Clinical Results of Platelet-Rich Plasma for Partial Thickness Rotator Cuff Tears: A Case Series

Zohreh Zafarani, MD; Fateme Mirzaee, MSc; Mohamadreza Guity, MD; Hamidreza Aslani, MD

Research performed at Knee and Sport Medicine Research and Education Center, Milad Hospital, Tehran, Iran

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Abstract

Partial thickness rotator cuff tears (PTRCTs) are a common pathology among shoulder disorders in people over 50 years. Treatment of PTRCTs remains controversial. Most studies on the treatment of PTRCTs have explained surgical techniques or outcomes; few studies have centralized on the conservative and new management of PTRCTs, like treatment with Platelet-rich plasma (PRP). These case series study have been conducted on Platelet-rich plasma (PRP) injection, as a concentrated source of autologous platelets in blood plasma, contains several different growth factors and other cytokines that can stimulate healing of soft tissue.

PRP injection showed positive effect on improving PTRCTs complains. This method improved pain, function, DASH score and shoulder joint range motion in. Because of PRP products are safe and easy to prepare and apply, and also according to improving patient’s condition, this method can be used to treat PTRCTs.

Keywords: Partial thickness rotator cuff tears, Platelet-rich plasma, PRP injection

Introduction

Partial thickness rotator cuff tear (PTRCTs) is a common pathology among shoulder disorders in people over 50 years old (1, 2). The prevalence of PTRCTs ranges from 13% to 32%, which is in part correlated to patients’ age (2-4). In 2002, the mean cost of the physicians’ visits and almost 40,000 inpatient procedures on the rotator cuff was $14,000 per case in the United States (5). Nearly one third of the silent rotator cuff tears will become symptomatic through the following years. In particular, women are more susceptible to be affected by the common shoulder conditions (6, 7). The prevalence of degenerative rotator cuff tears will be increasing as the number of elderly grows in the population. Most studies on PTRCTs have explained surgical techniques or surgical outcomes; however, few studies have discussed the nonoperative modalities including platelet rich plasma (PRP) injection (2, 5, 7-13).

The use of PRP was first described in 1999 by a research group in Vitoria in Spain for maxillofacial and plastic surgery (14). Recent researches have assessed the biologic enhancement of the healing process. PRP is potentially able to produce collagen, growth factors, and probably increase in the number so available stem cells, which consequently enhance healing by delivering high concentrations of alpha-granules containing biologically active moieties (such as vascular endothelial growth factor and transforming growth factor-β) to the areas of soft tissue damage (13, 15, 16). PRP has been shown to be safe and effective in most other fields including dermatology, dentistry and orthopedic surgery (8, 17, 18). This concentration may be applied either in the clinic as a nonoperative treatment or intraoperative (1, 3, 19-21).

In this study we aimed to assess the efficacy of local injection of autologous PRP on pain and function of the patients with PTRCTs.

Case presentation

Nineteen consecutive patients including 8 men and 11 women were enrolled and treated with an autologous PRP injection for the treatment of PTRCTs. The indication for PRP injection was physical examination and MRI findings consistent with type I, II and III of PTRCTs lasting more than at least 3 months based on the Ellman’s classification (grade 1: partial tear < 3mm deep, grade 2: partial tear 3-6 mm deep not exceeding one-half of the tendon thickness, grade 3: partial tear > 6 mm deep) (22). Of these patients, 21% (4 patients) were type
Clinical Outcome
The average age of the patients was 56 ± 4.1 years (range, 50-63 years old). Right shoulder was injected in 14 patients and left shoulder was done in the other 5 patients. The average pre-treatment flexion was 97 degrees and abduction was 91 degrees. Also scores for VAS, DASH, and SF-12 Health Survey questionnaire were 7.5, 34, and 32, respectively [Table 1]. After 3-month follow-up, all patients showed significant improvement in shoulder ROM, pain, and function. Patients reported 53% improvement in shoulder ROM, 66% in pain, 76% in DASH score, and 84% in SF-12 Health Survey questionnaire.

Discussion
The repair of a partially torn rotator cuff tendon may be successfully performed through a variety of techniques such as open or arthroscopic methods. Repaired tissue often degenerates locally and might enhance a weak tear; which is then repaired as a full thickness rotator cuff tear. Moreover, complications of surgery including infection and shoulder stiffness have a relatively high prevalence (1-4, 20, 22). This has lead the surgeons to investigate the effect of intraoperative PRP injection (2, 7, 9, 11, 12, 24). Furthermore, some researches have shown that nonoperative treatment with PRP can be as effective as surgery in patients with PTRCTs.

Biologic augmentation strategies such as PRP offer the potential to improve healing in partial tears or in situations when prior repair has failed (2, 17, 25-27). The healing potential of PRP has been described to the release of multiple growth factors from the highly concentrated platelets. In recent studies, enhanced tendon repair was demonstrated following application of growth factors (5). Platelet derived growth factor (PDGF), epidermal growth factor (EGF), vascular endothelial growth factor; and transforming growth factor beta (TGF-b) are key cytokines existing at high levels in platelet rich plasma (PRP) (8,28-30).

In this report, we evaluated the efficacy of PRP injection in patients with PTRCTs. After 3 month the result showed improvement in shoulder joint ROM, DASH score, pain and function, without any side effects or complications. Overall, the goal of PRP injection is to accelerate the natural healing cascade through the action of the elevated cytokine concentrations released during platelet degranulation, which probably stimulates the capillary regeneration (31-33).

Additional research with randomized clinical trials is warranted to determine the effect of this protocol and to be able to attribute the improvement to the PRP rather than the stretching exercise and other probable intervening factors (34). Other limitations were small number of
the patients and short follow-up. We did not have a gold standard such as follow-up MRI or arthroscopy to prove the healing. However, we were able to assess the clinical outcomes. Future studies should investigate tendon healing using magnetic resonance imaging (MRI).

PRP injection showed positive effect on improving PTRCTs. This method improved pain, function, DASH score, and shoulder range of motion while it is safe too.

Zohreh Zafarani MD
Fateme Mirzaeem MSc
Hamidreza Aslani MD
Knee and Sport Medicine Research and Education Center, Milad Hospital, Tehran, Iran

Mohamadreza Guity MD
Tehran University of Medical Sciences, Tehran, Iran

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