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Asian Journal of Oral Health and Allied Sciences

Case Report

Versatility of autologous growth factor concentrate therapy in early-stage androgenetic alopecia: A case report

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Received: 18 July 2025
Accepted: 19 August 2025
Published: 21 October 2025

DOI
10.25259/AJOHAS_41_2025

Quick Response Code:

ABSTRACT

Androgenetic alopecia (AGA) is a common progressive condition in men, influenced by genetic predisposition and androgen sensitivity. Conventional therapies such as minoxidil and finasteride provide limited efficacy and require long-term use, often associated with side effects. Regenerative approaches like autologous growth factor concentrate (GFC) have emerged as promising alternatives. This report presents a 28-year-old male with Norwood–Hamilton Grade III vertex AGA, treated with standardized GFC injections administered monthly for four sessions. Post-treatment, the patient demonstrated reduced hair shedding, improved density (72 to 98 hairs/cm^2), and an 18% increase in shaft thickness, with no adverse effects. Patient satisfaction was rated 9/10. These findings suggest that GFC is a safe, effective, and minimally invasive modality for early AGA management.

Keywords: Androgenetic alopecia, Growth factor concentrate, Intradermal injection, Platelet-rich plasma, Regenerative therapy

INTRODUCTION

Androgenetic alopecia (AGA), more commonly known as male pattern baldness, is the most common form of hair loss affecting men globally, with a prevalence that increases with age and reaches up to 80% by the seventh decade of life.[1] AGA is a chronic, non-scarring, progressive condition characterized by miniaturization of terminal hair follicles into vellus-like follicles under the influence of dihydrotestosterone (DHT), a potent androgen.[2] The condition predominantly affects the frontal, temporal, and vertex scalp regions, following a patterned progression classified using the Norwood–Hamilton scale.

Beyond the esthetic concern, AGA has been shown to carry significant psychological implications, including anxiety, depression, and diminished quality of life.[2] Despite its benign clinical course, the emotional and social ramifications necessitate effective treatment approaches.

Conventional pharmacologic treatments include topical minoxidil, a vasodilator that prolongs the anagen phase, and oral finasteride, a 5-alpha-reductase inhibitor that reduces DHT levels.[3,4] While both agents are Food and Drug Administration-approved and widely used, they are often associated with limited efficacy, a prolonged onset of action, and a need for continuous use to maintain results. Moreover, adverse effects such as scalp irritation (minoxidil) and sexual dysfunction (finasteride) may affect patient adherence.[3]

As a result, regenerative therapies, especially those utilizing autologous biologics, have gained attention. Among them, platelet-rich plasma (PRP) has been the most extensively studied. PRP involves concentrating platelets from autologous blood and injecting them into the scalp to release growth factors that promote follicle regeneration.[5,6] However, traditional PRP preparations have limitations, including variability in growth factor concentration, presence of leukocytes leading to inflammation, and lack of standardization.[7,8]

Growth factor concentrate (GFC), a next-generation advancement over PRP, addresses these issues by standardizing the preparation and isolating a leukocyte-free, platelet-derived product rich in growth factors such as platelet-derived growth factor (PDGF), vascular endothelial growth factor (VEGF), insulin-like growth factor (IGF-1), and epidermal growth factor (EGF).[9,10]. These bioactive molecules play a critical role in angiogenesis, extracellular matrix remodeling, and stimulation of dermal papilla cells, all of which are essential to the hair regeneration process.[11]

Compared to traditional PRP, GFC offers higher growth factor yield, better reproducibility, and reduced risk of inflammation, making it a promising modality for AGA management.[10]

Unlike many studies that focus on PRP, this work highlights the leukocyte-free, high-growth-factor yield of GFC, minimizing inflammation while enhancing efficacy. This case report, in accordance with case report guidelines, details the clinical protocol, outcome, and literature-supported discussion of GFC therapy in a 28-year-old male with early-stage AGA.

CASE REPORT

A 28-year-old Indian male presented to our outpatient clinic with complaints of progressive hair thinning localized over the frontal and vertex regions, ongoing for the past 3 years. The patient had no significant medical history, including any history of scalp trauma, autoimmune conditions, or systemic illnesses. A positive family history of androgenic alopecia was noted on the paternal side, suggesting a hereditary component.

Clinical examination classified his hair loss as Norwood–Hamilton Grade III vertex. The hair pull test was positive in both frontal and vertex regions, indicating active hair shedding. Trichoscopic examination revealed decreased hair density, anisotrichosis, and significant hair shaft miniaturization in the affected areas, findings consistent with early-stage AGA [Figure 1].

Routine laboratory investigations, including complete blood count, liver and renal function tests, and thyroid profile, were within normal limits. Hormonal assays, including serum testosterone and thyroid function tests, were unremarkable. His platelet count was 2.5 lakh/mm^3, adequate for autologous platelet-based therapy.

After counseling the patient regarding available treatment options, including minoxidil, finasteride, low-level laser therapy, and regenerative techniques, he opted for autologous GFC therapy, citing its non-surgical approach, minimal side effects, and regenerative potential.

Treatment technique

The procedure was performed under sterile conditions, following informed consent. Initially, 16 mL of peripheral venous blood was collected from the patient using four 4 mL specialized GFC preparation tubes (e.g., Wockhardt GFC kit). These tubes contain proprietary platelet activators designed to stimulate platelet degranulation and facilitate growth factor release.

Following blood collection, the tubes were incubated in an upright position at room temperature for 30 min. This was followed by centrifugation at 3200 rpm for 10 min. After centrifugation, a clear supernatant rich in growth factors (approximately 1–2 mL per tube) was obtained. This plasma fraction was aspirated carefully without disturbing the cell pellet, ensuring a leukocyte-free, growth factor-rich solution [Figure 2].

The patient's scalp was cleaned thoroughly using 70% isopropyl alcohol and povidone–iodine solution. To minimize discomfort during injection, a topical anesthetic cream containing lidocaine 2.5% and prilocaine 2.5% was applied over the treatment area 45 min prior. The treatment zones – including the frontal scalp, mid-scalp, and vertex – were marked appropriately.

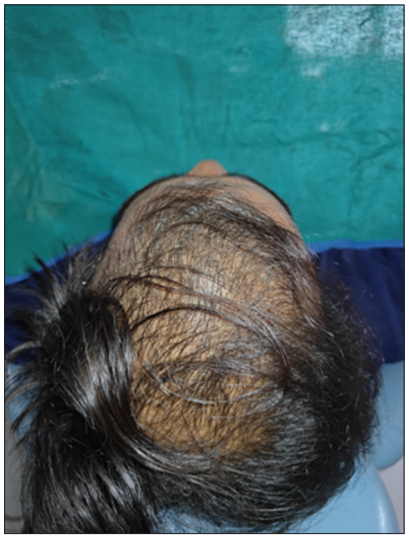

Figure 1: Pre-operative.

Using a 30-gauge insulin syringe, GFC was injected intradermally using the nappage technique at intervals of 1 cm. A total of approximately 4–6 mL of GFC was administered per session, depending on the extent of the alopecic area. Post-treatment instructions included avoidance of scalp washing for 24 hours, refraining from sun exposure and strenuous physical activity for 48 hours, and the use of oral paracetamol for any post-procedure discomfort [Figure 3].

The patient underwent four sessions at monthly intervals.

Outcome and follow-up

The patient began noticing a reduction in hair shedding after the second session. By the third session, he reported visible improvements in scalp coverage and overall hair texture. The treatment was well-tolerated, with no reports of infection, hypersensitivity, or other adverse effects.

Objective assessment using trichoscopy at the vertex region showed a baseline hair density of 72 hairs/cm^2. After four sessions, this increased to 98 hairs/cm^2, representing a 36% improvement. In addition, hair shaft thickness improved by 18% compared to baseline measurements. Global photographic documentation confirmed the enhanced hair volume and density. On a Visual Analog Scale, the patient rated his satisfaction at 9 out of 10. A maintenance session was scheduled 6 months following the final therapeutic session to sustain the clinical benefits achieved [Figure 4].

DISCUSSION

AGA is fundamentally driven by the interplay between genetic predisposition and androgenic activity, particularly the conversion of testosterone to DHT via 5-alpha-reductase. DHT binds to androgen receptors in susceptible hair follicles, triggering a progressive miniaturization process and reducing the duration of the anagen phase while prolonging the telogen phase.[11] The result is a gradual transformation of thick terminal hairs into thin, unpigmented vellus hairs.

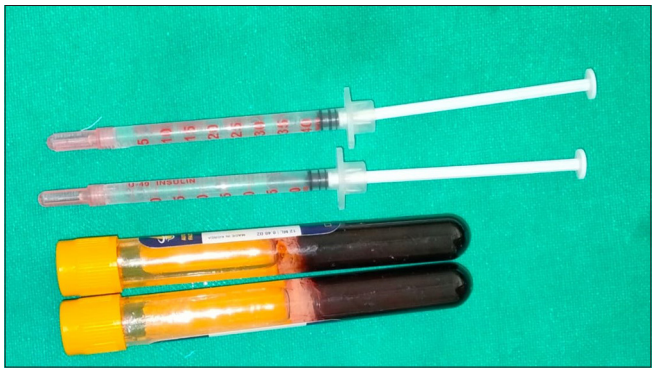

Figure 2: Growth factor concentrate.

Current medical therapies, although beneficial in many cases, do not reverse follicular miniaturization or restore lost hair in advanced stages. Thus, regenerative therapies aim to restore follicular vitality and reverse miniaturization by activating dermal papilla cells and improving scalp vascularity.

Growth factors play a central role in hair follicle biology. PDGF and VEGF promote angiogenesis and improve perifollicular blood supply; IGF-1 stimulates proliferation of follicular keratinocytes and prevents follicular apoptosis; EGF enhances matrix cell migration and proliferation, supporting follicular development.[11] When administered intradermally, these growth factors help reactivate dormant follicles and prolong the anagen phase.[12]

GFC differs from traditional PRP in its method of preparation. In GFC therapy, autologous blood is collected in pre-activated tubes containing platelet activators. These tubes are incubated, followed by centrifugation, to separate a cell-free supernatant rich in activated growth factors. The leukocyte-free nature of GFC minimizes inflammation while ensuring high concentrations of bioactive molecules.[10,13]

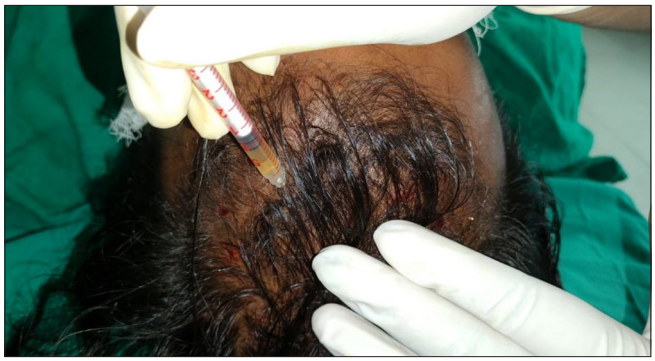

Figure 3: Administration of growth factor concentrate.

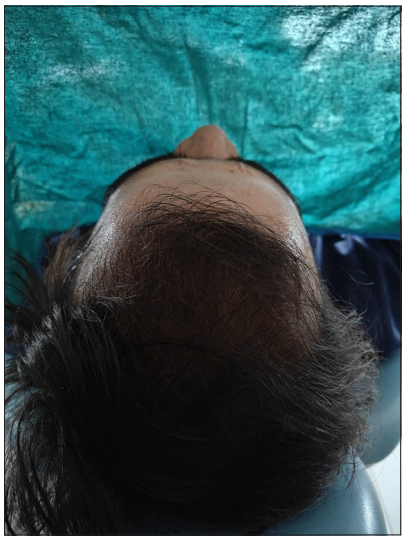

Figure 4: Post-operative 3 months.

A comparative trial by Kapoor *et al*., demonstrated that patients receiving GFC experienced a more significant improvement in hair density compared to PRP recipients at 6 months.[13] Sahu *et al*., also reported improved hair thickness and patient satisfaction scores with GFC, reinforcing its clinical utility.[14]

Our case reinforces these findings. After four sessions of monthly GFC therapy, our patient showed an 18% increase in hair shaft thickness and a 36% increase in hair density. Notably, subjective improvements were reported after the second session, and no adverse events were observed. The therapy was well-tolerated, with minimal discomfort owing to topical anesthesia and fine-gauge needle application.

The GFC method has multiple clinical advantages:

- Standardization: The preparation technique ensures consistent growth factor yield across sessions
- Safety: The absence of leukocytes and erythrocytes reduces the risk of post-injection inflammation
- Efficacy: A high concentration of essential growth factors enhances the therapeutic response.

Patient selection remains pivotal. Ideal candidates include those with early to moderate AGA (Norwood grades II-IV), preserved follicular units, and realistic expectations. Contraindications include platelet dysfunction syndromes, active infections, malignancies, and autoimmune alopecia, such as alopecia areata.[15]

The longevity of GFC effects remains to be fully elucidated. Maintenance sessions every 6–12 months may be necessary to sustain results, especially in patients with progressive forms of AGA.

In conclusion, GFC represents a significant advancement in autologous regenerative therapy for hair restoration. Its efficacy, safety, and reproducibility make it a viable alternative or adjunct to conventional pharmacotherapy. Further randomized controlled trials with larger sample sizes and long-term follow-up are needed to establish standardized guidelines for GFC use in clinical practice.

CONCLUSION

This case demonstrates that GFC is a safe, minimally invasive, and effective modality for early-stage AGA. The therapy resulted in significant improvements in hair density, patient satisfaction, and cosmetic outcomes, with no adverse effects. GFC represents a refined autologous therapy that aligns with the principles of regenerative medicine and is a promising addition to the armamentarium for AGA management.

Further multicentric randomized controlled trials are needed to validate long-term efficacy, optimize treatment intervals, and compare outcomes with PRP and other modalities.

Ethical approval: Institutional Review Board approval is not required.
Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent.
Financial support and sponsorship: Nil.
Conflicts of interest: There are no conflicts of interest.
Use of artificial intelligence (AI)-assisted technology for manuscript preparation: The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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How to cite this article: Ingle AS, Tandon S, Chauhan H, Mehra H, Tiwari G. Versatility of autologous growth factor concentrate therapy in early-stage androgenetic alopecia: A case report. Asian J Oral Health Allied Sci. 2025;15:24. doi: 10.25259/AJOHAS_41_2025