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CONCOMITANT PSORIASIS VULGARIS AND METABOLIC SYNDROME: A CASE REPORT

Psoriasis Vulgaris dan Sindrom Metabolik yang Bersamaan: Laporan Kasus

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ABSTRACT
Among the various dermatological conditions, psoriasis assumes significant relevance concerning Metabolic Syndrome (MetS). A 57-year-old man presents with pruritic and scaly erythematous plaque on the right ankle persisting for four weeks. The dermatological examination uncovered a noticeable erythematous plaque with a scaly surface on the right ankle, conclusively observed as psoriasis clinical features. Physical examination for metabolic syndrome indicated blood pressure readings of 160/100 mmHg and central obesity with a waist circumference of 98 cm. The psoriasis treatment involves the use of topical corticosteroids and emollients, along with oral metabolic medication consisting of simvastatin and amlodipine, and lifestyle modifications to treat the metabolic disorder. Metabolic syndrome leads to an elevation in the synthesis of pro-inflammatory cytokines, which are shared characteristics with psoriasis. Following comprehensive therapy of ten days of topical treatment and lifestyle modifications, the patient experienced an improvement in the active psoriatic lesions, despite the presence of metabolic disorders.

Keywords*: Metabolic syndrome, Proinflammatory cytokines, Psoriasis*

ABSTRAK
Di antara berbagai kondisi dermatologis, psoriasis memiliki relevansi yang signifikan terkait Sindrom Metabolik (MetS). Seorang pria berusia 57 tahun datang dengan plak eritematosa yang gatal dan bersisik di pergelangan kaki kanan yang bertahan selama empat minggu. Pemeriksaan dermatologis menemukan plak eritematosa yang terlihat dengan permukaan bersisik di pergelangan kaki kanan, yang secara meyakinkan diamati sebagai ciri klinis psoriasis. Pemeriksaan fisik untuk sindrom metabolik menunjukkan pembacaan tekanan darah 160/100 mmHg dan obesitas sentral dengan lingkar pinggang 98 cm. Perawatan psoriasis melibatkan penggunaan kortikosteroid topikal dan emolien, bersama dengan pengobatan metabolik oral yang terdiri dari simvastatin dan amlodipine, dan modifikasi gaya hidup untuk mengobati gangguan metabolik. Sindrom metabolik menyebabkan peningkatan sintesis sitokin pro-inflamasi, yang merupakan karakteristik yang sama dengan psoriasis. Setelah terapi komprehensif selama sepuluh hari pengobatan topikal dan modifikasi gaya hidup, pasien mengalami perbaikan pada lesi psoriasis aktif, meskipun terdapat gangguan metabolik.

Kata kunci: *Psoriasis, Sindrom metabolik, Sitokin proinflamasi*

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INTRODUCTION

Psoriasis represents a prevalent, enduring, immune-mediated inflammatory disorder characterized by unregulated keratinocyte proliferation (Lønnberg et al. 2016). Psoriasis arises from immune system dysregulation and excessive proliferation of keratinocytes because of complicated interactions between genetic, immunological, and environmental factors (Lee and Kim 2023). Characterized by red, scaly plaques appearing on various parts of the body, psoriasis significantly impacts both the physical and mental well-being of affected individuals. Among the spectrum of skin disorders investigated, psoriasis assumes particular significance concerning its association with metabolic syndrome (Stefanadi et al. 2018). Psoriasis is characterized by an immune response imbalance mediated by T-cells, a phenomenon that has been linked to metabolic syndrome and its individual components (Kim et al. 2019).

The prevalence of metabolic syndrome, a complex condition characterized by the coexistence of numerous illnesses that raise the risk of cardiovascular problems, ranges from 20% to 50% in psoriasis patients and rises as the severity of psoriasis worsens (Wu et al. 2022). Metabolic syndrome is distinguished by several risk factors, including high blood pressure, central obesity, glucose intolerance, and dyslipidemia (Peralta et al. 2019). A meta-analysis unveiled that individuals with psoriasis exhibit a 2.2-fold increased likelihood of having metabolic syndrome in comparison to the general population (Ferdinando et al. 2018).

The prevalence of cardiovascular problems is higher in people with severe psoriasis compared to those with milder forms of the disease (Yuwita et al. 2017). Furthermore, individuals diagnosed with psoriasis are at an increased risk of developing insulin resistance or diabetes mellitus (Merola et al. 2022). Therefore, ensuring sufficient therapy for psoriasis is crucial to prevent the potential progression into metabolic problems. This case was presented with the intention of offering a thorough overview of metabolic events in patients with psoriasis.

CASE REPORT

A 57-year-old man presents with pruritic and scaly erythematous skin thickening on right ankle, persisting for four weeks. The patient acknowledged that his skin condition had significantly affected his daily activities, leading him to seek evaluation at the clinic. The patient engages in daily professional activities as a lecturer and a businessman, operating under considerable stress. He has a history of the similar complaints spanning the past 15 years, with symptoms typically exacerbated during periods of stress. Despite experiencing symptoms that are considered as psoriasis, the patient has actively pursued therapeutic interventions by seeking multiple consultations with a dermatologist, has received topical treatment and has undergone improvement with each treatment received. The patient denies any family history of similar complaints. The patient is experiencing discomfort due to the skin problem.

During the general physical examination, the patient's blood pressure readings were recorded at 160/100 mmHg, while all other vital signs were within the acceptable range. Furthermore, central obesity was noted, with a waist circumference measuring 98 cm. Dermatological examination shows two types of psoriasis lesions are observed on the patient's body: A new psoriatic lesion characterized by an erythematous plaque with a scaly surface that is well-demarcated and causes itching (Figure 1). The second type is hyperpigmented patch lesions covering two-thirds of the back, which remain from the previous onset of psoriasis lesions, without any itching or pain (Figure 2). Positive Auspitz sign and Koebner phenomenon were noted on the new lesion. In clinical laboratory tests, the patient's total cholesterol level measured 244.9 mg/dL, triglycerides were 463.6 mg/dL, and fasting glucose levels were 165 mg/dL. These data show that blood pressure, central obesity, and clinical laboratory tests have already met the defined criteria for metabolic syndrom

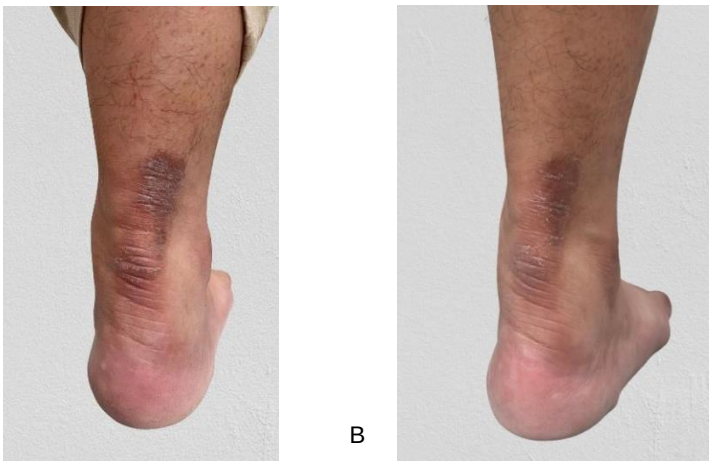

Figure 1. (A) A solitary erythematous plaque, distinctly demarcated with a scaly surface on the right ankle prior to treatment. B) Improvement observed following a ten-day regimen of therapy involving *betamethasone valerate 0.1%* and vaseline gel

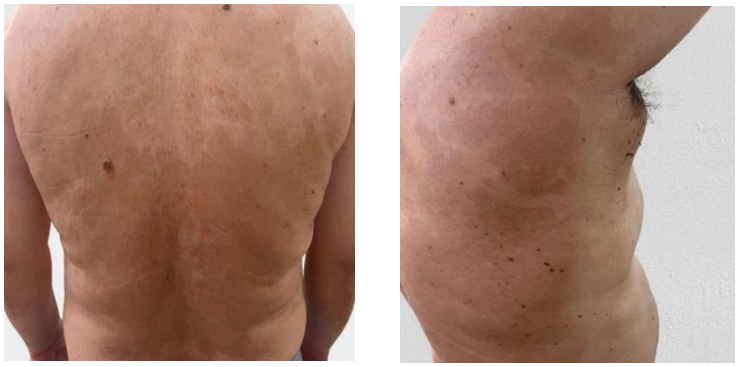

Figure 2. An expanse of post-inflammatory hyperpigmentation on the back, manifested as brownish multiple patches resulting from previous psoriasis

The diagnosis of psoriasis in this case is established through a dermatological physical examination. Due of its limits facilities, this present case was not subjected to a histological study. The patient presents with psoriasis, specifically categorized as vulgaris or plaque psoriasis, with a PASI *(Psoriasis Area and Severity Index)* score calculated at 1,2. Plaque psoriasis is typified by red plaques covered with silver scales that are firmly attached and well-defined, as observed in this patient. Potential alternative diagnoses encompass atopic dermatitis, neurodermatitis, and tinea pedis. The prognosis for this patient is uncertain but potentially favorable.

The patient is undergoing a comprehensive therapeutic regimen targeting both metabolic syndrome and psoriasis. For managing metabolic syndrome, the patient were offered metabolic monitoring, comprising lifestyle adjustments, weight reduction, and the prescription of oral medications including 20 mg simvastatin and 5 mg amlodipine once a day. In order to mitigate psoriatic symptoms, as a general practitioner, the author can only suggest moderate-potency topical corticosteroids containing *betamethasone valerate 0.1%* and vaseline gel, which should be applied twice daily for a duration of ten days. Despite having metabolic syndrome as a comorbidity, significant improvements were observed after ten days of topical treatment and the patient's adherence to lifestyle changes, such as reducing daily caloric intake. The patient experienced resolution of skin-thinning lesions and itching issues (Figures 1A and 1B).

RESULTS AND DISCUSSION

Psoriasis and MetS Association

Psoriasis and metabolic syndrome may develop concurrently because they have a common immunopathogenesis,

which is defined by persistent low-level inflammation mediated by pro-inflammatory cytokines. Metabolic syndrome involves a process where the combination of obesity and insulin resistance leads to an increased production of pro-inflammatory cytokines. These same factors are also found in individuals with psoriasis (Pannu and Rosmarin 2021). Furthermore, gene transcription alterations were specifically observed in genes that have a significant impact on psoriasis and metabolic problems, including renin, cytotoxic T-lymphocyte antigen 4 (CTLA4), and Toll-like receptor 3 (Gisondi et al. 2018). Alongside the activation of the Th1 and Th17 pathways, proinflammatory cytokines and increased oxidative stress play a role in endothelial dysfunction, resulting in enhanced leukocyte adhesion and promoting a prothrombotic state (Fernández-Armenteros et al. 2019).

Th17 cells have a crucial function in the development of psoriasis and serves as markers for an elevated vulnerability to the disease. These cells secrete multiple cytokines, such as IL-17 (IL-17A/IL-17F), tumor necrosis factor-alpha (TNF-α), and IL-22, which induce alterations in the proliferation and aberrant growth of keratinocytes (Hao et al. 2021; Singh et al. 2017). Consistent with the preceding statement, a variety of inflammatory molecules such as IL-1, IL-6, IL-8, IL-23, vascular endothelial growth factor (VEGF), interferon-γ are additionally generated within psoriatic skin lesions. It appears that these molecules are released into the systemic circulation, correlating with the severity and extent of the skin lesion (Voiculescu et al. 2014). These pieces of evidence could help clarify the heightened occurrence of metabolic syndrome in individuals with psoriasis.

The criteria for metabolic syndrome according to the International Diabetes Federation (IDF) comprise: central obesity (waist circumference ≥ 90 cm in Asian males and ≥ 80 cm in Asian females), triglyceride levels >150 mg/dL, low levels of high-density lipoprotein (HDL) <40 mg/dL in females and <50 mg/dL in males, hypertension with systolic >130 mmHg and diastolic >85 mmHg, and fasting blood sugar levels >110 mg/dL (Ford 2005). Metabolic syndrome is identified when at least three out of the five criteria are fulfilled (Ali et al. 2014; Prasad et al. 2020). Out of these basic risk factors, central adiposity and glucose intolerance are considered the most significant (Gui et al. 2018). In psoriasis, inflammation originates from both the epidermis and dermis layers of the skin, while in obese persons, it arises from the adipose tissue (Pannu and Rosmarin 2021). Adipose tissue releases bioactive substances that are commonly referred to as adipocytokines or adipokines. Leptin is an adipokine that functions as a signaling molecule to the hypothalamus, aiding in the regulation of appetite and body mass. Research on psoriasis has demonstrated that levels of leptin are increased in individuals with psoriasis (Singh et al. 2017).

Management

Evaluating the severity of psoriasis is essential for maximizing treatment efficacy (Drvar et al. 2019; Mattei et al. 2014). Psoriasis treatment encompasses various modalities, including topical therapies, phototherapy, systemic immunosuppressive agents, and biologic therapies. Some psoriasis medications have the potential to alter metabolic syndrome risk factors, whereas others may exacerbate them (Voiculescu et al. 2014). As per the BSA criteria, the lesions observed in this patient are categorized as mild psoriasis, as they occupy less than 3% of the entire body surface area. This degree of severity can be effectively addressed with topical treatments, aligning with prevailing guidelines advocating topical therapies as the primary therapeutic approach (Segaert et al. 2022).

Approved topical agents for psoriasis encompass corticosteroids, vitamin D analogs, combination corticosteroid/vitamin D formulations, vitamin A derivatives, anthralin, and more recent tar formulations (Segaert et al. 2022). Due to being in the primary health care setting, the availability of medications is severely limited. As an initial therapy, the patient was treated with a moderate-potency topical corticosteroid through *bethametasone valerate 0.1%* and supported by vaseline gel as an emollient to keep the skin moisturized on the affected area. Corticosteroids have the capability to suppress the production of local inflammatory mediators, thereby inhibiting their

systemic release, notably cytokines and prostaglandins (such as IL-6 and 8, TNF-α, Interferon-γ, and leukotrienes) (Asad et al. 2019) while emollients decrease scaling and irritation, alleviate fissures, and enhance the absorption of other topical treatments (Maroto-Morales et al. 2021).

A recent research on weight reduction interventions demonstrated that decreasing calorie intake resulted in a reduction in psoriasis severity by approximately 2.5 points on the PASI score (Jensen and Skov 2016). Studies have shown that calorie restriction in obese individuals decreases the concentration of inflammatory cytokines in the bloodstream (Debbaneh et al. 2014). In addition to intake adjustments, statins also have immunomodulatory characteristics that could be effective in treating psoriasis. Statins, for example, reduce inflammation in arterial walls. Moreover, statins within the skin promote Th1-mediated immune responses, inhibit MHC II activation, suppress cytokine release and mast cell degranulation, and impede interactions among pro-inflammatory chemokines (Socha et al. 2020).

CONCLUSION

This case demonstrates that after receiving comprehensive therapy consisting of ten days of topical treatment and lifestyle modifications, the patient showed improvement in active psoriatic lesions, despite the presence of metabolic disorders. Given the interconnectedness between psoriasis and metabolic syndrome, along with their respective severity levels, healthcare professionals should adopt a proactive approach to identifying comorbidities linked to chronic psoriasis, aiming for a more optimal therapeutic outcome. Therapies that prove ineffective and lack comprehensiveness for psoriasis may exacerbate the prognosis and increase the likelihood of patients developing other metabolic issues.

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