

Alopecia areata after COVID-19 vaccination: Two cases and review of the literature

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Abstract

Alopecia Areata (AA) is an autoimmune disorder characterized by hair loss, due to a T-lymphocyte-mediated inflammatory response targeting anagen-phase hair follicles. Former studies have suggested that vaccination and viral infections may play a role in the onset of AA through a variety of different mechanisms. We report here two cases of AA following COVID-19 vaccination.

Introduction

Alopecia Areata (AA) is an autoimmune disorder characterized by hair loss due to a T-lymphocyte-mediated inflammatory response targeting anagen-phase hair follicles. It has an unpredictable course, ranging from spontaneous remission to chronic and not responding to therapy cases.

Previous reports highlighted that both vaccination and viral infections may have a role in triggering AA through several potential mechanism.^{1,2}

Since the introduction of anti-COVID-19 vaccines, several side effects have been reported, including pain at the injection site, fever, malaise, headache, nausea, and diarrhea. Recently it has been suggested that this vaccination could be associated with immuno-mediated side effects, and to-date only 4 papers highlighted the relation with AA.³⁻⁶

To increase these observations, we report two cases of AA after COVID-19 vaccine.

Case Report #1

In January 2022 a 42-year-old man came to our clinic for acute hair loss. He had a previous single episode of patches AA in 2020, successfully treated with intralesional steroid injections, resulting in complete hair regrowth in few months (Figure

1A). He reported personal history for atopic dermatitis and celiac disease.

In spring 2021 he received the first dose of BNT162b2 mRNA vaccine, and he was completely asymptomatic. One month later he underwent the second dose and began to experience patches alopecia. In December 2021 he underwent the third dose of the same vaccine, after which he rapidly worsened.

Physical examination revealed a pattern of alopecia totalis, with complete loss of the whole scalp hairs but preservation in the other body sites (Figure 1B). Trichoscopy showed prevalence of yellow dots and rare cadaveric hairs (Figure 1C).

A topical treatment with high potency steroids was prescribed and the patients is currently performing the treatment.

Case Report #2

An 18-year-old man was being treated in our office for patches AA with intralesional steroid infiltration from February 2021 with good clinical response (Figure 2A). No family history for AA was present or personal history of related diseases.

In June 2021 he received the first dose of BNT162b2 mRNA vaccine; after 20 days he experienced a mild worsening of the patches being treated.

After the second dose, he progressively worsened. At the physical examination widespread hair loss was present on the whole scalp and pull test was positive. The hairs in the other body sites were normal and eyebrows and eyelashes were preserved (Figure 2B). Trichoscopy showed black dots, vellus hairs and exclamation mark hairs; a diagnosis of alopecia totalis was made (Figure 2C).

A topical treatment with high potency steroids was prescribed and the patients is currently performing the treatment.

Discussion and Conclusions

AA is an autoimmune disease that leads to non-scarring hair loss with a complex multifactorial pathogenesis; external factors such as infections and vaccines may trigger this disease.^{1,2} Recently, single case reports suggested the relationship between COVID-19 vaccine and AA,³⁻⁶ proposing different potential mechanism.

Essam et al. reported the first case of AA after COVID-19 vaccine in August 2021; the authors supposed the role of molecular mimicry between the vaccine-induced protein of COVID-19 and human

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components in producing pathological autoantibodies.⁶

Rossi *et al.*,⁵ reported 3 cases of AA after different types of vaccines, supposing that the vaccination may activate a cascade of immunological events leading to aberrant autoimmune response in susceptible individuals.

Later, Scollan *et al.*⁴ described 9 cases of AA following different types of messenger RNA (mRNA) vaccines; they pointed out that the mRNA vaccines could trigger a T-cell mediated immune response with the downstream effects of alopecia.

Both of our patients had alopecia totalis after vaccination, more severe than the AA form they had previously. The first case was a relapse after complete recovery, while the second one was a worsening during therapy. However, while the first patient experi-

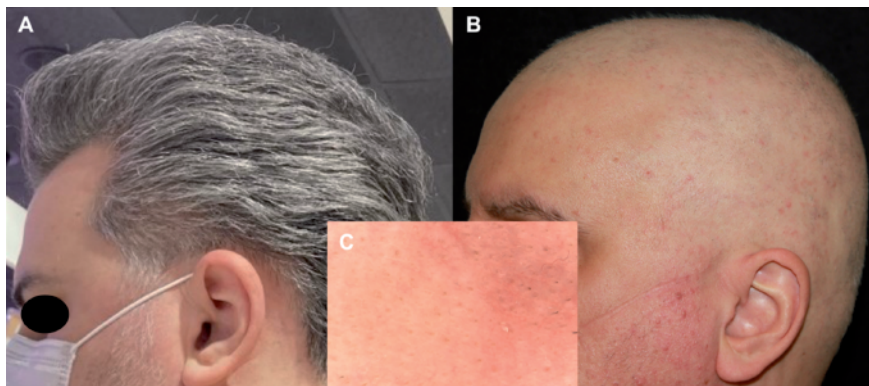


Figure 1. A: clinical picture of a 42-year-old man before covid-19 vaccine. **B:** picture of the same man after the third dose of BNT162b2 mRNA vaccine. **C:** dermoscopy shows prevalence of yellow dots (FotoFinder, FotoFinder Systems GmbH, Bad Birnbach, Germany, Magnification 20x).

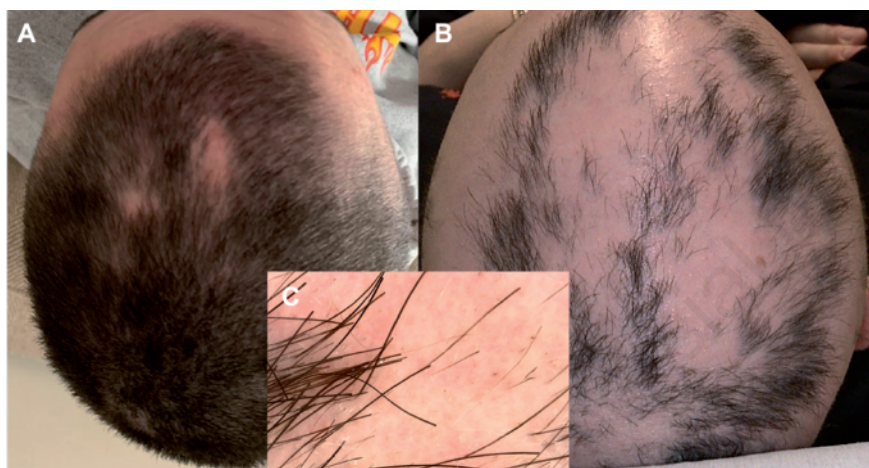


Figure 2. A: clinical picture of an 18-year-old man before covid-19 vaccine. **B:** picture of the same man after the second dose of BNT162b2 mRNA vaccine. **C:** dermoscopy shows yellow dots, black dots, vellus hairs and exclamation mark hairs (FotoFinder, FotoFinder Systems GmbH, Bad Birnbach, Germany, Magnification 20x).

enced alopecia totalis after the second vaccination, the second worsened already at the first dose.

As the previous reports said, we cannot exclude that the two events are coincident, however the timing of onset makes us suppose a possible correlation.

In the case of the first patient, it is possible that small patches of alopecia (that he did not notice) occurred after the first dose, and that he came to our observation when he experienced alopecia totalis. On the other hand, even in the second patient the pathology progressively worsened up to AA

totalis. Therefore, vaccine doses may induce a cumulative immunological response, which increases with the number of doses administered. To date, however, no adverse immunological events have been reported that have progressively worsened with the number of doses administered.

Immune-related side effects remain rare events and the cases of AA described are uncommon and with no evidence of other associated serious side effects respect to the number of vaccine doses administered worldwide.

Therefore, we recommend the administration of anti-COVID vaccine both in patients with a previous history of alopecia areata and in patients with active disease.

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