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Original Article

Role of autologous platelet rich plasma (PRP) in limited alopecia areata in local population

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Abstract

Objective To evaluate the efficacy and safety of autologous platelet rich plasma **(**PRP) in treatment of limited alopecia areata in local population.

Methods We performed a prospective study of 20 patients with Alopecia Areata. Both females and males with one or multiple patches of alopecia were included. Autologous PRP was injected once a month for three months. Primary endpoint was regrowth of hair. Digital photographs were taken before treatment and after each visit. Patients were further followed up for 6 months after treatment for any relapse or side effect. Results were assessed clinically and using digital photographs.

ResultsOut of 20 patients, 6 (30%) had excellent response, 5 (25%) with good response, 4 (20%) with fair and 5 (25%) poor response. Mild pain at the site of injection was noted for 5 to 30 min at injection site. No other side effect was noted nor reported by any of the patients. Patient compliance and satisfaction was good and all patients completed the treatment.

Conclusion PRP is safe, low-cost and effective treatment of alopecia areata.

Key words
Platelet rich plasma (PRP), alopecia areata.

Introduction

Alopecia areata (AA) is an autoimmune condition, in which the individuals' own immune system targets its hair follicles, causing them to fallout. The condition may manifest as small circular patches of hair loss or occur more diffusely. Diffuse AA not only causes cosmetic disfigurment, but also can be resistant tostandard treatments, such as topical and intralesional steroids.[1,2] Rinaldi has suggested use of PRP to control anagen phase.[3]Uebel*et al.*[4]showed that application of PRPto follicular units before transplantation resulted in improvedhair growth and thickness. PRP has been used since 1990's in the field of sports medicine e.g. for treatment of tendon injuries and other injuries.[5] Use of an autologous platelet rich plasma is a simple and effective modality for the treatment of AAwithout any side effects.[6] Activated autologous PRP is supposed to causeproliferation of dermal papillary cellsby modulating fibroblast growth factor7 (FGF-7), b-catenin, extracellular signal-related kinase (ERK) and Akt signalling.[7] Active hair growth associated with angiogenesis has been suggested due to the secretion of vascular endothelial growth factor (VEGF) by the keratinocytes of the outer root sheath and fibroblasts from the dermal papilla. Increase in the secretion of VEGF influences growth of both normal and pathological hairstructures. Tobin*et al.*[8] reported that hair mesenchyme possessessignificant hair

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cycle-related modulation. Modification of these cell changes is important during hair follicle transformations, for example vellus hair changing to terminal and terminal to vellus inandrogenetic alopecia. Injection of PRP has been used to improve ischemic conditions of skin of scalp and vascular structures around hair follicles. Keeping in view these properties, we conducted this study.

Methods

This interventionalstudy was conducted at Department Of Dermatology / Post Graduate Medical Institute/ Ameerudin Medical College, Lahore General Hospital, Lahore fromMarch 2015 to October 2015. Twenty patients,12 males and 8 females were enrolled. Informed written consent was obtained from all the participants. A detailed history was taken regarding recent and past stress, illness, medications used (oral, topical or intralesional)for alopecia areata and any other disease. All the baseline investigations like complete blood count, liver function tests, HBsAg, anti-HCV antibodies, prothrombin time, activated partial thromboplastin time, and INR were done. Inclusion criteria for the study were male and female patients aged 16-50 years with patches of alopecia clinically diagnosed as alopecia areata, not responding to standard therapies and duration of patches at least 6 months. Exclusion criteria were patients who received topical therapy (monoxidl, corticosteroids) and systemic drugs (steroids, finasteride or antiandrogen) during last six months and any other active disease at the site of intended treatment. Similarly, patients with active or history of malignancy, severe anemia, platelet disorders, bleeding and clotting disorders,pregnancy or breast feeding women,known patients of hepatitis B, C and HIV,alopecia totalis or alopecia universalis and those having tendency of poor wound healing and keloid were also excluded.

Presently there are 16 different methods available for PRP. We used Takikawa's manual double spin method with slight modification.[9]Fifteen ml blood was taken using sodium citrate as anticoagulant and centrifuged at 2000 revolutions per minute for 10 minutes. Plasma was separated and was again centrifuged at 4000 revolutions per minute for 10 min. Upper 2/3 was discarded. Injection10% calcium chloride was added as activator (0.3 ml for 1 ml of PRP). EMLA cream under occlusion was applied at the site of injection 30-40 minutes before the injection. PRP was injected using insulin syringe 0.1ml/cm^2 at a site 1 cm apart using aseptic technique.

PRP treatment was done monthly for three months. Patients were followed up to 6 months after treatment. Size of patches was noted and photographs were taken at time of enrollment and each visit.

The primary endpoint of the study was hairregrowth assessed by clinical evaluation, reduction in patch size and number of hair growth per patch and global photograph.[10,11,12] Response was rated as excellent: 80-90% hair regrowth, good: 60-79% hair regrowth, fair: 30-59% hair regrowth, and poor: 0-29% hair regrowth. Any local or systemic side effects were noted.

Result

Out of 20 patients, 12 were males and 8 females. **Table 1** shows the clinical data of the study population. Single patch was treated in 2 (10%),two patches in 9 (45%) and multiple (3 to 6) patches in 9 (45%) patients. Areas treated by PRP were scalpin 12 (60%), beard areain 7

Table 1 Clinical characteristics of the study population (n=20).

	N (%)
Sites of involvement	

Scalp	12 (60)
Beard area	7 (35)
Scalp and beard area	1 (5)
Number of patches treated	
1	2 (10)
2	9 (45)
3-6	9 (45)

Table 2 Clinical response after PRP therapy in study population (n=20).

Grades of clinical response	*N (%)*
Excellent (80-90% hair regrowth)	6 (30)
Good (60-79% hair regrowth)	5 (25)
Fair (30-59% hair regrowth)	4 (20)
Poor (0-29% hair regrowth)	5 (25)

(35%), and scalp and beard area in 1 (5%) patient.

Clinical response at 9th month of the study is illustrated in **Table 2**. Out of 20 patients, 6 (30%) patients (4 female and 2 male) had excellent response; 5 (25%) patients (4 male and 1 female) with good response. More than Hair regrowth ≥60% was noted in 11 (55%) patients. Of the rest, 4 (20%) patients (2 male and 2 female)showed fair and5 (25%), (4 male and 1 female) poor response. Significant hair growth was seen after 2nd month of PRP treatment. Relapse did not occur in any patient.

Mild pain was noted for 5-30 min at site of injection no other side effect was noted nor reported by any of the patients.

Discussion

Alopecia areata (AA) is recurrent nonscarring type of hair loss and affects hair-bearing parts of body. Although it can involve any hair bearing area but hair loss involving scalp and face area is most common and is cause of significant emotional and psychological trauma.[12]It has a significant impact on patient's quality of life.

During our study, we found that PRP had an excellent response in patients with AA. Patients follow-up and response was good and all the patients completed the treatment. Treated patients were followed up for 6 months and photographed. There was no relapse reported, which is very encouraging.

Our results are comparable with many previous studies about the effects of PRP in AA.Trink*et al.*[13] in a double-blind study of 45 patients found that PRP increases hair regrowth significantly and decreases dystrophy of hair. Side effects like burning or itching sensation were not present as compared with triamcinolone or placebo. Cell proliferation, indicator Ki-67 level, was also significantly increased with PRP without side effects.

Kang *et al.*[11] suggested that the CD34+ hematopoietic stem cells mobilized in peripheral blood and further concentrated in PRP could have synergistic effects on PRP-induced angiogenesis in patients with pattern hair loss.

Singh *et al.*[14] in their prospective study of 20 patients, conducted on biopsy-proven AA reported successful treatment with PRP, only one patient had relapse and there were no side effects reported.

Li *et al.*[10]found increased secretion of follicular growth factor 7 and catenin, with the subsequent proliferation of cells of the hair papilla and activation of the extracellular kinase- and Akt-dependent signaling pathways. The study showed that PRP injection in mice promoted acceleration in the transition from telogen to anagen compared to the control group.

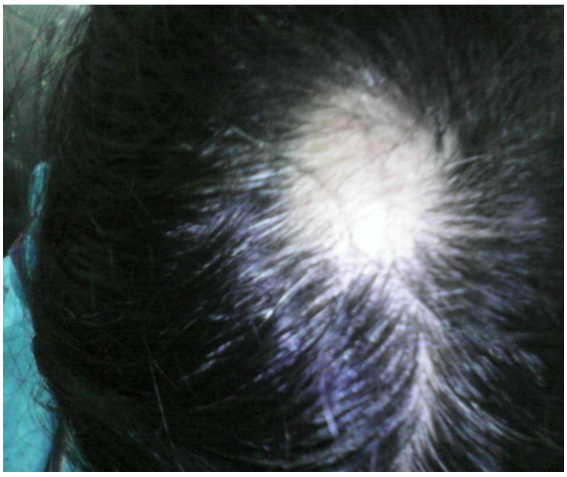

Figure 1 A patch of alopecia areata on scalp in a young female.

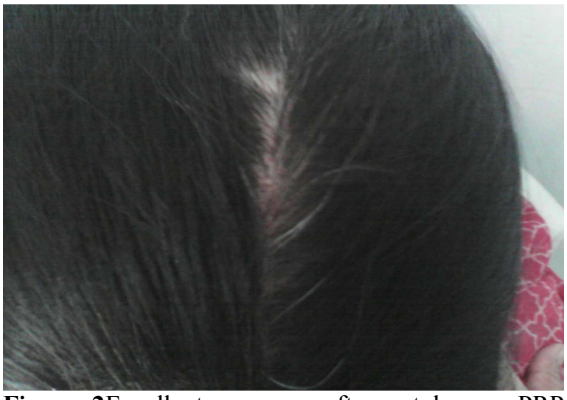

Figure 2 Excellent response after autologous PRP therapy.

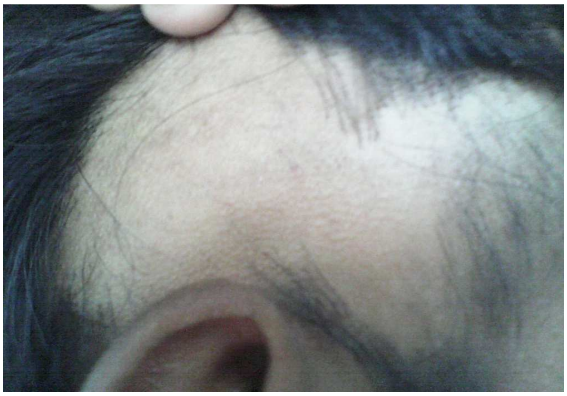

Figure 3 A large patch of alopecia areata on temporal region in a male patient.

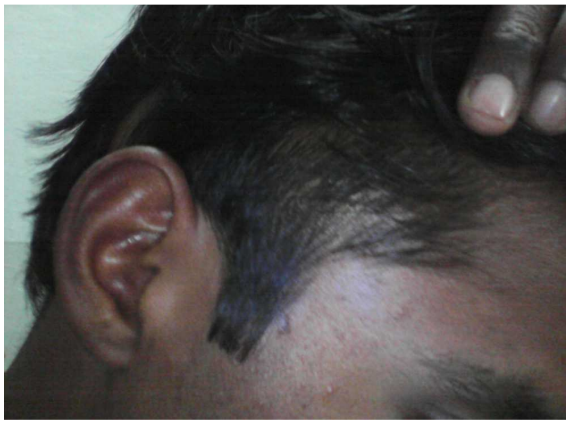

Figure 4 Excellent hair regrowth after autologous PRP therapy.

Conclusion

Our study, first to investigate role of PRP in our population, concludes that PRP is very safe, low-cost and highly effective monotherapy for limited AA without any significant side effects. PRP can be very useful adjuvant therapy along with standard therapies in alopecia totalis and univarsalis. This opens new avenue for further controlled studies with using larger patient number to achieve better and definitive conclusion.

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