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Effectiveness and functional outcome of Platelet Rich Plasma for Tennis Elbow (Lateral Epicondylitis)

KEYWORDS: PRP, Tennis Elbow, VAS score

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ABSTRACT *Background: Lateral epicondylitis is a common manifestation also known as Tennis elbow. Various modes of treatments are available for tennis elbow. Studies have suggested the use of PRP (platelet rich plasma) as a safe and effective therapy for tennis elbow. The Purpose of this study is to assess the efficacy of Platelet Rich Plasma in patients with chronic Lateral Epicondylitis.*

Material and methods: The study was an interventional study of 64 cases with chronic Lateral Epicondylitis. Mean age of patients was 40 years. Dominant Hand was most commonly involved. PRP was prepared from autologous venous whole blood. All patients had at least 3 months of symptoms and failed conventional therapy (Bracing, medicine) and were followed for a period of 2 years. An analysis of result with regards to pain (VAS score) and daily activity was done.

Results: Right elbow was more predominantly affected in our sample, which was also the dominant side. The analysis revealed a significant and continuous improvement in pain and all the measured parameters.Success was defined as reduction of pain (VAS) without re-intervention after a follow up of 1 year. 48 out of 64 patients (75%) had complete pain relief. 9(14.06%) out of 64 patients were lost to follow up. 7 (10.93%) out of 64 patient did not have relief and had to be Re-Intervened with PRP injection. There was progressive improvement with no complications.

Conclusion: Treatment of patients with chronic Lateral Epicondylitis with PRP reduces pain and significantly increases function, even after a follow up of 2 years. Local injection of autologous PRP proved to be a promising form of therapy for Tennis Elbow. It is both safe and effective in relieving pain and improving function.

Introduction:

The term tennis elbow was first used in 1883 by Major1 in his paper "lawn- tennis elbow". Cyriax in 19363 initially thought the disease to be self-limiting and seldomly persisting beyond one year and once cured never recurred, can at times become a major disability with recurrence and resistance to usual modalities of treatment. Lateral epicondylitis, also known as tennis elbow, affects approximately 1% to 3% of the population. The condition mostly occurs in patients whose activities require strong gripping or repetitive wrist movements. Essential feature are discomfort or pain over the origin of extensor carpi radials brevis over the lateral epicondyle. Pain is exaggerated by resisted wrist dorsiflexion and forearm supination. Pain on lifting of heavy objects. Actions such as raising a cup, lifting weight using a hammer usually exacerbate pain and the wrist extension test is a convenient way to reproduce this phenomenon. This test is however best performed with elbow in full extension, but it may sometime be found that the patients suffering from tennis elbow are unable to extend the joint fully2 ,and an elastic resistance to the last few degrees of extension is encountered by the examiner. Individuals between the ages of 30 to 50 years are at high risk. The dominant arm is most frequently affected and the cause being unknown. It is thought that lesion occur in the common origin of the wrist and finger extensors on the lateral epicondyle because of a combination of mechanical overloading and abnormal microvascular responses. Numerous methods have been advocated for treating elbow tendinitis, including rest, non-steroidal anti-inflammatory medication, bracing, physical therapy, extracorporeal Shockwave therapy, and botulinum toxin injection. Corticosteroid injection, which was considered to be the gold standard before, is actually currently controversial. Whole-blood injections and various types of surgical procedures have also been recommended. In vitro studies suggest that growth factors released by platelets recruit reparative cells and may augment soft-tissue repair. Its use in surgery to augment rotator cuff and Achilles tendon repair has also been reported. Since platelet rich plasma has healing properties at molecular level4, it is likely to impart a permanent cure to this ailment. Within platelets are powerful growth factors including PDGF, TGF-beta and epidermal growth factor. Slater et al5 reported that addition of platelets to a culture medium stimulated the proliferation of human osteoblast like cells.

Platelet-rich plasma (PRP) is promoted as an ideal biologic autologous blood-derived product and its application enhance wound healing, bone healing, and also tendon healing.

Material and Method:

This was an interventional study conducted in tertiary care center in Pune, Maharashtra between August 2012 and July 2014. A total number of 64 patients (18-60 years) with tennis elbow were included after informed consent.

Inclusion Criteria were Pain over the outer part of elbow, point tenderness over the lateral epicondyle, positive cozen test, not responding to conservative treatment.

Exclusion Criteria were patients with Active infection, Poor skin condition, associated shoulder or elbow pathology, uncontrolled Diabetes mellitus, hypertension and known allergy to local Anesthetic solution.

Patients were analyzed for pain using VAS score and for functional improvement based on QUICK DASH score.

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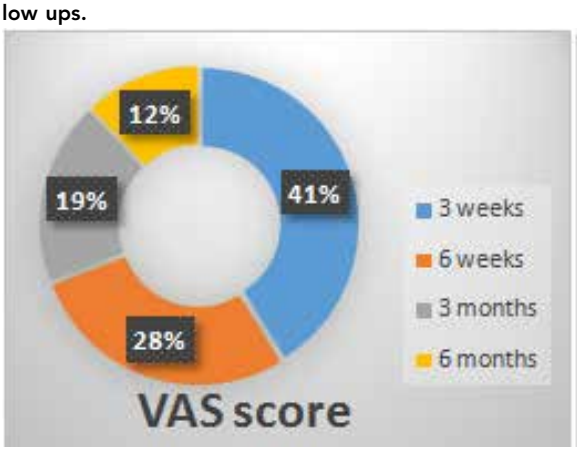
Platelet rich plasma Preparation:
Approximately 15 to 20 ml of blood is withdrawn from the patient's unaffected arm under all aseptic precautions and then transferred in a sterile Acid Citrate Dextrose (ACD) vacationers and mixed well by gently moving the tubes upside down for a few times. Blood is then centrifuged using double centrifugation technique at 1800 rpm for 8 minutes and PRP was extracted for injection. Fraction of PRP sample, along with patients unprocessed blood sample was analyzed for platelet count assessment.

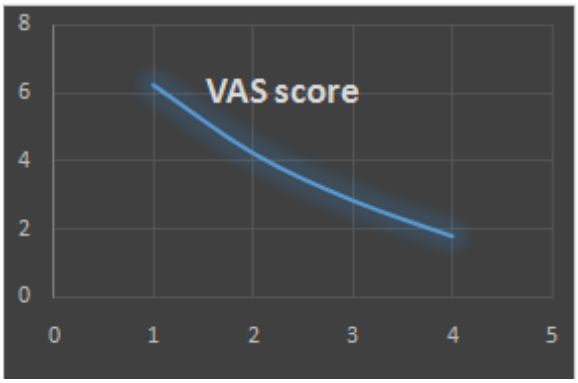
Injection Technique:
Patients were placed in sitting posture holding an Intra venous stand keeping the elbow parallel to the ground and hand mid pronated and under all aseptic precautions 1 ml of Platelet Rich Plasma was injected at the most tender point over the lateral epicondyle of humerus (extensor Carpi Radials Brevis tendon)using 22 gauge needle using peppering technique whereby after the needle is inserted into the tender area, multiple small droplet injections are performed by withdrawing, redirecting and reinserting the needle without emerging from the skin. After 30 min of observation the patients were discharged.

Post injection protocol:
Patients were advised to report in case of any adverse events and were advised not to massage or hot fomentation, if there was severe pain then ice application along with Paracetamol was advised. NSAIDS were avoided. Patients were advised to follow up at 3 weeks, 6 weeks, 3 months and 6 months.

Results:
A total number of 64 patients were included. Age ranged was 30-64 years with mean age of 40 years, maximum number of patients were in the age group of 40-50 years. 37 Males (57.81%) and 27 females (42.18%).Right elbow was more predominantly affected, which was the dominant side. The analysis revealed a significant and continuous improvement in pain and functions, starting from the 3rd follow up and continued to improve till the last follow-up at 6 months.Success was defined as reduction of pain (VAS and DASH score) without re-intervention after a follow up of 1 year. 48 out of 64 patients (75%) had complete pain relief. 9(14.06%) out of 64 patients were lost to follow up. 7 (10.93%) out of 64 patient did not have relief and had to be Re-Intervened with PRP injection. There was progressive improvement with no complications.

Table 1: Changes observed in VAS Score at regular follow ups.





injection for relieving pain and improving elbow function in

Conclusion:
The result of this study supports the effectiveness of PRP

Tennis Elbow. Improvement in the symptoms was noted by 3-4 weeks after PRP injection which gradually improved over the next 6 months. No local or systemic complications were reported.

Discussion:
Lateral epicondylitis or tennis elbow is used to describe a mydriad of symptoms around the lateral aspect of the elbow. It usually occurs in individuals requiring repetitive supination and pronation of the forearm with the elbow in near full extension. Although originally described as an inflammatory process, the current consensus is that lateral epicondylitis is initiated as a micro tear, most often within the origin of the extensor carpi radials brevis muscle.

Numerous methods have been advocated for treating lateral epicondylitis both nonsurgical and surgical. Regardless of the underlying cause, non-operative treatment is successful in 95% of patients with tennis elbow.

In recent years, there has been an increasing prevalence of the use of autologous blood products that might provide cellular and humoral mediators to favor tissue healing in a variety of applications. The rationale is based on the activity of blood growth factors. The growth factors are the diverse group of polypeptides that have an important role in the regulation of growth and tissue development, determining the behavior of all cells, including chondrocytes. In the past decade, several crucial roles of growth factors have been identified in tissue repair. Blood derived growth factors delivered in the form of autologous blood or platelet rich plasma have already been studied for their potential in tissue healing and documented in the literature. Most recently Peer booms et al conducted a study in one hundred patients with elbow epicondyle pain where they used buffered Platelet-Rich Plasma as the treatment modality and found that Treatment of patients with chronic elbow tendinitis with buffered platelet-rich plasma reduced pain significantly in this pilot investigation. Although many studies have been conducted on patients with tennis elbow in the west, there is a paucity of literature on the management of patients with tennis elbow in the Indian set up. Also there is a paucity of data to study the therapeutic role of platelet rich plasma (PRP) in refractory cases of tennis elbow in Indian population.

The limitations of this study were that the sample size was small and there were no any test performed for tissue diagnosis of tear or healing of tear. We also did not use any

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platelet activating agent i.e. calcium chloride.

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