

Combined Effect of Physiotherapy and Platelet-Rich Plasma (Prp) In Case of Avascular Necrosis

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Abstract:

Avascular necrosis of femoral head is a debilitating disease frequently progressing to femoral head collapse and joint destruction. The combined approach (physiotherapy and Platelet-rich plasma) addresses the structural and biomechanical issues of Avascular Necrosis. The current study aimed to find effectiveness of this combined approach results in better functional outcomes and higher satisfaction scores compared to utilizing either treatment alone. This was quasi-experimental study conducted among 168 patients attending at Dhaka Pain, Physiotherapy & Rehabilitation Center (DPRC) hospital for treatment. All patients were divided into two separate intervention group and outcome was measured by Chi-square test. Excellent improvement was found sixteen times higher among patients who were given physiotherapy along with Platelet-Rich Plasma than patients were given physiotherapy only and the same scenario was seen in case of very good improvement. Not satisfactory improvement was none who were given physiotherapy along with Platelet-Rich Plasma. The effectiveness of intervention was statistically significant. More center based gold standard randomized clinical trial can be conducted in order to get more accurate result.

keywords: platelet-rich plasma; avascular necrosis; physiotherapy

Introduction

Avascular necrosis of femoral head is a localized destruction of the femoral head caused by a variety of complex reasons, which eventually progresses to collapse of the femoral head and loss of joint function.[1] Combining Platelet-Rich Plasma with physiotherapy creates a synergistic, non-surgical approach to treating early-stage Avascular Necrosis. Platelet-Rich Plasma promotes tissue regeneration and reduces inflammation, while physiotherapy preserves joint mobility and strengthens surrounding musculature. Together, they can significantly reduce pain and delay the need for joint replacement. Literature confirms that avascular necrosis of femoral head is a prevalent disease for orthopedics that leads to total hip arthroplasty in 80% of cases.[2] The interruption of the blood supply and increased intraosseous pressure lead to cellular death in trabecular bone and marrow, then cause collapse of articular cartilage and subsequently secondary osteoarthritis.[3] The course of avascular necrosis of femoral head is rarely reversible, eventually leading to loss of joint function.[4]

Methods

This was quasi-experimental study conducted among 168 patients attending at Dhaka Pain, Physiotherapy & Rehabilitation Center (DPRC) hospital for treatment. All patients were divided into two separate intervention group and outcome was measured by Chi-square test. First of all careful history taking was carried out followed by documents checking and physical examination was done and investigation was done according to patients need. Rapport building and consent taking were ensured. Detail procedure of the study was explained and confidentiality was maintained throughout the study. Statistical Package for Social Sciences version 22.0 was used to data analysis. Improvement was divided into five categories as like excellent, very good, good, satisfactory and not satisfactory considering pain reduction and functional outcome.

Results

Age group (in years)	Physiotherapy and Platelet-Rich Plasma (PRP) group	Physiotherapy group
	Frequency(Percentage)	Frequency(Percentage)
≤20	3(1.8)	8(4.8)
21-40	67(39.9)	59(35.1)
41-60	12(7.1)	13(7.7)
>60	2(1.2)	4(2.4)
Total	84(50.0)	84(50.0)

Table 1: Age distribution of the subjects.

Nearly two-third of the patients in both group represented from 21-40 years followed by 12%-13% from 41-60 years and 3%-8% from ≤20 years respectively.

Gender	Physiotherapy and Platelet-Rich Plasma (PRP) group	Physiotherapy group
	Frequency(Percentage)	Frequency(Percentage)
Male	66(39.3)	63(37.5)
Female	18(10.7)	21(12.5)
Total	84(50.0)	84(50.0)

Table 2: Gender distribution of the subjects.

Approximately three-fourth of the patients was male and one-third was female.

Occupation	Physiotherapy and Platelet-Rich Plasma (PRP) group	Physiotherapy group
	Frequency(Percentage)	Frequency(Percentage)
Day labor	12(7.1)	9(5.4)
Housewife	20(11.9)	16(9.5)
Service	36(21.4)	37(22.0)
Student	9(5.4)	11(6.5)
Business	1(0.6)	4(2.4)
Others	6(3.6)	7(4.2)
Total	84(50.0)	84(50.0)

Table 3: Occupation distribution of the subjects.

In case of occupation, service, housewife and day labor were dominant.

Marital status	Physiotherapy and Platelet-Rich Plasma (PRP) group	Physiotherapy group
	Frequency (Percentage)	Frequency (Percentage)
Single	22(13.1)	25(14.9)
Married	62(36.9)	59(35.1)
Total	84(50.0)	84(50.0)

Table 4: Marital status of the subjects.

Two-third of the patients was married and few were single.

Marital status	Physiotherapy and Platelet-Rich Plasma (PRP) group	Physiotherapy group
	Frequency(Percentage)	Frequency(Percentage)
Single	22(13.1)	25(14.9)
Married	62(36.9)	59(35.1)
Total	84(50.0)	84(50.0)

Table 5: Effect of holistic approach ((Physiotherapy and Platelet-Rich Plasma) in case of avascular necrosis.

Excellent improvement was found sixteen times higher among patients who were given physiotherapy along with Platelet-Rich Plasma than patients were given physiotherapy only and the same scenario was seen

in case of very good improvement. Not satisfactory improvement was none who were given physiotherapy along with Platelet-Rich Plasma. The effectiveness of intervention was statistically significant ($p=0.001<0.05$).

Intervention	Improvement					Total	Chi-square value	p value
	Excellent n (%)	Very good n (%)	Good n (%)	Satisfactory n (%)	Not satisfactory n (%)			
Physiotherapy and Platelet-Rich Plasma (PRP) group	27(16.1)	31(18.5)	21(12.5)	5(3.0)	0(0.0)	84(50.0)	65.56	0.001
Physiotherapy	1(0.6)	13(7.7)	24(14.3)	30(17.9)	16(9.5)	84(50.0)		
Total	28(16.7)	44(26.2)	45(26.8)	35(20.8)	16(9.5)	168(100.0)		

Discussion

Platelet-Rich Plasma is a concentration of own platelets that contains growth factors and cytokines. When injected into the affected joint, it stimulates angiogenesis (new blood vessel formation) and osteogenesis (new bone formation), which accelerates the healing of necrotic lesions and protects the cartilage. Physiotherapy plays an essential role in optimizing the healing environment and restoring function. It helps prevent muscle atrophy, improves range of motion (ROM), and teaches controlled, safe movement patterns that offload stress from the damaged bone. The present study found that excellent improvement was found sixteen times higher among patients who were given physiotherapy along with Platelet-Rich Plasma than patients were given physiotherapy only and the same scenario was seen in case of very good improvement. Not satisfactory improvement was none who were given physiotherapy along with Platelet-Rich Plasma. It is known that PRP therapy delivers growth factors directly to the site of injury. This can stimulate the healing of tendons, ligaments, or joint cartilage. However, healing tissue requires guided movement and strengthening to function properly. Without rehabilitation, even a biologically enhanced structure may remain weak, tight, or unbalanced. Physiotherapy addresses these challenges through: controlled loading of healing tissues, mobility exercises to restore range of motion, strength training to stabilize surrounding muscles, neuromuscular re-education to improve movement patterns, strategies to prevent recurrence or overuse. Together, PRP and physiotherapy form a two-part solution: one addresses biological healing, while the other addresses functional recovery.⁵⁻⁸ The timing of physiotherapy after PRP depends on the treated area and the condition being managed.⁵⁻⁸ Most patients begin gentle therapeutic exercises within a few days of their PRP injection, once any post-injection inflammation subsides. In some cases, early movement is encouraged to prevent stiffness. Many soft tissue injuries respond well to a combined approach of PRP and physiotherapy. This is especially true for injuries involving repetitive strain or biomechanical imbalances. While many patients experience improvement from combining PRP and physiotherapy, recovery is rarely immediate. It's important to remain patient and committed to rehab plan. Tissue healing is a biological process that unfolds over weeks or months. Physiotherapy helps ensure that healing leads to long-term function, not just pain reduction. In some cases, a single course of PRP and rehab may

be enough to return to full activity. In others, especially in chronic conditions or more advanced degeneration, maintenance exercises and occasional follow-up care may be needed.⁵⁻⁸

Conclusion

The study concluded that effectiveness of intervention (physiotherapy and PRP) was statistically significant in case of avascular necrosis. More center based gold standard randomized clinical trial can be conducted in order to get more accurate result.

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