

LETTER

Intractable alopecia areata following the second dose of COVID-19 vaccination: Report of two cases

Dear Editor,

COVID-19 vaccines are considered as effective intervention to control the COVID-19 pandemic; however, there is growing evidence that the vaccines could induce various cutaneous adverse events.¹ Herein, we reported two patients with pre-existing alopecia areata (AA) that showed favorable treatment response. However, both patients experienced rapidly progressive hair loss that are resistant to treatment after the second dose of COVID-19 vaccination.

A 29-year-old man presented to our department owing to multiple newly developed balding patches on the scalp after the second

dose of AstraZeneca vaccination. The patient had a history of AA, and after three courses of pulse steroid therapy (Methylprednisolone 250 mg every 12 h on 3 consecutive days), there was significant hair regrowth and the disease has been stable for 7 months without active hair loss (Figure 1A). However, diffuse hair shedding across the scalp was found 1 week after the second dose of vaccination (Figure 1B). He was retreated with pulse steroid therapy (the same regimen), but the disease continued to progress during 2-month follow-up.

Another 26-year-old woman attended our department with complaints of diffuse hair loss involving the scalp, eyebrows, eyelashes,



FIGURE 1 Clinical course of the two cases. (A) The hair condition of case 1 has been stable for 7 months (SALT of 13%) preceding the vaccination. (B) After the second dose of AstraZeneca vaccination, significant hair loss was found (SALT of 82%) in case 1. (C) The hair condition of case 2 has been in nearly complete remission (SALT of 5%) before the vaccination. (D) After the second dose of Pfizer-BioNTech injection, rapid progression to alopecia universalis was noticed in case 2

and body hairs after two doses of Pfizer-BioNTech vaccination. The patient was previously diagnosed with AA, and she has received four courses of pulse steroid therapy with nearly complete remission preceding the vaccination (Figure 1C) for 2 months. Two weeks after the second dose of vaccination, diffuse hair loss across the scalp and body hairs was noticed, and rapidly progressed to alopecia universalis (Figure 1D). She was retreated with pulse steroid therapy; unfortunately, there was no response despite another four courses of treatment.

Since the beginning of coronavirus pandemic, few literatures have documented the exacerbation of AA following COVID-19 vaccination.²⁻⁴ Essam et al.² reported relapse of AA after AstraZeneca vaccination; whereas Rossi et al.⁴ reported three cases of recurrent AA associated with COVID-19 vaccine, with one receiving Pfizer-BioNTech and two with AstraZeneca. These reports suggested an association between COVID-19 vaccine and AA, but rarely did they discuss about the response to treatment.

The development of AA involves the disruption of immune privilege in hair follicles with subsequent assault on hair bulbs by cytotoxic T lymphocytes.⁵ Although the pathophysiology of vaccine-induced AA still remains uncertain, the potential mechanism may involve the activation of Th1-predominant response, leading to increased secretion of Th1-biased cytokines, including interferon- γ (INF- γ), production of the particular autoantibodies, and facilitation of CD8+T-cells activity.^{1,4} Another mechanism may be explained by molecular mimicry, since the peptides sharing between SARS-CoV-2 spike glycoprotein and human proteomes could contribute to the autoimmunity through cross-reaction with self-antigens.^{2,6}

In both patients, favorable response to pulse steroid therapy was observed prior to the vaccination. However, after immunization with the COVID-19 vaccine, poor response to treatment was noticed. A Korean study reported 27.6% of relapse rate in patients of severe AA treated with pulse steroid therapy, and those with relapsing episodes retreated with pulse therapy all experienced complete remission.⁷ Their finding was consistent with our previous experience, but the two patients who reported relapse after COVID-19 vaccination showed continued disease progression despite repeated pulse steroid therapy. It is hypothesized that the increased levels of INF- γ induced by vaccine may promote the burst of T-cells mediated responses and result in immune dysregulation in susceptible individuals with the resultant refractory AA.⁸ However, the mechanism explaining why both patients failed to respond to the previously efficient treatment strategy remains to be determined.

Our experiences, however, indicate that COVID-19 vaccination may not only initiate and worsen AA, but also instigate AA out from remission and become intractable to treatment that had worked prior to the vaccination.

AUTHOR CONTRIBUTIONS

Chieh-Hsun Chen, Yang-Yi Chen, and Cheng-Che E. Lan drafted the manuscript. Cheng-Che E. Lan revised the manuscript. All

authors have read and agreed to the published version of the manuscript.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

INFORMED CONSENT

The patients in this manuscript have given written informed consent to publication of their case details.

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