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RESEARCH ARTICLE
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TO EVALUATE THE OUTCOMES OF INJECTABLE PLATELET RICH FIBRIN IN TREATING FEMALE PATTERN HAIR LOSS

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ABSTRACT

Background: Nowadays, a very common hair loss disorder is spreading in adults which is called female androgenic alopecia (AGA). It is also referred to as female pattern hair loss (FPHL). This disorder is common in about 40% of females by 70 years of age. FPHL occurs when terminal hair on the frontal as well as the crown areas start getting thinner. The only FDA-approved treatment for FPHL is topical minoxidil (2% and 5%). There are several other options as well such as laser therapy, oral spironolactone, hair transplant, and finasteride (oral and topical). Recently, the study of APAs (autologous platelet aggregates) have proved that it can be a possible treatment for FPHL. PRP (platelet-rich plasma) injections are also similar to APAs. There is a new version of PRP which is called PRF (platelet-rich fibrin).

Objective: To Evaluate the Outcomes of Injectable Platelet Rich Fibrin In Treating Female Pattern Hair Loss

Methodology: This study is a controlled, single-center, prospective case series of females who are all adults. All the females were having FPHL and wanted to have PRF scalp injections. All the females who were aged more than 18 years old, were healthy, and had no history of any surgical treatment for hair loss were eligible for this research. FPHL was diagnosed based on scalp digital microscopy and Ludwig hair loss classification. Medical history, digital scalp imaging, and hair pull test were obtained in the first visit along with standardised pictures. Participants underwent three i Injectable Platelet Rich Fibrin scalp treatments. SPSS was used to analyse the data. A significant p-value was considered to be less than 0.05.

Results: There were a total of 20 female participants of this study. All the females were suffering from female pattern hair loss. All the females who were aged more than 18 years old (mean = 45.1). Their ages ranged from 32 years to 74 years (mean = 37.1). The mean number of hairs pulled were decreased throughout the study period. Through clinical photography, a clear improvement was seen in hair thickness and reduction of visible scalp.

Conclusion: In summary, Injectable Platelet Rich Fibrin is an effective and safe treatment for FPHL.

INTRODUCTION

Nowadays, a very common hair loss disorder is spreading in adults which is called female androgenic alopecia (AGA) [1]. It is also referred to as female pattern hair loss (FPHL) [2]. This disorder is common in about 40% of females by 70 years of age [3]. FPHL occurs when terminal hair on the frontal as well as the crown areas start getting thinner. There is usually incomplete hair loss and the frontal hairline is often kept unlike male AGA. The thinning appears in the centre of the head creating a "Christmas tree" pattern or as recession at the temples [4]. Many people want to treat this condition due to its emotional impact although it is not that dangerous [5]. Women specially consider their beauty, youth, and confidence linked with their hair. Even a little hair loss affects their quality of life, self-esteem, and self-image negatively.

The only FDA-approved treatment for FPHL is topical minoxidil (2% and 5%) [6]. There are several other options as well such as laser therapy, oral spironolactone, hair transplant, and finasteride (oral and topical). All these treatments have different results and have different risks, side effects, and high costs. Recently, the study of APAs (autologous platelet aggregates) have proved that it can be a possible treatment for FPHL [7]. The patient's own blood is used to make APAs. It contains high levels of platelets and it is also associated with growth factors. Due to this treatment, blood flow increases which extends the hair growth phase. It helps in activating pathways like ERK, Wnt/β-catenin, and Akt, supporting cell growth.

PRP (platelet-rich plasma) injections are also similar to APAs [8]. There is a new version of PRP which is called PRF (platelet-rich fibrin) [9]. A single spin in a centrifuge is used to make it without any anticoagulants which makes it fully autologous. White blood cells, platelets, red blood cells, and a fibrin matrix are included in PRF. PRF can be made as a liquid or a solid gel depending on how it's processed. Solid PRF is used in dental implants, bone grafts, and surgeries to help reduce infection and help in healing. In 2014, injectable PRF was introduced using slower spins (700 rpm for 3 mins) [10]. It was made in plastic tubes to keep it liquid. As soon as it is injected into the scalp or skin, it slowly forms a fibrin matrix. Growth factors are released over time which helps in giving long-lasting effects that PRP.

A better version for this treatment was also developed later in 2018 which is called Injectable Platelet Rich Fibrin [11]. Larger plastic tubes are used in it along with spins for a bit longer which were about 700 rpm for 5 minutes. Many research studies have revealed that Injectable Platelet Rich Fibrin works well for facial and dental treatments [12]. A few studies have also used Injectable Platelet Rich Fibrin for male hair loss [13]. However, there were no studies that were looking over using Injectable Platelet Rich Fibrin for female hair loss. Therefore, we have conducted this study to evaluate the outcomes of Injectable Platelet Rich Fibrin in treating female pattern hair loss.

METHODOLOGY

This study is a controlled, single-center, prospective case series of females who are all adults. All the females were having FPHL and wanted to have PRF scalp injections. The Ethical Review Committee approved this research. Every participant was informed about this study and their written consent was also obtained. All the females who were aged more than 18 years old, were healthy, and had no history of any surgical treatment for hair loss were eligible for this research. FPHL was diagnosed based on scalp digital microscopy and Ludwig hair loss classification. Every participant had to go through blood tests and clinical assessments before enrolment.

Exclusion criteria: Females who had other causes of hair loss, such as anemia, polycystic ovary syndrome, or thyroid were not a part of this research.

All the participants agreed to refrain from any aesthetic interventions, medications, topical hair cosmetics, or hair transplants during this study period. Participants had to visit six times during the

whole study duration. Medical history, digital scalp imaging, and hair pull test were obtained in the first visit along with standardised pictures. Participants underwent three Injectable Platelet Rich Fibrin + scalp treatments. WAA-QoL questionnaire was completed. Later on, follow-ups were done along with imaging, clinical assessments, and photography. Adverse effects were also recorded and reviewed at each visit.

In order to prepare Injectable Platelet Rich Fibrin , 26 mL of blood from each participant was collected under sterile conditions. A low-speed centrifugation method was used. The upper plasma layer was extracted and filled into a syringe. The syringe was connected to a mesotherapy device. Intradermal injections of Injectable Platelet Rich Fibrin were administered across the scalp. These were injected at a depth of 1.5 to 2.5 mm. The time duration for this whole process was 15 minutes. If any Injectable Platelet Rich Fibrin + was left, it was massaged into the scalp.

Hair pull tests, data from digital microscopy, and WAA-QoL were expressed in terms of mean and SD. Student's t-test was used to compare the results. SPSS was used to analyse the data. A significant p-value was considered to be less than 0.05.

RESULTS

There were a total of 20 female participants of this study. All the females were suffering from female pattern hair loss. All the females who were aged more than 18 years old. Their ages ranged from 32 years to 74 years. The duration of hair loss ranged from 4 months to 72 months. Table number 1 shows the mean values of age and hair loss duration.

Table No. 1:

Variables	**Mean**
Age (yrs)	45.1
Hair loss duration (months)	37.0

Table number 2 shows the mean values of digital microscopy analysis at baseline, 12th, and 24th week.

Table No. 2:

Digital microscopy analysis (Mean Follicles Containing Hair per mm²)	
Variables	**Mean**
Baseline	0.57
12th week	0.89
24th week	1.03

Table number 3 shows the mean hair pulls at baseline, 12th, and 24th week.

Table No. 3:

Hair pull tests (Mean number of hairs pulled)	
Variables	**Mean**
Baseline	4.2
12th week	0.4
24th week	0.3

Through clinical photography, a clear improvement was seen in hair thickness and reduction of visible scalp.

Figure No. 1: Androgenic alopecia in a 50 year old female

Figure number 1 compares the results of PRF after 3 sessions in a 50 year old female who had androgenic alopecia.

Figure No. 2: 30 year old female with PCOD with early androgenic alopecia

Figure number 2 compares the results of PRF after 6 sessions in a 30 year old female with PCOD who was struggling with early androgenic alopecia.

Figure No. 3: 45 years old female with androgenic alopecia

Figure number 3 compares the results of PRF after 6 sessions in a 45 year old female who had androgenic alopecia.

DISCUSSION

In this study, we evaluated the effects of Injectable Platelet Rich Fibrin on females who were suffering from FPHL. Both objective tools and subjective tools were used to measure the outcomes. The objective tools were hair pull test and digital microscopy. The subjective tool was the WAA-QoL questionnaire. All the tools were used at the start of the study, 12th week, and 24th week.

Through digital microscopy, we got to know that there were clear improvements seen regarding the health of hair. There was an increase in hair follicles containing hair and thicker hair strands. These results were proved when all the females who participated said that they also noticed a significant change in their hair. There were only a few short-lasting and mild side effects. Our study overall revealed that Injectable Platelet Rich Fibrin can be an effective method to treat FPHL.

Hair pull test, clinical photography, and digital microscopy was used to measure the treatment's after effects. Through the digital microscopy, we got to know how many hair follicles had hair in a given area which was measured in mm^2. This revealed whether there was new hair growing or not. Our study's way of measuring hair density is a little different from what other research studies have used [14,15]. Hair pull test is a common method used in most of the studies to check if hairs have grown or have become thicker after treatment [16,17].

There was an interesting observation in one participant where the new hair shafts were shown in a darker colour after the Injectable Platelet Rich Fibrin + treatment. This is similar to findings that revealed the same results after using PRP treatment. Up til now, there have not been any similar articles published that have reported the same. The reason for this colour change is still unknown. However, there is a speculation that the changes could be related to stimulation of melanocytes in the new hair follicles [18].

Nowadays, there has been expansion in the treatments for hair loss, offering non-surgical options. These include treatments like micro-needling, PRP, autologous stem cells, low-level light therapy, botulinum toxin and many others [19]. Often these treatments are combined by the clinicians in order to get enhanced outcomes. The use of Injectable Platelet Rich Fibrin treatment is considered as a cost-effective method with the potential to improve the results of the treatment [20].

CONCLUSION

In summary, Injectable Platelet Rich Fibrin is an effective and safe treatment for FPHL.

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This study was conducted without receiving financial support from any external source.

Conflict in the interest

The authors had no conflict related to the interest in the execution of this study.

Permission

Prior to initiating the study, approval from the ethical committee was obtained to ensure adherence to ethical standards and guidelines.

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