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### Exacerbation of Psoriasis Vulgaris Induced by Vaccine COVID-19 in HIV Patient: A Case Report

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#### ABSTRACT

**Background:** Psoriasis is a chronic and inflammatory skin disease. Many triggering factors can cause exacerbation of psoriasis, such as infection, trauma, and drugs. Several vaccines are known to cause new lesions or exacerbation of psoriasis, including Bacillus Calmette-Guerin (BCG), influenza, tetanus-diphtheria, and pneumococcal polysaccharide. In the COVID-19 pandemic, the COVID-19 vaccine is known to cause the appearance of new lesions or exacerbation of psoriasis. **Case presentation:** A woman, 31 years old, came to the clinic with itchy reddish patches with white scales on her face, chest, stomach, back, arms, and both legs, and increased since 2 weeks ago. Previously, the patient got the first COVID-19 vaccine (Sinovac), and three days later, red patches appeared with white scales on the chest, stomach, and back. The patient had been diagnosed with psoriasis 3 years ago. Dermatology examination showed reddish patches with white scales on the face, chest, stomach, back, arms, and both legs. Auspitz sign and Kaarvetsvlek phenomenon were positive. PASI score was 9,2. Dermoscopy examination showed red dot distribution on light pink background and white scales. She was treated with desoximetasone cream 0,05% twice a day and cetirizine tablet 10 mg once a day. After 2 months of therapy, reddish patches were decreased, and the PASI score was 6,9. **Conclusion:** COVID-19 vaccine can cause exacerbations in psoriasis patients, but this vaccine can still be given to psoriasis patients. It is based on the documented efficacy of the COVID-19 vaccine in the prevention of severe COVID-19 infection and fatality. Psoriasis patients should be consulted before getting vaccinated for COVID-19, and prompt clinical visits should be available if exacerbation develops.

#### 1. Introduction

Psoriasis is a common, immunologically mediated, inflammatory disease characterized by skin inflammation, epidermal hyperplasia, and increased risk of painful and destructive arthritis, as well as cardiovascular morbidity and psychosocial challenges. The prevalence of psoriasis varies widely in various populations, between 0.1-11.8%.<sup>1-3</sup>

Psoriasis may be precipitated by drugs, infection,

stress, physical trauma, and vaccination.<sup>4</sup> A lower rate of influenza vaccination in psoriasis patients may be attributed to the fact that vaccines may be a triggering factor for aggravation.<sup>5</sup> Psoriasis vaccinialis had been described in different types of vaccines, including influenza, Bacillus Calmette-Guerin, tetanus-diphtheria, and pneumococcal polysaccharide vaccines. Patients may present as widespread severe

psoriasis or new-onset guttate psoriasis. Recently, coronavirus (COVID-19) vaccinations have been linked to the exacerbation of psoriasis.<sup>4,6,7</sup>

The Center for Disease Control (CDC) Vaccine Adverse Events Reporting System (VAERS) data reported numerous patients who experienced both new onset and worsening of known psoriasis following Moderna, Pfizer-BioNTech, and Janssen vaccines. Most of the CDC patients (60,76%) experienced their symptoms after the first dose or within 28 days of the vaccine, with 5 patients who reported worsening after receiving a second dose.<sup>6,7</sup> This study aimed to describe a case of psoriasis exacerbation after COVID-19 vaccines.

## 2. Case presentation

A 31-year-old female patient came with a chief complaint of reddish patches with white scales that felt itchy on the face, chest, stomach, back, arms, and both legs and increased since 2 weeks ago. Initially, on December 1<sup>st</sup>, 2021, the patient received the first Sinovac vaccine. Three days later, red patches with white scales occurred on the chest, stomach, and back. Before the patient got the vaccine, reddish patches were few and small in size on both arms and both legs. The patient did not treat the complaint. ± 1 week ago, red patches with white scales spread to both arms and both legs. ± 2 weeks ago, red patches with white scales increased in number and size on the face, chest, stomach, back, arms, and both legs. The patient had been diagnosed with psoriasis 3 years ago by a dermatologist in Central General Hospital Padang. The patient, for the past 1 year, did not control the dermatologist and only bought his own medicine at the pharmacy. The patient was diagnosed with HIV stage 1 by an internist 3 years ago and routinely took Atripla tablets (efavirenz 600 mg/emtricitabine 200 mg/tenofovir disoproxil fumarate 300 mg) once a day.

There was no history of infection (tooth cavities, sore throat, fever, cough, rhinorrhea, vaginal discharge, yellow skin and yellow eyes, and painful urination). The patient was not consuming alcohol,

smoking, or exposed to cigarette smoke. She never consumed drugs in the long term (antimalaria,  $\beta$ -blocker, lithium, nonsteroidal anti-inflammatory drugs). She is usually exposed to sunlight 30 minutes to 1 hour per day.

From the physical examination, there were no carriers in the teeth, and sclera was not icteric, pharynx and tonsil were not hyperemic, tonsil size T1-T1, and hepar not palpable. Dermatology examination showed reddish patches with fine scales and erythematous papule on the chest, stomach, back, both arms, both legs, and both feet, hypopigmented macules on the back, striae rubra, and an atrophic scar on both upper chests, both of breasts, both of upper arms, both of thighs (Figure 1). Auspitz sign and Kaarvetsvlek phenomenon were positive. PASI score was 9,2. PASI score was 9,2, and body surface area was 38%.

Dermoscopy examination showed a red dot with distribution homogenous on light pink background and white scales (Figure 2). Laboratory examination revealed viral load was negative, CD4 level was 487, and throat swab examination showed no growth. Gram staining examination in genital discharge did not find clue cells, no pseudohyphae, and blastospores, no diplococcus gram-negative. Potassium hydroxide examination in genital discharge did not find pseudohyphae and blastospores found. Sodium chloride examination in genital discharge did not find trichomonas. Urinalysis examination was not found an abnormality. The patient's DLQI was 5 (small effect on her life), and the DASS with a total score for stress was 4 (normal), anxiety was 0 (normal), and depression was 0 (normal).

The patient has treated with cetirizine tablet 10 mg once a day, clobetasol propionate cream 0,05%, twice a day on the reddish patches, urea cream 10% twice a day on the reddish patches, and used 15 minutes before applying clobetasol propionate cream, retinoic acid cream 0,05% once a day in the night on white patches and scratches. After 2 months, reddish patches were decreased, and the PASI score was 6,9.

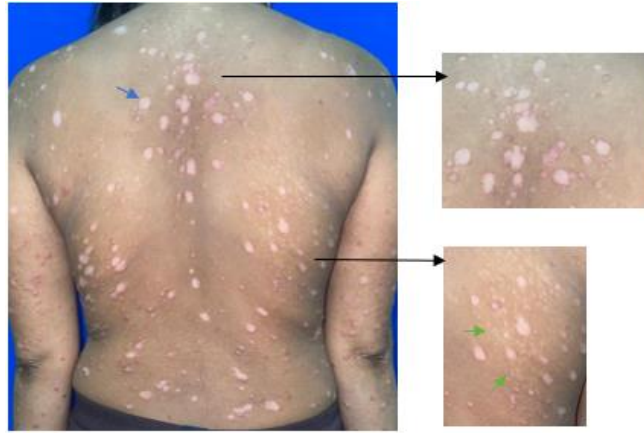


Figure 1. Reddish patches and white scales on chest, stomach, and back (blue arrow), hypopigmented macule (green arrow).



Figure 2. Dermoscopic examination: there were light pink backgrounds (black arrows), white scales (blue arrows), and red dots (green arrows).

### 3. Discussion

One of the risk factors for exacerbation of psoriasis was an infection.<sup>8</sup> Streptococcal throat infections have also been demonstrated to exacerbate preexisting chronic plaque psoriasis. Tonsillectomy has been shown to lead to long-term improvement in psoriasis. Severe exacerbation of psoriasis can be a manifestation of HIV infection. The prevalence of psoriasis in HIV infection is no higher than in the general population, indicating that this infection is not a trigger for psoriasis but rather a modifying agent.<sup>9</sup> Psoriasis is increasingly more severe with the

progression of immunodeficiency but can remit in the terminal phase. This paradoxical exacerbation of psoriasis may be caused by the loss of Tregs and increased activity of the CD8 T-cell subset.<sup>10,11</sup> Psoriasis exacerbation in HIV disease may be effectively treated with antiretroviral therapy.<sup>12,13</sup> Psoriasis has also been associated with hepatitis C infection.<sup>1</sup> In this patient, the patient did not have fever, cough, painful of swallowing, and on physical examination, there was no hyperemic pharyng and tonsil, tonsil size was T1-T1, so the possibility of streptococcal infection could be ruled out. The patient

also had no history of hepatitis infection. The patient was also diagnosed with HIV infection and routinely took antiretroviral every day.

Coronavirus disease 2019 (COVID-19), caused by the novel coronavirus SARS-CoV-2, has spread worldwide and raised a number of concerns among patients with psoriasis.<sup>14</sup> SARS-CoV-2 vaccination has become one of the most important strategies to prevent infection and control the pandemic. Although psoriasis is not a contraindication for many vaccinations of infectious diseases, the vaccination rate in patients with psoriasis remains low owing to concerns about the safety of vaccines and unawareness of the risk of infection. Although evidence is limited, some case series recently reported psoriasis flare-ups linked to SARS-CoV-2 vaccination.<sup>15</sup>

Wei et al. (2021) reported 7 patients who experienced an exacerbation of known psoriasis and one patient with new onset psoriasis following vaccination against COVID-19 with the Pfizer and Moderna vaccines.<sup>7</sup> Six of our patients presented with their symptoms after the second dose of the vaccine only, with 1 patient reporting flares after each dose. The days to symptom onset ranged from 0 to 65 days after the first injection, with an average interval of approximately 10 days.

Perna et al. (2021) reported a 40-year-old man with psoriasis got the COVID-19 vaccine.<sup>15</sup> The patient received the Pfizer vaccine (first dose) 5 days before the development of the rash, with no recent illnesses or new medication exposures. The rash began with tender, erythematous patches and plaques on his abdomen and arms, with progression to his legs and buttocks.

In this patient, three days after the patient got the COVID-19 vaccine (Sinovac), there were reddish patches with white scales that felt itchy on the chest, stomach, and back. One week later, reddish patches with white scales spread to both arms and legs. The patient got systemic treatment (cetirizine tablet 1x10 mg) and topical treatment (mometasone furoate cream 0,1 % twice a day on reddish patches on the face and

desoximetasone cream 0,05% twice a day on reddish patches on the chest, stomach, back, both of arms, and both of legs. After getting treatment in 1 month, the reddish patches with white scale were reduced.

COVID-19 vaccination may be a triggering factor for psoriasis, as suggested by the short time intervals between vaccination and psoriasis exacerbation.<sup>16</sup> Most of the currently used COVID19 vaccines are based on adenovirus as vector or mRNA; thus, the immunologic reaction to the COVID-19 vaccine may be distinct from the influenza vaccine, which is mediated by T helper (Th)1 and Th17 responses. Previous studies reported an increase in tumor necrosis factor (TNF)- $\alpha$  and interferon (IFN)- $\gamma$  production by CD4+ T cells after the Oxford-AstraZeneca COVID-19 vaccine.<sup>17,18</sup> TNF- $\alpha$  is well-known as a potent proinflammatory cytokine in psoriatic skin lesions, whereas IFN- $\gamma$  has been recognized as one of the pathogenic cytokines that can trigger inflammatory cascades of psoriasis with the potential to become a severity marker. The critical role of the Th17 subset of CD4+ T cells, possibly IL-6 induced, in COVID-19 immunopathology and vaccine-induced immune enhancement was highlighted by recent studies.<sup>11,17</sup> Interwoven with Th17, TNF- $\alpha$ , and IFN may be the link between psoriasis exacerbation and COVID-19 vaccines, yet further investigations are required to unravel the immunologic reactions. Further investigations and large controlled studies are warranted to elucidate the relationship between psoriasis and COVID19 vaccines.<sup>11,17,18</sup>

#### **4. Conclusion**

The COVID-19 vaccine can cause exacerbations in psoriasis patients, BUT this vaccine can still be given to psoriasis patients. It is based on the documented efficacy of the COVID-19 vaccine in the prevention of severe COVID-19 infection and fatality. Psoriasis patients should be consulted before getting vaccinated for COVID, and prompt clinical visits should be available if exacerbation develops.

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