

Evaluation of Autologous Platelet Rich Plasma Injection in the Treatment of Rotator Cuff Tendinopathy

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ABSTRACT

Background: Rotator cuff tendinopathy (RCT) is a significant source of disability and loss of work. As commonly used subacromial corticosteroid injection for treatment of chronic rotator cuff tendinopathy has adverse effects especially in elderly people, new treatment options such as Platelet-Rich Plasma (PRP) can be considered for managing of this pathology. The aim of the present study was conducted to evaluate the effectiveness of autologous platelet rich plasma injection in the treatment of rotator cuff tendinopathy.

Materials and Methods: The present study was conducted among adults of age 30-70 years over the period of 1 year from Feb 2018 to Jan 2019. The primary outcome measure for all participants was a score on a 0-10 visual analog scale (VAS) assessing current resting pain at baseline and at 8, 12, and 52 weeks. Demographics and information about duration of RCT pain and prior therapies for RCT were collected. Each participant underwent a single injection of PRP. In-person assessment occurred at 2, 8, and 12 weeks and by phone at 52 weeks. Statistical analysis was done using SPSS 21 software. *P* values less than .05 were considered statistically significant for main and interaction effects.

Results: In the present study total sample size was 46 in which 32 were males and 14 were females. VAS score was

evaluated for the treatment of Rotator cuff Tendinopathy at baseline, 8 week, 12 week, 52 weeks after the injection of autologous platelet rich plasma. The result shows that VAS score was less after 8 weeks and after 12 weeks and 52 weeks it was almost same.

Conclusion: Our study concluded that pain was less in the patients of Rotator cuff Tendinopathy after the injection of autologous platelet rich plasma.


Keywords: Rotator Cuff Tendinopathy, Autologous Platelet Rich Plasma.

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INTRODUCTION

Chronic musculoskeletal diseases are the most common cause of severe long-term pain and physical disability. The term "Tendinopathy" is defined as a chronic tendon injury with molecular disruption without any definitive etiology.¹ Rotator cuff tendinopathy (RCT) is an important condition of the upper extremity, affecting 1 in 50 adults²; incidence increases with age, making shoulder pain a common musculoskeletal complaint in adults over age 65.^{3,4}

Its greatest impact is on workers with repetitive and high-load upper extremity tasks and on athletes; shoulder pain and weakness are associated with significant morbidity, affecting activities of daily living, recreation, and work life.⁵ A combination of some extrinsic and intrinsic factors are generally responsible for the development of RCT, including biomechanical and anatomic dysfunctions causing subacromial impingement, tendon degeneration associated with aging, alterations in tendon

mechanical properties, poor vascularity, tension overload, and overuse.⁶⁻⁸ The medical community as a whole, and in particular orthopedic surgery, has seen a rapid rise in the clinical use of platelet-rich plasma (PRP) over the past decade.^{9,10} As an autologous derivative of whole blood, PRP is rich with growth factors that are theorized to modulate the inflammatory pathway and to encourage healing of tendon, ligament, muscle, and bone.¹⁰⁻¹³ The aim of the present study was conducted to evaluate the effectiveness of autologous platelet rich plasma injection in the treatment of rotator cuff tendinopathy.

MATERIALS AND METHODS

The present study was conducted among adults of age 30-70 years over the period of 1 year from Feb 2018 to Jan 2019 in the Department of Orthopaedics, Nalanda Medical College and Hospital, Patna, Bihar, India.

Before the commencement of study ethical approval was taken from the Ethical committee of the institute and informed consent was obtained from the patients. Patients with clinical diagnosis of RCT with symptoms for 3 months or more, failed conservative treatment of at least 4 weeks of formal physical therapy (including rotator cuff strengthening and scapular and proprioceptive stabilization), at least one corticosteroid injection, shoulder x-ray to rule out adhesive capsulitis, and magnetic resonance imaging (MRI) study indicating RCT but no significant acromio-clavicular joint impingement, retracted tears, significant labral lesions, or significant glenohumeral arthrosis were included in the study. Patients with joint instability defined by positive apprehension and relocation test, pregnancy, immune system compromise, significant upper extremity comorbidity, anticoagulation therapy, history of shoulder surgery, and corticosteroid injection within 3 months were excluded from the study. The primary outcome measure for all participants was a score on a 0–10 visual analog scale (VAS) assessing current resting pain at baseline and at 8, 12, and 52 weeks. Demographics and information about duration of RCT pain and prior therapies for RCT were collected. Each participant underwent a single injection of PRP. At baseline, an antecubital blood draw of 20 mL was concentrated in a SmartPReP (Harvest Technologies Corp, Plymouth, Massachusetts) to yield 3.5 cc of PRP and a supra-physiological concentration of white blood cells. Using the baseline MRI as a guide, the patient underwent a manual and ultrasound shoulder exam by the principal investigator (MS). The lesion was marked and the area sterilely prepped. All injections were done under ultrasound guidance. A two-part injection process was used. An advancing 25 G 2-in needle first placed 3 mL of 1% xylocaine proximal to the tendinopathic area or tear. The needle was then re-inserted at the proximal aspect of the lesion and slowly removed while infiltrating of 3.5 mL of PRP without activation with CaCl/thrombin at the lesion and surrounding tendon. No repeated needling (tenotomy) was done. Posttreatment pain control (hydrocodone/acetaminophen #20 5/500 mg) was used. In-person assessment occurred at 2, 8, and 12 weeks and by phone at 52 weeks. Patients were discouraged from using nonsteroidal anti-inflammatory medications and starting new therapies for RCT. Participants were advised to use relative rest including 2 days off work, then to slowly advance activities of daily living progressively over 2 weeks and return to activity as tolerated. Statistical analysis was done using SPSS 21 software. *P* values less than .05 were considered statistically significant for main and interaction effects.

Table 1: Distribution according to Gender

Gender	N(%)
Males	32(69.56%)
Females	14(30.43%)
Total	46(100%)

Table 2: Distribution according to Visual analog scale

VAS score	Mean ± SD
At baseline	7.7±0.5
Week 8	3.6±0.3
Week 12	0.4±0.2
Week 52	0.3±0.3

RESULTS

In the present study total sample size was 46 in which 32 were males and 14 were females. VAS score was evaluated for the treatment of Rotator cuff Tendinopathy at baseline, 8 week, 12 week, 52 weeks after the injection of autologous platelet rich plasma. The result shows that VAS score was less after 8 weeks and after 12 weeks and 52 weeks it was almost same.

DISCUSSION

Tendon disorders are responsible for substantial and significant increased morbidity in sporting, recreational and occupational activities. Tendinopathies are clinical conditions in and around tendons arising from overuse. Tendinopathy is a difficult problem requiring lengthy management, and patients often respond poorly to treatment. The major risk factor for acute tendon rupture is the pre-existing degeneration which is a result of traumatic insult over a long period of time. Despite appropriate management, due to hypovascular nature of tendons, the tendon injuries produce considerable morbidity to the individuals.¹⁴

In the present study total sample size was 46 in which 32 were males and 14 were females. VAS score was evaluated for the treatment of Rotator cuff Tendinopathy at baseline, 8 week, 12 week, 52 weeks after the injection of autologous platelet rich plasma. The result shows that VAS score was less after 8 weeks and after 12 weeks and 52 weeks it was almost same.

It has been shown that platelet concentrates contain factors such as transforming growth factors, and fibroblast growth factors which can promote tendon cell proliferation, collagen synthesis and vascularisation in vitro and in vivo.¹⁵⁻¹⁷ Also, PRP and other growth factor containing biologicals have been used in addition to rotator cuff tear surgery with some positive effects.^{18,19}

Kesikburun et al, have not found any difference between injecting PRP or saline for treatment of rotator cuff tendinopathy or partial tendon ruptures at a 1-year follow-up.²⁰ Warth et al., comparing the effectiveness of PRP-augmented arthroscopic rotator cuff repairs with control cases (no PRP), PRP had a large re-tear reduction effects when used after double-row rotator cuff repairs in patients with initial tear sizes > 3 cm (25.9% v 57.1%, *p* = 0.046).¹⁸ Jo et al., in a randomized controlled trial, showed improvement in structural outcomes in patients who received PRP and underwent arthroscopic rotator cuff repair of large to massive tears.²¹

Vavken et al. also assessed re-tear rate as it related to PRP with a focus on its cost-effectiveness in that context.²²

CONCLUSION

Our study concluded that pain was less in the patients of Rotator cuff Tendinopathy after the injection of autologous platelet rich plasma.

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