

## Development of Alopecia Areata After Platelet-Rich Plasma Injection for Female Pattern Hair Loss: A Case Report

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### **ABSTRACT:**

Platelet-rich plasma (PRP) is an autologous serum that contains high concentrations of platelets and growth factors. PRP is considered as an alternative treatment to improve hair conditions among patients with alopecia areata (AA) and androgenetic alopecia (AGA) that are refractory to standard treatments. Currently, some case reports have described complications after PRP injection. This is the first case report to describe a patient who never had an AA lesion, but later developed AA after 3-session of PRP injection for AGA treatment. The laboratory investigations were evaluated and the results were unremarkable. We postulated that some cytokines containing in PRP might play a role in the development of AA in our patient or this could be the coincidence with AGA.

**Key words:** Platelet-rich plasma; Androgenetic alopecia; Alopecia areata; Complication

### **Introduction**

Androgenetic alopecia (AGA), which is the most common non-scarring alopecia, is characterized by terminal hair miniaturization to vellus hairs, which leads to progressive hair thinning in pattern distribution<sup>1</sup>. Oral finasteride and minoxidil are currently the only treatments that have been approved to treat this condition<sup>2</sup>. However, the standard treatments may be ineffective in some cases. Platelet-rich plasma (PRP) is considered an alternative

treatment to improve hair conditions among patients that are refractory to standard treatments. PRP is an autologous serum that contains high concentrations of platelets and growth factors<sup>3</sup>. Many recent studies have reported the effectiveness of PRP as an alternative treatment for alopecia, especially AGA and alopecia areata (AA). However, some case reports have described complications after PRP injection<sup>3</sup>.



**Figure 1** Non-scarring alopecia at the vertex area of the scalp appeared 1 month after completion of 3 platelet-rich plasma injections



**Figure 2** Dermoscopic findings showing exclamation mark hairs, hair follicle miniaturization, and scalp scaling

### Case report

A 51-year-old Thai woman complained of hair thinning, especially at the frontal and vertex areas, and female pattern hair loss was diagnosed in this patient. She was treated with a 5% minoxidil solution for 3 years with only moderate response. She was then alternatively

treated with 3 leukocyte-poor PRP injections that were separately administered over a 1-month treatment period (Supplement data 1). After her PRP treatment was completed, she noticed less hair loss and improved thickening of the shafts of her hair. However, at 1 month after her last PRP injection, she developed multiple non-scarring alopecia lesions at the vertex area of her scalp (Figure 1). Hair pulling test was positive. Dermoscopic findings showed exclamation mark hairs, hair follicle miniaturization, and scalp scaling (Figure 2). AA was diagnosed. Blood tests for thyroid stimulating hormone and antinuclear autoantibody were reordered, but the results remained unremarkable. PRP treatment was then discontinued and she was treated for 4 months with monthly 2.5-5 mg/ml intralesional corticosteroid, which effectuated resolution of her AA within 4 months.

### Discussion

AA is a type of non-scarring alopecia that is characterized by small to extensive well-demarcated patches, and infrequently by diffuse involvement<sup>4</sup>. Autoimmune mechanism is considered to be the probable pathogenesis of this disease<sup>4</sup>. The inflammation caused by immune cells, such as T lymphocyte, disrupts hair follicles and results in hair loss<sup>4</sup>. Treatment of AA is challenging due to the chronic and recurrent nature of the disease.

There are many studies of PRP treatment in AGA and AA patients<sup>3,5</sup>. Enriched growth factors in PRP promote cell proliferation and differentiation<sup>3</sup>. Interestingly, some studies reported anti-inflammatory effect of PRP<sup>6</sup>, while others reported that PRP contains cytokines and chemokines that are involved in inflammatory process<sup>7</sup>. Few adverse events and outcomes have been reported after PRP treatment including pain, swelling at the injected area, and serum sickness disease<sup>8</sup>.

To our knowledge, the present case report is the first to describe a patient who never had an

AA lesion, but then developed AA after PRP injection for AGA treatment. The reason why PRP could cause AA when it is literally an alternative treatment for AA is unclear. Our method of preparing PRP produces leukocyte-poor PRP that contains some leukocytes, growth factors, and cytokines. Thus, we propose a possible pathogenesis based on the available published data. Firstly, previous studies reported that PRP contained cytokines derived from leukocytes, such as interleukin- $1\beta^7$  which are reported to be the mediators that are involved in an immunologic reaction that causes AA lesions<sup>9</sup>. Thus, the cytokines in PRP might play a role in the development of AA in our patient. However, this proposed pathogenesis requires further investigation. Secondly, a previous study reported that the injection procedure may induce trauma resulting in development of alopecia<sup>10</sup>. Lastly, the co-occurrence of AA and AGA in this patient could be possible.

In conclusion, PRP may be a therapeutic option for hair conditions based on the reported evidence; however, it is not a current standard treatment. The risk of possible complications after PRP injection should be considered in all cases. Follow-up after treatment is important to assess effectiveness and ensure safety.

## Statements

### Statement of Ethics

Written informed consent was obtained from the patient for publication of this case report and the study has been done according to the Declaration of Helsinki. Ethical approval is not required for this study in accordance with institutional guidelines.

### Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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