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Role of Autologus platelet rich plasma injection in treatment of tennis elbow

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ABSTRACT

Background: lateral epicondylar tendinopathy also known as tennis elbow is a common condition and one of the most common overuse syndrome. platelet rich plasma is reservoir of growth factor's and set of molecules which accelerate healing process and regenerate tissue. **Material and method**: During august 2014 to April 2016, 120 patients of tennis elbow who failed conservative treatment were treated with Autologus platelet rich plasma injection and results were evaluated with VAS and DASH score. All patients were followed up to 24 weeks, at 2 week interval. **Results**: among 120 patients with tennis elbow (72 males and 48 females) significant difference were observed in VAS and DASH score at baseline and after 4 weeks, 8 weeks and 12 weeks post injection ($p<0.001$). No complication observed. **Conclusion:** Autologus platelet rich plasma injection is a safe and effective treatment in refractory case of lateral epicondylitis .

Keywords: platelet rich plasma, tendinopathy, tennis elbow, epicondylitis.

Introduction

Lateral epicondylitis or tennis elbow result from overuse of extensor muscle of forearm leading to damage of affected tendon and present with pain and tenderness in the region of common extensor tendon insertion on lateral epicondyle of humerus (lateral side of elbow). Tendon repair is very slow due to relatively low blood supply. Epicondylitis is misnomer because of low level of inflammatory cell at tendon site but rather excess of fibroblasts and blood vessels consistent with finding of neo angiogenesis.[1] platelet rich plasma is an ideal autologus biological product which release high concentration of platelet derived growth factor that enhance tendon healing.[2] platelet are activated by thrombin and collagen releasing growth factor that attract undifferentiated cells into newly formed matrix and trigger cell division [3].

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platelet rich plasma can inhibit cytokine release from macrophage accelerate tissue healing and regeneration.[4] We studied effect of Autologus platelet rich plasma injection in refractory case of tennis elbow who failed to respond to conservative treatment of 12 weeks.

Material and method

The study has been approved by ethical committee of our institution. During august 2014 to April 2016, 120 refractory case of tennis elbow who failed to respond after 12 weeks of conservative treatment were treated with Autologus platelet rich plasma injection in department of orthopedics J.L.N. medical collage Ajmer. Out of 120, 72 were males and 48 were females. NSAID were stopped one week before and avoided in follow up.

Inclusion criteria-
- Tenderness over lateral aspect of elbow
- Positive cozen test, wringing test, mills maneuver and jar lifting test.

Exclusion criteria-
-pregnancy
-anemia (Hb <7)
-thrombocytopenia (platelet<150*10 3)

-any malignancy
-history of local corticosteroid injection
-diabetes mellitus
-rheumatoid arthritis
-Patients on anticoagulant therapy

Method for data collection

Data collected by verbal communication with patients including inform consent. Written documentation (VAS) and evaluation of limitation of function (DASH) was done before and at each follow up. Complete blood count, bleeding time, clotting time, blood sugar was done before procedure.

Platelet rich plasma preparation

Draw34 ml of venous blood using 50ml disposable syringe and pour into four 8.5ml ACD-A containing vacuum sterile glass tube and centrifuge for 2500rmp for 7 min at 22degree Celsius in centrifuge machine (PRP centrifuge, Model –CM-8 plus, REMI company, WHO guidelines, with ISO9001/2008 certification) resulting in the three following layers: the inferior layer contain erythrocyte, the intermediate layer contain leukocyte and the superior layer made of plasma. The Buffy coat layer together with plasma layer was transferred in to another sterile tube(without anticoagulant) by using separate 20cc disposal syringe and centrifuge for 3000 rpm for 6 min. the lower 1/3rd is platelet rich plasma and upper 2/3rd platelet poor plasma is obtained after 2nd centrifugation. Using 20cc disposal syringe remove platelet poor plasma. Remaining is platelet rich plasma gently shacked to suspend platelets in PRP and gently aspirated and used for injection in tennis elbow within 30 min of preparation. An aliquot of product was sent to the laboratory for analysis of platelet concentration.

Procedure

The patient is supine under strict aseptic precaution 2% xylocaine followed by PRP injection into the affected site with a 18-guage needle and advised to take rest for 15min. limb is immobilized in elastic crepe bandage and cuff and collar for 48 hr and advised to avoid activity that involve wrist extension. After 48 hr patients allowed to do daily activity.

Observation and results

The mean age of patients in our study was 37.5 ±15.5year and includes 72 males and 48females. Follow up every 2weeks and VAS and DASH score recorded. Below table compare the mean VAS and DASH score during first visits and at 4th week, 8th week and 12th week.

Table 1: Mean VAS and DASH score during first visits and at 4th week, 8th week and 12th week

score	1st visit	Post PRP injection					
		At 4th wk	P	At 8th wk	P	At 12th wk	P
VAS	8.2±0.76	3.9±1.2	<0.0036	3±1.2	<0.001	2.7±1.2	<0.001
DASH	74±6.7	37±9.3	<0.0018	34±6.5	<0.001	31.2±9.4	<0.001

In our study we observed highly significant difference between VAS and DASH score before and after PRP injection P<0.001 after 4th to 8th week of injection.80% patient has excellent VAS score improvement (>50% reduction) and 60% had excellent DASH score reduction (>50% reduction).No significant complication observed in any case other then edema and inflammation at local injection site in 16 cases which resolved with ICING and NSAID.

Discussion

PRP use in orthopaedics is new field of study, PRP are used now a days for various tendinopathy, shoulder impingement, osteoarthritis, avascular necrosis and planter fasciitis . Autologus PRP improve early neotendens properties[5] and improvement of tissue healing by enhancing cellular chemo taxis, proliferation and differentiation of cells, angiogenesis and laying of extra cellular matrix.[6]Our observation are similar to those describe by mishra and pavelko[7] who reported a significant improvement of symptom in patients of tennis elbow after PRP injection ,60% of improved at the end of 8th week in there VAS score (P<0.001). Our observation also similar to Peerboom et al[8] who reported that 49% patients in corticosteroid injection group and 73% patients in PRP group was successful (P<0.001).PRP injection have been compare to several other treatment modalities. Available literature suggest that PRP may be more effective then needling[9], laser therapy[10,11] and local anesthetic injection.[12] One trial found that PRP was no better than saline injection.[13] However prepared PRP in this study was estimated to have 1.6 time concentration which is below 4-5 times concentration of platelets need to provide optimal

results.Adverse effect are rare with PRP other then local edema and inflammation in some case. Conversely corticosteroid tend to have short relief but associated with long term degenerative effect on tendon integrity.[9,14,15]Most of clinical trial demonstrated a significant benefit of PRP over corticosteroid injection for pain related end point.[10,11,13,16-18]

Conclusion

Autologous PRP injection is safe and effective treatment for refractory case of tennis elbow. It relieves pain and improve function in most of the case and available literature also support the use of PRP in tennis elbow.

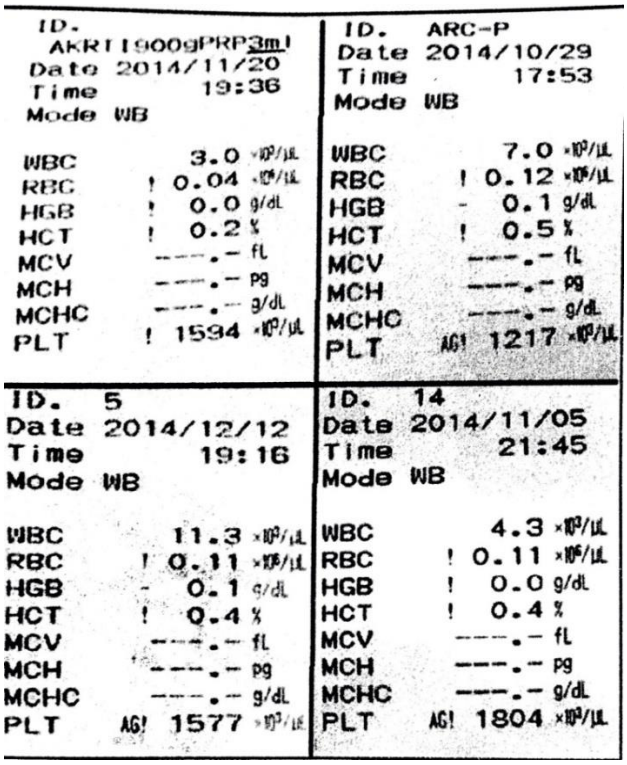

Fig 1:Various laboratory reports of PRP prepared in the study showing higher concentration of platelet achieved

Fig 2: PRP preparation using centrifuge machine

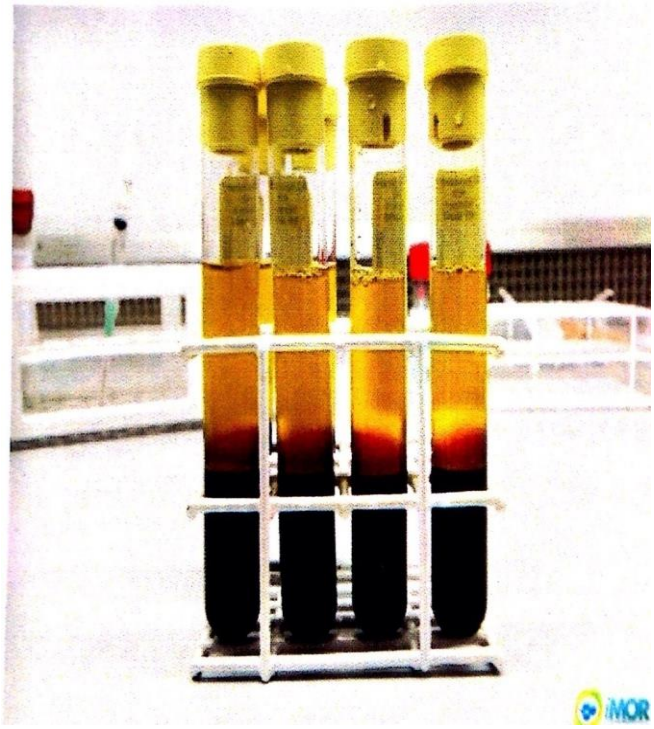

Fig3: 3 layer formation (from top to bottom :Plasma,buffy coat,RBC precipitate)

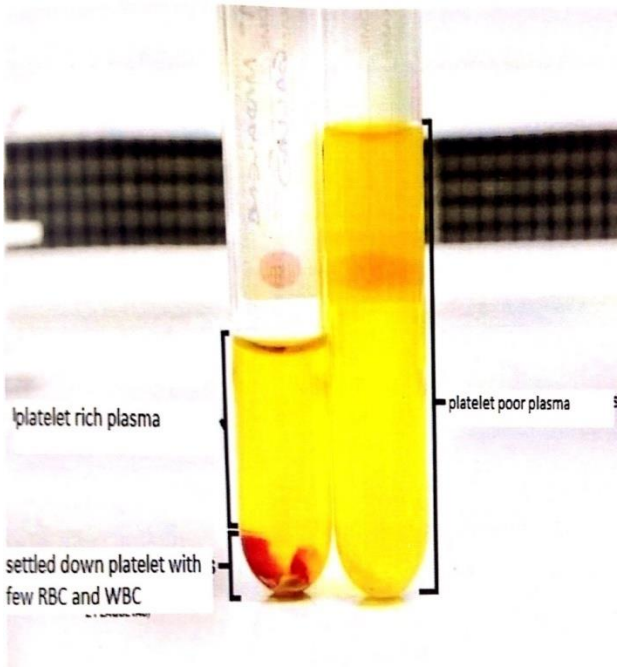

Fig 4: Prepared platelet rich plasma

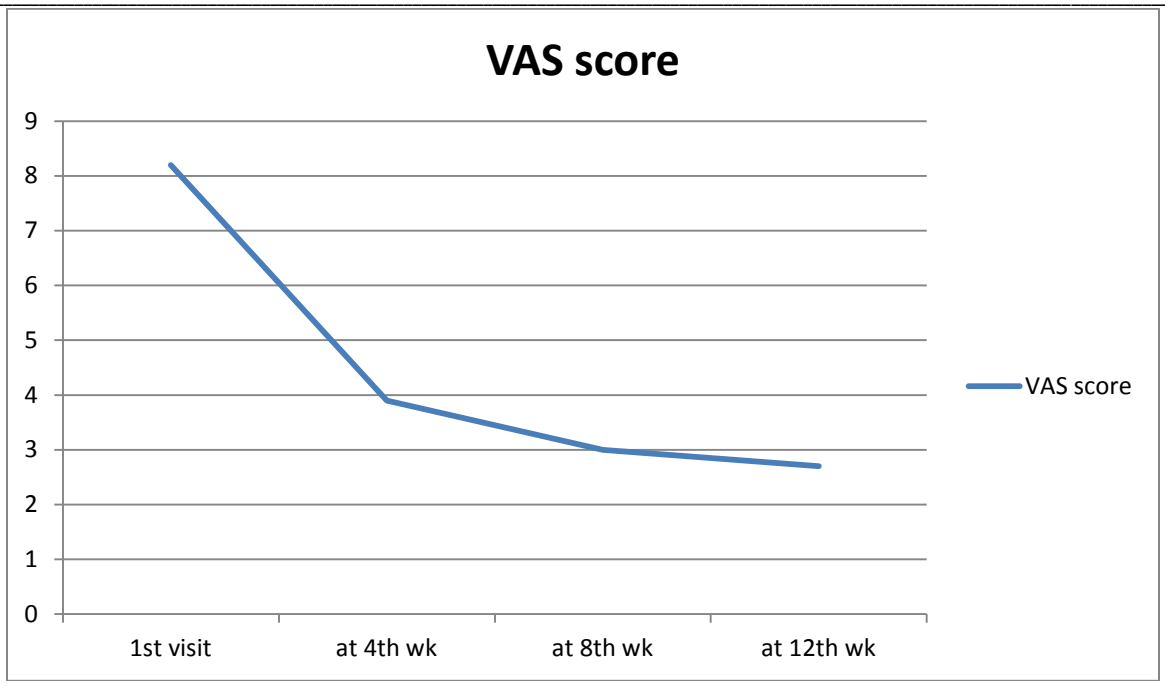

Fig 5: Graph showing improvement in visual analog scale

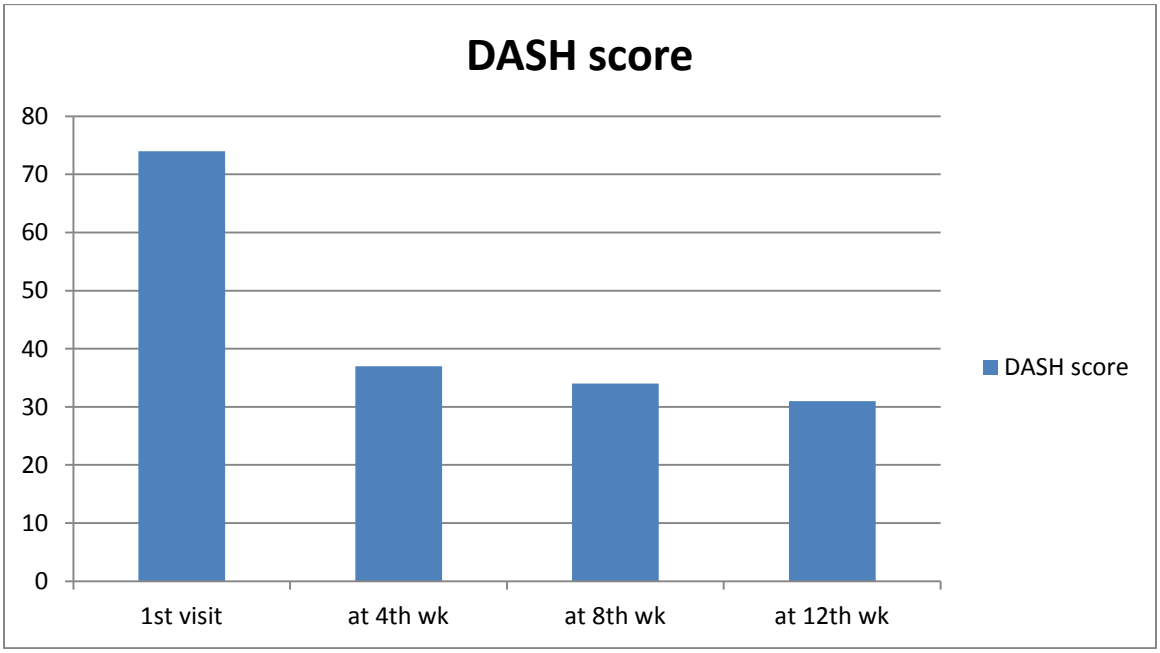

Fig 6: Graph showing improvement in disabilities of Arm Shoulder and Hand Score

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