points), VAS scale (0-10 points) and requirement of pain-killers (at baseline, 1 month and 3 months interval).
Results: Fifteen patients participated in study and reported statistically significant improvement in AOFAS score from 31 pretreatment level (range, 22 to 63) to 68 (range52-86) at one month and to 93 (range, 85 to 100) by 3 months ($p<0.001$) improvement in VAS score from 7.4±0.8 points pretreatment level to 2.3±0.7 at one month and 0.9±0.3 points at three months post PRP injection follow up.. Mean analgesic use declined from 8.7±2.33 units/week pretreatment to 2.8±1.7 units/week at one month which further declined to 0.8±0.2 units/week at three month post PRP injection.
Conclusions: A single injection of autologous PRP is a safe and effective mean of treatment of plantar fasciitis.

INTRODUCTION

Chronic plantar fasciitis is a commonly occurring orthopaedic problem which affects both sport participants as well as inactive middle aged individuals[1,2]. Plantar fascitis is usually a self-limiting condition and spontaneously resolves regardless of type of intervention received[3]. Various conservative management modalities for recalcitrant plantar fasciitis are available now a days[4], e.g. physiotherapy[5], icepacks, night splints, prefabricated and custom made inserts, shoe modification, nonsteroidal anti-inflammatory drugs (NSAIDs) and injection corticosteroid. Platelet rich plasma (PRP) injections has shown promising results in treatment of muscle and tendon injuries and degeneration[6-12]. Autologous Platelet Rich Plasma (PRP) injection contains high concentration of platelets with various growth factors[13,14] and bio active substances like VEGF,TGF-b, IGF1, alfa granules etc which stimulates natural healing cascade and halts or even revert degenerative process of tendinopathies[15-19].PRP has established its role in musculoskeletal pathologies[20]. PRP represents a treatment option for many foot and ankle pathologies, including tendinopathy (Achilles, peroneal, posterior tibial, flexor hallucis longus, anterior tibial) and chronic ligamentous injury, such as plantar fasciitis. The purpose of this study was to assess the safety of PRP injections for treating chronic plantar fasciitis and provide initial clinical assessment of its effectiveness.

MATERIALS AND METHODS

After approval from institutional ethical committee (IEC), clinically diagnosed fifteen adult patients of both sexes of symptomatic planter fasciitis not responding to conservative treatment of one month were included in the study and patients with history of local steroid injection in past 3 months, patients having significant cardiovascular disease, anemia, renal or hepatic disease, pregnancy, any local infection or malignancy, diabetes, hypothyroid, neuropathy or any vascular insufficiency, bleeding or platelet disorder, patients who had previous surgery around ankle, joint instability and significant co morbidity of lower limb were excluded from the study. All the patients were explained about the study and an informed consent was obtained. Only those providing consent to participate in the study were enrolled in the study. Participants were treated with 3 ml of autologous injection of PRP at the

point of maximum tenderness by single corresponding & first author. Patients were followed up for 3 months post injection PRP. No analgesic was prescribed during follow up except tab paracetamol (650 mg) SOS.

At baseline, the demographic information and medical history of the patients was obtained. Assessment of results done on the basis of American Orthopaedic Foot And Ankle Society's (AOFAS) Ankle-Hindfoot Scale (100 points)[21], VAS score (0-10 points) and requirement of pain-killers (at baseline, 1 month and 3 months interval).

The PRP was prepared by withdrawing 20 cc of whole blood under aseptic precautions from antecubital vein , mixed with 2.8 ml of Acid Citrate Dextrose solution (ACD solution)[22] in sterile vials, centrifuged in centrifuge machine @ 1500 rpm for 15 minutes[23], PRP was made and collected in fresh vial by pipette. After waiting for one hour at 20-22° (air condition room) so that platelets come in resting phase[24] PRP was injected intralesionally and surrounding tendons by aseptic technique without prior activation by mean of pharmacological agents[25]. In PRP, concentration of platelets should increase 3-5 times than that in whole blood for proper effect.

Statistical Analysis

The statistical analysis was done using SPSS (Statistical Package for Social Sciences) Version 15.0 statistical Analysis Software. The values were represented in Number (%) and Mean±SD.

RESULTS

Table-1 Baseline data

Demography Male/Female	8/7	Total 15
Age of patients Mean/SD	39.5±8.6 yrs,	Range 23-62 yrs

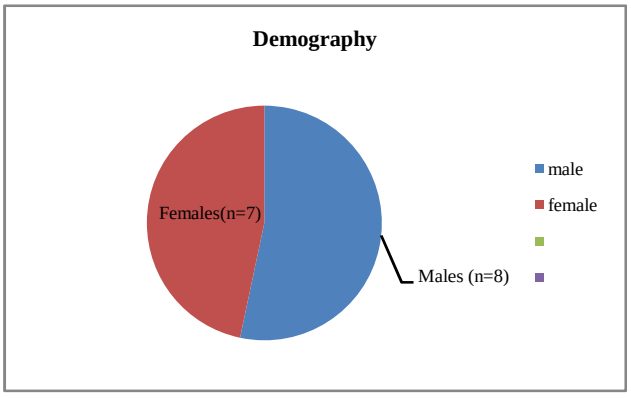

Figure-1 Demography

Out of fifteen enrolled patients 8 were male (53.3%) and 7 were females (46.7%) and mean age of participants was 36.7±9.6 years, age of participants ranged from 24 to 57 years.

Table-2 Evaluation of Functional Outcome

S.No	Tests	Pretreatment	At 1 month	At 3 month
1	AOFAS	31	68	93
2	VAS	7.4±0.8	2.3±0.7	0.9±0.3
3	Analgesic use (units/week)	8.7±2.33	2.8±1.7	0.8±0.2

Average improvement in AOFAS score was from 31 points pretreatment level (range, 22 to 63) to 68 points (range52-86) at one month and to 93 points (range, 85 to 100) by 3 months ($p<0.001$).which is a meaningful improvement.

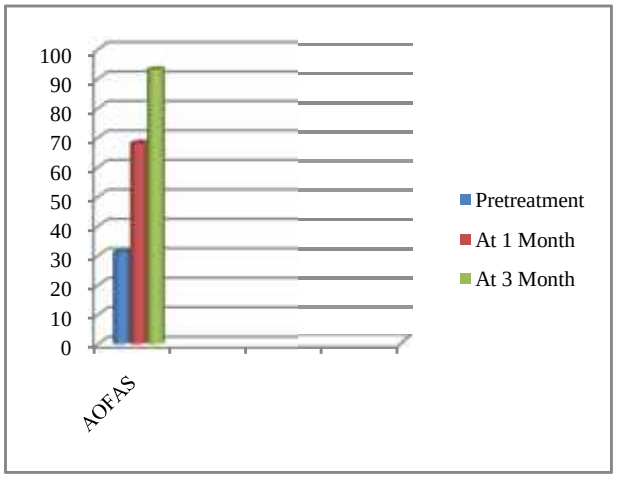

Figure-2 Graphical representation of improvement in AOFAS

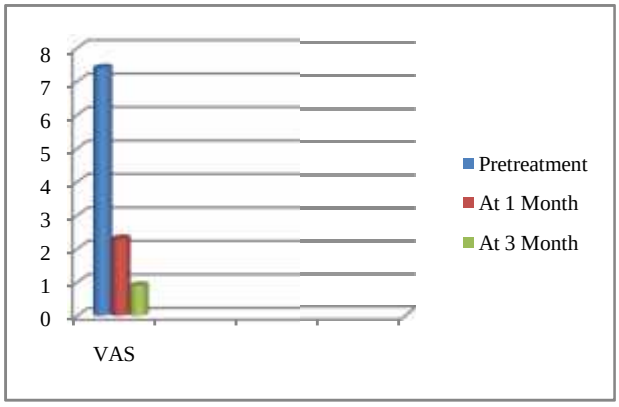

Figure-3 Graphical representation of improvement in VAS

VAS score improved from baseline pretreatment score of 7.4±0.8 to 2.3±0.7 at one month, with a further improvement of 0.9±0.3 points at 3 months ($p<0.001$) which is a meaningful and statistically significant improvement.

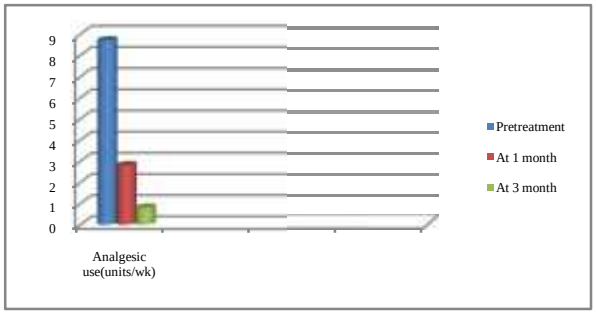

Figure-4 Graphical representation of Analgesic requirement

Mean analgesic use declined from 8.7±2.3 units/week pretreatment to 2.8±1.7 units/week at one month which further declined to 0.8±0.2 units/week at three month post PRP injection. That means that after PRP injection patients needed significantly less analgesic and overall improvement in quality of life.

No side effect during treatment with injection PRP was noticed except pain at injection site in one patient which lasted for ten minutes and relived spontaneously.

DISCUSSION

Results of study done by Nicolo *et al*[26] showed that three PRP injections provided improvement in VAS for pain, with symptom resolution in 78.6 % of the patients, according to

criteria of the Roles and Maudsley score, at 12 months of follow up, results were rated as excellent in nine (64.3 %), good in two (14.3 %), acceptable in two (14.3 %) and poor in one (7.1 %) patient. VAS for pain was significantly decreased from 7.1 ± 1.1 before treatment to 1.9 ± 1.5 at the last follow up($p < 0.01$). Some other studies also suggest an improved healing process of tendons following local administration of growth factors through PRP injections[27,28]. In a prospective study of 15 patients with chronic elbow tendinosis, Mishra *et al*. found significant pain decrease two years after PRP injection [29]. In a prospective comparative study done by Monto *et al* [30] suggests that PRP was more effective and durable than cortisone injection for the treatment of chronic recalcitrant cases of plantar fasciitis. The cortisone group had a pretreatment average AOFAS score of 52, which initially improved to 81 at 3 months post treatment but decreased to 74 at 6 months, then dropped to near baseline levels of 58 at 12 months, and continued to decline to a final score of 56 at 24 months. In contrast, the PRP group started with an average pretreatment AOFAS score of 37, which increased to 95 at 3 months, remained elevated at 94 at 6 and 12 months, and had a final score of 92 at 24 months.

In our study there was more than 90% reduction in pain and analgesic use and significant improvement was also seen in functional outcome and pain score after treatment with single injection of PRP. AOFAS score improved from average 31 pretreatment level to 93 at three months post PRP injection and improvement in VAS score was from 7.4±0.8 pretreatment level to 0.9±0.3 at 3 months while decrease in requirement of analgesic was 8.7±2.33 units/week pretreatment level to 0.8±0.2 units/week at 3 months post PRP injection. This is consistent with studies which state that a single injection of autologous PRP is an effective mean of treatment of Planter fasciitis. In our study no side effect of PRP injection noted except pain in injection site which lasted for ten minutes is consistent with studies which states that autologous PRP is devoid of potential side effects[31]. In vivo studies also suggest that PRP helps in healing of musculoskeletal system and even promotes regeneration[32].

In our study sample size and follow-up duration is less so we suggests further study should be carried out with larger sample size and longer follow up for making autologous injection PRP as a definitive treatment option for Planter fascitis.

CONCLUSION

A single intralesional injection of PRP significantly decreases pain (improves VAS score), improves AOFAS score & functional outcome and reduces the need of analgesics. Autologous PRP is safe deprived of side effects and effective mean of treatment of Planter fasciitis.

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