

CASE REPORT

Platelet-rich plasma in the treatment of alopecia areata after COVID-19 vaccination

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Key Clinical Message

Alopecia areata may develop in patients after COVID-19 vaccination. Platelet-rich plasma (PRP) has an outstanding anti-inflammatory effect and could be an alternative treatment for alopecia patients who are refractory or intolerant to corticosteroids.

Abstract

A 34-year-old female with no systemic illness presented with non-scarring hair loss after the second COVID-19 vaccination shot 4 weeks ago. The hair loss worsened and progressed to severe alopecia areata. We started double-spin PRP therapy. Her hair recovered completely after six courses of PRP treatment.

KEYWORDS

alopecia areata, COVID-19 vaccination, platelet-rich plasma

1 | INTRODUCTION

Alopecia areata (AA) is a manifestation of autoimmune disorders and is characterized by a T-cell-mediated inflammatory process in hair follicles.^{1–3} AA may develop in patients after COVID-19 infection, as well as after COVID-19 vaccination.¹ Corticosteroids are the backbone of therapy for AA because of their anti-inflammatory effect.⁴ Managing alopecia patients who are refractory to steroid treatment presents challenges. We report a patient who suffered from rapidly progressive AA after the second dose of COVID-19 vaccination and was resistant to steroid treatment.

2 | CASE REPORT

A 34-year-old female with no history of autoimmune disease, thyroid disorder, or other systemic illness presented with non-scarring hair loss after the second COVID-19 vaccination (AZD1222; AstraZeneca, University of

Oxford) shot 4 weeks ago. She visited a dermatologist at a nearby regional hospital and received oral prednisolone, 25–40 mg daily for more than a month. However, the hair loss worsened and progressed to diffuse involvement of the scalp, indicating no response to the steroid treatment. Physical examinations found evident hair loss over the entire scalp. A hair pull test showed massive hair loss after a slight pull. We started double-spin platelet-rich plasma (PRP) therapy. PRP was prepared from 80 mL of whole blood. The second dose of PRP was prepared from 160 mL of whole blood 6 weeks later. The hair loss stopped and new hair regrew after two doses of PRP treatment. Her hair recovered completely after six courses of PRP treatment (Figure 1).

3 | DISCUSSION

To the best of our knowledge, this is the first study to reveal that PRP can treat severe AA induced by COVID-19

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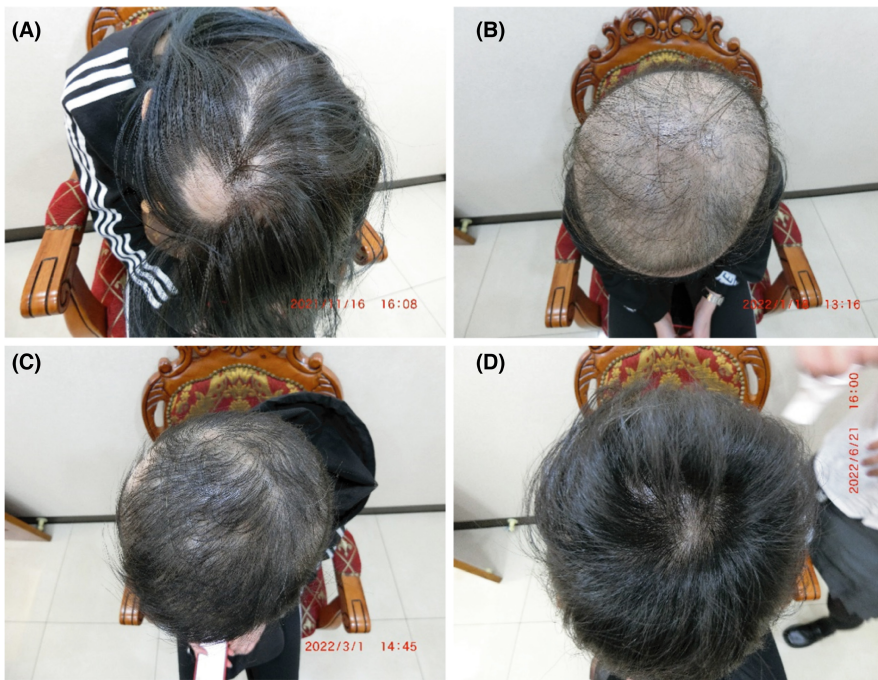


FIGURE 1 Clinical course of a patient with alopecia areata. (A) Her hair condition 8 weeks after second shot of COVID-19 vaccine. The patient received systemic corticosteroid therapy but in vain. (B) Alopecia areata rapidly progressed to diffuse involvement of the entire scalp 8 weeks later. (C) Her hair regrew after four courses of double-spin platelet-rich plasma treatment. (D) The hair condition was in nearly complete remission after six courses of treatment.

vaccination. Our institute has substantial experience treating alopecia patients with PRP. In this case, we used double-spin PRP, prepared using a Shang-Hao Plus PRP Concentrate Kit (SH-PRP, Chenhao Global Biomedical Co., Ltd.). The concentrations of platelets in the six therapies were between 1412 and $1818 \times 10^9/L$. We adjusted the centrifugation setting as follows: the first split at 2500 RPM for 5 min and the second split at 2800 RPM for 5 min, which led to much higher platelet concentrations than most the other methods.

Alopecia after routine immunization has been reported since 1984,⁵ with vaccine antigens and adjuvants seen as a possible trigger for T-cell-mediated immune responses.^{6,7} Topical corticosteroids, intralesional corticosteroids, and topical immunotherapy are the mainstay therapy for AA-induced by COVID-19.⁸ However, some cases are refractory to steroid treatment.^{7,9} Our patient completely recovered from severe AA using PRP therapy, which is more convenient and less toxic than the other therapies.

Some studies have reported that PRP shows no improvement for patients with severe AA induced by COVID-19 vaccination. In contrast, this patient's hair loss remarkably improved after two courses of treatment and completely recovered after six courses of therapy. Platelet concentration may be the key factor behind the differences in treatment responses.

AA has been considered a cell-mediated tissue-specific autoimmune hair disease.^{10–12} In contrast to atopic dermatitis, AA is regarded as a type 1 inflammatory disease with dominant expression of IFN- γ .¹³ Previous studies into PRP have focused on the effect of regeneration. This

case demonstrates that high-concentration PRP has an outstanding anti-inflammatory effect, which has been proven in many studies.^{14–18} We have also successfully treated steroid-refractory chronic dermatitis and rosacea using high-concentration PRP, as well as AA, which was known caused by chronic inflammation.¹⁹ PRP could be a potential alternative treatment for AA patients who are refractory or intolerant to steroid treatment. The case was diagnosed based on clinical interpretation. She was previously treated with oral prednisolone but did not respond to the treatment at that time. Although this patient's hair loss improved significantly after the double-spin PRP intervention. The improvement might be contributed partially by the previous systemic corticosteroid therapy. Further clinical trials of PRP in treating AA are needed.

AUTHOR CONTRIBUTIONS

H-CT and H-HC participate in the patient's data collection, manuscript writing, and final revision. All authors have read and approved the final manuscript.

FUNDING INFORMATION

None.

CONFLICT OF INTEREST STATEMENT

The authors have no conflict of interest to declare.

DATA AVAILABILITY STATEMENT

All data generated during this study are included in this published article.

CONSENT STATEMENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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REFERENCES

- Bardazzi F, Guglielmo A, Abbenante D, Sacchelli L, Sechi A, Starace MVR. New insights into alopecia areata during COVID-19 pandemic: when infection or vaccination could play a role. *J Cosmet Dermatol*. 2022;21(5):1796-1798. doi:10.1111/jocd.14864
- McElwee KJ, Freyschmidt-Paul P, Hoffmann R, et al. Transfer of CD8(+) cells induces localized hair loss whereas CD4(+)/CD25(-) cells promote systemic alopecia areata and CD4(+)/CD25(+) cells blockade disease onset in the C3H/HeJ mouse model. *J Invest Dermatol*. 2005;124(5):947-957. doi:10.1111/j.0022-202X.2005.23692.x
- Gilhar A, Ullmann Y, Berkutzki T, Assy B, Kalish RS. Autoimmune hair loss (alopecia areata) transferred by T lymphocytes to human scalp explants on SCID mice. *J Clin Invest*. 1998;101(1):62-67. doi:10.1172/jci551
- Seetharam KA. Alopecia areata: an update. *Indian J dermatol venereol leprol*. 2013;79(5):563-575. doi:10.4103/0378-6323.116725
- González Barajas AJ, Contreras PC. Therapeutic options to refractory alopecia areata. *Int J Med Sci Clin Res Stud*. 2023;3(1):25-27. doi:10.47191/ijmscrs/v3-i1-06
- Wise RP, Kiminyo KP, Salive ME. Hair loss after routine immunizations. *JAMA*. 1997;278(14):1176-1178.
- Essam R, Ehab R, Al-Razzaz R, Khater MW, Moustafa EA. Alopecia areata after ChAdOx1 nCoV-19 vaccine (Oxford/AstraZeneca): a potential triggering factor? *J Cosmet Dermatol*. 2021;20(12):3727-3729. doi:10.1111/jocd.14459
- Scollan ME, Breneman A, Kinariwalla N, et al. Alopecia areata after SARS-CoV-2 vaccination. *JAAD Case Rep*. 2022;20:1-5. doi:10.1016/j.jidcr.2021.11.023
- Birkett L, Singh P, Mosahebi A, Dhar S. Possible associations between alopecia areata and COVID-19 vaccination and infection. *Aesthet Surg J*. 2022;42(11):NP699-NP702. doi:10.1093/asj/sjac165
- Leung MC, Sutton CW, Fenton DA, Tobin DJ. Trichohyalin is a potential major autoantigen in human alopecia areata. *J Proteome Res*. 2010;9(10):5153-5163. doi:10.1021/pr100422u
- Wang EHC, Yu M, Breitkopf T, et al. Identification of autoantigen epitopes in alopecia areata. *J Invest Dermatol*. 2016;136(8):1617-1626. doi:10.1016/j.jid.2016.04.004
- Gilhar A, Laufer-Britva R, Keren A, Paus R. Frontiers in alopecia areata pathobiology research. *J Allergy Clin Immunol*. 2019;144(6):1478-1489. doi:10.1016/j.jaci.2019.08.035
- Ito T, Tokura Y. The role of cytokines and chemokines in the T-cell-mediated autoimmune process in alopecia areata. *Exp Dermatol*. 2014;23(11):787-791. doi:10.1111/exd.12489
- El-Sharkawy H, Kantarci A, Deady J, et al. Platelet-rich plasma: growth factors and pro- and anti-inflammatory properties. *J Periodontol*. 2007;78(4):661-669. doi:10.1902/jop.2007.060302
- Zhang J, Middleton KK, Fu FH, Im HJ, Wang JH. HGF mediates the anti-inflammatory effects of PRP on injured tendons. *PLoS One*. 2013;8(6):e67303. doi:10.1371/journal.pone.0067303
- Mazzocca AD, McCarthy MB, Intravia J, et al. An in vitro evaluation of the anti-inflammatory effects of platelet-rich plasma, ketorolac, and methylprednisolone. *Arthroscopy*. 2013;29(4):675-683. doi:10.1016/j.arthro.2012.12.005
- Bendinelli P, Matteucci E, Dogliotti G, et al. Molecular basis of anti-inflammatory action of platelet-rich plasma on human chondrocytes: mechanisms of NF-κB inhibition via HGF. *J Cell Physiol*. 2010;225(3):757-766. doi:10.1002/jcp.22274
- Osterman C, McCarthy MB, Cote MP, et al. Platelet-rich plasma increases anti-inflammatory markers in a human coculture model for osteoarthritis. *Am J Sports Med*. 2015;43(6):1474-1484. doi:10.1177/0363546515570463
- Mustafa AI, Khashaba RA, Fawzy E, Baghdady SMA, Rezk SM. Cross talk between oxidative stress and inflammation in alopecia areata. *J Cosmet Dermatol*. 2021;20(7):2305-2310. doi:10.1111/jocd.13814

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