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ORIGINAL ARTICLE

Local injection of autologous platelet rich plasma compared to corticosteroid treatment of chronic plantar fasciitis patients: A clinical and ultrasonographic follow-up study

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KEYWORDS

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Foot Health Status Questionnaire (FHSQ)

Abstract *Background:* Platelet-rich plasma (PRP) has been gaining popularity as a treatment for plantar fasciitis (PF).

Aim of the work: To compare local autologous PRP and steroid injections both clinically and sonographically within 3-months and also regarding its safety.

Patients and methods: This study was carried out on 50 patients with chronic PF divided into two groups: steroid and PRP groups ($n = 25$ each). Patients were assessed by visual analog scale (VAS), Foot Health Status Questionnaire (FHSQ) and ultrasonography at 1.5 and 3 months post-injection.

Results: The 50 patients had comparable disease duration ($p > 0.5$). At 1.5 months post-injection, there was more improvement in the PRP than in the steroid group both clinically (as assessed by the VAS) and ultrasonographically (as regards the echogenicity) ($p = 0.008$ and $p < 0.01$, respectively). There was no significant difference between both groups at 3 months. The echogenicity significantly improved at 3 months post-injection within each group ($p < 0.0001$). Regarding thickness, the difference did not reach significance ($p = 0.11$, $p > 0.05$). No significant difference was present between the 2 groups regarding the reduction plantar fascia thickness at 1.5 ($p = 0.89$) and 3 months ($p = 0.64$) post-injection. Regarding the safety of both injections, none of our patients in either group developed any significant complications.

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Conclusions: We suggest that the PRP injection is a new, readily available, well tolerated and safe choice of therapy for chronic PF and is not inferior to steroid injection in a short term 3 month follow up. Comparing the long-term efficacy both clinically and sonographically is necessary to confirm their sustained effect.

1. Introduction

Heel pain is a common presenting complaint in the foot and ankle practice. Plantar fasciitis (PF) is the most common cause of heel pain [1]. It tends to occur more often in women, middle-aged, military recruits, athletes and the obese [2]. Approximately 10% of people suffer from PF at some point during their lifetime [3].

Corticosteroid injections are used for cases of PF refractory to conservative treatment and have been an effective modality for pain relief [4]. However, the effect seems to be limited and short-lived [5]. Also, a number of complications may occur of which the most serious are plantar fascial rupture and plantar fat pad atrophy. Fascial rupture interrupts the intrinsic windlass mechanism of the foot and can promote further inflammation in the surrounding tissue. In addition, plantar fat pad atrophy diminishes subcalcaneal cushioning, availing the plantar fascia to further insult and, hence, more pain [6].

Platelet-rich plasma (PRP) has been gaining popularity as a treatment for PF. Injection of PRP is thought to be safe, and not to interfere with the biomechanical function of the foot [7]. It is a component of whole blood that is centrifuged to a concentrated state, treated with an activating agent, and injected into the affected area [8]. The basic biologic mechanism of action of PRP is simple, after injection of PRP in an injured area, it induces a local inflammation. The pro-inflammatory mediators together with the growth factors released from the granules of the platelets trigger the localized inflammation and the wound healing cascade, resulting in the cellular migration and proliferation, glycosaminoglycan and collagen deposition, collagen maturation and remodeling of the healing tissue at different stages of wound healing [9]. PRP therapy has been shown to improve pain scores and functional ability and to decrease plantar fascia thickness. In 2004, Barrett and Erredge treated nine patients with chronic PF with ultrasound-guided PRP injections. Seven patients reported complete resolution of symptoms and showed sonographic improvement [10]. Later on in 2011, Scioli performed PRP injections for PF and noted marked reduction in pain, and improved ability to stand and walk in nearly all his patients [11]. Similarly, Ragab and Othman in 2012 evaluated 25 patients and reported that VAS significantly improved and plantar fascia thickness dropped with PRP treatment [7].

There is still controversy regarding the effectiveness of PRP injections compared with steroid injections in PF patients. Omar et al. in 2012 carried out a randomized controlled trial on 30 patients and found a significant improvement in pain and foot function at 1.5 months after PRP compared to steroid injection [12]. More recently, Shetty et al. in 2014 found a better response with PRP injections at the end of a 3 month follow up [13]. Moreover, Monto found sustained improvement in the American Orthopedic Foot and Ankle Society (AOFAS) hind foot score at 3, 6, 12 and 24 months following PRP injection [14].

To date, all previous studies in this field have either assessed local autologous PRP injections alone clinically and sonographically, or compared PRP with steroid injections only clinically. The aim of this study was to compare local autologous PRP injections and local steroid injections both clinically and sonographically within 3 months regarding its effect on pain, function, thickness and echogenicity of the plantar fascia and also regarding its safety.

2. Patients and methods

2.1. Patients

This study was carried out as a prospective, single-center, randomized, blind comparative study on 50 patients with chronic PF, attending the Rheumatology and Rehabilitation outpatient clinic in Zagazig University Hospitals, Faculty of Medicine. An approval had been obtained from the Institutional Review Board (IRB) of Zagazig University and all participants signed an informed consent.

Patients were included in the study if they were >18 years old and had chronic PF (>3 months). Clinical diagnosis of the patients was considered in those having inferior heel pain that usually worsens with their first steps in the morning or after a period of inactivity, with maximal tenderness over the anteromedial aspect of the inferior heel. The diagnosis was also confirmed by ultrasonography based on having plantar fascia thickness greater than 4 mm.

Patients were excluded if they had bilateral PF (for sonographic comparisons), received non-steroidal anti-inflammatory drugs (NSAIDs) within 1 week before the study, had a previous local injection or surgery for PF, had haematological disorder like anemia (hemoglobin $<$ 7.0 g/dl), thrombocytopenia (platelets $<$ 15,000/μL) or bleeding dyscrasias, had associated inflammatory enthesitis such as spondyloarthropathies, cardiovascular, renal or hepatic disease, bacteremia, cellulitis, skin ulceration, vascular insufficiency or neuropathy related to heel, diabetes mellitus or allergy to bupivicaine. Pregnant and breast feeding patients were also excluded.

The chronic PF patients were allocated randomly using a simple randomization method (odd for PRP and even for steroid) into two equal groups (25 patients each) by one of the researchers who injected the patients with either steroids or PRP (not guided by ultrasound) and did not share in clinical nor in ultrasonographic assessments: Group I (PRP) was injected 3 ml PRP after local anesthetic injection [15] and group II (steroid) was injected 2 ml triamcinolone acetonide (40 mg/ml) with local anesthesia [16]. The clinical examiners and sonographers were blind to the type of the given injection.