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A PROSPECTIVE OBSERVATIONAL ASSESSMENT OF THE OUTCOME OF TENNIS ELBOW TREATMENT WITH PLATELET RICH PLASMA

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ABSTRACT

Aim: The aim of the present study was to assess the efficacy of PRP in tennis elbow treatment.

Methods: The study was conducted on the patients between 20-50 years of age who had positive clinical tests (Mill's and Cozen's test) were included in the study. The study included 100 patients.

Results: In the present study, there were 68 males and 32 females. 70% patients had right side involved. According to age distribution, most of the patients belonged to 20-30 years followed by 31-40 years and 41-50 years. There was statistical significance in the difference of means of pain score obtained using both VAS score at 12 weeks and 24 weeks. Results were excellent in 90, good in 6, fair in 3 and poor in 1.

Conclusion: In tennis elbow patients, PRP injections show an effective reduction in pain according to VAS score and especially, the young age group has shown more benefit in terms of pain reduction for PRP treatment. Thus, PRP injections can be used as an important alternative to other standard regimens in and those who don't want surgery. More scientific evidence studies need to done before we can determine whether PRP therapy is effective in other conditions.

Keywords: tennis elbow, PRP, treatment

1. INTRODUCTION

Platelet-rich plasma, often known as PRP, is a type of autologous human plasma preparation that has a greater platelet concentration than regular plasma. This preparation is made by centrifuging a larger amount of the patient's blood. Platelet alpha granules contain a number of different growth factors and mediators, including transforming growth factor-1 (TGF-1), platelet-derived growth factor (PDGF), vascular endothelial growth factor (VEGF), epidermal growth factor (EGF), and insulin-like growth factor-1 (IGF-1), which are concentrated during centrifugation to deliver supraphysiologic levels of such growth factors and cytokines to an injury site and aid in the natural healing process.[1] The average number of

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platelets found in human blood is anything from 150000 to 450000 microL. Platelets that have been concentrated to a volume of up to one million microL have showed promise in the treatment of bone and soft tissue injuries. This represents a three- to five-fold increase in the platelet count.[2,3] PRP has been shown to be effective in treating tendon injuries and tendinopathies in a number of research investigations.[4-7]

During the stages of inflammation, cellular proliferation, and subsequent tissue remodelling that take place during the process of healing, many of the cytokines that were discovered in PRP are involved in the signalling pathways that take place during these stages. In addition, platelet-rich plasma (PRP) may stimulate neovascularization, a process that boosts blood flow and the nutrients that are necessary for cells to heal damaged tissue while also bringing in new cells and clearing away waste. These modes of action could be especially useful in the treatment of chronic tendinopathies, which occur when the underlying biological circumstances aren't favourable to the repair of tissue. According to the findings of a recent thorough study and meta-analysis, PRP injections are an effective method for treating symptomatic tendinopathy.[8] On any given day, lateral epicondylitis affects between one and two percent of middle-aged persons and is connected with significant expenses to both the healthcare system and society.[9,10] Glucocorticoid injection has been a mainstay of treatment, but its benefits are short-lived.[11] Platelet-rich plasma (PRP) is one example of a treatment that many front-line practitioners have turned to since there are not many other alternatives available and because there has been a change towards focusing on regenerative results. These therapies are less regulated and are thought to be risk-free. It is essential to keep in mind that there is not one single type of PRP. There are preparations that just have platelets that have been concentrated and mixed with a tiny amount of plasma. The other types have varying degrees of platelets and white blood cells in their composition. Platelets have a significant impact on the behaviour and function of white blood cells, which is also extremely essential.[12] In the literature on wound healing, there is a recommendation to activate the platelets with thrombin and/or calcium in order to trigger the release of the contents of the granules outside of the body. New findings, on the other hand, clearly shows that platelet-rich plasma (PRP) that has not been activated fosters a stronger healing response.[13] Patients who had failed nonoperative therapy for lateral epicondylar tendinopathy and who were considering surgery were included in the pilot research that Mishra and Pavelko published in 2006.[14] The study suggested that unactivated concentrated platelets with concentrated white blood cells may be useful in treating lateral epicondylar tendinopathy. Hence the aim of the present study is to assess the efficacy of PRP in tennis elbow treatment.

2. MATERIALS AND METHODS

The study was conducted on the patients between 20 and 50 years of age who had positive clinical tests (Mill's and Cozen's test) were included in the study. The study included 100 patients.

Patients with arthritis of elbow, cervical spine pathology, infection, myositis, previous elbow trauma, previous steroid injection, or surgical intervention were excluded from this study. About 30 ml of the patient's blood was collected.[15]

The blood sample is placed in a centrifuge to separate the PRP from the other components of whole blood. PRP was injected into the site of the maximum tenderness. Patients were asked to rate their pain according to visual analog scale (VAS). All cases were protected with brace initially and given anti-inflammatory agents for 1 week with cold fomentation, and then restoration of normal daily activities was allowed from the 3rd week with stretching and physiotherapy.[16]

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 07, 2023

The primary analysis included VAS[17] for measuring pain in patients, local tenderness, pain on extension of the wrist, grip strength, elbow swelling were clinically assessed at different interval of follow-up, clinical and functional outcome were evaluated at final follow-up with statistical analysis. Patients were assessed after 1 week, 3 weeks, 2 months, 4 months, 6 months, and 12 months. Results were calculated based on descriptive statistics with SPSS version 19.

3. RESULTS

Table 1: Gender distribution and side involved

Gender	**N**	**%**
Male	68	68
Female	32	32
Side involved		
Right	70	70
Left	30	30

In the present study, there were 68 males and 32 females. 70% patients had right side involved.

Table 2: Age distribution

Age groups in years	**N**	**%**
20-30	55	55
31-40	30	30
41-50	15	15

According to age distribution, most of the patients belonged to 20-30 years followed by 31-40 years and 41-50 years.

Table 3: Distribution of the study participants according to the VAS

VAS	**VAS pre-procedure**	**VAS week 12**	**VAS week 24**
Mean	6.84	1.64	1.65
Std. Deviation	1.119	0.894	0.957
Median	7	1	2
Inter-quartile range	6 – 8	1 – 2	1 - 2
Mode	6	1	2
Minimum	5	0	0
Maximum	9	4	4

There was statistical significance in the difference of means of pain score obtained using both VAS score at 12 weeks and 24 weeks.

Table 4: Outcome

Outcome	**N**	**%**
Excellent	90	90
Good	6	6
Fair	3	3
Poor	1	1

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 07, 2023

Results were excellent in 90, good in 6, fair in 3 and poor in 1.

4. DISCUSSION

Tennis elbow is related to accumulated microtrauma from repeated wrist extension and alternate pronosupination of forearm with angiofibroblastic degeneration of the common extensororigin.[18] Ultrasound therapy, extracorporeal shock wave therapy, laser therapy, autologous blood injection, and platelet-rich plasma (PRP) have been in use for tennis elbow treatment. Tennis elbow therapy is yet unexplained; the use of PRP is a proactive therapeutic option which jumpstarts the healing process, which contains many distinct growth factors and other cytokines that accelerate mending of bone and soft tissue.[19] Despite advances in tendon biology, tennis elbow pain's mechanism is unknown. In reaction to hypoxia and tissue damage, cytokines and growth factors (GFs) are produced, and a complicated, sequential cascade leads in neovascularization and synthesis of poorly organized tendon tissue.[20,21] The basic justification for PRP injection is that platelets contain many GFs and other potentially active proteins, therefore when administered to areas of damage, it is hypothesized to aid the healing process. Animal and cell research have demonstrated that PRP may have numerous effects on tendons: it promotes vascularity, tenocyte proliferation and collagen synthesis.[22]

68 men and 32 women were studied. 70% were right-sided. Most patients were 20-30, followed by 31-40 and 41-50. Both VAS pain scores at 12 and 24 weeks differed statistically. 90 were outstanding, 6 good, 3 mediocre, and 1 bad. PRP contains many growth factors and other cytokines that accelerate bone and soft tissue repair.[23,24] Transforming growth factor beta enhances Type I collagen synthesis in tendon sheath fibroblasts in vitro, according to Klein et al.[25] PRP injection for chronic elbow tendinosis revealed 93% better outcomes than pre-injection status in another trial.[26]

In a research done by Watts et al., in the year 2020, comparing the efficacy of PRP and surgical result in refractory tennis elbow patients, concluding that roughly 70 percent of the study participants avoided the need for surgery, while post-surgery patients have decreased pain scores than PRP group.[27] A comparative study was done by Boden et al., in 2019, in the USA among 62 patients retrospectively, with the aim of comparing PRP injection with Tenex for the management of golfers and tennis elbow found that the visual analog pain scale levels, Quick Disabilities of the Arm, Shoulder, and Hand scores, and EuroQol-5D scores all improved clinically and statistically in the PRP and Tenex groups. Between the two groups, there was no statistically significant difference.[28] Although the specifics are yet unknown, PRP has the ability to repair bone and soft tissue function. PRP after injecting to the problematic location becomes activated by collagen from the surrounding soft tissue, releasing growth factors, and cytokines.[29] These bioactive proteins and amino acid chains in turn activate local stem cells and boost extracellular matrix gene expression, following which reparative cells from the vascular tissues and bone marrow then happens. PRP has the capacity to decrease inflammation, apoptosis, and metalloproteinase activity. This leads in repair of soft tissue and structural component, which can bear stress and pressure, consequently a reduction in pain.

5. CONCLUSION

In patients suffering from tennis elbow, receiving PRP injections results in a significant reduction in pain, as measured by the VAS score. In particular, individuals who are younger have demonstrated a greater benefit from receiving PRP treatment in terms of the reduction of pain. Therefore, platelet-rich plasma injections can be utilized as a significant alternative to other common treatments in patients who do not desire surgical procedures. Before we can

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 07, 2023

evaluate whether or whether PRP treatment is successful in treating other illnesses, further scientific proof studies will need to be conducted.

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ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 07, 2023

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