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The coincidence of psoriasis vulgaris and pemphigus foliaceus in geriatric after COVID-19 vaccination

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Abstract

Background: Psoriasis is a chronic autoimmune disease characterized by well-demarcated, erythematous, scaly plaques, such as mica. Psoriasis occurs as a damaging result of Th17, TNF- α , and IFN- γ cells. The coincidence of psoriasis with pemphigus foliaceus is rare. Several studies have shown that Th17, TNF- α , and IFN- γ cells induced by COVID-19 vaccination can play a role in this mechanism although it remains unclear.

Case series: A 60-year-old woman without comorbidities with a 6-year history of controlled psoriasis, since 2016, with the administration of methotrexate and phototherapy. The diagnosis of psoriasis is clinically based on the form of erythematous, scaly plaques scattered throughout the body. The patient got the COVID-19 vaccination twice during the pandemic, followed by the exacerbation of psoriasis and coincidence with pemphigus foliaceus. The biopsy showed epidermal acantholysis with perivascular infiltration of PMN inflammatory cells and lymphocytes. The patient did not improve with the administration of methotrexate and phototherapy but showed improvement with methylprednisolone injections with tapering. Psoriasis relapsed again, but the patient improved after being given 4 times injections of secukinumab.

Conclusion: COVID-19 vaccination is necessary during a pandemic, but can lead to post-vaccination autoimmune exacerbations, such as the coincidence of psoriasis and pemphigus foliaceus. More research is needed to understand the potential of COVID-19 vaccination which is the first mRNA vaccine in humans.

Keywords: Coincidence, COVID-19 vaccination, geriatric, pemphigus foliaceus, psoriasis vulgaris

Introduction

Psoriasis is a chronic and recurrent inflammation of the skin, characterized by firmly bounded erythematous plaques, coarse-skinned, layered, and silvery-white like mica, in which patients will continue to experience alternating periods of remission and exacerbation [1]. Psoriasis is known as an autoimmune disease caused by excessive activation of the cellular immune system, but until now the antigen triggering psoriasis has not been identified [2]. Genetic predisposing factors coupled with environmental triggering factors such as medication, stress, physical trauma, ultraviolet radiation, burns, and vaccinations can cause the onset of this disease [3].

The term "Psoriasis vaccinalis" is an exacerbation of psoriasis after vaccination. Some of the known vaccines include influenza vaccines, Bacillus Calmette-Guerin (BCG), tetanus-diphtheria, and pneumococcal [4]. Although currently COVID-19 vaccination is highly recommended for autoimmune patients by some dermatological experts, there have been reported cases of skin reactions occurring after COVID-19 vaccination [5].

Cases of psoriasis were reported to be related to bullosa pemphigus, but the coincidence of psoriasis and foliaceous pemphigus was a fairly rare event [7]. We reported a case of coincidence of psoriasis and foliaceous pemphigus after the COVID-19 vaccination.

Case Report

A 60-year-old woman without comorbidities with a 6-year history of psoriasis, since 2016. For the past 3 years, psoriasis patients were controlled (PASI 0) with the administration of methotrexate and phototherapy. Clinically based diagnosis of psoriasis is in the form of thick-skinned erythematous plaques scattered throughout the body. Patients received the COVID-19 (Sinovac) vaccination twice during the pandemic; first in March 2021, and

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second in April 2021. In the first COVID-19 vaccination, the patient only experienced pain at the injection site for 24 hours. Two days after the second vaccination (3 weeks after the first vaccination), an exacerbation of psoriasis occurs followed by a coincidence with foliaceous pemphigus. (Figure 1-2)

Patients complain of the onset of blisters that extend rapidly from the facial area to the rest of the body, except for the

mucosal area, itchy and hot. Pain at the injection site and fever are refuted. Enforcement of the diagnosis of foliaceous pemphigus based on the results of a biopsy that showed the presence of intraepidermal acantholysis under the stratum corneum with a litter of PMN inflammatory cells and lymphocytes. In clinical examination, a picture of multiple thick-coupled erythematous plaques was also obtained, most of which were located in the patient's torso (PASI 15.9).



Fig 1: The facialist and trunk regions, (A, B) appear multiple erythematous plaques, confluent, with white squamous on top. There are vesicles and bullae that have been broken with erosion.



Fig 2: The region of the lower limbs, (A) appears as an erythematous macula with a ruptured bula on it accompanied by excoriation. (B) Multiple erythematous plaques of varying sizes, firmly bounded, with thick squamous on top.

Table 1: The patient's blood examination.

Parameters	Results	Normal Value	Unit
Leucocyte	13.15	4.5 - 11	($10^3/\mu\text{L}$)
Erythrocyte	3.95	4.6 - 6.0	($10^6/\mu\text{L}$)
Hemoglobin	11.7	12 - 16	(g/dL)
Hematocrit	36.5	36 - 54	(%)
Platelet	262	150 - 440	($10^3/\mu\text{L}$)
Na ⁺	142.27	135 - 147	(mmol/L)
K ⁺	3.95	3.5 - 5.0	(mmol/L)
Cl ⁻	103.57	95 - 105	(mmol/L)
Ca	1.16	1.0 - 1.5	(mmol/L)
Glucose	146	70 - 150	(mg/dL)
Ureum	30.2	13 - 43	(mg/dL)
Creatinine	0.75	0.6 - 1.2	(mg/dL)
SGOT	28.2	1.0 - 40.0	(U/L)
SGPT	18.6	1.0 - 34.0	(U/L)
Albumin	3.0	3.8 - 5.5	(g/dL)

The patient did not improve with the administration of methotrexate and phototherapy, then given methylprednisolone injection therapy (2mg/ kg of body

weight / day) with tapering for 1 week and showed improvement so that the patient was allowed to go home. (Figure 3).



Fig 3: The facialist region, (A-C) appears to be a conflicting multiple erythematous maculae accompanied by multiple excoriations mainly in the perioral area.

Psoriasis then reappears after Eid, May 2022 (PASI 8). (Figure 4) At this second exacerbation, the general condition of the patient is good so the patient is allowed outpatient

treatment. The patient improved after being given 4 injections with a PASI score of 0. (Figure 5)



Fig 4: (A, B) The trunk region, upper arms, and lower limbs, appear as multiple erythematous plaques, firmly bounded, varying in size, conflicting, with a white squall on top.





Fig 5: (A) The facialist region, (B) the trunk, and (C, D) the lower limbs, appear multiple maculae hyperpigmentation, varying in size, and conflicting in size. No visible inflammatory lesions. The photo was taken 1 week after the use of 4 injections of secukinumab.

Discussion

Psoriasis is known as an autoimmune disease caused by the excessive activation of the cellular immune system.² The process of occurrence of psoriasis begins with the presence of plasmacytoid dendritic cells activated in the dermis resulting in interleukin (IL)-12 and IL-23 which are able to make most of the lymphocytes of T helper (Th) 1 and Th17 infiltrate psoriasis skin lesions. Th17 cells play an active role in the CD4+ T cell differentiation process in producing IL-17A, IL-17F, and IL-22, while Th1 cells play a role in producing tumor necrosis factor (TNF)- α and interferon (IFN)- γ responsible for the occurrence of inflammation and hyperplasia of the epidermis. Both TNF- α and IL-17A are able to induce keratinocyte cells to produce psoriasis-related genes. IL-17A is also produced not only by Th17 cells, but also by neutrophils, mast cells, and cytotoxic T cells^[8].

Exacerbations of psoriasis following COVID-19 vaccination have been reported. A total of 414 patients after the Pfizer-BioNTech and Moderna COVID-19 vaccines experienced a cutaneous reaction, and 2 of them were accompanied by psoriasis exacerbations^[9]. In addition to the worsening of pre-existing psoriasis lesions, pustular psoriasis also appeared after the administration of the first dose of the AstraZeneca-Oxford COVID-19 vaccine^[5]. COVID-19 vaccination can be a triggering factor for psoriasis based on the short time interval between vaccination and psoriasis exacerbation. This is supported by previous studies^[9, 5]. Most of the COVID-19 vaccines currently in use are based on adenovirus or mRNA vectors; thus, immunological reactions to COVID-19 vaccines may differ from influenza vaccines, which are mediated by the Th1 and Th17^[10]. Previous studies reported increased production of TNF- α and IFN- γ by CD4+ T cells after the AstraZeneca-Oxford COVID-19 vaccine^[11, 12]. The role of Th17 in CD4+ T cells may also play a role in post-vaccine immunopathology^[13]. The relationship between Th17, TNF- α , and IFN- γ could be a trigger for exacerbation of psoriasis post-COVID-19 vaccine, but more investigation is needed to determine the immunological reactions that occur.

Cross-sectional studies regarding the relationship between pemphigus and psoriasis have also been reported^[6, 14]. The pathogenesis underlying the occurrence of pemphigus in patients with psoriasis is not yet fully known. However, some hypotheses have been postulated to explain this relationship. This pathogenesis can be attributed to the "phenomenon of the spread of the epitope", in which the inflammatory process of psoriasis can cause alterations in proteins in the epidermis, thus exposing certain epitopes that were previously hidden from the immune system. This process may eventually induce a secondary autoimmune humoral response^[13]. Another opinion states that it is a change in the regulation of T cells that leads to an increase in autoantibodies resulting in the coexistence of pemphigus and psoriasis^[14].

The level of plasminogen activators has been shown to increase in psoriasis lesions. Interestingly, the activation of plasminogen has also been found to have a role in the acantholytic process in pemphigus^[6]. Some studies assume that inflammation from another dermatosis can also form an environment suitable for expressing intraepidermal antigens as well as increasing the activity of pemphigus pathogen autoantibodies^[15]. HLA DRB1 alleles have also been reported to be associated with pemphigus⁶ and psoriasis genetically^[1].

The use of secukinumab in this case is safe to use and gives quite satisfactory results (based on PASI scores) in patients with psoriasis. Secukinumab is an IgG1 monoclonal antibody that selectively binds to and neutralizes IL-17A^[8]. Secukinumab administration was approved by the United States Food and Drug Administration (FDA/USFDA) in 2015 as a treatment for moderate to severe degree psoriasis in adults eligible for systemic therapy or phototherapy^[8].

Currently COVID-19 vaccination is recommended for all patients with psoriasis, regardless of severity^[16]. Patients with psoriasis who have no contraindications to vaccination should follow a statement of guidance published by the National Psoriasis Foundation to receive an mRNA-based

COVID-19 vaccine as soon as it becomes available to them. These recommendations are based on the key benefits of COVID-19 vaccines in the prevention of more severe COVID-19 infections ^[16].

Conclusion

In some cases, COVID-19 vaccination can be associated with psoriasis and pemphigus cozymes. Patients with autoimmune diseases are advised to consult first before getting the COVID-19 vaccine and re-control if there begins to be an exacerbation after vaccination. More research is needed to identify the incidence, immunological reactions that occurred, and what factors contributed to the co-vengeance of psoriasis and pemphigus after COVID-19 vaccination.

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