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CASE REPORT

Irritant Contact Dermatitis Induced by Compound Clobetasol Propionate in a Patient with Undiagnosed Type 2 Diabetes Mellitus

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Abstract: Irritant contact dermatitis (ICD) is a common inflammatory skin condition caused by direct cytotoxic effects of irritants on the epidermis. Topical corticosteroids, while effective for treating inflammatory dermatoses, may paradoxically induce adverse skin reactions when misused. This case highlights ICD triggered by self-administration of compound clobetasol propionate ointment, exacerbated by undiagnosed type 2 diabetes mellitus (T2DM).

Keywords: irritant, contact dermatitis, type 2 diabetes

Introduction

Contact dermatitis (CD) is a prevalent inflammatory skin condition characterized by erythema, edema, and vesicular lesions, resulting from exposure to irritants or allergens. It is classified into two main types: irritant contact dermatitis (ICD) and allergic contact dermatitis (ACD). ICD is often triggered by direct damage to the skin barrier from irritants, while ACD results from a sensitization process involving the immune system. Common irritants include soaps, detergents, and topical medications, with glucocorticoids being notable for their potential to induce skin reactions when misused.[1]

Diabetes mellitus, particularly Type 2 diabetes mellitus (T2DM), is associated with various skin complications due to impaired wound healing and increased susceptibility to infections. Patients with diabetes often experience skin changes, including xerosis, pruritus, and infections, which can complicate the management of dermatological conditions.[2] The use of topical medications in diabetic patients requires careful consideration, as the compromised skin barrier may lead to exacerbated reactions or delayed healing. The interaction between diabetes and skin conditions underscores the importance of monitoring and managing skin health in this population.[3]

The main ingredients of Compound Clobetasol Propionate Ointment are 0.05% clobetasol propionate and 0.025% all-trans retinoic acid.[4] Clobetasol propionate is a synthetic corticosteroid (specifically, a superpotent class I topical glucocorticoid).[5] All-Trans Retinoic Acid (ATRA) is a retinoid with keratolytic properties. Among them, retinoic acid has the effects of exfoliating, anti-proliferation, and strengthening epidermal cells. At the same time, 0.025% all-trans retinoic acid can enhance the absorption and permeability of clobetasol propionate, helping to control disease symptoms and improve therapeutic outcomes in a short period.

Case Presentation

A 56-year-old male presented with a 20-day history of erythema, erosions, and ulceration in the right inguinal region. The patient reported applying Compound Clobetasol Propionate Ointment (containing 0.05% clobetasol propionate and 0.025% all-trans retinoic acid) twice daily to alleviate localized dermatitis. Within one day of use, the affected area developed progressive erythema, erosions, and painful ulceration, prompting medical attention (Figure 1). The patient denied prior diabetes history.

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Figure 1 Clinical presentation of skin lesions.

Laboratory investigations revealed elevated blood glucose (8.97 mmol/L on 2025–04-05; 9.83 mmol/L on 2025–04-10) and hemoglobin A1c (9.5%, reference: <6.5%), confirming a concurrent diagnosis of T2DM. No signs of bacterial or fungal infection were detected via microbial culture. A diagnosis of ICD secondary to compound clobetasol propionate ointment misuse and T2DM was established. The patient was initiated on a comprehensive treatment regimen. This included topical application of Radix Lithospermi oil (purple sage oil) twice daily, and multidisciplinary management with endocrinology consultation for glycemic control (fasting glucose: 6.2 mmol/L). After two weeks of targeted therapy, the inguinal lesions demonstrated marked improvement, with significant resolution of erythema and progressive epithelialization of ulcerations. Concurrently, the patient's blood glucose levels stabilized. The patient was discharged with detailed counseling on appropriate topical corticosteroid use, diabetic skincare precautions, and long-term glycemic monitoring to prevent recurrence.

Discussion

This case of a 56-year-old male presenting with erythema, erosions, and ulceration in the right inguinal region underscores the complexities involved in diagnosing and managing (ICD, particularly in the context of concurrent T2DM. The patient's history of applying a compound clobetasol propionate ointment, initially intended to alleviate localized dermatitis, resulted in a worsening of his symptoms within a short time frame. This highlights a critical aspect of patient education regarding the use of potent topical corticosteroids, as misuse can lead to exacerbation of skin conditions rather than resolution. Previous studies have demonstrated that diabetic patients are predisposed to various skin disorders, and their skin may respond differently to topical treatments due to altered skin barrier function and immune response.[6] Meanwhile, Compound Clobetasol Propionate Ointment also played an important role in the course of this disease. The ointment contains two active ingredients: Clobetasol Propionate and All-Trans Retinoic Acid. Prolonged application of Clobetasol Propionate in intertriginous areas can lead to epidermal atrophy, compromise skin barrier function, and heighten susceptibility to irritants. ATRA enhances epidermal turnover but disrupts stratum corneum integrity. The groin's thin epidermis and occluded environment enhance percutaneous absorption of topical agents, amplifying irritant effects. Synergistic irritation from ATRA and corticosteroid-induced skin atrophy likely precipitated ICD.[7] Hyperglycemia disrupts keratinocyte differentiation and delays wound healing. Individuals previously diagnosed with dermatitis are considered to face an elevated risk of developing irritant contact dermatitis, primarily attributed to compromised epidermal barrier function, increased transepidermal water loss (TEWL), and enhanced susceptibility to allergen and irritant penetration through the skin when compared to individuals with healthy, non-dermatitic skin.[8]

Conclusion

This case is important as it highlights the risks of unsupervised use of potent topical corticosteroids, especially in sensitive areas like the groin, and the compounding effect of undiagnosed T2DM on skin integrity and healing.

Ethics Approval

The publication of case report does not require ethical approval. We confirm that no institutional approval was required for publishing the case details.

Consent for Publication

Informed consent was obtained for the publication of the case. This article adheres to the applicable CAse REport (CARE) guidelines.

Informed Consent for Publication

The patient had signed informed consent and provided informed consent for the publication of the case details and any accompanying images.

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Disclosure

The authors report no conflicts of interest in this work.

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