

Pemphigus Foliaceus in A Potato Donut Seller: A Case Report

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Abstract

Background: Pemphigus foliaceus is a condition of a rare and potentially life-threatening autoimmune blistering skin disease, thought to be caused by circulating autoantibodies against desmoglein-1 (Dsg-1), a glycoprotein with an integral role in maintaining intercellular adhesion between keratinocytes. Pemphigus foliaceus primary lesions generally manifest as erythematous papules, plaques, and erosions with the addition of scaly crusts as secondary lesions. Immunosuppressant is the mainstay therapy for pemphigus foliaceus. This case report describes the case of a female patient who worked as a potato donut seller with pemphigus foliaceus and analyzes the relationship between her disease and work.

Case Presentation: A 31-year-old woman presented with a history of itchiness, redness, and burning sensation on her face, followed by the appearance of vesicles on her face, spreading to the back, arms, and legs. The patient worked as a potato donut seller and encountered numerous potential hazards. Upon further examination, the patient was diagnosed with pemphigus foliaceus.

Discussion: Establishing an occupational disease requires a seven-step method, taking into account the clinical diagnosis, occupational, individual, and other exposures outside of work. In this case, neither occupational, individual, nor other environmental risk factors of pemphigus foliaceus was found.

Conclusion: There are no substantial evidence that occupational exposures as a potato donut seller cause or exacerbate the patient's diagnosis of pemphigus foliaceus. The patient's innate genetic susceptibility remains the main factor contributing to her diagnosis.

Keywords: pemphigus foliaceus, potato donut seller, occupational disease

Abstrak

Latar Belakang: Pemphigus foliaceus adalah penyakit autoimun langka yang menyerang kulit dan berpotensi mengancam jiwa. Pemphigus foliaceus dipercaya disebabkan oleh autoantibodi terhadap desmoglein-1 (DSG-1), suatu glikoprotein yang memiliki peran penting dalam mempertahankan adhesi antara keratinosit. Lesi primer pemphigus foliaceus umumnya bermanifestasi sebagai papul, plak eritematosa, dan erosi dengan krusta. Imunosupresan merupakan terapi utama dalam penanganan pemphigus foliaceus. Laporan kasus ini membahas kasus seorang pasien pemphigus foliaceus yang bekerja sebagai penjual donat kentang dan menganalisis hubungan antara pekerjaan dengan penyakit tersebut.

Kasus: Seorang wanita berusia 31 tahun mengalami keluhan berupa gatal, kemerahan, dan sensasi terbakar di wajah, diikuti oleh timbulnya vesikel di wajah, punggung, lengan, dan kaki. Pasien bekerja sebagai penjual donat kentang di mana ia terpapar berbagai potensi bahaya. Setelah pemeriksaan lebih lanjut, pasien didiagnosis dengan pemphigus foliaceus.

Diskusi: Penegakan diagnosis penyakit akibat kerja memerlukan metode yang terdiri dari tujuh langkah dengan mempertimbangkan diagnosis klinis, pekerjaan, faktor individual, dan paparan di luar pekerjaan. Pada kasus ini, tidak ditemukan faktor risiko dalam pekerjaan, individual, maupun faktor risiko lingkungan lainnya yang kemungkinan mencetuskan pemphigus foliaceus pada pasien.

Kesimpulan: Tidak terdapat bukti bahwa paparan pekerjaan pasien sebagai penjual donat kentang menyebabkan atau memperburuk pemphigus foliaceus pada pasien. Kerentanan genetik pasien merupakan faktor utama yang berkontribusi pada diagnosis pemphigus foliaceus.

Kata kunci: Pemphigus foliaceus, penjual donat kentang, penyakit akibat kerja

Background

Pemphigus foliaceus is a condition of a rare and potentially life-threatening autoimmune blistering skin disease. Nevertheless, this condition affects almost an estimated number of 1 million patients all around the USA and Europe.¹ Pemphigus foliaceus is thought to be caused by circulating autoantibodies against desmoglein-1 (Dsg-1), a glycoprotein that plays an integral role in maintaining intercellular adhesion between keratinocytes.² The loss of intercellular adhesion only occurs in the upper epidermal layers and is also restricted to the skin with no mucosal involvement, a condition attributable exclusively to the expression pattern of Dsg-1, which distinguishes pemphigus foliaceus from its more common counterpart, pemphigus vulgaris. Hence, this disease is characterized by its typical involvement in the seborrheic skin areas. Pemphigus foliaceus primary lesions generally manifest as erythematous papules, plaques, and erosions, with the addition of scaly crusts as secondary lesions.³ Susceptibility to pemphigus foliaceus has been studied and found to be correlated with the presence of numerous genetic markers such as HLA-DR4, DR-14, and DR-1, but no single allele has been distinguished to be associated with the disease.⁴

Like many other autoimmune diseases, immunosuppressant is the mainstay therapy for pemphigus foliaceus. Glucocorticoids are the most commonly used first-line treatment, with other immunosuppressants also well-established to treat this condition, such as azathioprine, methotrexate, or rituximab.^{5,6} Here, we describe the case of a female patient who worked as a potato donut seller and suffered from pemphigus foliaceus; to analyze whether there was a connection between patient's field of work and her skin condition.

Case

A 31-year-old woman experienced itchiness, redness, and a burning sensation on her face in 2018. Vesicles started to appear on her face, spreading to the back, arms, and legs. The patient was referred to Cipto Mangunkusumo General Hospital and was diagnosed with pemphigus foliaceus. On October 2022, the patient went to the hospital for a monthly check-up.

Most of the patient's back rashes had dried and turned brown. The patient still had complaints of itchiness, especially on her back. The itchiness still interfered with her daily activities and sleeping schedule. Complaints of new rashes, wet rashes, fever, cough, nose congestion, and sore throat were denied. The patient consumed one dose of 4 mg of methylprednisolone, two doses of 180 mg of myfortic, and a topical medication daily. The patient denied any history of hypertension, diabetes mellitus, allergy, asthma, cardiovascular disease, previous autoimmune conditions, cancer, or symptoms related to her menstruation cycle. History of hypertension, diabetes mellitus, atopic, asthma, autoimmune conditions, cancer, and similar symptoms in the patient's family were denied.

The patient lived in a family-owned one-story house with her husband and their 6-year-old child. The house had concrete walls and cement floors. The patient did not smoke or drink alcohol. However, the patient's husband was an active smoker.

The patient had been working in a potato donut shop for one year. The shop was located inside a shopping mall. The patient worked every day and took a 30-minute busway ride to get there. The patient and her co-worker had two shifts, the morning shift (09.30 am to 04.00 pm) and the afternoon shift (01.00 pm to 09.00 pm), alternating with each other every other week. Upon arrival at the potato donut shop, the patient would open the shop, prepare the dough, fry the donuts, and serve the customers. The patient spent most of the time sitting down, and she could get some rest when there was no customer. On average, the shop served approximately 10-20 customers on weekdays and around 30-35 on weekends.

There were several potential hazards at the patient's workplace, including physical, chemical, ergonomic, and psychosocial hazards. Potential physical hazards consisted of UV rays, whole body vibration inside the bus, low temperature from the AC, hot weather, vibration on the hands whilst preparing the dough, noise, and high temperature from the cooking oil used to fry the donuts. Potential chemical hazards the patient had to encounter included vehicle emissions (CO, Pb). Potential ergonomic hazards consisted of legs flexion, standing up while extending an arm holding on to the bus handrail; neck and arm flexion, gripping the dough mixer while preparing the dough; awkward position and repetitive movement while kneading the dough;

repetitive movement of flipping the donuts white frying them; and sitting down for a long period of time. Potential psychosocial hazards consisted of exhaustion, stress, and boredom due to monotonous work.

Physical examination revealed multiple erythematous - hyperpigmented plaques - patches, lenticular - plaques, discrete - confluence, circumscribed - diffuse, with coarse dry white scales and red-blackish crusts on the scalp, hairline, bilateral retroauricular to auricula, neck, chest to breast, back, abdominal, and bilateral lower limbs regions (**Figure 1**). Histopathologic examination in 2018 revealed epidermal layers with orthokeratic, scanty, focal atrophic, spongiotic, exostosis neutrophils and eosinophils; subcorneal gaps, and intraepidermal layers containing erythrocytes, eosinophils, and neutrophils; superficial dermal layers consisting of fibro-collagen connective tissue with chronic inflammatory cells, eosinophils, and neutrophils, especially around blood vessels. Those findings were consistent with the diagnosis of pemphigus foliaceus.

Discussion

An occupational disease is a state of ailments brought on or exacerbated by exposure at work. A specific method that involves the following seven phases is necessary to diagnose an occupational disease:

1. Establishment of the clinical diagnosis
2. Determination of the occupational exposures
3. Determination of the relationship between occupational exposures and the clinical diagnosis
4. Determination of whether the exposure is intense enough to cause the clinical diagnosis
5. Determination of other individual factors that might be the cause or a risk factor of the diagnosis
6. Determination of other factors outside the workplace
7. Establishment of the diagnosis of occupational disease.⁷



Figure 1. Physical examination findings

Establishing a clinical diagnosis is the first stage in diagnosing an occupational disease. Considering the patient's medical history, physical, and histopathological examination, a diagnosis of pemphigus foliaceus was made. The patient had vesicles outbreak on her face, back, arms, and legs with itchiness, redness, and a burning sensation. Specific characteristics of the lesions, lack of mucosal involvement, typical histopathological findings, and no apparent history of contact or allergy led us to the clinical diagnosis of pemphigus foliaceus. The patient then underwent a clinical trial of treatment with immunosuppressants and showed significant progress, which strengthened the diagnosis.

The second step of the occupational disease diagnosis process is to identify occupational exposure. This can be accomplished by thoroughly analyzing the environment and details of the patient's work. The patient came into contact with the following possible risks such as physical hazards (extreme temperature, vibration, noise, UV rays), chemical hazards (flammable, explosive), ergonomic hazards (immobility for a long period of time, repetitive movements), and psychosocial hazards (physical exhaustion, mental exhaustion/boredom, stress).

The third step of the occupational disease diagnosis process is to determine the relationship between occupational exposure and clinical diagnosis. We found no clear evidence of a direct connection between the aforementioned exposures and pemphigus foliaceus. However, pemphigus foliaceus is an autoimmune disorder, which is a complex disease with genetic, epigenetic, and environmental components that are characterized by an inappropriate immune response to self-antigens. Autoimmune disease cannot be entirely attributed to hereditary and genetic causes. There has been a developing discussion regarding the impact of psychological stress on the onset or progression of autoimmune disease. Moreover, epidemiological studies have indicated that stress may both precede the development of autoimmune diseases and increase their symptoms.⁸ Nevertheless, we could not attribute the stress factor due to the patient's occupation as a potato donut seller alone. The patient's diagnosis was established years before she started working as a potato donut seller. Therefore, occupational exposure as a potato donut seller could not be the cause of her diagnosis. There was no evidence of any progression of the disease following her current occupation. Quite the contrary, her most recent monthly check-up results

indicated that her overall condition had improved. Hence, there was no suspicion that the patient's occupational exposure exacerbated her illness.

The fourth step of diagnosing an occupational disease is to determine whether the exposure is intense enough to cause the clinical diagnosis. The patient had worked as a potato donut seller for one year, 8 hours a day, 7 days a week. The patient used plastic gloves and a mask as a means of self-protection. However, since there was no specific exposure proven to cause or exacerbate the patient's illness, it can be concluded that the occupational exposure's intensity was not enough to cause or exacerbate the clinical diagnosis of pemphigus foliaceus.

The fifth step of diagnosing an occupational disease is to determine other individual factors that may be the cause or a risk factor of the diagnosis. Susceptibility to pemphigus foliaceus has been found to be correlated with the presence of numerous genetic markers, such as HLA-DR4, DR-14, and DR-1, even though no single allele has been proven to be associated with the disease.⁴

Other trigger factors reported included diseases such as infections, cancer, and autoimmune diseases. Most viruses stimulate immune responses; consequently, this also causes an exacerbation or induction of autoimmune conditions. Herpes virus infections have been known to exacerbate pemphigus. There have been many reports of the co-existence of different types of pemphigus and various cancers. Thusly, it is believed that there is a complex relationship between them, which needs further studies. Reports have shown that some autoimmune diseases (e.g., pemphigoid) are closely related to pemphigus. Several reports also showed the co-existence of pemphigus and another autoimmune condition, as well as a family history of autoimmune conditions.⁹ Another risk factors of pemphigus include certain ethnic backgrounds (Jewish, Indian, Southeast European, Middle Eastern), particular geographic locations (rural regions of Brazil and Tunisia), and specific age groups (between 40 and 60 years old).¹⁰

The patient and her family had no history of previous autoimmune diseases, atopic, allergy, hypertension, diabetes mellitus, cancer, and recent viral infection. The patient is a Southeast Asian living in Indonesia, and she was in her late 20s when the symptoms of pemphigus foliaceus began to appear. Therefore, no individual factor was found to cause or exacerbate pemphigus foliaceus.

The sixth step of the occupational disease diagnosis process is to determine other factors outside the workplace. Studies on endemic pemphigus foliaceus found that individuals living in rustic houses with adobe walls, thatched roofs, and absent or poorly fitted doors were more likely to develop pemphigus foliaceus. The chances of these individuals developing pemphigus foliaceus might be increased with exposure to hematophagous bites (from bed bugs).¹¹ Some cases have been associated with the use of certain drugs, namely captopril and penicillamine. Captopril and penicillamine contain sulfhydryl groups, speculated to cause interaction with the sulfhydryl groups in Dsg1 and Dsg3.¹² In this case, the patient lived in a one-story house with concrete walls and cement floors. There were no reports regarding exposure to hematophagous bites, and the patient did not have any history of captopril or penicillamine consumption.

The seventh and last step of the occupational disease diagnosis process is to establish the diagnosis of occupational disease. From the available evidence, history taking, and rigorous examination of the patient, it can be inferred that the patient's diagnosis of pemphigus foliaceus was not caused or exacerbated by occupational exposure.

Environmental, immunologic, and genetic factors all play a role in the development of pemphigus foliaceus. Even though comprehensive analysis has shown no evidence of occupational exposure, we would like to focus on what variable of environmental factors could contribute to the development of this autoimmune disease. Unique and notable characteristics of pemphigus foliaceus include geographic and temporal clustering of cases, prevalence of cases in adolescents and children, and a relationship with certain different HLA-DR alleles. Another startling finding is the declining prevalence in some regions that coincides with urban development.¹³ However, no environmental factor described in the patient's profile matched the epidemiological feature of pemphigus foliaceus. The only notable factor possible in this case is psychological stress. Stressful life experiences have been linked to the development of various autoimmune skin diseases and have been suggested as a potential trigger and aggravating factor for pemphigus in people with a predisposition to the condition.¹⁴ Monotonous work, hectic lifestyle in crowded capital city, and socioeconomic condition may contribute to the persisting psychological stress which is a tough challenge to encounter. There are some

efficient stress management methods to offer. They frequently involve actions that enhance physical health, such as exercise, balanced diet and nutrition, and other technique to enhance mental and emotional capacity.¹⁵ Patient could be explored in more depth and encouraged to modify their reflexive conditioning to a more adaptive and measured response with better awareness of the present time with styles tailored specific to her profile.

Conclusion

The diagnosis of occupational disease necessitates a comprehensive and thorough examination. Taking into consideration various potential workplace hazards and how they relate to the clinical diagnosis, it is important to assess potential risks that may exist elsewhere. In this case, there is no strong evidence that the patient's diagnosis of pemphigus foliaceus was brought upon by or made worse by her work as a potato donut seller. The patient's innate genetic susceptibility remains the main factor contributing to her diagnosis.

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