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Generalized Exfoliative Dermatitis Suspected Caused by COVID-19 Vaccine : A Case Report

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ABSTRACT

Introduction: Exfoliative dermatitis (ED) is a skin disorder characterized by the presence of erythema and scaling of the skin involving more than 90% of the total body surface area. One of the main etiologic factor of ED is drug hypersensitivity reaction. Vaccine administration can result in allergic reactions. The aim of this case report is to provide information on one of the forms of allergy to the COVID-19 vaccine, which can be ED.

Case: A woman, 61 years old, with complaints of reddish patches accompanied by thickened scales and spread throughout the body accompanied by itching, pain in the skin, experiencing fatigue and chills since 3 days ago before the patient said she had received COVID-19 booster vaccine. The patient was diagnosed with generalised exfoliative dermatitis suspected to be caused by the COVID-19 vaccine. The patient was given therapy with oral methylprednisolone 36 mg/day with tapering if there was improvement, and topical urea 10% cream and hydrocortisone 2.5 % cream (face) and desoxymethasone 0.25 % cream (body).

Conclusion: Exfoliative dermatitis can be idiopathic or secondary to drug hypersensitivity including vaccine administration. A complete history including history of drug administration and a thorough physical examination are required so that treatment can be given appropriately.

Keywords

Exfoliative dermatitis, COVID-19 vaccine, Treatment

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INTRODUCTION

Exfoliative dermatitis (ED) is defined as diffuse erythema and scaling of the skin involving more than 90% of the total body skin surface area.[1] It is a reaction pattern and cutaneous manifestation of a myriad of underlying ailments, including psoriasis and eczema, or a reaction to the consumption of certain drugs. Though some experts believe it does not pose a significant risk of death, erythroderma is a potentially life-threatening condition that requires proper diagnosis, identification of underlying etiology, and management.[2]

Vaccines constitute the most effective medications in public health as they control and prevent the spread of infectious diseases and reduce mortality. Similar to other medications, allergic reactions can occur during vaccination. Polyethylene glycol, also known as macrogol, in the currently available Pfizer®-BioNTech and Moderna® COVID-19 mRNA vaccines, and polysorbate 80, also known as Tween 80, in AstraZeneca® and Johnson & Johnson® COVID-19vaccines, are excipients mostly incriminated for allergic reactions.[3]

The actual incidence of exfoliative dermatitis in the U.S. and worldwide is unknown. Yet another study suggested a general incidence of 1 to 2 patients per 100000. Generally speaking, erythroderma has a predilection of males to females varying between 2 and 4 to 1 and a mean age of onset between 40 and 60.[4]

The classic presentation of ED is erythematous patches that increase in size and coalesce into generalized red erythema with a shiny appearance. By definition, ED involves more than 90% of the patient's skin surface. A few days after the onset of erythema, fine white or yellow scaling begins, classicallya rising in the flexures. Plate-like scaling may occur acutely and on the palms andsoles. The scaling progresses further, giving the skin a dull red appearance. With chronicity, edema and lichenification lead to skin induration.[1,5]

The working diagnosis includes a complete history and physical examination, with careful analysis of pertinent clinical clues and dermatohistopathology. Other laboratory workup is often required and determined by clinical clues. Management of ED involves combining symptomatic relief with addressing the underlying etiology and potential systemic complications. Inpatient hospitalization is required in acute cases.[1,2,5]

This review will summarize the current state of knowledge of immediate and delayed allergic reactions in the currently available vaccines against COVID-19, together with the general and specific therapeutic considerations.

CASE

A 61-year-old woman came to the Dermatology Venereology and Aesthetics clinic of Prof. Dr. H Chairuddin Panusuan Lubis Hospital - Universitas Sumatra Utara (Prof. CPL - USU Hospital) with complaints of reddish patches accompanied by scales that thickened and spread throughout the body accompanied by itching, pain in the skin, fatigue, and chills since 3 days ago, previously the patient said she had received a *Pfizer*® type COVID-19 booster vaccine. A history of food allergy was denied, and a history of other atopy diseases in the patient and family was denied. The history of high uric acid in the patient is known since about 2 years ago, routinely taking Allopurinol but has never caused drug allergy symptoms.

Figure 1. Exfoliative Dermatitis. Patches erythematous with thickened scales were found in the fascial region, trunk, superior extremities, and inferior extremities (generalized).

On physical examination, general condition was good, compos mentis. On dermatological examination, patch erythematous are found in the fascialis, trunkus, and inferior extremities, and scales were found in the fascialis, trunks, superior extremities, and inferior extremities (generalized) (Figure 1). The differential diagnosis of the patient was Steven-Johnson Syndrome - Toxic Epidermal Necrolysis (SJS-NET), and generalised exfoliative dermatitis due to previous illness (psoriasis and dermatitis). The working diagnosis in this patient is based on anamnesis, history of drug use, physical examination and additional examinations such as laboratory tests, based on this the patient was diagnosed with generalised exfoliative dermatitis presumably caused by the COVID-19 vaccine. The patient was treated with oral methylprednisolone 4 mg 3 - 3 - 3 tablets/day (36 mg) tapering off if there was improvement, cetirizine 10 mg 1 tablet per day, ranitidine 150 mg per 12 h before meals and topical 10% urea cream applied to the whole body 2 times day, then after 15 minutes, 0.25% desoxymethasone cream was applied to the body and extremities 2 times per day, and 2.5% hydrocortisone cream on the face area was applied 2 times per day. The prognosis for this patient was quo ad vitam bonam, quo ad functionam bonam, and quo ad sanationam dubia ad bonam.

DISCUSSION

Exfoliative Dermatitis is a skin disorder characterised by universal erythema (90%-100%), usually accompanied by scales. In accordance with this case report, the patient is a 61-year-old woman, who came to the Dermatology Venereology and Aesthetics polyclinic of Prof. Dr. CPL Hospital - USU with complaints of reddish patches accompanied by scales that thickened and spread throughout the body accompanied by itching, pain in the skin, experiencing fatigue, malaise and chills since 3 days ago, previously the patient said she had received a Pfizer® type COVID-19 booster vaccine. The component of the Pfizer® vaccine that may cause an allergic reaction is polyethylene glycol - 2000. Allergic responses caused by COVID-19 vaccines can cause type IV allergic reactions starting 48 h after vaccination and peaking between 72 and 96 hours. The initial reaction of hypersensitivity is characterised by erythema, swelling, and itching that occurs near the site of COVID-19 vaccine administration, approximately a week after vaccination. A history of food allergy was denied, and a history of other atopy diseases in the patient and family was denied. The history of high uric acid in the patient was known since about 2 years ago, routinely taking Allopurinol but never caused symptoms of drug allergy.[6-13]

Based on the literature, management of ED includes providing nutrition, controlling skin hydration, preventing scratching, and preventing triggering factors such as medication use, as well as treating the underlying disease.[1] Patients who experience systemic allergic reactions to vaccines should not receive a second dose of the vaccine, or vaccines with similar ingredients.[10-14] Topical therapy modalities that are the first line for ED are compresses on wet rashes, topical emollients, and topical corticosteroids. As for systemic therapy, sedative antihistamines, oral antibiotics if secondary infection is found, diuretics if peripheral oedema is found and fluid replacement therapy to avoid electrolyte balance disturbances.[1,14]

Inflamed skin can be given moisturiser or topical steroids of mild potency, while systemic corticosteroids are used in ED caused by atopic dermatitis and ED caused by drug eruption with a slow dose reduction to minimise the risk of rebound flares. Systemic corticosteroids 1-2 mg/kg/day are effective to overcome inflammatory reactions in the skin.[8] Moisturiser is given to improve impaired skin barrier function. Antihistamines are needed to reduce itching. Tapering off systemic corticosteroids is recommended to be decreased weekly by 5 mg until it reaches 30 mg, after which a daily dose reduction regimen is started according to clinical improvement and side effects that occur in patients. The use of corticosteroids in high doses and long-term can cause suppression of adrenal gland function, suppression of the immune system, Kaposi's sarcoma, and psychiatric disorders.[6,8]

CONCLUSION

Exfoliative Dermatitis is defined as a skin disorder characterised by erythema and squamous skin involving more than 90% of the total body skin surface area. The etiology of ED is drug hypersensitivity reaction,

underlying diseases such as psoriasis, atopic dermatitis, and cutaneous T-cell lymphoma (CTCL). Vaccine administration can control, prevent the spread of infectious diseases and reduce mortality. As with other drugs, allergic reactions may occur during vaccination. Topical therapy modalities that are the first line for ED are compresses, emollients, and topical corticosteroids. As for systemic therapy, sedative antihistamines, oral antibiotics if secondary infection is found, diuretics if peripheral oedema is found, fluid replacement therapy to avoid electrolyte balance disorders and systemic corticosteroid administration of 1-2 mg/kg/day with tapering off if there is improvement, are effective to overcome inflammatory reactions on the skin.

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