

Combination Therapy with Injectable Platelet Rich Fibrin (PRF) and Polydioxanone (PDO) Threads in Treatment of Male Pattern Baldness: A Novel Approach

Shashank Bansod *, Umesh Bilewar, Amit Kerure, Shaurya Rohtagi

Hi-Tech Skin Clinic and Hair Transplant Centre, Nagpur, Maharashtra, India

ABSTRACT

Injectable PRF is a second generation, fully autologous biomaterial obtained from blood, having greater number of cells and their growth factors as compared to conventional (Platelet Rich Plasma) PRP. It predominantly has type-1 collagen and lymphocytes along with its cytokines. It is more cost effective, easy to prepare and requires minimal materials for its preparation.

PDO threads have been used in cardiac surgeries since long and recently have been used in dermatology as a face lifting procedure. Proposed mechanisms include neocollagenosis, fibroblast proliferation and improvement in microcirculation among others.

Considering the favorable properties, we combined injectable PRF therapy and PDO monofilament thread insertion into the scalp for the treatment of Androgenetic alopecia in our patients with encouraging results.

Keywords: Injectable PRF; PDO threads; Hair loss; Growth factors; Neocollagenosis; Androgenetic alopecia

INTRODUCTION

Male pattern baldness is an androgen dependent hair loss which has been an area of major concern among the affected individuals. Minoxidil and finasteride are the two FDA approved agents used commonly for the treatment [1]. PRP, micro needling, low level laser light is some of the adjunctive therapies which have been tried with variable results.

Injectable PRF is a second generation, fully autologous biomaterial, whose preparation is based on the principle of differential centrifugation. This concept was described by Dr. Ghannati and Dr. Choukran, where they concluded that slow speed of centrifugation produces higher yield of cells and their growth factors [2].

PDO threads are bioabsorbable, non-allergic and when used for face lifting procedure, their effect lasts for about 10-15 months. They help majorly in induction of collagen and improvement in microcirculation. Combination of Injectable PRF and PDO monofilament thread insertion into the scalp is a novel treatment option for Androgenetic Alopecia.

MATERIALS AND METHODS

Preparation of Injectable PRF is a simple process requiring minimal instrumentation. We require 20 ml syringe, scalp vein catheter, 2 ml syringe and insulin syringes.

After proper patient selection and taking an informed consent, under all aseptic precautions whole venous blood is withdrawn from antecubital vein via scalp vein catheter into a 20 ml syringe

and collected into sterile 15 ml conical bottom plastic centrifuge tubes without adding any anticoagulant. Immediately, the tubes are placed in the centrifuge with swing out rotor (the authors used Remi R4C model, Remi lab world, Mumbai, India), diametrically opposite to each other and rotated at the speed of 800 rpm for 4 minutes [3].

The upper orangish yellow colored fluid obtained is Injectable PRF (Figure 1), which is then filled into the insulin syringes. We get approximately 1 ml of product for every 10 ml of blood.



Figure 1: Orange yellow superficial fluid at the top is injectable PRF.

Injectable PRF remains in fluid state for approximately 15 minutes after which it attains a gel like consistency, because of which it is essential to inject Injectable PRF as early as possible.

Correspondence to: Nooshin Bagherani, Department of Dermatology, Khorramshahr, Iran, E-mail: nooshinbagherani@yahoo.com

Received: November 10, 2020; **Accepted:** November 28, 2020; **Published:** December 09, 2020

Citation: Bagherani N (2020) Scalp Disorder: Telogen Effluvium. Hair Ther Transplant 10:156

Copyright: © 2020 Bagherani N. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

The product is injected intradermally into the scalp every 2 cms apart with insulin syringe, using point by point nappage technique. Depending on the severity of baldness, the authors advise a total of 7-9 sessions for appreciable results, with a gap of 5-6 weeks between two sessions.

While preparation of Injectable PRF, the safety part is looked after by using all the sterile and single use disposables. The efficacy is ensured every time by using the same centrifuge machine and same set of parameters.

For thread embedding therapy using PDO threads, the authors use 29 G, 38 mm monofilament threads. After a detailed relevant history and proper consultation, an informed consent is taken and the procedure is done under all aseptic precautions.

The threads are inserted at an angle as acute to the scalp as possible, along the direction of hair growth (Figure 2). While inserting the thread with one hand, the fingers of other hand helps to stabilize the scalp surface. This technique helps in easy insertion of the thread in the desired plane. To alleviate the pain, a small bleb of anesthetic solution containing lignocaine and adrenaline can be injected at the entry point.

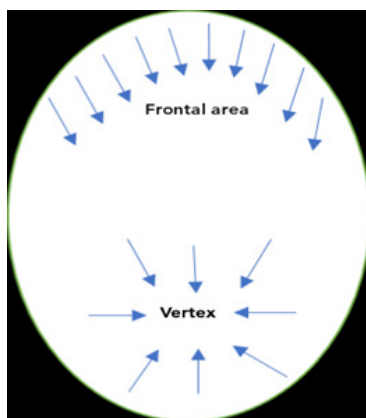


Figure 2: Direction of PDO thread insertion in frontal area, mid scalp and vertex.

Each thread is inserted 2-3 cm apart, and the optimum number of threads to be inserted would depend on the area of baldness. The authors use 14-16 threads in frontal area (Figure 3), mid scalp and vertex (Figure 4), which accounts to approximately 45-50 threads for whole scalp coverage. A repeat session after 6-8 months may be required depending upon the severity of baldness and response to treatment.



Figure 3: 38 mm threads inserted in mid frontal area, 2 cm apart, in the direction of hair growth.



Figure 4: 38 mm PDO thread insertion in the vertex area, along the hair growth direction.

The authors combined Injectable PRF and Do mono threads in few patients mentioned below, the results of which were measured by global photography index.

Case-1

A 28 years old male presented in the OPD with grade 2 androgenetic alopecia progressing to grade 3. He was prescribed minoxidil elsewhere, but could not tolerate it in any available formulation. After all thorough counselling was treated with one session of thread embedding therapy using PDO monofilament threads of size 38 mm, where 20 threads were inserted into the frontal area of scalp. The patient was also treated with injectable PRF in the same sitting, which was repeated after every 6 weeks. Additionally, he was also prescribed tablet dutasteride 0.5 mg to be taken alternate day. After 4 sessions of injectable PRF, there was an appreciable increase in hair density and hair texture (Figure 5), which was noticed by both the patient and treating doctor.



Figure 5: Before and after results in grade-2 baldness after 4 sessions of injectable PRF and 1 session of PDO threads.

Case-2

A 25 years old male with AGA grade 4, regularly applied minoxidil 5% solution for hair loss for 3 years. Initially he experienced new hair growth for about one year, after which there was no further improvement. He was treated with 5 sessions of injectable PRF, each session 6 weeks apart. Along with this, 30 PDO threads were inserted in scalp in a single session. The procedure was uneventful

and relatively painless. The patient experienced tightness in the scalp which resolved spontaneously in next 48 hours. Injectable PRF injections were slightly painful, but tolerable to patient. After 6 months of treatment, global photography showed visible increase in hair density with less scalp visibility (Figure 6).



Figure 6: Before and after results in grade 4 alopecia treated with injectable PRF and PDO threads.

Case-3

A 38 years old man with grade 5 alopecia progressing to grade 6, with no previous history of treatment, was started on 5% minoxidil solution and 5 sessions of injectable PRF with 2 sessions of PDO thread insertion were done. Total 50 threads were inserted in two divided sessions of 25 threads each at an interval of 6 months. There was appreciable hair growth and increased density after 5 months of treatment (Figure 7). The patient is still under treatment and 4 more sessions of injectable PRF sessions have been planned.

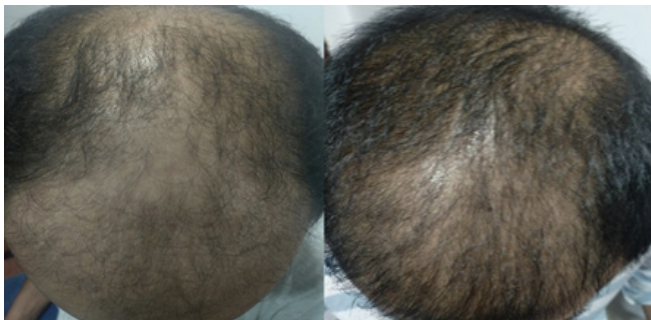


Figure 7: Before and after results in a case of Androgenetic alopecia grade 5-6 after 2 sessions of PDO threads and 5 sessions of injectable PRF.

RESULTS

The authors found the novel combination of injectable PRF and PDO threads useful in treatment of male pattern baldness, whose result was evident in the form of increased hair density on global photography index, evaluation of Minimal Erythema Dose (MED).

DISCUSSION

Androgenetic alopecia in males have been treated traditionally by combination of minoxidil and finasteride, the two FDA approved treatment options. Apart from these, Platelet Rich Plasma (PRP), micro needling, Low Level Laser Light Therapy (LLLT) have also be tried with variable results.

Injectable PRF is a fully autologous second-generation biomaterial obtained by slow centrifugation of whole venous blood, its peculiarity is that, it remains fluid for a certain time, after which it attains a gel

like consistency [4]. It contains the cells distributed evenly within the 3-dimensional network of fibrin. This configuration helps in slow and consistent release of cellular growth factors over a period of time; hence the effect lasts longer which helps in decreasing the number of sessions required.

Injectable PRF contains B-Lymphocytes, monocytes, neutrophils and even stem cells, in addition to platelets and its cytokines, most commonly PDGF, TGF- β , EGF, IGF and VEGF.

As compared to PRP, this biomaterial has quite a few differences. Injectable PRF is fully autologous, has less preparation time, total growth factor release is higher and effect lasts longer. The authors have described this difference in their previous article on Injectable PRF [5].

PDO threads are flexible, non-allergic, synthetic having high retention and slow absorption rate and have been used in cardiac surgeries since long. Recently they are also being used in face sculpting and lifting procedures [6]. They have been also tried in the treatment of androgenetic alopecia. It acts more or less similar to the traditional micro needling technique, with primary principle of collagen induction [7].

The advantage of using threads over micro needling is only one or two sessions are required spaced 6-8 months apart, as against 8-10 sessions for micro needling, once every month. This helps in avoidance of repeated trauma to scalp and hence increased compliance among the patients.

Apart from collagen induction, increased expression of cell proliferation markers, particularly PCNA was seen at the level of hair bulk, which is known to enhance cell division in hair matrix, leading to prolonged anagen phase [8].

There was also increased expression of FGF-7, which helps in anagen development [8]. Along with this, growth factors like PDGF, VEGF are said to be released, along with fibroblastic proliferation and improvement in microcirculation [9].

Due to their complementary mode of action, combining injectable PRF and PDO thread insertion would theoretically produce enhanced results within a shorter time.

CONCLUSION

Injectable PRF and PDO threads as a combination therapy produced encouraging results in patients of Androgenetic alopecia, with visible increase in hair density in every patient on whom this procedure was tried.

This novel approach was tried in a few patients hence large-scale studies are required to confirm the authors' findings. Due to their complementary mode of action, combining injectable PRF and PDO thread insertion would theoretically produce enhanced results within a shorter time.

REFERENCES

1. Lee SW, Juhasz M, Mobasher P, Ekelem C, Mesinkovska NA. A systematic review of topical finasteride in the Treatment of androgenetic alopecia in men and women. *J Drugs Dermatol*. 2018;17:457-463.
2. Choukroun J, Ghanaati S. Reduction of relative centrifugation force within injectable platelet-rich-fibrin (PRF) concentrates advances patients' own inflammatory cells, platelets and growth factors: The first introduction to the low speed centrifugation concept. *Eur J*

- Trauma Emerg Surg. 2018;44:87-95.
3. Abd El Raouf M, Wang X, Miusi S, Chai J, Mohamed AbdEl-Aal AB, Nefissa Helmy MM, et.al. Injectable-platelet rich fibrin using the low speed centrifugation concept improves cartilage regeneration when compared to platelet-rich plasma. *Platelets*. 2019;30:213-221.
 4. Miron RJ, Fujioka-Kobayashi M., Hernandez M , Kandalam U, Zhang Y, Ghanaati S, et.al. Injectable platelet rich fibrin (i-PRF): opportunities in regenerative dentistry? *Clinical Oral Investigations*. 2017;21:2619-2627.
 5. Shashank B, Bhushan M. Injectable Platelet-Rich Fibrin (PRF): The newest biomaterial and its use in various dermatological conditions in our practice: A case series. *J Cosmet Dermatol*.2020;1-6.
 6. Kalra R. Use of barbed threads in facial rejuvenation. *Indian J Plast Surg*. 2008;41: S93-S100.
 7. Fukaya M. Two mechanisms of rejuvenation using thread lifting. *Plast Reconstr Surg Glob Open*. 2018;6(12):e2068.
 8. Shin HJ, Lee DJ, Kwon K, Seo HS, Jeong HS, Lee JY, et.al. The success of thread-embedding therapy in generating hair re-growth in mice points to its possibly having a similar effect in humans. *Journal of Pharmacopuncture*. 2015;18(4):20.
 9. Bharti J, Sonthalia S, Patil P, Dhurat R. Scalp threading with polydioxanone monofilament threads: A novel, effective and safe modality for hair restoration. *J Eur Acad Dermatol Venereol*. 2017;31:e492-e493.