Platelet-Rich Plasma (PRP) Injection For Treatment Of Plantar Fasciitis

(Systematic review and Meta-analysis)

Submitted for partial fulfillment of master degree

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Poula Rizk Saad Mina

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List of abbreviations & Acronyms

Abbreviation	Term
ACD	acid citrate dextrose
ADP	Adenosine Diphosphate
AFAS	American Foot and Ankle Society
ATP	Adenosine triphosphate
bFGF	basic fibroblastic growth factor
CL	confidence limit
EDTA	Ethanol, Dimethylsulfoxide, Ethylenediam-inetetraacetic Acid
EGF	epidermal GF
FADI	Foot and Ankle Disability
FEM	fixed-effects method
FHSQ	Foot Health Status Questionnaire
IGF	Insulin-like growth factor
L-PRF	Leucocyte- and platelet-rich fibrin
L-PRP	Leucocyte Platelet Rich Plasma
NSAIDs	non-steroidal anti-inflammatory drugs
PDGF	Platelet-Derived Growth Facto
PF	Plantar fasciitis
PPP	platelet poor plasma
P-PRF	Pure platelet-rich fibrin
P-PRP	Pure Platelet Rich Plasma

Abbreviation	*Term*
PRP	Platelet Rich Plasma
RBC	red blood cells
REF	random-effects method
RM	Roles Maudsley
SE	standard error
SF-36	Short form-36 questionnaires
SMD	standardised mean difference
TGF	Transforming Growth Factor
UCLA	University of California and Los Angeles score
US	Ultra Sound
VAS	Visual Analogue Scale
VEGF	vascular endothelial growth factor

ABSTRACT

Background and introduction:

In our study we determine whether platelet-rich plasma (PRP) injections are associated with improved pain and function scores when compared with corticosteroid injections for plantar fasciopathy.

Methods:

This systematic review consisted of 6 steps, including a systematic search of the literature (PubMed, SCOPUS, Web of Science, and The Cochrane Library), selection of studies, recording of study characteristics, assessment of methodological quality and bias. and extraction of data on clinical outcomes and their comparisons between different groups, then meta analysis.

Results:

After exclusions, 19 studies were included in the final meta-analysis incorporating data on 911 unique patients (PRP Group=496, steroid=390) between the years 2007and 2017. The mean age of included patients in the PRP group ranged from 30.7 to 51.0 years compared with 33.9–59.0 years in the steroid group.

Conclusion:

PRP injections are associated with improved pain and function scores at three month follow-up when compared with corticosteroid injections. Information regarding relative adverse event rates and cost implications is lacking. Further, large-scale, high-quality, randomised controlled trials with blinding of outcome assessment and longer follow-up are required.

Keywords: Plantar fasciopathy . Platelet rich plasma . Corticosteroids . Meta-analysis.

INTRODUCTION

The medial longitudinal arch of the foot is sustained mainly by the plantar fascia, a specific subcutaneous structure of dense connective tissue. It can act as a beam when the metatarsals are subjected to important bending forces (propulsion) and a truss when the foot absorbs forces of impact expanded during landing and in the stance phase of gait. The plantar fascia extends from the calcaneus to the distal part of metatarsophalangeal joints of each toe and is divided in central, medial, and lateral sections. The broadest and strongest component of the fascia is the central portion[(1)]. Plantar fasciitis (PF), which is characterized by pain, sharpened with the first walking in the morning or after a long period of rest, in adults worsening the patients' quality of life. PF affects both sexes, either in elite or recreational athletes and women are affected slightly more often than men[(2)]. In the United States, more than 1 million patients per year receive healthcare for PF, which is provided by family physician. Even podiatrists, orthopaedic surgeons, physical therapists, and chiropractors are involved in the treatment of PF, which develops on the plantar fascia insertion and can be unilateral or bilateral. It is a common cause of foot pain.

In the past PF was defined as chronic inflammatory condition, nowadays PF is considered a degenerative pathology, more similar to tendinopathy and to a chronic disease which is evident at the site of the attachment of plantar fascia at the medial tubercle of the calcaneus. PF

is also referred to plantar heel pain syndrome, heel spur syndrome, plantar fasciopathy or painful heel syndrome[3]. The acute phase of PF can turn into a chronic phase, which is characterized by a clinical remission and progression of the plantar fascia degeneration process.

The risk factors associated with the onset of PF are intrinsic and extrinsic. The intrinsic risk factors are associated with body characteristics and include anatomic, functional and degenerative factors. The extrinsic risk factors are associated with physical activities and include overuse, incorrect training and inadequate footwear.

PF is experienced in both recreational and elite athletes and is reported in different sports. A recent review concerning ankle and foot injuries in sport, that can be considered in differential diagnosis has included. Achilles tendinopathy is the most frequently investigated injury, mostly in running and soccer athletes. Other frequently reported pathologies were stress fracture or PF, mainly reported in basketball players and runners, respectively. These data are in agreement with those detected in elite athletes who competed at the London 2012 Olympic Games. The incidence of PF in runners ranges from 4.5 to 10%, and represents the third most frequently experience running-related musculoskeletal injuries after medial tibial stress syndrome (incidence ranging from 13.6 to 20%) and Achilles tendinopathy (incidence ranging from 9.1 to 10.9%) [4], in accordance with those previously reported by Taunton et al. [7]. A recent prospective study that analysed the novice running-related injuries, has revealed that PF accounts for about 5%, after medial tibial stress syndrome (10%),

patellofemoral pain (10%), medial meniscal injury (9%), and Achilles tendinopathy (7%) [5]. In ultra-marathon runner athletes PF has an incidence of about 11% [6].

Local injection is a commonly used treatment modality for PF. Most authors recommend steroid injection, although there are some trials for other injectables like botulinum toxin , hyperosmolar dextrose/lidocaine and autologous platelet concentrate. [7]

Corticosteroid have been shown to inhibit fibroblast proliferation and expression of ground substance proteins. It is possible that these known effects may be of benefit in treatment of PF, as increased fibroblast proliferation and excessive secretion of proteoglycans are commonly reported features of the condition. [7]

Recently platelet-rich plasma (PRP) has been suggested as an alternative to steroid injections in the treatment of tendinopathy. PRP is a bioactive form of autologous whole blood with a platelet concentration greater than baseline. It has been suggested to aid wound healing by the local action of autologous growth factors and secretory proteins provided by the concentrated platelets.[8]

AIM OF THE WORK

A systematic review and meta-analysis for available evidence about comparing the effects of platelet-rich plasma (PRP) and steroid injections in patients diagnosed with plantar fasciitis.