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Efficacy of Using PRP Combined with 5% Minoxidil Solution and Nutritional Supplements for Female Pattern Hair Loss

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Abstract

Androgenetic alopecia or female pattern hair loss is a common type of hair loss that affects women with reduced hair density. It is one of the most common encountered problems for dermatologists. Hair loss is often having a great impact on women rather than men as it is less acceptable socially for them. It tends to persistent and cosmetically unacceptable that negatively impacts on one's quality of life. It can severely affect a women emotional well-being thus; successful treatments are necessary. Androgenetic alopecia as the name suggests is an action of hormones called androgen that are essential for male sexual development, functions in both sexes including regulation of hair growth. This condition may be inherited and likely to increased androgen activity. Among women the precise role of androgens is hard to determine unlike androgenetic alopecia in men. The objective of this study was to investigate the clinical efficacy of PRP along with minoxidil and nutritional supplements in treatment of female pattern hair loss. The 12 female patients having (FPHL) were given autologous PRP injections on the affected area of alopecia over a period of 4 months at interval of 3 weeks and results were assessed. The patients presented clinical improvement in hair counts, hair root strength, hair thickness with an overall alopecia. PRP along with minoxid 5% and nutritional supplements is effective and promising therapy for Female pattern hair loss with no major adverse effects.

Keywords: Androgenic; Alopecia; Platelet rich plasma; Minoxidil; Antiandrogens; Female pattern hair loss

Abbreviations: FPHL: Female Pattern Hair Loss; TE: Telogen Effluvium; AGA: Androgenetic Alopecia; AA: Alopecia Areata; FDA: Food and Drug Administration; MSM: Methyl Sulfonyl Methane

Introduction

Female pattern hair loss (FPHL), is a form of no scarring, reduction in hair density with sparing of the frontal hairline. The part width is usually progressively increases, mostly prominently anteriorly demonstrates with thinning hair rather than baldness. No-scarring alopecia with diffuse rapid onset is not common in patterned alopecia. This condition raised suspicion for systemic illness such as thyroid disease, iron deficiency, medication exposure and an autoimmune etiology [1]. Symptoms such as itching, pain, inflammatory papules, erythema, pustules and scarring are suggestive of scarring process. Patterned alopecia has been reported commonly in females is suggested an underlying endocrine disorder of polycystic ovarian syndrome [2]. Ultimately, female pattern hair loss is primarily a cosmetic concern displayed symptoms of depression. Hair transplantation is an only current successful permanent option, that it requires surgical procedures. Non-surgical medical options include antiandrogens, prostaglandin analogs and ketoconazole are reported to be beneficial.

On the other hand, laser and light therapies became popular despite the lack of profound benefit. Management of expectations is very crucial, while the aim of therapy is to slow or stop disease progression with contentment. Female patients presenting with all types of hair loss should be screened by complete medical history, dietary habits and physical exam to see the risk factors for nutritional deficiencies. The deficiency in nutrients can impact both hair growth and hair structure. The impact includes acute and chronic telogen effluvium (TE), which is a well-known effect of decreased protein intake. Female pattern hair loss (FPHL), androgenetic alopecia (AGA) and alopecia areata (AA) are result in potential associations between nutritional deficiencies [3]. There are many nutritional supplements marked for hair loss treatments which composed of different formulation. As U.S. Food and Drug Administration (FDA) have no authority to review these supplements for safety and effectiveness, therefore responsibility of manufacturers is yet questionable. These supplements can carry risks as over supplementation of nutrients prove harmful to hair [4].

The world most common and well known nutritional deficiency is iron. Certain populations have higher risk for iron deficiency. In women menstrual blood loss and in men gastrointestinal blood loss may present, while malabsorption disorders (such as celiac disease) includes other risk factors. Patients with advanced iron deficiency develop anemia that require replacement. This condition may result in reduction of storage of iron which is measured by serum ferritin. Zinc is an essential mineral that is required by hundreds of enzymes that regulate gene expression [3]. Zinc deficiency may be inherited or acquired may affect multiple organ systems. Zinc deficiency can occur by malabsorption syndrome, other groups including liver or renal dysfunction, alcoholic patients and pregnant women [5].

Selenium is an essential element that protects from oxidative damage and prevents sparse hair growth [6]. Risk factors for zinc deficiency include long-term hemodialysis, malabsorption disorders and HIV. Niacin deficiency is another frequent factor for alopecia. Malabsorption disorders, drug induced cases and alcoholism are main causes in niacin deficiency [7]. Vitamin E deficiency can result in decreased hair in numbers [8]. Vitamin D role play an important role in the hair follicle cycling. Risk factors are obesity, inadequate sun exposure and fat malabsorption [9]. Vitamin H or Biotin deficiency serves an important role in patchy alopecia [10]. Antioxidants are compounds that prevent oxidative damage. Oxidative stress is linked to hair loss [11].

Materials and Methods

This study approved by Laser Clinic IRB. There are 12 female patients, with age of above 18 and having FPHL. Written informed consent was taken prior the study. All patients were tested by ELISA for HBsAg, HIV, nutritional deficiencies and platelet count. Patients who had thyroid dysfunction and dermatological disorders were excluded from the study. All participants had never been received topical or systemic treatment before the enrollment for at least 3 months. All patients were advised to avoid any kind of hair products and medicines. All patients were advised to avoid washing hair 2 days prior to the treatment.

Currently the only validated medication for hair density increasing is FDA-approved minoxidil solution. Female patients were treated with nutritional supplements combined with 12 PRP sessions and 5% topical minoxidil solution twice daily for four months. Hair pull test was done before every treatment session. This test was performed by same clinician each time before each session. Baseline follicular units were counted by dividing area in to four small quadrants with help of trichoscan. To evaluate hair growth, volume, overall fullness and quality pictures were taken from front, vertex and lateral with back view in every session. PRP treatment was performed by the collecting 20cc of fresh blood in a sodium citrate vacutainer in a minor operation theatre under aseptic precaution [12].

Tubes were then rotated in centrifugation machine at the 1500 revolutions. After the “soft spin” that allows blood separation in three layers 55% of total volume namely bottom RBC layer, next process called platelet poor plasma 40% of total volume, an intermediate PRP layer called “buffy coat” (5% of total volume) was done. After PPP collected with a Finn pipette in to another test tube a second centrifugation called “hard spin” platelets (PRP) was settle at the bottom of that tube. The upper layer PPP was discarded and lower layer of PRP loaded in insulin syringe that was calcium chloride as an activator. Anesthetic cream was applied an hour prior to administration of PRP. Syringe was injected PRP by nappage technique (multiple small injections one-cm apart in a linear pattern) in a minor operation theatre. This treatment was repeated in every two weeks for the four sessions.

Results

Hair count was noted in each visit and subjective improvements were noted. Hair growth was seen in eight patients after 9 days and in four patients after 15 days. By the end of 4 months, all twelve patients had good hair growth (Figures 1 & 2). We evaluated all the patients at the end of 16 weeks. Before our treatment, all patients had a positive hair pull test. The pull test was negative with a significant reduction was observed in hair loss, while moderate improvement in volume was noticed by participants. None of the twelve patients had any inflammation or infection. Only two patients complained of a mild headache after the initial procedure of PRP which was alleviated after paracetamol 500 mg. From these results we found that PRP combined with 5% minoxidil solution and nutritional supplements have efficacy in the treatment of FPHL.

Figure 1:

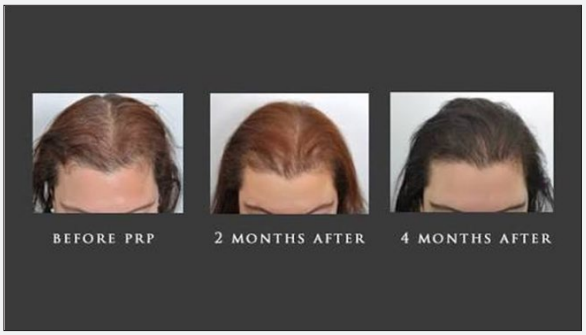

Figure 2 :

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Table 1: Observations on hair pull test in twelve subjects before and after 16 weeks of PRP, along with 5% minoxidil foam and nutritional supplements.

Age	PRP Counts	Hair Pull Test before Treatment	After treatment Hair Pull Test	Visible Hair Growth
21	12.64	7	2	1-week
23	12.12	9	4	2-weeks
26	11.32	4	0	1-week
29	9.62	6	2	1-week
32	9.32	7	2	1-week
34	9.12	8	3	2-weeks
35	7.92	4	0	2-weeks
36	8.12	6	2	1-week
29	11.32	5	1	2-week
19	12.89	3	0	1-week
22	9.54	4	0	1-week
31	8.98	5	0	1-week

Discussion

Topical minoxidil 2% solution or foam is the only currently FDA approved treatment for FPHL, however a more potent 5% solution is available and approved that we used for our patients. Foam preparation does not contain propylene glycol that causes irritant dermatitis. Furthermore, the solution form has higher alcohol content, which is a known irritant. Additionally, 5% foam once daily was aesthetically more pleasing to patients. There was less scalp pruritus and facial hypertrichosis. This treatment less interfered with hair styling in their routine. This study concluded that 5% foam once daily was clinically significant effective and offered an aesthetic advantage. A meta-analysis of randomized controlled trials for treatment in FPHL demonstrated that greater proportion of patients treated with minoxidil reported an increase in hair growth [13]. Fortunately, minoxidil is not expensive, generically available and easy to use. It is an effective treatment in restoring the number of hairs.

But unfortunately clinical effects are unpredictable and some of the results may be mildly unappreciated by the patient. Although, if the treatment is not continued and indefinitely, the improvements will be lost. It is important to counsel the patients that clinical effects may not be noticeable for up to 6 months of continued daily use. If treatment is halted or inconsistently used, there may be a lack of appreciable improvement which may lose results. We informed patients that the goal of treatment is to prevent further hair loss, but also result in new growth and thickening of existing hairs. Facial hypertrichosis was reduced by applying the minoxidil foam directly to the scalp in a layer before going to bed. Ongoing clinical trials are investigating for new formulations, to increase or improve drug delivery [14]. Supplementation may be beneficial in combination with evidence-based treatments. Nutritional supplements with anecdotal evidence of hair growth. Biotin (Vitamin B7), B complex vitamins, copper, zinc, Coenzyme Q10 and Methylsulfonylmethane (MSM) are anecdotal evident of hair growth.

The hallmark feature of FPHL is progressive transformation of terminal hair follicles. Thinning of hair is due to a genetic predisposition influenced by androgens [15]. It is known that anagen (growth phase of the hair follicle) phase hair follicles gradually shorten resulting in fewer terminal follicles with more follicles in the shedding phase (telogen). A female patient failed other therapies and desires a permanent solution for hair loss has an option of hair transplantation. However, donor site availability in females is limited given the diffuse nature of the hair loss pattern. Moreover, transplantation procedures are often less comfortable, time consuming and expensive. Ultimate cure is not available even after multiple treatments. A realistic goal should be the improvement in hair density. Wigs or hair camouflage may be offered as a last option in those who is not willing to have surgery or for whom medical therapy did not proven beneficial.

Conclusion

Hair loss is distressing to both the patient and the practitioner. Most therapies for FPHL are yet only partially effective. As hair loss in females is cosmetically and psychologically distressing, it is important to address diagnosis early to catch the opportunity for therapeutic success. Our goal of therapy was to stop further progression in hair loss and improve the density of the hair that remains. Undergoing medical therapy should be considered a treatment success, while the concept should be discussed with patients in the first visit. Platelet rich plasma treatments, offer improved results over the long term use minoxidil.

Disclosure

The authors report no conflict of interest in this work.

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