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LETTERS TO THE EDITOR

Alopecia areata after CoronaVac vaccination

To the Editor,

In the setting of the coronavirus pandemic, SARS-CoV-2 vaccination is reaching 57% of the global population at the time of this report,[1] along with this encouraging increase in vaccination rates; several dermatological manifestations secondary to SARS-CoV-2 vaccination have been reported, including alopecia areata (AA).[2]

We report a case of AA, in a middle-aged female patient, following vaccination with CoronaVac, a SARS-CoV-2 vaccine developed by Sinovac Biotech.

1 | CASE

A 33-year-old female patient presented to the outpatient dermatology clinic, complaining of hairless patches over the scalp. These patches slowly developed after she completed the two-dosage SARS-CoV-2 vaccine regimen recommended by local authorities (Figure 1). She did not present any symptoms suggesting SARS-CoV-2 infection before, during, or after the period she noted excessive hair loss. Personal history was unremarkable, and she reported no underlying conditions; family history was negative for autoimmune or trichological disorders.

At clinical examination, the scalp showed several delineated hair loss patches with no scarring or scaling over the vertex, bitemporal, and occipital region, compromising <50% of the scalp (Figure 2A–D). There were no other cutaneous or systemic abnormalities. Trichoscopy revealed newly growing hairs with exclamation point hairs, black dots, and broken hairs (Figure 3).

A presumptive diagnosis of AA was made, and further laboratory assessment with thyroid function tests, anti-thyroid, and antinuclear antibodies was normal. Intralesional and topical corticosteroids were

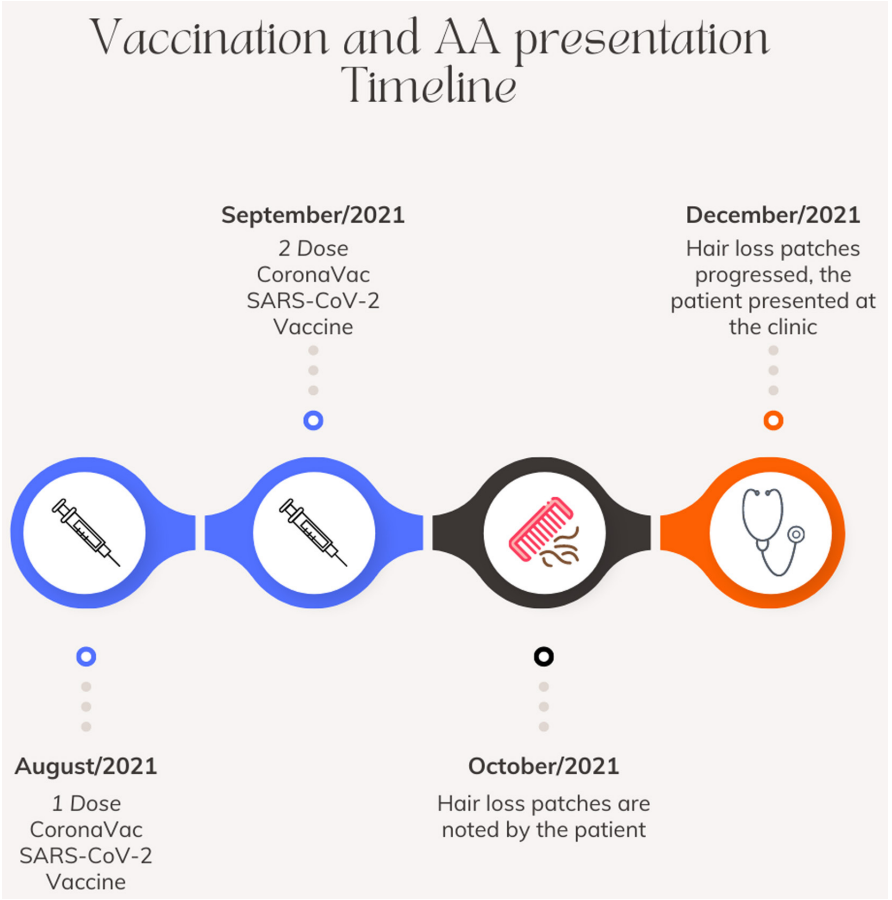

FIGURE 1 Patient vaccination and AA presentation timeline

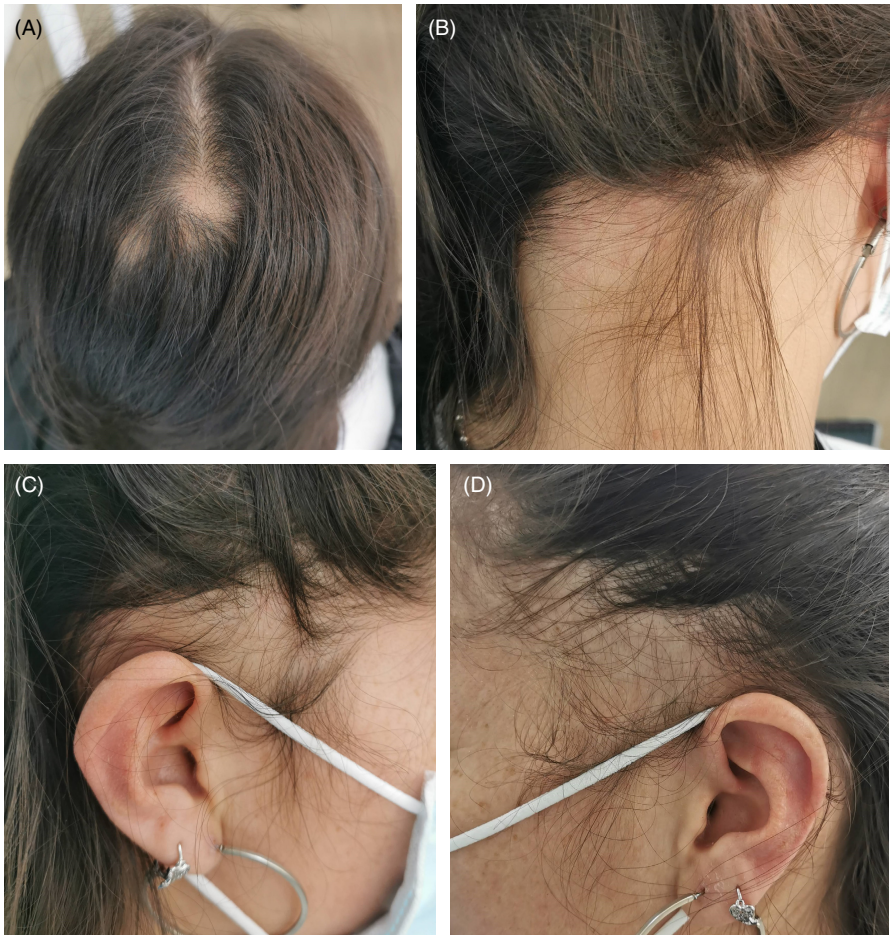

FIGURE 2 (A–D) Patches of nonscarring alopecia involving the vertex, occipital, and temporal scalp

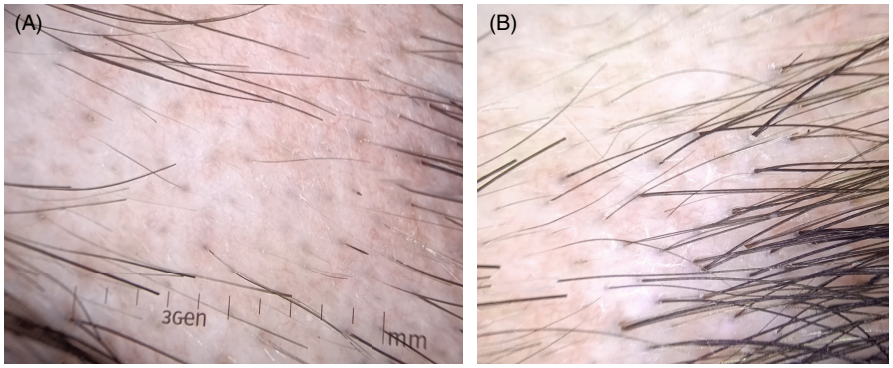

FIGURE 3 (A and B) Trichoscopy showing broken and exclamation mark hairs, black dots, yellow dots, and newly growing hairs

initiated. At 1-month clinical follow-up, lesions did not progress, and signs of regrowth were noted.

2 | DISCUSSION

AA is an organ-specific autoimmune disease that results in nonscarring alopecia from a collapse of the hair follicle immune privilege.[2] Numerous factors may trigger of AA, including emotional and psychological stress, viruses, and vaccines.[3] The precise significance of these factors is unknown, although they likely induce a condition that is already present in predisposed individuals. It is worth mentioning that new-onset AA may develop in patients with SARS-CoV-2 infection and manifests 1–2 months after the onset of COVID-19 symptoms, and it has demonstrated a positive response to traditional AA treatments like intralesional Triamcinolone acetonide and topical corticosteroids.[4]

Previously, several vaccines have been linked to AA, including hepatitis B virus and influenza vaccines, either as an eliciting or recurrence factor.[3] AA may develop after vaccination through cross-reaction of vaccine-generated antibodies with self-antigens due to molecular mimicry in individuals with a genetic predisposition.

The 0.5-ml CoronaVac vaccine is composed of 3 μg of inactivated SARS-CoV-2 virus plus excipients, including aluminum hydroxide, disodium hydrogen phosphate, sodium dihydrogen phosphate, sodium chloride, and water, and it does not contain preservatives.[5] It was developed to generate antibodies directed to several SARS-CoV-2 antigens. It appears to carry the risk of developing antibodies against

TABLE 1 Reports of AA following SARS-CoV-2 vaccination

Reports of AA after SARS-CoV-2 vaccination				
Case report	**Sex**	**Age**	**Vaccine**	**Clinical presentation**
Reported here	F	33	Inactivated SARS-CoV-2 CoronaVac	One month after second dose, patches of nonscarring alopecia over the vertex, bitemporal, and occipital region, compromising <50% of the scalp. No personal history of AA or autoimmune disease
Essam R. et al.	F	32	ChAdOx1 nCoV-19 vaccine (Oxford/AstraZeneca)	Hairless patch few days after vaccination. Personal history AA with no recurrence for 6 years
Rossi A. et al.	F	76	BNT162b2 vaccine (Pfizer-BioNTech)	Two weeks after first dose presented widespread hair loss on the whole scalp Personal history of AA (ophiasis) treated 2 years before this recurrence
	F	59	ChAdOx1 nCoV-19 vaccine (Oxford/AstraZeneca)	Three weeks after vaccination, single patch of alopecia appeared on the scalp Personal history AA and autoimmune thyroiditis
	F	29	ChAdOx1 nCoV-19 vaccine (Oxford/AstraZeneca)	Two weeks after vaccination, generalized hair loss on the scalp, partial loss of eyebrows, and eyelashes Personal history of patchy AA
Gallo G. et al.	M	31	BNT162b2 vaccine (Pfizer-BioNTech)	Three weeks after second dose, presented multiple patches of alopecia on the occipital, bilateral parieto-temporal, and frontal areas, with involvement of the beard No personal history of AA or autoimmune disease
May Lee M. et al.	M	80	BNT162b2 vaccine (Pfizer-BioNTech)	One week after first dose, widespread scalp hair loss associated with beard hair loss on the left cheek and the upper lip, condition worsens after the second dose of the vaccine No personal history of AA or autoimmune disease
Scollan M. et al.	W	33	mRNA-1273 (Moderna)	Two months after second dose, patches of nonscarring alopecia over the scalp. Personal history of chronic hepatitis B virus and family history of AA
	W	57	BNT162b2 vaccine (Pfizer-BioNTech)	Four months after second dose, widespread nonscarring alopecia of the scalp Personal history of remote AA
	W	62	mRNA-1273 (Moderna)	Two months after second dose, AA universalis Personal history of remote AA
	W	28	BNT162b2 vaccine (Pfizer-BioNTech)	One week after second dose, AA universalis Personal history of AA and Hashimoto thyroiditis
	W	29	BNT162b2 vaccine (Pfizer-BioNTech)	One week after second dose, two patches of nonscarring alopecia of the scalp Personal history of elevated levels of thyroglobulin antibody and thyroid peroxidase antibody
	M	22	mRNA-1273 (Moderna)	One month after second dose, patches of nonscarring alopecia with 30% hair loss over the scalp, 80% hair loss over beard Personal history of Elevated thyroid antibody
	M	15	BNT162b2 vaccine (Pfizer-BioNTech)	One week after second dose, two patches of nonscarring alopecia of the scalp Family history of Hashimoto thyroiditis
	M	61	BNT162b2 vaccine (Pfizer-BioNTech)	Two weeks after first dose, AA totalis Personal history of joint pain, on hydroxychloroquine
	M	16	BNT162b2 vaccine (Pfizer-BioNTech)	One–2 weeks after first dose, patches of nonscarring alopecia with 70% loss of scalp hair, sparse eyebrows, and eyelashes No personal history of AA or autoimmune disease

Abbreviations: AA, alopecia areata; F, female; M, male.

human proteins, similar to the pathological antibodies against the complex formed by platelet factor 4 in the setting of the vaccine-induced immune thrombotic thrombocytopenia seen with the ChAdOx1 nCoV-19 vaccine (Oxford/AstraZeneca).[6] Excipients may play a role triggering vaccine-related reactions and paired with molecular mimicry, an ideal pathological scenario ensues, where a T-cell-mediated immune response targets multiple structures of the anagen-phase hair follicle.

It has been hypothesized that SARS-CoV-2 vaccination-induced NF-kB production, increases the release of several cytokines that can activate AA, including interferon (IFN)-γ, implicated in the loss of the follicle's immune privilege and interleukin (IL)-6, inhibiting the transition to anagen from telogen through decreased proliferation of follicular keratinocytes and stem cells, crucial elements in AA development.[7]

AA following SARS-CoV-2 vaccination remains rare in the general population. Rossi et al. reported AA recurrence in 1 patient

after vaccination with BNT162b2 mRNA (Pfizer) and 2 patients with ChAdOx1 nCoV-19 vaccine (Oxford/AstraZeneca).[7] Additionally, Essam et al. reported a case with the ChAdOx1 nCoV-19 vaccine (Oxford/AstraZeneca) vaccine.[8] Three cases of AA using mRNA-1273 (Moderna) and 6 cases using BNT162b2 mRNA (Pfizer) were reported with different time ranges at the time of AA onset[2] (Table 1). To the best of our knowledge, the described case is the first one reported after inactivated SARS-CoV-2 CoronaVac vaccination.

In this report, AA occurrence after vaccination may be coincidental even though the timing is consistent with scientific literature formerly reported, while we cannot establish a causative relationship between SARS-CoV-2 vaccination and AA, and further studies are necessary to establish adequate conclusions.

SARS-CoV-2 vaccination should be widely encouraged, and special populations should be counseled about the risks of these immune-related events; on the grounds of this, we still advise all eligible patients with AA to receive anti-SARS-CoV-2 vaccinations, given the risk and benefit considerations.

ACKNOWLEDGMENT

None.

CONSENT STATEMENT

A written consent was taken from the patient.

ETHICAL STATEMENT

Authors declare human ethics approval was not needed for this study.

CONFLICT OF INTEREST

The authors have no conflicts of interest to declare. All co-authors have seen and agree with the contents of the manuscript, and there is no financial interest to report. We certify that the submission is original work and is not under review at any other publication.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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