

Comparison of Platelet Rich Plasma and Steroid Injection in the Treatment of Plantar Fasciitis

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Abstract: This prospective clinical study evaluates the efficacy of Platelet-Rich Plasma (PRP) versus steroid injections in the treatment of plantar fasciitis in 50 patients who had not responded to conservative management over a minimum of three months. Conducted at the Department of Orthopaedics, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, the study divided participants into PRP and steroid groups, assessing outcomes using the American Foot and Ankle Score (AFAS) and the Visual Analog Scale (VAS) over a 6-month period. Results indicated statistically significant improvements in both AFAS and VAS scores in the PRP group compared to the steroid group, suggesting that PRP injections offer a superior method for pain relief and functional outcome in plantar fasciitis treatment. The study highlights the degenerative and inflammatory pathology of plantar fasciitis and underscores the potential of PRP in promoting tissue repair through growth factor stimulation, without the risks associated with steroids, such as plantar fascia tear and osteomyelitis.

Keywords: Plantar Fasciitis, Platelet-Rich Plasma (PRP), Steroid Injections, Pain Management, Tissue Repair

1. Introduction

Plantar fasciitis is the localized inflammation and degeneration of plantar aponeurosis. Heel pain is the most common symptom. The pain is usually localized in medial calcaneal tubercle. In acute phase the pain is usually sharp and first step of the day is mostly painful and in chronic phase continuous and dull aching pain usually seen. NSAIDs, Extracorporeal shock wave therapy, stretching exercises, splints, silicone gel pad, soft cushion shoes application, steroid and PRP injections are useful non surgical treatment options.

2. Materials and Methods

Approval for this prospective clinical study was granted by local ethics committee and informed consent was taken for all 50 patients participating in this study. This study has been conducted in the Department of Orthopaedics, Jawaharlal Nehru Medical College and Hospital, Bhagalpur. Patients who have been diagnosed with plantar fasciitis, monitored for a minimum of 3 months and show no benefit from conservative management, were included in the study.

Inclusion criteria:

- Patients who have undergone conservative management for a minimum of 3 months but with no significant improvement
- Those who have given informed consent and confirmed their availability for the duration of the entire study protocol, that is 6 months.

Exclusion criteria:

- Traumatic heel pain
- Heel pain duration of less than 4 months
- Patients who are diabetic
- Known case of malignancy of any form
- Compressive neuropathies
- Skin disorders
- Pregnancy and lactating mothers

- Known hypersensitivity to NSAIDs

A total of 50 patients were selected for the study. They were divided into PRP and steroid groups consisting of 25 subjects each. Patients informed about the treatment options and those accepted were included in the PRP group consisting of 5 males and 20 females, the mean age being 47 years while the others were included in the steroid group consisting of 6 males and 19 females, the mean age being 48.6 years. A total of 30 cc peripheral blood from antecubital region and mixed with 3.2% sodium citrate. Samples were centrifuged at the rate of 1800rpm for 8 minutes at room temperature. From the 3.5mL of Platelet rich plasma (PRP) obtained, 1mL was sent to laboratory for bacteriological testing and estimation of platelet count. 2mL PRP activated with 5.5% CaCl₂ and used for injection. In one group 2mL pf PRP mixed with 1% Lignocaine was injected and in the other group 2mL of 40mg Methylprednisolone mixed with 1% Lignocaine was injected from the medial side of the foot to the point of maximum tenderness (medial calcaneal tubercle).

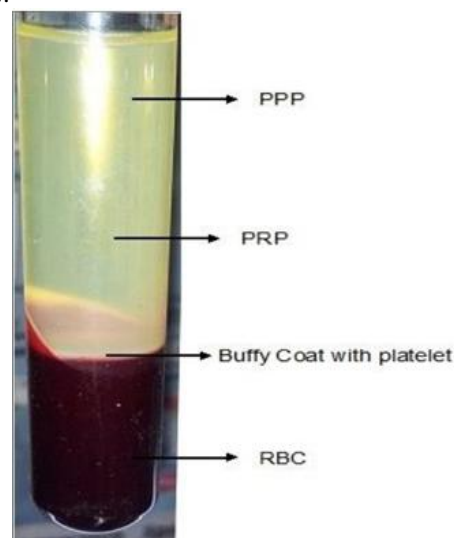


Figure 1: Centrifugation, the blood sample is separated in different blood fractions (from bottom to of tube) RBC: Red

Blood Cells; PRP: Platelet rich plasma; PPP: Platelet poor plasma



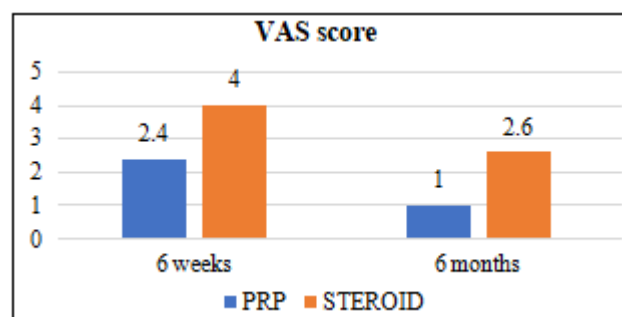
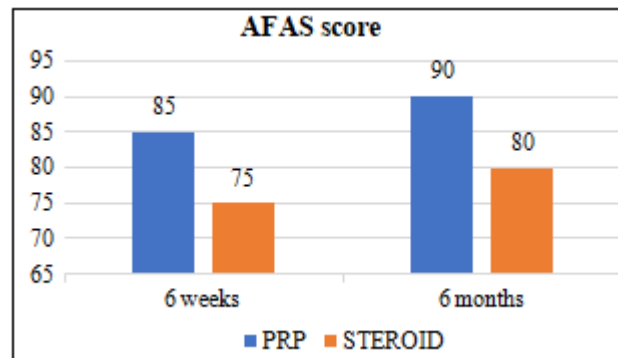
Figure 2: PPP layer was discarded with the help of a long bone sterile micropipette and around 2ml of PRP was collected and is ready to use



3. Results and Analysis

Clinical evaluation was performed before treatment, at the end of 6th week and 6 month follow ups. The American foot and ankle score (AFAS) and the visual analog scale (VAS) were used in the clinical evaluation. The AFAS evaluation covered pain, functional outcome, maximum walking distance, walking surfaces, gait abnormality, hindfoot motion, ankle hindfoot stability. Patients were questioned with regarding side effects and subjective satisfaction. In the PRP group AFAS score at 6th week was 85 and at 6 months

was 90, VAS score was 2.4 and 1 respectively at 6 weeks and 6 months, the differences between pretreatment and follow up scores were statistically significant. In the steroid group AFAS score was 75 at 6th week, 80 at 6 months. VAS score was 4 and 2.6 at 6th week and 6 months follow ups respectively. The PRP group have significantly higher mean AFAS score and VAS scores at follow ups than steroid group (P VALUE < 0.001).



4. Discussion

The pathology of plantar fasciitis includes degenerative changes in the plantar fascia with fibroblastic proliferation and limited inflammation. The use of steroid injections for plantar fasciitis has been reported to be useful in short terms. The complications include plantar fascia tear, fat atrophy and abscess, osteomyelitis. PRP stimulates the proliferation of various cell types in tissues and activates repair cells in blood circulation. More than 30 bioactive proteins are found in alpha granules of platelets. There are various growth factors like platelet derived growth factor, vascular endothelial growth factor, insulin like growth factor, transforming growth factor and various proteins like fibrin, fibronectin, thrombospondin help in various stage of tissue healing. With its growth factors PRP stimulates the local stem cells, activates the repair cells in peripheral blood and bone marrow. Excessive inflammation inhibits apoptosis and metalloproteinase activity. In tendon recovery PRP increases tenocyte proliferation by providing revascularization and expression of collagen in tenocytes with the help of growth factors. The prepared PRP can be activated by bovine or human thrombin or calcium chloride, in this study CaCl₂ is used. For PRP obtained from autologous blood there is no risk for immune reaction or disease transfer. In conclusion the administration of PRP in plantar fasciitis appears to be more effective method than steroid injection in terms of pain relief and functional outcome.

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