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Hair Therapy and Transplanatation

Case Report

Treatment of Fibrosing Alopecia in Androgenetic Distribution Pattern (FAPD With A Single Injection of Autologous Stem Cell Micrografts Combined with PRP: A Case Report

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ABSTRACT

Fibrosing Alopecia in a Pattern Distribution (FAPD) is a primary lymphocytic cicatricial alopecia characterized by the combination of clinical and histopathological features of lichen planopilaris and androgenetic alopecia. Recently, the use of stem cells for the treatment of alopecia has received a lot of attention, being identified as a potential treatment for the reactivation of hair follicle stem cells, thus providing the regeneration and development of follicles. The objective of this study was to report the case of a patient with FAPD who underwent a single application session of autologous stem cell micrografts in combination with Platelet-Rich Plasma (PRP). To disintegrate the autologous tissue obtained by biopsy, the 600 µm Microlyzer® device was used. Two months after the injection, analysis of digital images performed by Hairmetrix® revealed improvement in hair density, average hair width and increase in hair follicles. The results of this study showed that the application of micrografts with autologous stem cells in patients with FAPD could be considered a safe therapeutic method, responding favorably to a single treatment session with improvement in hair density and thickness. and with minimal side effects.

Keywords: Fibrosing alopecia in a pattern distribution; Treatment; Stem cells; Micrografts

INTRODUCTION

FAPD was first described in 2000 by Zinkernagel and Trueb [1]. It is a primary lymphocytic cicatricial alopecia characterized by hair thinning in the centroparietal region of the scalp [2]. Due to its similar clinical and histopathological features, it has been referred to as a possible variant of Lichen Plano Pilaris (LPP) and Androgenetic Alopecia (AGA) [3]. It is associated with a T-cell-mediated autoimmune reaction affecting terminal and vellus hairs, possibly representing an exaggerated inflammatory response to damaged hair follicles, triggered by AGA [4,6]. Clinically, it affects androgen-dependent areas while preserving the occipital scalp [5]. The diagnostic criteria for FAPD were recently proposed and include symmetrical hair loss in androgen-dependent scalp areas with preservation of the occipital scalp, as well as dermatoscopic and/or histopathological evidence of follicular inflammation and, occasionally, fibrosis [6].

FAPD treatment aims to stabilize the progression of hair loss, regenerate hair follicles, increase scalp coverage, and slow the progression of thinning [7]. Recently, the use of autologous products in alopecia treatments has received considerable attention, highlighted as potential tools for reactivating hair follicle stem cells, leading to follicle regeneration and development [8]. One of these approaches is with the use of autologous cellular micro grafts, which involves obtaining stem cells from the patient's scalp, using a preparation system for mechanical disintegration and filtering of solid tissues, which is then applied to the scalp area to be treated [9]. Human Follicle-

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Derived Stem Cells (HFSCs) can generate the interfollicular epidermis, hair shaft structures, sebaceous glands, and also a new follicle. Recent tissue processing technologies allow the isolation of these cells for application in areas affected by hair loss [10]. Recently, a new device, called Microlyzer®, was developed for processing scalp biopsies in order to obtain isolated HFSCs.

Other widely used approaches is the injection of Autologous Platelet-Rich Plasma (A-PRP), which can increase hair number and density [11]. PRP is an autologous concentration of human platelets in a small volume of plasma centrifuged to achieve supraphysiological concentrations of growth factors, leading to a regeneration of the hair follicle [12].

This study aims to report a case of FAPD in which the patient underwent a single session of autologous stem cell micrografts combined with A-PRP.

MATERIAL AND METHODS

This is a descriptive study with a qualitative approach. It presents a case report of FAPD, confirmed by biopsy. The patient was treated by trichologists at the Corp Clinic, a dermatology clinic specialized in hair science located in Feira de Santana, Bahia, Brazil. The patient signed a written informed consent of procedures that she underwent.

For the disintegration of autologous tissue, the Microlyzer® device with a 600 µm and 150 µm filters were used. The procedure involves the mechanical disintegration of a small sample of the patient's scalp obtained via a skin punch biopsy, followed by selective filtration in the Microlyzer® (T-Lab, Bursa, Turkey). After this process, an autologous micrograft solution is prepared. This solution can then be collected from the reservoir located at the posterior part of the device and injected directly into the affected area of the patient's scalp as a mesotherapy procedure, following the technical specifications provided by the manufacturer (Microlyzer® Protocol).

Pre-and post-treatment evaluations, including trichometry with digital image analysis, were performed using the Hairmetrix® tool. This platform utilizes Artificial Intelligence (AI) and imaging technology to conduct an in-depth analysis of the scalp and hair follicles, including hair strand thickness, density and other parameters.

CASE PRESENTATION

A 41-year-old female patient presented to the Corp Clinic for her first consultation complaining of severe hair loss. She reported that this condition was occurring for a few years, but the situation had worsened significantly over the past five months. Trichoscopy images of her scalp confirmed a decreased hair density as shown as Figure 1. The patient disclosed recent use of Ozempic, Vyvanse, and oxandrolone. Regarding oxandrolone, she stated she used the medication for only twenty days as it exacerbated her hair loss, prompting her to discontinue its use. She denied experiencing any other symptoms and reported no complaints of pruritus, trichodynia, or seborrhea.

Following a clinical examination, the prescribed treatment included a tonic containing 2% physavie, 0.5% dutasteride, and 0.05% clobetasol in Pro Cycle Hair for nightly application, as well as 1 mg oral naltrexone at night. Another external dermatology specialist performed a biopsy.

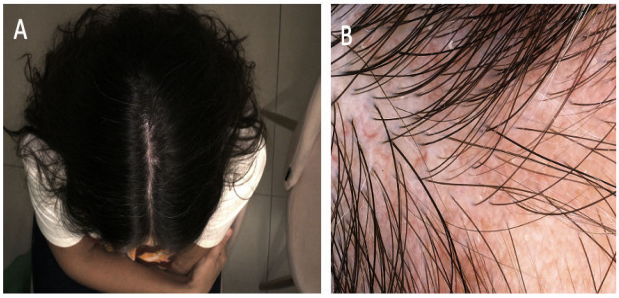

Figure 1: Trichoscopy of patient's scalp before the treatment.

(A): Reduced hair density extending across the mid-frontal scalp; (B): Trichoscopy image revealing hair thinning, decreased density and erythema.

Three months later, the patient returned to the clinic for follow-up with the biopsy results, which confirmed a diagnosis of FAPD. An evaluation and authorization from an ophthalmologist were requested to initiate treatment with 400 mg daily hydroxychloroquine. A shampoo (Dercos Sensi Scalp) was prescribed, with instructions to wash her hair on alternate days. Additionally, the tonic composition was adjusted to include 0.05% clobetasol and 0.1% tacrolimus in Pro Cycle Hair, and the oral naltrexone dose was increased to 2 mg.

After one month, the injection of autologous cellular micrografts was performed. Under local anesthesia, a 2 mm punch biopsy was used to extract three scalp fragments from the posterior part of the patient's ear. The fragments were transferred to the 600 µm Microlyzer® microprocessor using a 10 ml luer-lock syringe, with 8 ml of PRP added, which had been moved from another luer-lock syringe attached to the opposite side of the device. Following the manufacturer's recommendations regarding the sample processing phases, the resulting suspension was sub dermally injected into scalp areas using a 1 ml syringe fitted with a 32 g needle; 0.1 ml was injected at each point, spaced approximately 1 cm apart.

The procedure was uneventful, with slightly more bleeding than usual, likely due to the inflammatory process. Nearly thirty days later, the patient returned to the clinic for evaluation and presented with seborrheic dermatitis. However, it is not possible to know whether it was cause by the injection once the scalp already showed a mild erythema before the treatment (Figure 1B). Oral dutasteride 0.5 mg was administered three times a week, and hydroxychloroquine 400 mg was continued. Additionally, a seven-day course of itraconazole 100 mg was prescribed, along with the suspension of the previous tonic and the application of a new tonic containing 2% miconazole, 2% dabc, 2% physavie, 0.1% mometasone, and 0.1% allantoin for seven days.

Three months after the single Microlyzer injection, the patient showed an increase in hair density seen by trichoscopy images as shown as Figure 2 and analyses as shown as Table 1. In addition, the patient reported no side effect from the treatment and a satisfaction with the results.

Table 1: Trichoscopy analyses using Hairmetrix.

	Before	After
Terminal to Vellus Ratio	ND	35.0: 1
Average Hair per Follicular Unit	1.5	1.5
Average Hair Width (µm)	76.5	77.9
Follicular Units per cm²	133.0	139.0
Average Interfollicular Distance (mm)	1.04	1.03

Figure 2: Trichoscopy of patient's scalp after the treatment. Improvement of hair density and number and no sign of inflammation.

RESULTS AND DISCUSSION

This study reports the effect of injecting autologous stem cell micrografts in a patient with FAPD, utilizing the Microlyzer® device as a tool for processing tissue extracted from the patient's scalp. Three months after a single injection, digital image analysis conducted by Hairmetrix® revealed improvements in hair density, average hair thickness, and an increase in hair follicles.

The etiology and pathogenesis of FAPD remain unclear. It is a type of primary cicatricial alopecia recently described, sharing trichoscopic and histopathological characteristics with AGA and LPP [4]. FAPD affects androgen-dependent areas of the scalp and is typically associated with hair follicle miniaturization [6]. The progression of hair loss is slow and usually asymptomatic. Due to its insidious nature, patients with FAPD are often diagnosed late or misdiagnosed, which significantly reduces the potential for hair regeneration [5].

Physical examination and trichoscopic evidence of follicular inflammation, and occasionally fibrosis, are essential for identifying the condition, and dermoscopy-guided biopsy can confirm the diagnosis [4].

Topical corticosteroid treatments often improve scalp symptoms and stabilize hair loss when combined with other agents [7]. However, some medications require continuous application to achieve long-term benefits, which can lead to significant adverse side effects and hinder patient adherence [9]. In advanced stages of the disease, medical treatments are generally less effective, leaving hair transplantation as the only option for some patients [13].

The use of A-PRP has gained wide acceptance as a significant source of cytokines, growth factors, and other biologically active substances [13]. Studies have revealed that A-PRP treatment can significantly increase the average hair count compared to baseline values within just 12 weeks of application [10]. Autologous platelet-derived growth factors may provide valid support for regenerating hair tissue by promoting cell proliferation, differentiation, and neoangiogenesis, thus favoring wound healing processes [10]. In AGA, PRP's role is attributed to several growth factors released by platelets, acting on hair follicle stem cells to promote neovascularization and stimulate new follicle development [14]

Recently, stem cell transplantation has garnered attention as a potential agent for hair follicle regeneration [8]. A study evaluating the clinical improvement in the hair condition of 23 women with AGA six months after applying autologous micrografts found the treatment to be safe and effective, producing satisfactory results after a single session [15]. Autologous mature stem cell micrografts were injected into the scalps of 11 AGA patients, and almost six months after treatment, increased hair density was observed in the treated scalp area compared to the placebo-treated area [8]. Another study revealed that 12 weeks after treatment with epithelial stem cell micrografts from hair follicles, the average hair density increased significantly. Results showed a 30 ± 5.0% increase in hair density in the treatment group compared to less than 1% in the placebo group [10].

Some studies consider hair loss treatments based on stem cells to be relatively new and emphasize the need for more research and robust clinical studies to evaluate better their mechanisms of action, efficacy, safety, benefits, and limitations [13]. Future investigations should aim to gather evidence that allows the development of a cost-effective approach while minimizing the treatment's burden and cost [15].

CONCLUSION

The results of this study demonstrate that the injection of autologous stem cell micrografts in patients with FAPD can be considered a safe therapeutic method. It showed favorable responses to a single treatment session, with improved hair density and thickness and minimal side effects. This is particularly significant given the relatively long duration of the patient's hair loss prior to treatment, yet satisfactory responses were still achieved.

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