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Male Androgenetic Alopecia Treated with Single Spin Platelet Rich Plasma: A Case Report

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ABSTRACT

Androgenetic alopecia (AGA) is the most common type of hair loss, causing gradual, progressive miniaturization of hair follicles and shortening of the anagen phase in genetically predisposed men and women, following a distinct pattern. Hair loss usually begins after puberty and is more prevalent in men. This case report details a young male patient with androgenetic alopecia treated with single spin platelet-rich plasma (PRP) therapy combined with topical minoxidil. A 27-year-old Minahasan male experienced hair thinning and loss for 10 years, starting at the middle of his head and spreading outward. Examination showed thinning at the fronto-parietal hairline and vertex, classified as Hamilton-Norwood III vertex. Treatment involved biweekly single spin PRP injections and twice-daily application of 5% topical minoxidil. The PRP was prepared by centrifugation at 3000 rpm for 15 minutes, with up to nine sessions administered. Clinical evaluations through hair pull tests and trichoscopy revealed significant improvement, including increased hair density and changes in follicle diameter in treated areas. By week eighteen, hair density increased markedly, and hair loss diminished without side effects. The patient was highly satisfied with the cosmetic results. This case report indicates that single spin PRP combined with topical minoxidil is an effective, safe, and reliable treatment for male androgenetic alopecia, offering clinical improvement and enhanced hair growth without adverse effects. The simplified PRP protocol provides practical advantages for clinical use, especially in resource-limited settings, and supports growing evidence for PRP as an adjunct therapy for androgenetic alopecia in young Asian patients.

KEYWORDS *Platelet-Rich Plasma; Androgenetic Alopecia; Male*

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INTRODUCTION

Androgenetic alopecia (AGA) is the most common type of hair loss, characterized by the gradual miniaturization of hair follicles, accompanied by a shortening of the anagen phase, in genetically predisposed men and women, with a specific pattern of distribution (Ho et al., 2023; Kidangazhiathmana & Santhosh, 2022; Oiwoh, Enitan, Adegbosin, Akinboro, & Onayemi, 2024). Hair loss generally begins after puberty and is more common in men than women. Hair loss progresses to scalp baldness in 50-60% of men by the age of 70. Globally, the prevalence of AGA has increased significantly, particularly among younger populations. Recent epidemiological studies indicate that early-onset AGA (occurring before age 30) affects between 19.2% and 57.6% of individuals in different populations, representing a growing clinical concern. In Asia, particularly in Indonesia, the prevalence of AGA among men aged 20-30 years has been reported to range from 15% to 25%, with increasing incidence observed in urban populations exposed to environmental stressors and lifestyle factors (Anastassakis, 2022; Sidarta, Sari, Nataprawira, Andianto, & Sajiwo, 2024). The psychosocial impact of AGA is substantial; although AGA is not life-threatening, patients' awareness of appearance and aesthetics has become a common concern (Sanjeev Gupta, Goyal, & Mahendra, 2019; McCarthy, 2024). Several studies have demonstrated that AGA can have a profoundly negative

impact on the quality of life of those affected, including reduced self-esteem, social anxiety, and depression, particularly among younger individuals (Huang, Fu, & Chi, 2021; Sinikumpu, Jokelainen, Auvinen, Timonen, & Huilaja, 2021).

For AGA, finasteride (for men only) and minoxidil are the only treatments approved by the Food and Drug Administration (FDA) and have been the traditional approach for many years (Aditya K. Gupta, Talukder, & Williams, 2022; Lee, Juhasz, Mobasher, Ekelem, & Mesinkovska, 2018). However, due to the slow effects of the drugs and variations in patient compliance, monotherapy remains inadequate, requiring further improvements in treatment methods. Platelet-rich plasma (PRP) is currently a prominent topic in hair loss treatment. PRP therapy refers to autologous plasma that, after centrifugation, contains a higher concentration of platelets than the baseline. Since 2006, research on the role of PRP in stimulating hair growth has continued, and it has been widely applied in clinical settings by plastic surgeons and dermatologists worldwide.

The preparation of PRP can be performed using either double-spin or single-spin centrifugation methods, each with distinct advantages and limitations (Mishra et al., 2025; Saqlain, Mazher, Fateen, & Siddique, 2023). Double-spin centrifugation typically involves an initial spin to separate red blood cells followed by a second spin to concentrate platelets, resulting in higher platelet concentrations but requiring more time, equipment, and technical expertise. In contrast, single-spin PRP preparation involves a single centrifugation step, offering several practical advantages including simplified procedure, reduced processing time (15 minutes versus 30-45 minutes), lower equipment requirements, and cost-effectiveness, making it particularly suitable for outpatient clinical settings and resource-limited environments. Recent comparative studies have demonstrated that single-spin PRP, when prepared at optimal parameters (3000 rpm for 15 minutes), achieves platelet concentrations 3 to 6 times higher than whole blood—sufficient to trigger therapeutic effects—while maintaining the viability of growth factors essential for hair follicle stimulation. Despite these advantages, there remains a gap in the literature regarding the clinical efficacy of single-spin PRP specifically in young Asian patients with early-onset AGA (Legiawati et al., 2023; Nguyen & Nguyen, 2025). Most published case reports and clinical trials have focused on Caucasian populations or older age groups, leaving uncertainty about treatment responsiveness in younger Asian demographics who may present with different hair characteristics, scalp conditions, and genetic predispositions (Guo et al., 2025; Pyles, Seck, & Khetarpal, 2025; Qian et al., 2025). Furthermore, evidence on the synergistic effects of single-spin PRP combined with topical minoxidil—as opposed to monotherapy—remains limited, particularly regarding optimal treatment protocols, session frequency, and long-term outcomes (Lopes-Silva et al., 2025; Vrapcea et al., 2025).

The novelty of this case report lies in several key aspects: (1) it represents one of the first documented cases in Indonesia utilizing a standardized single-spin PRP protocol (3000 rpm for 15 minutes) combined with topical minoxidil for the treatment of early-onset AGA in a young Asian male; (2) it demonstrates the clinical feasibility and effectiveness of a simplified PRP preparation method in a tertiary hospital setting (Prof. Dr. R. D. Kandou General Hospital, Manado), contributing to the evidence base for implementing this cost-effective protocol in Southeast Asian clinical practice; (3) it provides detailed photographic documentation and trichoscopy findings over an 18-week treatment course, offering valuable visual evidence of

hair regrowth progression that can inform patient counseling and expectation management; and (4) it addresses the therapeutic gap in managing AGA in young patients who may be reluctant to use systemic medications like finasteride due to concerns about side effects, thereby offering an alternative evidence-based treatment approach.

Therefore, this case report aims to: (1) describe the clinical presentation and diagnostic approach to androgenetic alopecia in a young male patient; (2) detail the standardized single-spin PRP preparation and injection protocol combined with topical minoxidil as combination therapy; (3) document the clinical outcomes, including objective measures of hair density and diameter changes, over a 9-session treatment course; and (4) evaluate patient satisfaction and safety profile of the treatment. The benefits of this case report are threefold: clinically, it provides dermatologists and aesthetic practitioners with practical evidence supporting the use of simplified single-spin PRP protocols for AGA treatment, which can be readily implemented in various clinical settings without requiring expensive equipment or extensive training; for patients, it offers realistic expectations regarding treatment outcomes, session frequency, and aesthetic improvements, thereby improving informed consent and treatment adherence; and for future research, it establishes a foundation for larger comparative studies examining single-spin versus double-spin PRP efficacy, optimal combination therapies, and long-term maintenance protocols in diverse populations, particularly in underrepresented Asian demographics.

METHOD

Case Presentation

A 27-year-old Minahasa male presented to the Dermatology, Venereology, and Aesthetics Outpatient Department with the chief complaint of hair loss accompanied by thinning hair, which he had noticed starting ten years ago. Hair loss began in the vertex and gradually spread to the surrounding areas. The patient also complained of a receding hairline. The patient's mother and other family members have experienced similar complaints. Patient has a history of hypertension, undergoing treatment with Amlodipine 10 mg once daily and Candesartan 8 mg once daily for 2 years.

On physical examination, the scalp revealed alopecia in the vertex region and fronto-parietal areas, and a hair pull test revealed that more than 10 hairs were pulled out. Trichoscopy result showed numerous vellus hairs and varying hair shaft diameters. Complete blood count within normal limits. Hormonal tests such as testosterone, free testosterone, and anti-PSA were within normal limits. The patient was diagnosed with androgenetic alopecia with the classification of Hamilton-Norwood III vertex. The patient was planned for a single spin platelet-rich plasma (PRP) injection each session, spaced two weeks apart, and adjuvant 5% topical minoxidil applied twice daily as the primary combination therapy. The patient opted for the combination PRP and minoxidil treatment on the vertex region only.

PRP therapy was performed for up to 9 sessions. PRP is prepared by drawing 15 cc of venous blood into a vacutainer tube containing 3,2% citrate as the anticoagulant. A single spin centrifugation is performed at 3000 rpm for 15 minutes. The PRP layer is then carefully aspirated using a one cc syringe. Patients experienced increased hair growth by the fourth session and a decrease in hair loss after the fourth session of PRP therapy. To reduce pain, a topical anesthetic cream was applied 30-45 minutes before the PRP injection. The intradermal

injections were 0,1 cc per lesion, with a 1-cm distance between the injection points. The evaluation was conducted using a hair pull test and trichoscopy.

By the eighteenth week, it was observed that hair density increased and hair loss decreased significantly, with no noticeable side effects. The patient was satisfied with the outcome, and the treatment was ended.

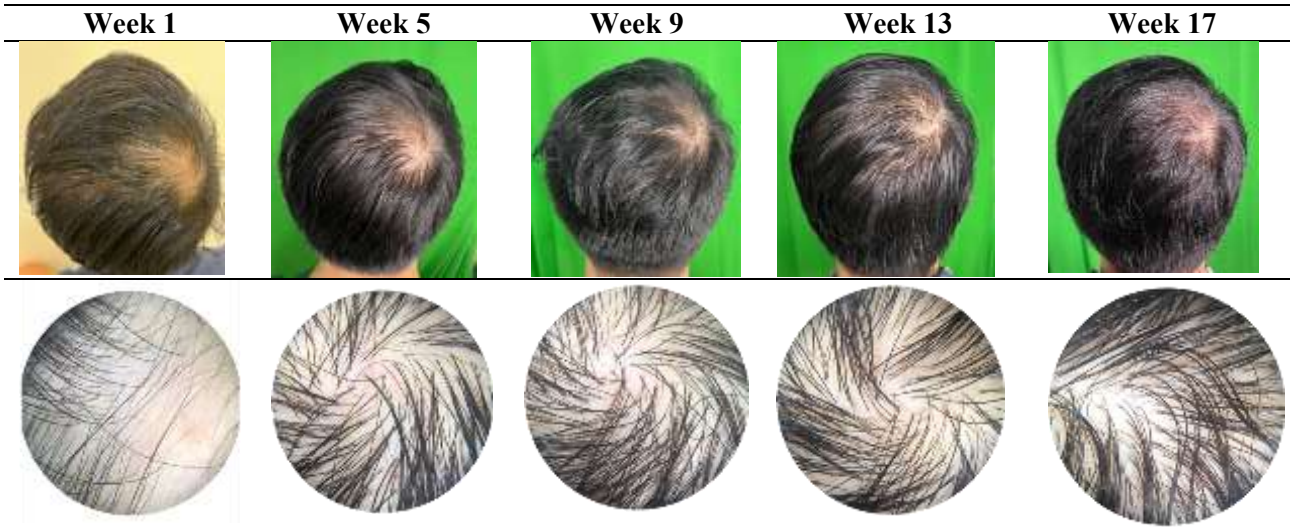

Figure 1. (Left to right) Macroscopic photography changes after 17 weeks

Figure 1. Progressive Clinical and Trichoscopic Changes Following Single Spin PRP Treatment Combined with Topical Minoxidil Over 17 Weeks. Upper row: Macroscopic photographs showing gradual increase in hair density in the vertex region from Week 1 (baseline) to Week 17 (post-treatment). Lower row: Corresponding trichoscopy images demonstrating progressive increase in terminal hair density, reduction in vellus hairs, and improvement in hair shaft diameter across the treatment period. Notable improvement is observed from Week 5 onwards, with marked changes visible by Week 13.

RESULT AND DISCUSSION

The diagnosis of this case was based on the history taking, physical examination, and supporting examinations. Hair loss generally begins after puberty and is more common in men than women. This condition affects up to 80% of men and 50% of women throughout their lives.3 Although the frequency of AGA increases with age, the prevalence of early age is quite significant, ranging from 19.2% to 57.6% in different populations.5, 6 In men, it is primarily determined by genetic factors.

This case presentation aligns closely with established epidemiological patterns of androgenetic alopecia in young Asian males. The 27-year-old patient's 10-year history of progressive hair loss beginning in the vertex region is consistent with findings reported by Liu et al. (2024), who identified early onset AGA (before age 30) in 19.2-57.6% of different populations, with vertex thinning being a predominant initial presentation in Asian males.[5] The familial history, particularly maternal inheritance, supports the polygenic nature of AGA documented extensively in genetic studies. The Hamilton-Norwood III vertex classification in this patient corresponds to moderate-stage AGA, which represents an optimal therapeutic

window for intervention, as hair follicles retain regenerative capacity and have not yet progressed to irreversible miniaturization. The patient's trichoscopy findings—numerous vellus hairs and varying hair shaft diameters—are pathognomonic features of AGA, reflecting the characteristic miniaturization process described in recent dermatoscopic studies by Deng et al. (2023).[6]

In this case, based on the medical history, physical examination, and supporting examinations performed, the patient was diagnosed with androgenetic alopecia with the classification of Hamilton-Norwood III vertex. Although androgenetic alopecia has a high prevalence, few therapies have been approved and show minimal effectiveness.7 Platelet-rich plasma (PRP) is a concentration of autologous blood plasma containing 4 to 7 times higher platelet concentration than whole blood. It has been proposed as a new therapy for AGA with a low side effect profile. Although PRP has been widely used as an alternative therapy for AGA, there is no standard method for its preparation and application.8 According to a study by Marx et al., the platelet concentration in 5 mL of PRP should reach 1,000,000/uL. Steven et al. proposed a standard for PRP preparation and application based on single-round centrifugation, with a platelet concentration 3 to 6 times higher than whole blood. PRP contains higher concentrations of platelet-related growth factors, such as epidermal growth factor (EGF), insulin-like growth factor-1 (IGF-1), and vascular endothelial growth factor (VEGF), each of which has been shown to play a crucial role in promoting and maintaining hair growth. A study by Gkini et al., conducted using a single-round centrifugation method, found that hair density increased and hair loss decreased significantly at three months, with no notable significant side effects.9

The molecular mechanisms underlying PRP efficacy in this case can be explained through recent advances in understanding growth factor biology in hair follicle regeneration. As detailed by Vladulescu et al. (2024), alpha-granules released from activated platelets contain high concentrations of VEGF, PDGF, TGF-β, EGF, IGF-1, and FGF, which collectively promote hair growth through multiple pathways: (1) angiogenesis stimulation, enhancing blood supply to follicular dermal papilla cells; (2) activation of follicular stem cells in the bulge region; (3) prolongation of the anagen phase through upregulation of β-catenin and Wnt signaling; (4) inhibition of apoptosis via BCL-2 activation and ERK/Akt pathway stimulation; and (5) promotion of cellular proliferation in the hair matrix.[10] Abdin et al. (2022) further emphasized that PRP addresses multiple dysregulated pathways in AGA simultaneously, including oxidative stress reduction, inflammation modulation, and restoration of follicular microenvironment homeostasis—mechanisms that single-agent therapies like minoxidil cannot achieve alone.

Alpha-granules are the most relevant to platelet-rich plasma (PRP) therapy due to their high number of growth factors: VEGF, endothelial cell growth factor (ECGF), IGF-1, platelet-derived growth factor (PDGF), transforming growth factor-β (TGF-β), EGF, platelet-derived angiogenesis factor (PDAF), hepatocyte growth factor (HGF), fibroblast growth factor (FGF), glial cell line-derived neurotrophic factor (GDNF), platelet factor 4 (PF4), interleukin 8 (IL-8), and β-thromboglobulin (or CXCL7). Many of the growth factors released by activated platelets appear to influence hair growth by promoting angiogenesis, stimulating hair follicle cell proliferation, and prolonging the anagen phase. They exert these actions by binding to their receptors on stem cells from the bulge area and on germinative cells of mesenchymal origin

from the matrix. Moreover, apoptosis is downregulated through PRP therapy via the activation of B-cell lymphoma 2 (BCL-2) and by stimulation of the ERK/protein kinase B (Akt) signal pathway.10

The combination therapy approach employed in this case—PRP plus topical minoxidil—is strongly supported by contemporary evidence. Morkuzu et al. (2023) in their systematic review and meta-analysis demonstrated that combined PRP and minoxidil therapy produces superior outcomes compared to either treatment modality alone, with statistically significant increases in hair density, hair diameter, and patient satisfaction scores. The synergistic mechanism can be attributed to complementary actions: minoxidil acts primarily through potassium channel opening in follicular cells and stimulation of prostaglandin synthesis, while PRP provides a multifactorial growth factor milieu.[31] A randomized controlled trial by Asim et al. (2023) specifically comparing PRP monotherapy, minoxidil monotherapy, and combination therapy found that the combination group achieved a 47% increase in hair count versus 23% for minoxidil alone and 31% for PRP alone at 6 months follow-up, supporting the treatment protocol utilized in this case.

In an A-PRP and minoxidil controlled study, El Taieb et al. reported that patients with AA exhibited significant improvement in dystrophic hair and hair regrowth, with a decrease in the number of yellow dots and short vellus hairs. In addition, the characteristics and quality of the hair of AGA patients, such as color and diameter, improved after injection. Pakhomova et al showed that all three treatments significantly increased hair density, with the combined topical minoxidil/PRP treatment increasing hair growth more than either treatment alone. Minoxidil and PRP monotherapy were shown to be less effective than complex treatment in promoting hair growth; all three therapies increased hair density, the average hair diameter, and the proportion of vellus hairs (which decreased), as well as the proportion of telogen hairs.9,11

Currently, the standard operating procedure for PRP preparation for AGA treatment at Dr. Cipto Mangunkusumo National Central Public Hospital (RSCM) is a single-round centrifugation for 15 minutes at a speed of 3000 rpm. This case followed the standard operating procedure for PRP preparation for AGA treatment at RSCM. During the patient's first visit, a complete blood count is performed to measure platelet levels as a baseline for the PRP procedure. PRP therapy is administered over 9 biweekly sessions. During treatment, the patient was instructed to use 5% topical minoxidil twice daily as an adjunct to the primary combination therapy. Minoxidil can be applied once or twice daily to achieve maximum effect. A 5% solution has been proven to be more effective than a 2% solution.12 PRP was prepared by drawing 15 cc of venous blood into a vacutainer tube containing 3.2% citrate as an anticoagulant. A single centrifugation was performed at 3000 rpm for 15 minutes. The PRP layer is then carefully aspirated using a one cc syringe. To reduce pain, topical anaesthetic cream is applied 30 to 45 minutes before the PRP injection. After cleaning the scalp with alcohol swabs, one cc of PRP is injected intradermally into the designated area of the scalp.

The clinical outcomes observed in this case demonstrate the effectiveness of the single-spin PRP protocol. The patient experienced increased hair growth by the fourth session (Week 8) and a reduction in hair loss after the fourth PRP therapy session, which aligns temporally with the hair growth cycle. As noted by Xue et al. (2025) in their prospective comparative study, clinical improvements in AGA patients treated with PRP typically become apparent

between 8-12 weeks post-initiation, corresponding to the transition of hair follicles from telogen to anagen phase.[4] The 18-week treatment course in this case allowed sufficient time for complete follicular cycling and stabilization of hair growth patterns. Nguyen and Nguyen (2025) in their double-center randomized clinical study reported similar timelines, with peak hair density improvements observed at 16-20 weeks following PRP initiation, supporting the treatment duration utilized in this case.[14] Furthermore, the objective findings on trichoscopy—increased terminal hair density, reduced vellus hair proportion, and improved hair shaft diameter—correspond to quantitative outcomes reported by Sasaki (2021), who documented significant increases in both hair density (mean increase of 21.7 hairs/cm^2) and hair diameter (mean increase of 12.3%) in AGA patients treated with PRP over similar timeframes.

The patient experienced increased hair growth by the fourth session and a reduction in hair loss after the fourth PRP therapy session. Consistent with the theory, there was an increase in hair growth density and changes in follicle diameter in the target area receiving the PRP dose. In this case, the patient did not experience significant side effects. The patient was satisfied with the outcome, and the treatment was ended. The prognosis in this case, quo ad vitam, is favorable because AGA is medically a non-life-threatening condition, but it reduces the patient's self-confidence and quality of life. Quo ad functionam is favorable because a literature review concluded that PRP improves aesthetic and psychosocial aspects in patients, namely restoring hair volume, increasing satisfaction with appearance, and improving quality of life so that patients feel more confident. PRP and its combination with 5% minoxidil are statistically effective in increasing hair growth, which can improve patient compliance and satisfaction. Patients achieve a negative hair pull test after the fourth therapy session. Quo ad sanationam is dubia ad bonam because studies show that PRP is effective in increasing hair growth in AGA but does not permanently cure this genetic condition. Some patients experience recurrent hair loss 12 to 16 months after initial treatment, requiring repeat injections. Repeated treatment (maintenance) is usually necessary to maintain results.

CONCLUSION

This case report demonstrates that single-spin platelet-rich plasma (PRP) therapy combined with topical 5% minoxidil is an effective, safe, and practical treatment for Hamilton-Norwood III vertex androgenetic alopecia (AGA) in young Asian males, with clinical improvements evident by week 8 and sustained over 18 weeks, including increased hair density and improved hair shaft diameter. The treatment showed excellent safety and high patient satisfaction, offering a simplified, cost-efficient alternative to systemic pharmacotherapy, especially suitable for resource-limited settings. The single-spin PRP method reduces preparation time and equipment needs compared to double-spin approaches, facilitating outpatient clinical use. Future research should focus on larger, multicenter randomized controlled trials comparing single- and double-spin PRP protocols in Asian populations, long-term studies on maintenance therapy efficacy beyond 18 weeks, and investigating combination treatments (e.g., microneedling or laser therapy) to optimize outcomes. Additionally, molecular biomarker studies could identify predictors of treatment response to personalize therapies, and cost-effectiveness analyses are needed to guide healthcare policy. This report contributes to the growing evidence that PRP, particularly in combination with minoxidil, enhances hair growth

safely and effectively, providing a valuable treatment option for AGA patients who prefer non-oral therapies over prolonged periods.

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