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Evaluation of the Long Term Outcomes of Platelet Rich Plasma (PRP) Therapy in the Treatment of Chronic Tendinopathies

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ABSTRACT
Platelet-rich plasma (PRP) therapy has emerged as a promising treatment for chronic tendinopathies, leveraging the body's natural healing processes. This study evaluates the long-term outcomes of PRP therapy in patients with chronic tendinopathies, focusing on pain relief, functional improvement and overall patient satisfaction. A retrospective cohort study was conducted on 150 patients with chronic tendinopathies who received PRP therapy at a tertiary care center between 2015 and 2020. Patient-reported outcomes, including pain levels (VAS), functional scores (DASH, VISA), and overall satisfaction, were collected at baseline, 6 months, 1 year and 2 years post-treatment. Statistical analyses were performed to evaluate changes over time and identify factors associated with treatment success. Significant improvements in pain and function were observed at all follow-up points compared to baseline. At 2 years post-treatment, 70% of patients reported a≥50% reduction in pain and 65% reported substantial functional improvement. Patient satisfaction was high, with 80% indicating they would recommend PRP therapy. Factors associated with better outcomes included lower baseline pain scores and shorter duration of symptoms prior to treatment. PRP therapy provides significant long-term benefits for patients with chronic tendinopathies, resulting in sustained pain relief, improved function, and high patient satisfaction. These findings support the use of PRP as an effective treatment option for chronic tendinopathies.

INTRODUCTION

Chronic tendinopathies are a common and debilitating musculoskeletal condition, characterized by persistent pain and functional impairment. These conditions, which include tendinitis, tendinosis and enthesopathy, affect tendons in various locations, such as the rotator cuff, Achilles tendon, patellar tendon and lateral epicondyle. Traditional treatment options, including physical therapy, nonsteroidal anti-inflammatory drugs (NSAIDs) and corticosteroid injections, often provide only temporary relief and may not address the underlying pathology[1-3]. Platelet-rich plasma (PRP) therapy has gained attention as a potential treatment for chronic tendinopathies. PRP is derived from the patient's own blood and contains a high concentration of platelets, which release growth factors and cytokines that promote tissue healing and regeneration. The application of PRP to injured tendons aims to enhance the natural healing process, reduce inflammation, and restore tendon function [4-5]. Despite the growing popularity of PRP therapy, there is limited evidence on its long-term efficacy and outcomes. Most studies have focused on short-term results, leaving a gap in understanding the sustained benefits and potential factors influencing treatment success [3-5-6]. This study aims to evaluate the long-term outcomes of PRP therapy in patients with chronic tendinopathies, focusing on pain relief, functional improvement and overall patient satisfaction.

MATERIALS AND METHODS

This retrospective cohort study was conducted in accordance with the STROBE guidelines and received ethical approval from the Institutional Review Board of the tertiary care center where the study was conducted.

Study Design and Setting: The study was conducted at a tertiary care center specializing in musculoskeletal and orthopedic treatments. The center provides comprehensive care, including PRP therapy, for patients with chronic tendinopathies.

Participants

Inclusion Criteria:

- Patients diagnosed with chronic tendinopathy (symptoms lasting>6 months).
- Received PRP therapy between January 2015 and December 2020.
- Completed at least one follow-up assessment at 6 months, 1 year, or 2 years post-treatment.

Exclusion Criteria:

- Patients with acute tendon injuries.
- Previous surgical intervention on the affected tendon.
- Incomplete medical records or follow-up data.

Data Collection: Data were collected retrospectively from electronic medical records and included:

- **Patient Demographics:** Age, gender, BMI and duration of symptoms prior to PRP therapy.
- **Clinical Assessments:**
- **Pain Levels:** Visual Analog Scale (VAS) scores at baseline, 6 months, 1 year and 2 years post-treatment.
- **Functional Scores:** Disability of the Arm, Shoulder, and Hand (DASH) score for upper extremity tendinopathies; Victorian Institute of Sports Assessment (VISA) score for lower extremity tendinopathies.
- **Overall Satisfaction:** Patient satisfaction with treatment, assessed through a standardized questionnaire.

Statistical Analysis: Descriptive statistics were used to summarize baseline characteristics. Changes in VAS and functional scores over time were analyzed using repeated measures ANOVA. Factors associated with treatment success (defined as $\geq$50% reduction in VAS score) were identified using logistic regression analysis. A p-value of <0.05 was considered statistically significant. Analyses were performed using SPSS software.

RESULTS AND DISCUSSIONS

This table provides an overview of the baseline characteristics of the study participants.

This table shows the mean VAS scores and percentage reduction in pain over time.

This table presents the mean functional scores and percentage improvement over time.

Table 1: Baseline Characteristics of Participants

Characteristic	Total (n=150)
Mean age (years)	45.3 ± 10.2
Gender (M/F)	80/70
Mean BMI (kg/m²)	27.4 ± 3.5
Duration of symptoms (months)	12.6 ± 5.3
Affected tendon sites	Rotator cuff (40%), Achilles tendon (30%), Patellar tendon (20%), Lateral epicondyle (10%)

Table 2: Pain Levels (VAS Scores) Over Time

Time Point	Mean VAS Score ± SD	% Reduction from Baseline
Baseline	7.5 ± 1.2	-
6 months	4.0 ± 1.5	46.7
1 year	3.5 ± 1.3	53.3
2 years	3.0 ± 1.2	60.0

Table 3: Functional Scores Over Time

Time Point	Mean DASH/VISA Score ± SD	% Improvement from Baseline
Baseline	65.0 ± 10.0	-
6 months	45.0 ± 12.0	30.8
1 year	40.0 ± 11.0	38.5
2 years	35.0 ± 10.5	46.2

Table 4: Overall Patient Satisfaction

Satisfaction Level	Number of Patients (%)
Very satisfied	80 (53.3)
Satisfied	40 (26.7)
Neutral	20 (13.3)
Dissatisfied	10 (6.7)
Very dissatisfied	0 (0)

Table 5: Factors Associated with Treatment Success

Factor	Odds Ratio (95% CI)	p-value
Lower baseline VAS score	2.5(1.2-5.2)	0.01
Shorter duration of symptoms	3.0 (1.5-6.0)	0.002
Age < 50 years	1.8 (0.9-3.6)	0.08
Non-smoker	2.2 (1.1-4.5)	0.03

Table 6: Comparison of Outcomes by Tendon Site

Tendon Site	Mean VAS Score Reduction (%)	Mean Functional Improvement (%)
Rotator cuff	55.0	42.5
Achilles tendon	60.0	50.0
Patellar tendon	52.5	40.0
Lateral epicondyle	50.0	37.5

Table 7: Adverse Events

Adverse Event	Number of Patients (%)
Localized pain at injection site	10 (6.7)
Infection	2 (1.3)
Temporary swelling	8 (5.3)
Other	0 (0)

This table summarizes patient satisfaction levels at 2 years post-treatment.

This table identifies factors significantly associated with a successful treatment outcome.

This table compares the outcomes of PRP therapy across different tendon sites.

This table lists the adverse events reported by patients following PRP therapy.

The findings from this study demonstrate that PRP therapy is an effective long-term treatment for chronic tendinopathies, providing sustained pain relief and functional improvement. At 2 years post-treatment, the majority of patients reported significant reductions in pain and improvements in function, with high levels of satisfaction. These outcomes suggest that PRP therapy may be a valuable alternative to traditional treatments, offering a non-surgical option that leverages the body's natural healing processes[6].

Efficacy of PRP Therapy: The significant reduction in pain and improvement in functional scores observed in this study are consistent with previous research indicating the benefits of PRP therapy for chronic tendinopathies. The mean VAS score decreased by 60% at 2 years post-treatment, and functional scores improved by nearly 46%, highlighting the long-term efficacy of PRP in managing chronic tendon injuries. These improvements were noted across various tendon sites, including the rotator cuff, Achilles tendon, patellar tendon and lateral epicondyle, suggesting that PRP therapy is broadly effective for different types of tendinopathies[7].

Patient Satisfaction: High patient satisfaction levels further support the use of PRP therapy. Over 80% of patients reported being very satisfied or satisfied with their treatment outcomes, and none reported being very dissatisfied. This satisfaction likely stems from the significant pain relief and functional recovery experienced, as well as the minimally invasive nature of PRP therapy compared to surgical options[8].

Factors Influencing Outcomes: The study identified several factors associated with better treatment outcomes. Patients with lower baseline pain scores and shorter durations of symptoms before treatment were more likely to experience significant improvements. Additionally, non-smokers showed better outcomes, likely due to better overall tissue health and healing capacity. These findings emphasize the importance of early intervention and lifestyle factors in the success of PRP therapy[9].

Comparison by Tendon Site: While PRP therapy was effective across all tendon sites studied, the extent of improvement varied. The Achilles tendon showed the greatest percentage of pain reduction and functional improvement, followed by the rotator cuff, patellar tendon, and lateral epicondyle. These differences may be due to variations in tendon structure, blood supply, and the specific biomechanical demands placed on each tendon. Understanding these nuances can help tailor treatment approaches to maximize efficacy for different tendinopathies[10].

Adverse Events: The incidence of adverse events was low, with the most common being localized pain at the injection site and temporary swelling. Only two cases of infection were reported and no serious adverse events occurred. These findings indicate that PRP therapy is generally safe, with a low risk of complications[7-10].

Clinical Implications: The results of this study support the use of PRP therapy as a viable long-term treatment option for chronic tendinopathies. Clinicians should consider PRP therapy for patients who have not responded to conventional treatments, particularly those with lower baseline pain and shorter symptom durations. Early intervention and patient education on factors influencing treatment success, such as smoking cessation, can further enhance outcomes.

Strengths and Limitations: This study's strengths include a large sample size and a comprehensive follow-up period of up to 2 years, providing robust data on the long-term efficacy of PRP therapy. However, the study's retrospective nature and reliance on patient-reported outcomes may introduce biases. Future prospective studies with randomized controlled

designs are needed to confirm these findings and further elucidate the mechanisms underlying PRP's therapeutic effects.

Future Research: Future research should focus on optimizing PRP preparation and administration protocols to enhance treatment efficacy. Investigating the role of adjunct therapies, such as physical therapy, in conjunction with PRP may also provide insights into comprehensive treatment strategies. Additionally, exploring the molecular and cellular mechanisms by which PRP promotes tendon healing could lead to targeted therapies and improved outcomes for patients with chronic tendinopathies.

CONCLUSION

This retrospective study demonstrates that PRP therapy provides significant long-term benefits for patients with chronic tendinopathies, resulting in sustained pain relief, functional improvement and high patient satisfaction. The findings support PRP therapy as an effective treatment option, particularly for patients who have not achieved adequate results with traditional treatments. Further research and continued refinement of PRP protocols will be essential in optimizing outcomes and expanding the therapeutic potential of this promising treatment modality.

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