



Lichen Simplex Chronic Skin Problems in Diabetes Mellitus Patient: A Case Report

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ABSTRACT

Diabetes mellitus is an endocrine, metabolic disease that can occur in all ages and socioeconomic groups. Uncontrolled diabetes mellitus can cause various complications. One of them is the manifestation of the skin. Chronic lichen simplex in diabetes mellitus patients was reported in cases with uncontrolled blood sugar levels greatly affecting chronic skin lesions in patients. Controlled sugar levels and appropriate topical therapy and psychological management in patients are expected to provide better output and prognosis. The patient came with complaints of itchy, red and painful wounds on both legs, accompanied by a fever for 7 days. Previously the patient often had numbness and tingling in the upper and lower extremities. Patients often scratch their skin, resulting in wounds that then dry out and thicken. The patient also has the comorbid disease of Diabetes mellitus. Complaints have been recurring frequently and have been felt for more than the last 2 years. Itching often recurs, especially when you think about something a lot and when you are resting. Based on the dermatological examination, the results showed that on both lower limbs, there were non-layered smooth white scaly lesions, lichenification accompanied by hyperpigmentation, the size of the plaques had indistinct boundaries, there was slight edema and erythema, multiple erosions with black crusts on the surface of the lesion were not easily removed. Diabetes mellitus is associated with dermatologist disorders. Early recognition of initial cutaneous changes such as xerosis, hyperkeratosis, or skin infections by appropriate management could help reduce late or severe complications of diabetes. Although most dermatological conditions require specific treatment, the most important rule is to improve blood glucose levels control in patients. Education in treatment, hygiene, emotional stress and lifestyle changes are important for improving the quality of life for patients with diabetes mellitus.

1. Introduction

Hyperglycemia is a condition in which blood glucose levels increase beyond normal values, which can occur especially in several diseases such as diabetes mellitus or other disease conditions. Diabetes mellitus is a group of metabolic diseases in which hyperglycemia occurs due to abnormalities in insulin secretion, insulin action, or both. Based on data from the International Diabetes Federation Organization in 2021, it is reported that 10.5% of the world's population suffers from DM, where it is predicted that

in 2045, there will be an increase of 46%, namely around 783 million world population diagnosed with DM. Southeast Asia is ranked third at 11.3% in 2019. Meanwhile, RISKESDA data shows the national DM prevalence was 6% in 2013 and increased to 8.5% in 2018, or around 20.4 million Indonesians were diagnosed with DM.¹⁻⁵

Patients with diabetes mellitus who are not controlled often have complications; as many as 51.1% - 97% of DM patients experience manifestations of skin disorders. Several mechanisms for the emergence



of skin manifestations in DM patients are a direct result of metabolic changes such as hyperglycemia, hyperlipidemia, neurological disorders, the immune system and progressive vascular damage such as microangiopathy also contribute significantly to skin manifestations. Hyperglycemic conditions inhibit keratinocyte proliferation, and phagocytosis also induces endothelial cell apoptosis. Involvement of the peripheral nervous system and vascular changes play a major role, in sensory neuropathy it plays a role in reduced skin sensation, paresthesia, and itching. Meanwhile, changes in the autonomic nervous system can reduce sweat secretion so that the skin becomes dry, causing xerosis and hyperkeratosis. If you scratch more often, fissures will be present.⁶⁻¹¹

Chronic lichen simplex or neurodermatitis is a chronic skin disease. Around 12% of the world's population suffers from neurodermatitis. This disease is characterized by lichenification dry diffuse plaque lesions resulting from continuous repeated scratching. Patients generally feel the itching getting worse, and scratching reflexively becomes an unconscious habit, which can affect the patient's quality of life. Knowledge of good dermatological manifestations in diabetes mellitus sufferers is expected to provide appropriate initial therapy and a better prognosis for patients.⁷⁻⁹

2. Case Presentation

A 57-year-old man came to the emergency room with complaints of wounds on both lower legs, accompanied by fever for 7 days before entering the hospital. The patient admitted that it was difficult to do activities because of itching and pain, especially in the right leg with VAS 7. Complaints often recurred, more than in the last 2 years. Complaints of itching are felt especially when thinking about problems a lot, and when resting, the desire to scratch becomes stronger. History of trauma was denied, previously, there were complaints that both arms and legs were often numb and tingling. The patient has a history of diabetes mellitus with peripheral neuropathy,

hypertension, and chronic lichen simplex but the patient rarely controls the disease. The patient's previous medical history had taken metformin 3x500mg, glimepiride 1x4mg, amlodipine 1x10mg, acarbose 2x100mg, alpentin 1x100mg, notisil 1x2mg, for complaints of neurodermatitis since 2021 if it relapses get routine medicine in the form of cetirizine 1x10 mg with a combination of 0.05% Clobetasole ointment and Vaseline albumin + 2% salicylic acid applied 2 times a day.

On physical examination, the patient was well-oriented (compos mentis, GCS 15) and well-oriented. Examination of vital signs showed blood pressure 155/83 mmHg, pulse 102x/minute, temperature 38.3, respiratory rate 19x/minute, and 98% oxygen saturation, with a patient weight of 64.4 kg. No abnormalities were found on thoracic and abdominal examination. On local examination of both lower limbs found non-layered smooth white scaly lesions, lichenification accompanied by hyperpigmentation plaque size indistinct boundaries, slight edema, and erythema, suggesting secondary infection in the lesion, multiple erosions were found on the surface of the lesion with black crusts that don't come off easily. This is consistent with the efflorescence of neurodermatitis. Routine blood tests showed Hemoglobin 12.1 g/dl, Hematocrit 34.4%, Platelets 204,000/uL, and Leukocytes 14,900/uL with an increased number of neutrophils. On GDS examination, the results were 279 mg/dl, complete urine yielded +2 protein, +2 glucose, negative ketones, +1 blood, and 2-3 leukocytes. D-dimer examination resulted in 1297 ng/mL and creatinine 1.29 mg/dl. The patient was diagnosed with Diabetes Mellitus with peripheral neuropathy and neurodermatitis

The patient received NS infusion therapy 20 drops per minute, Paracetamol 1gr IV injection. In addition, the patient was given Novorapid 10Unit, Ceftriaxone 2 grams a day, gabapentin 300mg a day, mecobalamin 500mg twice a day, Arixtra injections 2.5 mg one time, the lesions on the legs given NaCl compresses 2 times



a day, followed by giving desoxymethasone ointment 0.25% and vaseline album 70gr + salicylic acid 3% applied twice a day. To reduce the symptoms of pruritus, cetirizine 10mg a day is given. During the treatment period, on the second day, the patient received a novorapid injection with a sliding scale based on blood sugar levels, an additional injection of methylprednisolone 62.5 mg twice a day, and the antibiotic was changed to cefoperazone injection 3x1 gram on the third day of treatment with the consideration that the patient still felt itching, swelling, and erythema in the lesion area. Administration of methylprednisolone was stopped on the 4th day of treatment because the pain, swelling,

and erythema in both legs had improved. After 5 days of treatment, the patient was in hospital, with blood sugar results at 168mg/dl. The patient's condition improved, and the lesions on the skin had improved. Post-control one week later showed improvement in medical complaints, especially in both legs. Patients are regularly monitored every month with stable blood sugar levels in line with the improvement in the condition of the lesions in the lower limbs. Blood sugar levels play an important role in the manifestation of skin lesions, with controlled blood sugar levels to maximize comprehensive patient therapy.



Figure 1. Skin lesions in lichen simplex chronic patient with diabetes mellitus.

3. Discussion

Dermatological manifestations of diabetes mellitus are common and are one of the important aspects related to early detection and diagnosis which can improve the patient's quality of life. Diabetes mellitus is a chronic disease whose prevalence is increasing along with sudden life activity, diet and lifestyle. One of the microvascular complications in DM patients is skin abnormalities. As many as 30-70% of patients with diabetes mellitus have skin abnormalities detected during the disease, which are influenced by skin microvascularization in diabetes mellitus patients. Skin conditions in diabetes patients are a direct result of metabolic changes in the body, such as hyperlipidemia and hyperglycemia. Apart from that, progressive vascular, neurological, and immune damage also contributes to the skin manifestations of

diabetes mellitus patients. Hyperglycemia (pathological glucose levels) affects skin homeostasis by inhibiting proliferation, migration, and protein biosynthesis in keratinocytes and fibroblasts. Pathological glucose levels also cause induction of endothelial cell apoptosis and inhibit nitric oxide synthesis by inhibiting the nitric oxide synthetase enzyme, resulting in vasodilation in vivo. Furthermore, high blood glucose levels will also suppress chemotaxis and phagocytosis in the scientific immune system. In one of the in vitro studies, the negative effects of diabetes mellitus were not only through pathological glucose levels but also indirectly through glycation of lipids, proteins, and nucleic acids, which induced the formation of advanced glycation end products (AGEs). AGEs would change type I and type IV collagen, which is susceptible to glycation,



disrupting skin elasticity, and will contribute to the manifestation of skin disorders. AGEs will also activate pro-inflammatory cytokines, which increase intracellular oxidative stress, including the formation of reactive oxygen species (ROS), which will interact to disrupt the biological function of several extracellular matrix (ECM) and intracellular matrix (ICM) proteins. This pathomechanism results in micro- and macroangiopathy, which in turn causes tissue hypoxia and nerve damage where further consequences lead to decreased nociception, susceptibility to exogenous trauma, decreased circulation, anhidrosis, and xeroderma.^{12,13}

Involvement of the peripheral nervous system and vascular changes in the form of micro- and macroangiopathy are the main factors. Sensory neuropathy is responsible for the itching of paraesthesia as well as reduced sensation in the skin. Dysfunction of the autonomic nervous system can cause decreased sweat secretion (hypohidrosis) so that the skin becomes dry, which then causes xerosis, hyperkeratosis, fissure formation, and sclerotic skin changes. Several studies report DM patients experiencing complaints of pruritus. A recent study from Japan reported an increase in the prevalence of pruritus of truncal, which may be used as a marker of polyneuropathy. Chronic lichen simplex or neurodermatitis is the most common chronic skin disease. 12% of the world's population suffers from this disease, generally occurring at the age of 30-50 years. Chronic lichen simplex is a superficial and chronic pruritic inflammation of the skin that appears as lichenification plaques caused by scratching, which becomes a habit without realizing it. In the early stages, skin disorders include erythema and edema or grouped papules. As a result of repeated scratching, the lesions become thicker, drier, and scaly and experience hyperpigmentation and lichenification. The more chronic the skin can peel or erosion mix with the surrounding normal skin. Lesions can be single or multiple spread over areas that are easy to reach for

scratching.^{14,15}

The patient came with complaints that the wounds on both legs were itchy, red, and painful, disrupting activities. Patients often scratch their skin, resulting in wounds that then dry out and thicken. The patient also has the comorbid disease Diabetes mellitus, where pathological blood glucose levels can affect the condition of skin homeostasis, which in turn contributes to abnormalities in the skin manifestations of diabetes mellitus patients. Complaints have been repeated frequently and have been felt for more than the last 2 years. Itching often recurs, especially when resting or sleeping at night. Based on the dermatological examination, the results showed that on both lower legs, there were smooth, non-layered white scale lesions, lichenification accompanied by hyperpigmentation, the size of the plaque had no clear boundaries, there was slight edema and erythema, and multiple erosions were found on the surface of the lesions with black crusts that did not come off easily. This is consistent with the efflorescence of neurodermatitis.¹⁶

Therapy for diabetes mellitus patients with skin manifestations that appear requires comprehensive collaboration with the relevant departments so that management can be optimal and improve the patient's quality of life. The patient received anti-diabetic drug therapy to lower blood glucose levels by administering novorapid sliding scale injection according to current blood sugar levels as well as gabapentin 1x300mg and mecobalamin 2x500mg IV for peripheral neuropathy disorders. As is known, pathological blood sugar levels can cause complications with skin manifestations due to microangiopathy and macroangiopathy. Autonomic nerve disorders and peripheral neuropathy also play a role in the symptoms of pruritus, which arise due to decreased sweat secretion or hypohidrosis so that the skin becomes dry, which then causes xerosis, hyperkeratosis, which over time will cause lichenification and erosion of the skin. Topical therapy that can be given is topical steroids with keratolytic



agents such as salicylic acid. Administration of potent topical steroids such as desoxymethasone 0.25% and superpotent such as clobetasol 0.05% for 2 weeks is a therapeutic option to reduce inflammation. If the patient does not respond to topical therapy, systemic steroids, oral prednisone 40 mg, tapered off for 10 days, can be given. Intramuscular triamcinolone 1mg/kg up to 80 mg can be given for extensive, severe, and very itchy neurodermatitis. To reduce the symptoms of pruritus, antihistamines can be given.^{13,15}

The patient was given the oral antihistamine cetirizine 1x 10mg per day. For skin lesions, desoxymethasone 0.25% cream and a mixture of Vaseline albumin with 3% salicylic acid were applied twice a day. For crusts, a sterile gauze compress was applied with physiological NaCl solution 2 times a day. On the 2nd day of treatment, the patient received an injection of methylprednisolone and an injection of cefoperazone on the 3rd day of treatment by the internal medicine department, considering the inflammation in the legs had not subsided and suspicion of secondary infection. On the fourth day of treatment, the skin lesions appeared to improve, and signs of inflammation decreased from before. The methylprednisolone injection was stopped. After the fifth day of treatment, the patient experienced an improvement in complaints and lesions on the skin, blood sugar levels reached 169 mg/dl, and complaints of itching and inflammation in both legs subsided and gradually improved until the patient was fit to go home on the sixth day. The patient was sent home with the medication noticol 2 mg a day, cefixime 200mg twice a day, gabapentin 300mg a day, mecobalamin 500mg twice a day, metformin 500mg three times a day, glimepiride 4mg a day, Lantus 10Unit at night, amlodipine 10mg, acarbose 100 mg twice a day, cetirizine 10mg once a day and continued the medication ointment 2 times a day. After the control one week later, complaints of itching, pain, swelling and erythema on the legs had subsided, skin lesions,

hyperpigmentation, and lichenification had improved, and no erosion was found on the patient's skin surface. Non-medical therapy education for patients regarding wound care is carried out by compressing the wound with gauze and clean water or a physiological infusion solution, after which it is continued by applying the prescribed ointment. Patients are prohibited from scratching the wound because it can make the condition worse. Patients can just pat the itchy area without scratching. Excessive scratching can cause complications in the form of secondary infections. Chronic lichen simplex can be a persistent lesion, and repeated exacerbations can occur triggered by the patient's psychological stress. If emotional stress interferes with daily activities, can be consulted in the psychiatry department for Psychotherapy and pharmacological therapies such as tricyclic antidepressants to reduce stress and the desire to scratch continuously. The prognosis is worse if there are psychological disorders and other accompanying illnesses.¹⁷

4. Conclusion

Based on anamnesis, physical examination, and supporting examination, the patient is diagnosed with Diabetes mellitus accompanied by peripheral neuropathy and neurodermatitis. The result of the intervention showed a decrease in blood sugar, complaints of itching, pain, erythema, tingling, and skin lesions of both lower legs were improved. Risk factors for uncontrolled blood sugar levels, unhealthy lifestyle, lack of physical activity, hygiene, emotional stress, and non-compliance with medication are important aspects that must be considered. Diabetes mellitus is associated with dermatologist disorders. Early recognition of initial cutaneous changes such as xerosis, hyperkeratosis, or skin infections by appropriate management could help reduce late or severe complications of diabetes. Although most dermatological conditions require specific treatment, the most important rule is to improve glycemic control



in patients. Education in treatment, hygiene, emotional stress, and lifestyle changes are important for improving the quality of life for patients with diabetes mellitus.

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