

Investigating the Effects of Platelet-Rich Plasma Injection on Pain Reduction in Frozen Shoulder Patients

Swati Mani¹ | Mounica²

^{1,2}VR Siddhartha Medical College, Vijayawada, AP, India
swatimani@gmail.com

To Cite this Article

Swati Mani and Mounica, "Investigating the Effects of Platelet-Rich Plasma Injection on Pain Reduction in Frozen Shoulder Patients", *Journal of Engineering Technology and Sciences*, Vol. 01, Issue 02, October 2024, pp:01-04

Abstract: In recent years, platelet-rich plasma (PRP) technologies have attracted the interest of various researchers due to their relatively effective treatment ratio. This low-cost strategy of forgoing surgery lowers discomfort, hospital stays, and the risk of limb impairment. The purpose of this research is to better understand how freezing pain treatment.

Techniques: This descriptive case series study was conducted in the Department of Orthopedic Mayo Hospital in Lahore, Unit I, over the course of six months, from January to June 2018. A total of 300 patients were involved, and 73.3 percent of them reported having pain relief. We include people 40–80 years old, of both sexes, who have had a frozen shoulder for six weeks.

Keywords: Adhesive capsulitis, Pain, Frozen Shoulder

I. Introduction

Frozen shoulders or adhesive capsulitis affect 2-2.4 percent of the world's population each year, or 11.2 cases per thousand persons. 1-2. Fibrosis in the shoulder capsule 3-4 causes restricted mobility in this glenohumeral joint condition. Frozen shoulder cases typically affect 3-5% of the general population, but in recent years, their morbidity in diabetes patients was concerning, with a 20% prognosis of illness⁵. This self-limiting condition has been common in patients 1-3 years, although in certain investigations, 20–50% of patients with frozen shoulder and ROM impairments have reported sickness for more than 10 years. According to researchers, this is uncommon in the age range of 40 and happens in the fifth and sixth decades of human existence years. Compared to males, women were more likely to experience a frozen shoulder⁷. The possibility of the frozen shoulder for life was 2–4 percent high in diabetic patients together with various co-morbidities like hypoadrenalism, Parkinson's disease, heart disease, pulmonary illness, stroke^{8,9}. The aetiology of adhesive capsulitis is not yet determined, although the subacromial bursar's inflammatory process was regarded as a cause of disease¹⁰.

Frozen shoulder adhesive capsulitis is typically referred to as manual therapy and exercise. But adequate frozen arm treatment is not yet defined. Many operational and non-operational approaches are utilised for handling frozen shoulders. These treatments are mostly aimed at reducing pain and restoring joint function. Conservative therapies such as therapeutic joint injection or anaesthetic manipulation or physical treatment are frequently utilised for the treatment of adhesive capsulitis¹⁰⁻¹². Due to the very effective treatment ratio, several researchers have been interested in platelet-rich plasma (PRP) technologies in recent years. This low-cost strategy of forgoing surgery lowers discomfort, hospital stays, and the risk of limb impairment patients experience improved quality of life^{13,14}. A comparatively little body of research has been published to evaluate the PRP technique's efficacy in treating patients with adhesive capsulitis. The purpose of this research is to better understand how freezing pain treatment uses platelet-rich plasma injections.

II. Methodology

The six months between January and June of 2018 were spent doing this descriptive case series study at the Mayo Hospital in Lahore, Unit I, the Department of Orthopedics. A total of 300 patients were involved, and 73.3 percent of them reported having pain relief. We include people 40–80 years old, of both sexes, who have had a frozen shoulder for six weeks. On a visual analogue scale, patients with shoulder joint discomfort greater than three were included for both passive and active motion. Patients with rotation (elbow flexed to 90 degrees), 150 degrees of

abduction, 180 degrees of advanced flexion, 45 to 60 degrees of expansion, and 90 degrees of external and internal rotation, respectively, were also included. Every pregnant woman who acted inappropriately was disqualified.

Patients having a history of systemic inflammation, joint osteoarthritis, or frozen shoulder were excluded from the study. Patients were enrolled by OPD at the Orthopedic Mayo Hospital Lahore department after providing informed consent. Clinical data about the patients was observed, along with basic demographic information. In the first step, 20 milliliters of the patient's blood was drawn, and it was spun at 5000 rpm for five minutes using a double syringe to separate the blood into layers of red blood cells, plasma, and leukocyte buffer. Furthermore, for a period of four weeks, the subacromial area and the intra-articular space have been routinely injected with plasma. At this point, PRP was the only substance injected into the GH joint. Two distinct gadgets were employed to gather data. Sex was mentioned in the opening chapter of the age-related questions for the patients. The second part used a visual analogue scale, with 0–10 grades representing pain episodes. There are four categories of pain: none at all (zero), mild (1-3), moderate (4-6), and severe (7-8). This visual analogue scale has proven to be accurate and dependable in earlier studies. The ethical permission of the institution was obtained before beginning this research. Every one of the Helsinki Protocol's tenets has been upheld. The patients were fully informed of the objectives, and their formal agreement was obtained before any intervention took place. Pain was tracked both before and during the sixth week of treatment. Patients were advised to engage in a brief activity following each injection. For the purpose of data analysis in this study, we used SPSS 22.0. The average and standard deviation was utilized to examine quantitative data at six weeks, such as age and pain, whereas gender and pain score improvement were evaluated using frequency distribution. The Chi-square formula was applied to the comparison. For this study, a statistically significant threshold of 0.05 has been chosen.

III. Results

The patients ranged in age from 40 to 80 years old, with a mean of 60.47 ± 11.55 years. With higher male-to-female ratios, 164 (53.8%) of the patients were male and 141 (46.2%) were female. The pain median before and after treatment was 2.42 ± 1.71 and 6.56 ± 1.79 , respectively. After therapy, the average pain reduction was $64.57 \pm 19.40\%$, with reductions of 0% and 88.89%, respectively. A 50% improvement was seen in 267 cases (87.5%), while 38 cases (12.5%) showed an improvement of less than 50%. There were 172 (64.4%) cases with the age range of 40–65 years, and 95 (35.6%) cases with the age range of 66–80 years. Of those not displayed, 22 (57.9%) had the age range of 40–65 years, and 42.1% of those having a range of ages from 66 to 80. In both age groups, the frequency of 50% better was statistically equal, with a p-value greater than 0.05. There have been 144 (53.9%) male and 123 (46.1%) female cases in the TEM 50% of the cases; among the cases that have not showed TEM 50%, there have been. For both genders, the incidence of a 50% improvement was statistically equal ($p\text{-value} > 0.05$). There have been 144 (53.9%) cases of disease duration <12 weeks, 123 (46.1%) cases of disease from 12 weeks, 26 (68.4%) cases of disease from cases that did not indicate <12 weeks, 12 (31.6%) cases of disease from 12 weeks, and 12 (31.6%) cases from 12 weeks in cases where there has been a 50% improvement. The frequency of A 50% improvement was statistically equivalent regardless of the duration of the illness ($p > 0.05$). Ten (26.3%) cases had baseline pains < 6 and 28 (73.7%) cases had baseline pains were detected in cases without baseline pain as 6% improvement with < 5%. There were 94 (35.2%) cases with baseline pains < 6 and 173 (64.8%) with starting pain as low as 610. Regardless of baseline pain, the frequency >50% is the same, with a p-value > 0.05.

Table 1: Age (years), pain, and reduction descriptive statistics

Amount of Variables	Mean $\pm$ SD	Total Range	Minimum	Maximum
Age	60.47 ± 11.55	40	40	80
Score before pain	6.56 ± 1.79	5.00	4.00	9.00
Score after pain	2.42 ± 1.71	6.00	1.00	7.00
Reduction	64.57 ± 19.40	88.89	0.00	88.89

Table 2: Comparison of Improvement $\geq 50\%$ in terms of age, gender, length of illness, and pain threshold

Variables	Improvement $\geq 50\%$		Chi square	p value
	Yes	No		
Age			0.612	0.434 (Insignificant)
40- 65	172 (64.4%)	22 (57.9%)		
66- 80	95 (35.6%)	16 (42.1%)		
Gender			0.023	0.880 (Insignificant)
Male (n= 164)	144 (53.9%)	20 (52.6%)		
Female (n= 141)	123 (46.1%)	18 (47.4%)		
Duration of disease			2.830	0.092 (Insignificant)
<12 weeks	144 (53.9%)	26 (68.4%)		
≥ 12 weeks	123 (46.1%)	12 (31.6%)		
Pain			1.170	0.279 (Insignificant)
Before < 6 weeks	94 (35.2%)	10 (26.3%)		
After 6-10 weeks	173 (64.8%)	28 (73.7%)		

IV. Discussion

Frozen shoulders have been resolved in the past with manual therapy, exercises, and physical therapy procedures. According to our research, women who reached their peak at 56 years old had a higher risk of developing adhesive capsulitis. Sixteen to seventeen percent of the participants in this study experienced another frozen shoulder within five years of receiving treatment for their original shoulder. Dominant shoulders (15) experienced an influence. Usually, the frozen shoulders are categorised as primary or secondary. While the following frozen shoulder appears due to systemic, intrinsic, or extrinsic illness, the primary frozen shoulder radiographs appear to be normal and idiopathic¹⁵. The frozen shawl goes through three stages over its complete length, which are referred to as the painful, inflammatory, freezing, and thawing stages, , or between 12 and 18 months. 16. The typical duration of a frozen shoulder is six months, though this can change based on the

patient's circumstances. In the inflammatory stage of frozen patients, there is minimal capsular pattern mobility and ongoing discomfort. People with shoulder rigidity experienced reduced pain during the second phase, although their range of motion was restricted. But in the final phase, shoulder movements were regained with less pain¹⁷. In most cases, the objective of adhesive capsulitis was to minimise pain, regain function, and continue with activities. Physiotherapy comes in many forms, such as massage, electrotherapy, and exercise. According to research, TENS (transcutaneous electrical stimulation of the nerve), deep heat massage, cold, ultrasound, and laser treatments can reduce , or between 12 and 18 months. 16. The typical duration of a frozen shoulder is six months, though this can change based on the patient's circumstances. In the inflammatory stage of frozen patients, there is minimal capsular pattern mobility and ongoing discomfort. People with shoulder rigidity experienced reduced pain during the second phase, although their range of motion was restricted. But in the final phase, shoulder movements were regained with less pain¹⁷. In most cases, the objective of adhesive capsulitis was to minimise pain, regain function, and continue with activities. Physiotherapy comes in many forms, such as massage, electrotherapy, and exercise. According to research, TENS (transcutaneous electrical stimulation of the nerve), deep heat massage, cold, ultrasound, and laser treatments can reduce was recorded as 42 (35-52) after the treatment score dropped from 13 (11-23) to 18 (13-26) after one to three months. They discovered that PRP therapy results in a full recovery and lessens patients' subjective issues⁴. These outcomes agree with what we found. Another study found that PRP therapy produced adequate outcomes in 12 weeks without having any negative side effects on the patient¹⁹. They found that PRP is far more effective than ultrasonography and corticosteroid therapy. Active and passive range of motion were assessed following a 12-week course of PRP therapy.

Conclusion

Based on the facts, we can conclude that the PRP treatment is considerably more effective in treating frozen shoulders than any other costly approach. Simple PRP injections and low-cost injections reduce hospital stays while posing little danger of limb damage.

References

- [1] M, Andrew comprehensive review of several corticosteroid injection randomised studies. G, George Michael. 2011 pp 23-43.
- [2] Val Kilmer, FK Kennedy, General practice disorders: prevalence, patient features, and treatment. Ann Rheum . 2010;12:1250
- [3] T.Ambathula, Kiran Rathod, Handling the condition of frozen shoulder . Orthop . 2022;9: 12-32.
- [4] Farukh Abdulla, Rahim Hussain: A case study report for Frozen Shoulder 2012 pp:1034-1067
- [5] Praveen Siddhartha, Mc Quilen Fernandes, Sk Khan Singh Issues with the adhesives methods, Vol 12 2012 pp: 734-768.
- [6] Suleman Shaik Khan, Geo. Micheal and Geogry Pret, Patients with multiple organic failures including shoulder frozen vol (9) 10, 1432, pp:213-243.
- [7] Tigor Dutt, Shing Chen and Man Mohan Das, Case study on shoulders disorders with multiple diseases vol(12) 2009, pp: 56-72.
- [8] Raja Sekhar, Srinivasa Varma and Bhanu Krishna, Study on diseases related dialysis with multiple problems related to shoulder vol(10) 1998, pp: 12-78