

## THE COVID- 19 VACCINATION: AUTOIMMUNE PHENOMENON

### ALOPECIA AREATA

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#### ABSTRACT

The COVID-19 pandemic has a major impact on our living life. It has affected the global economy and health. The COVID-19 caused by the corona virus which damages the respiratory system and also affects the immunity[11,12]. The one of the most effective way to control the spreading of the COVID-19 is the vaccination. When the new drug come into the market the drug passes through the many processes. The time required for the development of new drug to come into the market it take a time of 12 to 15 years, but in COVID-19 pandemic the vaccine are developed in 2-3 months. The most of the vaccine for COVID-19 during pandemic are approved without detail studies on their side effects or long term effect on the various system of the body. The many autoimmune disorder are observed after the COVID-19 vaccination. The alopecia areata is one of the autoimmune disorders found in post vaccination of the COVID-19. The alopecia areata is shows the hair loss in circular patch due to inflammatory response targeting the hair follicle.[1]

#### I. INTRODUCTION

Almost three- four years have passed since the beginning of the novel corona virus disease 2019 pandemic. Studies have revealed that more than one- third of patient with COVID-19 developed a range of symptoms after the acute phase of the infection. The many autoimmune disorder are observed after the COVID-19 vaccination [e.g. immune thrombotic thrombocytopenia, alopecia areata, autoimmune liver disease, Guillain- Barre syndrome, IgA nephropathy][3,4]

**Table 1:** The autoimmune disorder caused by COVID-19 Vaccine.

Autoimmune phenomena	Vaccine type
Vaccine-induced immune thrombotic thrombocytopenia	Adenovirus vector vaccine and mRNA vaccine
Immune thrombocytopenic purpura	mRNA vaccine
Autoimmune liver diseases	mRNA vaccine and Adenovirus vector vaccine
Guillain-Barré syndrome	mRNA vaccine and Adenovirus vector vaccine
IgA nephropathy	mRNA vaccine
Autoimmune polyarthritis	mRNA vaccine
Rheumatoid arthritis	mRNA vaccine and Adenovirus vector vaccine
Graves' disease	mRNA vaccine
Type 1 diabetes mellitus	mRNA vaccine
Systemic lupus erythematosus	Adenovirus vector vaccine

The many scientist work on COVID-19 vaccine showing 100% effect against the corona virus. There are about 21 vaccines available in market worldwide. The 137 vaccines are in clinical trials and about 194 vaccines are in the pre-clinical development[11].



**Fig 1:** Alopecia Areata.

The alopecia areata is the autoimmune disorder which is T lymphocyte-mediated. In this disorder the hypersensitive immune system attack on the own body cell i.e. hair follicle. In alopecia areata the circular patch form due to inflammatory response targeting the hair follicle, which is coin size. The alopecia is of two types one in which the all the hair on the scalp is lost [alopecia totalis] and second is the all body hair is lost [alopecia universalis]. The hair loss is permanent and temporary. This is commonly shown in the male. There are about 7 million people in the UK are facing to this autoimmune disorder. There is some factor which cause the alopecia areata, the deficiency of the vitamin D also causes the hair loss. The vitamin D is essential for stimulating new and old follicle[5,7]

The alopecia is also seen in the women, but the percentage is very less as compared to the male. The imbalance in the female sex hormone i.e. testosterone and estrogen. The DHT can trigger the androgenic alopecia.

**The alopecia areata seen in post vaccination:**



Hair loss is not common in the acute phase of COVID-19 but is the well known sequel of COVID-19 observed in approximately 20% of this patient. In this disorder the immune cell attacks on the own cell of the body. I.e. hair follicle. The vaccination and found that the 84% of hair loss in 50 reports of alopecia areata occurred within the one month of vaccination[2,3].

In the period of the covid 19 the corona virus is attacks on the immune system. The immune system is failed to fight against it. In this period the immune system is totally disturbed hence to improve it we take and an immune stimulator were taken. There are many immune system enhancers in the market[3,6]. The all vaccines which work on the corona virus which increases the immunity of the body. The alopecia is also an autoimmune disorder, which is seen by after the vaccination. The many vaccines that effectively work on the corona virus shows the autoimmune disorder as a side effect like an alopecia areata. The vaccines are work on the COVID-19 pandemic period are discovered or manufacture form the viral vector [replicating and non- replicating], nucleic acid based [RNA and DNA]; Protein based and inactivated or weakened virus. The mRNA based vaccines are mostly used to treat the COVID-19 like, Pfizer-BioNTech and Moderna. The covishield is also the used for the treatment of COVID-19 developed by the serum institute.

The vaccine has been implicated as triggers of autoimmune diseases in genetically predisposed individuals. An antibody-mediated response prompted by vaccination may cross-react with self-antigen, leading to autoimmunity. According to the report the alopecia areata after a long period of disease quiescence in middle-aged woman following immunization with the ChAdOx1 nCoV-19 vaccine. The alopecia areata is also seen in children and adult after other routine vaccination[8,9].

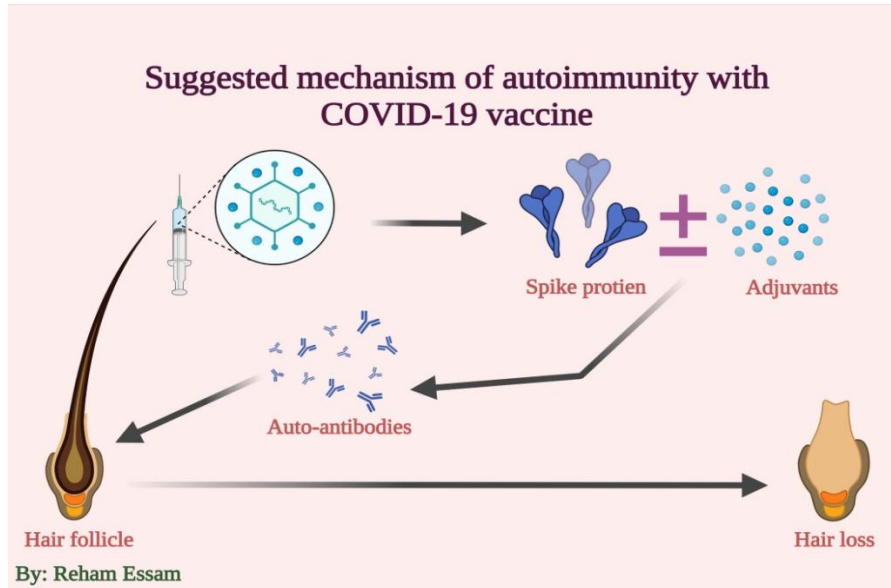


Fig 2: Mechanism of autoimmunity with COVID-19 vaccine.

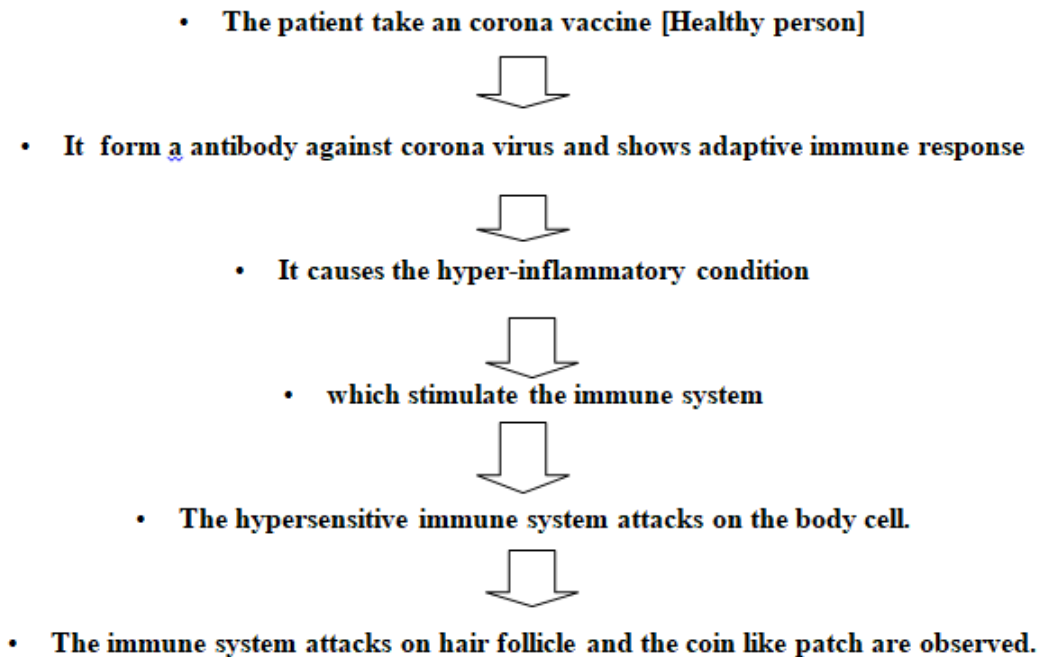


Fig 3: The flow chart of the action of the covid 19 vaccine on the immune system showing the autoimmune response.

The corona vaccines are showing the autoimmune response which is the T cell mediated. The vaccines are increasing or developing the antibody against the covid 19 virus. The spike protein which is present on the corona virus which is essential for the binding the vaccines are inhibit it and avoid the spreading of the corona virus[4,7]. The vaccine triggers the adaptive immune response to show the protective effect against the corona virus, which stimulate the hyper-inflammatory condition. The after the vaccination the healthy human shows the increasing the l IFN expression, oxidative stress and DNA damage to form an antibody against the corona virus. Due to these changes the immune system is hyper sensitive and it shows the autoimmune side effect and it attacks on the own body cell.

**Treatment:**

The scientist study on the post vaccination side effects on the body the autoimmune side effects are seen in more number. The vaccines like Pfizer, Moderna and some cases of covishield are found to show the alopecia

areata after the vaccination. The scientist which study the autoimmune side effect of covid vaccine the suggest the Tofacitinib citrate [5-10 mg twice a day]. The Tofacitinib citrate is the immunosuppressant which suppresses the immune system [2,3].

The other hand the other drug which is used for the treatment of the alopecia areata is the corticosteroid and the anti-inflammatory drug. The homeopathic drug like Tuja occidentalis. The Monoxidil is also recommended by the doctor to cure the alopecia areata which the antihypertensive and vasodilator. Betamethasone is the corticosteroid which inhibit the production of the prostaglandins and reduce inflammation, which is used to treat alopecia and it stop to new patch formation. The folic acid also helps to regrow the hair and hair nourishment. Benzyl nicotinate with salicylic acid reduce the inflammation and help to regrow the hair [7,8]

## II. CONCLUSION

The alopecia areata is the adverse effect of the COVID-19 vaccine, which effect on the hair follicle and the baldness on the scalp is observed in this disorder. This disorder is some time is untreatable but by using some corticosteroid and anti-inflammatory drug it can be treating. The immune system suppressant is used to suppress the immune system. The alopecia areata is seen in many patients after the seven month diagnosis of the acute infection of the COVID-19. There are approximately about 20% patients developed the alopecia.

Therefore the alopecia areata is the major side effect of the COVID-19 vaccine which cause due to the autoimmune effect of the vaccine.

## III. REFERENCE

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