

Original Research Article

A study on the efficacy of platelet rich plasma for the treatment of patterned hair loss

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ABSTRACT

Background: Platelet rich plasma (PRP) is a promising and novel therapy new therapy for the treatment of androgenetic alopecia. There are various growth factors in PRP which induce the proliferation of dermal papilla cells.

Methods: We selected twenty-five cases of both male and female pattern hair loss for the study.

Results: Very good improvement was seen in 8 (32%) patients, good improvement was seen in 12 (48%) patients, average improvement, was seen in 2 (8%) and poor improvement, was seen in 3 (12%) patients. Regarding the side effects of PRP, bruising was seen in 2 (8%), pain was seen in 3 (12%). After 4 months of treatment, average hair count increased by 40% and average hair shaft diameter increased by 56%.

Conclusions: PRP is a novel therapy, but is not an evidence-based therapy for the treatment of alopecia.

Keywords: Platelet rich plasma, Androgenetic alopecia, Female pattern hair loss, Centrifugation

INTRODUCTION

Androgenetic alopecia (AGA) is a psychologically distressing condition for both males and females and it leads to low self-esteem. Many therapeutic modalities are being tried for androgenetic alopecia in males and female pattern hair loss. There are various modalities for the treatment of AGA including topical minoxidil and oral finasteride. There has been a lot of hype on the use of platelet rich plasma (PRP) for various dermatological indications including acne scarring, leg ulcers, facial rejuvenation, alopecia areata and androgenetic alopecia. Out of all the treatment modalities, platelet rich plasma shows promising results. PRP has healing properties due to the increased concentrations of autologous growth factors and secretory proteins which help in the healing process.¹ PRP is an autologous concentration of human platelets contained in a small volume of plasma and has

haemostatic and tissue repairing effects.² For the preparation of PRP, whole blood from the patient is first centrifuged to separate the plasma from packed red blood cells and then further centrifuged to separate PRP from platelet-poor plasma. This concentrate is then activated with the addition of thrombin or calcium, resulting in a gelatinous platelet gel. Clinically valuable PRP contains at least one million platelets per microliter. Lesser concentrations cannot be relied on to enhance wound healing. Activated PRP stimulates the proliferation and differentiation of stem cells in the hair follicle bulge area by various mechanisms.^{3,4}

Aim

The aim of the study was to evaluate the efficacy of platelet rich plasma in twenty-five male and female patients of patterned hair loss.

METHODS

We selected twenty-five cases of both male and female pattern hair loss for the study. A randomised controlled trial was conducted in a District Hospital (Ferozepur) in North India from 2014 to 2015, on the efficacy of platelet rich plasma in 25 patients with patterned hair loss. Prior approval of hospital ethical committee was taken for the study. Written informed consent of all the patients was taken before the start of the study.

The PRP preparation was done under aseptic precautions 20 ml of venous blood was drawn and added to a test tube containing acid citrate dextrose in a ratio of 9:1 (blood: acid citrate dextrose), centrifuged at 5000 rpm for 15 min to separate the red blood cells from the platelets and plasma. Double spinning method was used for centrifugation. Then the supernatant and the buffy coat composed of platelets and plasma was collected and centrifuged again at 2000 rpm for 5 to 10 min. The bottom layer about 1.5 ml was taken and 10% calcium chloride was added (0.3 ml for 1 ml of PRP). Total 2 to 3 cc of PRP was injected at each session. The platelet count in the PRP was done by automated cell analyzer. The interfollicular injections of PRP were given every month for a total of 4 sessions. 2 to 3 ml of PRP was injected into the scalp using the nappage technique. Nappage is a multi pricking technique where 2 to 4 injections are made per second, every 2 to 4 mm apart at an angle of 30 to 60 degrees from the skin surface. The needle penetrates to a depth of 2 to 4 mm while constant unchanging pressure is applied to the piston of the syringe. Clinical photographs of the patients were taken at baseline and then after every visit. All patients were advised to avoid washing hair 2 days before the treatment. The "hair pull test" is performed 3 times by the same clinician. To evaluate overall hair growth, hair volume, hair quality, and fullness, global pictures are taken in every session from the front, vertex, lateral, and back view. Hair pull test was done in all the patients. 50 to 60 hairs were grasped between the thumb, index, and middle finger from the base close to the scalp and the extracted hair was counted in every session. The improvement was assessed by grading the patient according to physicians global assessment scale as follows.⁵ Poor improvement was known when <25% restoration of hair growth, followed by average improvement i.e., 25% to 50% restoration of hair growth, good improvement 51% to 75% restoration of hair growth and very good improvement when >75% restoration of hair growth was observed.

After the procedure, the patients were instructed to refrain from any physical exercise or sunlight for 2 to 3 days. PRP was done at an interval of four weeks and a total of four sessions were done. Pre and post treatment photographs of the patients were taken. Follow up of patients was done for a period of 6 months. Any side effects experienced by the patients were noted. The data was analyzed using chi square test.

Inclusion criteria

All the male and female patients with patterned hair loss; patients who have not been on any other treatment modality during the past six months; patients having no other systemic disorder; patients not responding to topical and oral modalities were included in the study.

Exclusion criteria

Patients with unrealistic expectations and patients who are not on any antiplatelet or anticoagulant drugs were excluded.

RESULTS

The data was collected, tabulated (Table 1 and 2) and the results were analyzed using the IBM SPSS® software platform. The assessment of the patients was done both subjectively and objectively (Figure 1A and 1B, 2A and 2B).

Table 1: Age distribution of patients.

| S. no. | Age distribution | Number of patients | Percentage (%) |
|--------|------------------|--------------------|----------------|
| 1 | 0-20 | - | - |
| 2 | 21-40 | 16 | 64 |
| 3 | 41-60 | 9 | 36 |

Table 2: Improvement of alopecia.

| S. no. | Grading of improvement | Number of patients | Percentage (%) |
|--------|------------------------|--------------------|----------------|
| 1 | Very good | 8 | 32 |
| 2 | Good | 12 | 48 |
| 3 | Average | 2 | 8 |
| 4 | Poor | 3 | 12 |

Table 3: Side effects of PRP therapy.

| S. no. | Side effects | Number of patients | Percentage (%) |
|--------|--------------|--------------------|----------------|
| 1 | Bruising | 2 | 8 |
| 2 | Pain | 3 | 12 |

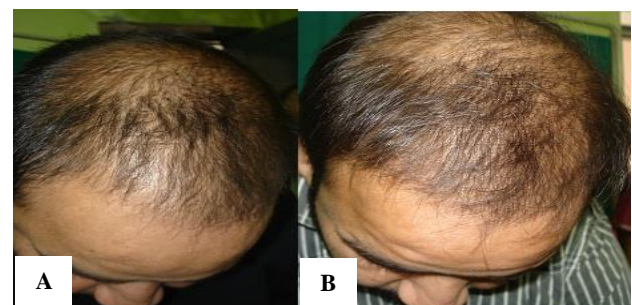


Figure 1: Pre and post treatment photograph in a 43 years old male before and after 3 sessions of PRP.



Figure 2: Pre and post treatment photograph in a 22 years old female before and after 3 sessions of PRP.

The objective improvement of the patients (Table 2) was seen by physicians global assessment scale as follows- very good improvement was seen in 8 (32%) patients (Figure 1 and 1A), good improvement was seen in 12 (48%) patients (Figure 2 and 2A), average improvement was seen in 2 (8%) and poor improvement, was seen in 3 (12%) patients. Regarding the side effects of PRP (Table 2), bruising was seen in 2 (8%), pain was seen in 3 (12%).

DISCUSSION

There were 21 males and 4 females and male: female was 5.2:1. Regarding the age distribution (Table 1) of patients, maximum number of patients (64%) were between 41 to 60 years of age, followed by 9 (34%) patients between 21 to 40 years of age. The assessment of the patients was done both subjectively and objectively. Subjective improvement was seen in all the patients including stoppage of hair fall and restoration of hair growth. The objective improvement of the patients (Table 2) was seen by physicians global assessment scale as follows- Very good improvement was seen in 8 (32%) patients (Figure 1A and 1B), good improvement was seen in 12 (48%) patients (Figure 2A and 2B), average improvement was seen in 2 (8%) and poor improvement, was seen in 3 (12%) patients. Regarding the side effects of PRP (Table 2), bruising was seen in 2 (8%), pain was seen in 3 (12%). After 4 months of treatment, average hair count increased by 40% and average hair shaft diameter increased by 56%. Overall satisfaction score of the patient was good with increased hair density and appearance. In a study by Ayatollahi et al, 13 male patients with AGA Hamilton grade III to VI were studied.⁶ Patients received five injections of 2 to 4 ml PRP by single spin process every 2 weeks. An evaluation was performed at baseline and 3 months after the last injection by standard photographs and hair density and diameter. The results revealed a decrease in anagen, increase in telogen, and decreased anagen/telogen ratio. But no difference in hair count or density was found. This was different from our study as hair count increased in our study. In our study, pain and discomfort were seen in 3 patients and bruising after PRP was seen in 2 patients. The most common side effect reported in a study by Kim

et al was temporary pain at the injection site.⁷ No major adverse effects were reported. This data was similar to our study. All the samples were evaluated for the concentration of platelets before and after the procedure. Our method of PRP preparation was manual double spin method and platelet concentration reached was four to five times the normal value. The double-spin method was developed and produces a higher platelet concentration (>5 times whole-blood platelet concentration) with little to no red blood cells and neutrophils.⁸

Platelet-rich plasma contains autologous growth factors, which could act synergistically with growth factors induced by skin needling in order to enhance the wound-healing response.^{9,10} Platelets, once activated, release several growth factors, cytokines, and chemokines. The beneficial effects of PRP in AGA can thus be attributed to various platelet derived growth factors causing improvement in the function of hair follicle and promotion of hair growth.^{11,12} It is safe, cheap, and nonallergic. The mitogenic effects of PRP are only limited to augmentation of the normal healing process and is theoretically not mutagenic, as the growth factors released do not enter the cell or its nucleus, but only bind to the membrane receptors.^{13,14} Since PRP is an autologous preparation, it is devoid of any serious adverse effects, apart from local injection site reactions like pain or secondary infection, which can be avoided with proper precautions. PRP has no issues regarding transmission of infections such as hepatitis or HIV.¹⁵

Various studies have been conducted on the efficacy of PRP in androgenetic alopecia. In a study by Lopez et al, an open labelled controlled study was done to assess the effect of PRP mesotherapy in AGA.¹⁶ A total of 62 patients were taken up for the study and there was significant increase in hair density and borderline increase in hair number.

In another study by Park et al, a split scalp comparison of PRP injections versus saline was done in an AGA patient and it resulted in significant increase in hair density and borderline increase in hair number.¹⁷ In a study by Li et al, molecular mechanisms were used to illustrate molecular mechanisms of effect of interfollicular injections of PRP was studied an increase in hair growth was seen at three weeks. In all these studies, there was appreciable increase in hair growth.¹⁸ But all said and done, PRP is still in the nascent phase and more multicentric trials need to be conducted to prove its efficacy in various disorders.

CONCLUSION

To conclude, PRP is a safe procedure with minimal risks and side effects. Since it is an autologous preparation, the risk of allergy and infection is minimal. But in manual PRP it is important that complete aseptic precautions should be taken while handling the samples. Also, in

manual PRP, temperature maintenance is very important as the potency of PRP decreases with increased temperature. More trials need to be conducted with larger number of patients. The role of PRP in restoring hair density leads to a better outcome for the treatment of male and female pattern hair loss. But, all said and done, it is not an evidence based therapy and larger studies need to be conducted to prove its efficacy.

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Ethical approval: The study was approved by the institutional ethics committee

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