

Safety and efficacy of microneedling with autologous platelet-rich plasma in chronic and stable alopecia areata

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Abstract *Objective* Safety and efficacy of microneedling with autologous platelet-rich plasma (PRP) in chronic and stable alopecia areata.

Methods This study was conducted from September 2013-October 2015 and included 25 patients of alopecia areata attending dermatology OPD of Victoria Hospital and Bowring and Lady Curzon Hospital affiliated to Bangalore Medical College and Research Institute. Patients were included in the study based on the exclusion and inclusion criteria. It was conducted as a randomized prospective study for a period of 12 weeks. SALT score at the baseline and at the end of 12 weeks and hair regrowth at the end of 12 weeks was calculated to see the treatment response.

Results Patients showed statistically significant hair regrowth and decrease in the SALT score from baseline at the end of 12 weeks.

Conclusion Study concluded that microneedling with autologous PRP can serve as a safe and efficient treatment in cases of chronic and extensive alopecia areata for faster hair regrowth.

Key words

Alopecia areata, platelet-rich plasma.

Introduction

Alopecia areata (AA) is the second most common form of non-scarring alopecia involving the scalp and/or body and is characterized by hair loss without any clinical inflammatory signs.¹

In general, AA was estimated to occur in 0.1% to 0.2% of the general population with a lifetime risk of 1.7%.² The exact pathophysiology of alopecia areata remains unknown. The most widely accepted hypothesis is that alopecia areata is a T cell-mediated autoimmune

condition that is most likely to occur in genetically predisposed individuals.³ Alopecia areata can affect any hair-bearing area, and more than one area can be affected at once. Scalp is the most common affected site.⁴ Alopecia areata can be classified according to its pattern, as follows: patchy, reticular, ophiasis, sisaipho, alopecia totalis and alopecia universalis. Patchy type is the most common.

Diagnosis usually can be made on clinical grounds. A scalp biopsy seldom is needed, but it can be helpful when the clinical diagnosis is less certain.⁵ Although, alopecia areata is a benign condition and most patients are asymptomatic; however, it can cause emotional and psychosocial distress in affected individuals. Self-consciousness concerning personal appearance can become important.⁶ Many

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therapeutic modalities have been used to treat alopecia areata with variable efficacy and safety profiles. Unfortunately, none of these agents is curative or preventive.⁷ Presently corticosteroids are the treatment of choice.⁸ In our study, microneedling with autologous platelet-rich plasma is being tried for the faster hair regrowth.

Methods

Our study was conducted over duration of 2 years starting from 1st November 2013 till 31st October 2015. Patients visiting to the Dermatology OPD of Victoria Hospital and Bowring and Lady Curzon Hospital, both affiliated hospitals of Bangalore Medical College and Research Institute, were included in the study.

A total of 25 patients who presented with alopecia areata based on the exclusion and inclusion criteria, were enrolled for the study.

Patients counseling and consent

All the patients enrolled for the study were first explained about the nature of the disease. They were explained about the treatment options we have and why microneedling treatment and platelet-rich plasma therapy can be useful. They were explained about the procedure, duration of the therapy, associated possible complications, possible outcomes of the treatment and the expected duration to get the optimum results. After complete counseling of the patient in their own understandable language, a written informed consent was taken.

History and clinical examination

Complete history of the patient including, name, age, sex, address, contact number, occupation, marital status, onset and duration of hair loss of the present episode, associated symptoms, any

history of previously received treatment for the hair loss, history of bleeding tendencies, or intake of any anticoagulant drugs were taken.

Under adequate illumination, patient was examined for the pattern of hair loss, number of patches, skin changes over the affected area, baseline SALT score, associated nail changes. Also the patient was examined for other associated autoimmune disorders. Local examination of the patch was done by both naked eye and by using dermoscopy. All the above findings were noted down in the proforma and similar evaluation was done at every sitting till the final observation.

Inclusion/exclusion criteria

Cases of alopecia areata of scalp of duration more than 6 months, and age group of more than 18 years. Patients who gave written informed consent were included in the study. Patients on any kind of treatment in the past 3 months, alopecia areata with spontaneous hair regrowth, patients with bleeding disorder and on anti-coagulant therapy were excluded.

Laboratory investigations

Before starting the study, all the patients were asked to undergo the following tests. Complete blood count, platelet counts, peripheral smear comment, bleeding time and clotting time, random blood sugar, thyroid function test, HIV-1 and 2, VDRL.

Preparation of autologous platelet-rich plasma (PRP)

Following steps of preparation of autologous PRP were undertaken. Using a sterile 10 ml syringe, 8 ml of whole blood was drawn from the patient. The blood was then put into two vacutainers containing sodium citrate

anticoagulant, 4ml in each. Both the vacutainers were labelled and were centrifuged at 3000 rpms for 15 minutes. After the centrifugation, the supernatant achieved in each of the vacutainers were separated. The upper half of the supernatant, platelet-poor plasma (PPP) was discarded. The plasma concentrate in the lower 1/3rd, i.e. platelet-rich plasma, and a part of the RBCs and the buffy coat was collected in a sterile syringe. The collected concentrates of plasma in the above step were again centrifuged in a plain vacutainers (not having anti-coagulant) at 2000 rpms for 10 mins. After the 2nd centrifugation, the concentrated PRP was obtained in a 5 ml sterile syringe. For each patient in microneedling with PRP, 2-4 ml of PRP was prepared.

Preparation for dermaroller (Microneedling) treatment

As the procedure is relatively painless no anesthesia was used.

Application of Platelet rich plasma and dermaroller procedure

Microneedling using a dermaroller was first performed on the affected area of scalp. Dermaroller was rolled in four possible directions, i.e. vertical, horizontal and the two diagonal directions. This was done till minute pinpoint bleeding points were noticed. It was followed by intermittent application of freshly prepared PRP. The applied PRP was spread over the whole affected area and again rolled till pinpoint bleeding points were noticed. The procedure lasted 10-15 minutes in most of the patients and was well tolerated by most of them without any immediate side effects.

Post-procedure care and advice

After the completion of the procedure, the

excess blood was cleansed using saline soaked cotton. Patient was asked to report back if any short term or long term side effects were noted.

The above procedures were repeated at all visits. In total 4 such treatment sittings were conducted at an interval of 3 weeks. In every sitting clinical photographs were taken and hair regrowth was observed

Follow-up

Patients were followed up every 3 weeks till 12 weeks. SALT score of each patient at baseline and at the end of 12 weeks and hair regrowth scale was used to calculate treatment response every 3 weeks until 12 weeks. Patients were followed upto 9 months to look for any relapse.

Hair regrowth scale (HRG)

HGR was scored as HRG 0- no response, HRG 1- <25%, HRG 2- 25-50%, HRG 3 -50-75% and HRG 4> 75%.

Hair regrowth was measured every 3 weeks till the end of 12 weeks by HRG scale as mentioned before. A HRG of 0 and 1 was taken as poor response, 2 as moderate response, 3 as good response and 4 as excellent response. At the end of 12 weeks, a HRG of ≥ 3 was considered as improved and a HRG of ≤ 2 was considered as not improved.

Results

In our study, a total of 25 patients were enrolled. All the patients were followed up and included in the statistical analysis.

Age distribution

In the study, out of the 25 patients maximum number of patients pooled in 26-35 years with mean age of 33.43 ± 7.22 years. Slight male

preponderance, male:female 1.27:1 In our study we observed an average duration of hair loss was 10.47 ± 2.76 months minimum being 6.5 months and maximum 26 months.

All the 25 patients included in our study had patchy type of alopecia areata.

Post-procedure assessment

SALT score

Significant decrease in the SALT score from baseline (15.92 ± 2.07) to the end of 12 weeks (3.524 ± 2.11) was noted in the patients ($p < 0.05$).

HRG ≥ 3 at the end of 12 weeks was considered clinically improved and HRG ≤ 2 as not improved. In our study 60.9% of the patients improved at the end of 12 weeks. Only 1 patient had relapse at the end of 9 months of follow up.

No major side effects were noted during the procedure or post procedure.

Discussion

In the study, out of the 25 patients maximum number of patients pooled in 26-35 years with mean age of 33.43 ± 7.22 years. Study by Tan *et al.*⁹ suggested that 85.5% of Asian patients with AA have disease onset before 40 years of age. Slight male preponderance, male:female 1.27:1, consistent with various studies.^{9,10,11,12}

In our study 60.9% of the patients receiving microneedling with PRP improved at the end of 12 weeks. In a study by Trink *et al.*¹³ patients treated with PRP had significantly increased hair regrowth compared with those treated with triamcinolone acetonide (TrA); 27% of patients treated with TrA achieved complete remission at the end of 6 months, compared with 60% of patients treated with PRP, which is significantly higher than TrA- and placebo-treated patients.

Uebel *et al.*¹⁴ have shown that storing hair grafts in PRP can enhance graft survival, improve hair density and stimulate the growth of transplanted follicular units. In a study by Deepak and Shwetha,¹⁵ reported successful treatment of three cases of AA with scalp roller therapy, which were resistance to both systemic and topical treatment for inducing hair on cosmetic region like scalp and concluded that scalp roller therapy can be used as an effective adjuvant to the conventional therapy to treat resistant AA cases locally.¹⁵

In the study by Singh,¹⁶ out of the 20 patients of chronic AA, only one patient had a relapse, and his hair regrowth was also minimum.

Conclusion

Microneedling along with platelet-rich plasma can serve as a safe and efficient tool for hair regrowth with an added advantage of decrease in the number of relapses attributing to the anti-inflammatory role of PRP in alopecia areata.

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