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CLINICAL PHARMACY EVALUATION OF IRRITANT CONTACT DERMATITIS ASSOCIATED WITH FACIAL WHITENING CREAM USE IN AN AESTHETIC CLINIC: A CASE REPORT

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Abstrak

Background: Facial whitening creams containing active ingredients such as tretinoin, hydroquinone, and topical corticosteroids are commonly prescribed in aesthetic clinics for the management of hyperpigmentation and skin rejuvenation. Although generally effective, inappropriate use or individual intolerance may lead to adverse cutaneous reactions, including irritant contact dermatitis. Reporting such cases is important to highlight the role of clinical pharmacy services in identifying, assessing, and managing cosmetic-related adverse reactions. **Case Summary:** A 28-year-old female presented to an aesthetic clinic with facial erythema, burning sensation, skin dryness, and desquamation after two weeks of regular use of a prescribed facial whitening cream. She had no previous history of dermatological disorders, allergies, or chronic illnesses. Her symptoms progressively worsened despite continued application. Clinical examination revealed diffuse facial erythema and mild scaling without signs of infection or systemic involvement. **Investigation and Diagnosis:** A comprehensive medication and cosmetic-use history was obtained by the clinical pharmacist. Differential diagnoses included allergic contact dermatitis, rosacea, and irritant contact dermatitis. Based on the temporal relationship between symptom onset and product use, characteristic clinical manifestations, and symptom improvement after product discontinuation, the condition was diagnosed as irritant contact dermatitis associated with facial whitening cream use. Causality assessment using the Naranjo Adverse Drug Reaction Probability Scale yielded a score of 6, indicating a probable association. **Management:** The whitening cream was temporarily discontinued. Supportive management included a ceramide-based moisturizer and broad-spectrum sunscreen with SPF 50+. The patient received pharmacist-led counseling regarding skin-barrier protection, gradual reintroduction of active topical agents, and recognition of potential adverse reactions. Follow-up monitoring was conducted to assess treatment response. **Outcome:** Clinical improvement was observed within seven days, with reduced erythema and burning sensation. At the two-week follow-up, the irritation had substantially resolved, no further complications were reported, and the patient resumed a modified skincare regimen under professional supervision. **Conclusion:** This case emphasizes the importance of clinical pharmacy involvement in cosmetovigilance and the management of cosmetic-related adverse skin reactions. Early identification, causality assessment, patient education, and appropriate therapeutic interventions can improve patient safety and treatment outcomes in aesthetic practice.

Keywords: case report; clinical reasoning; diagnosis; management; outcome.

INTRODUCTION

Facial whitening creams are widely used in aesthetic practice for the treatment of hyperpigmentation disorders, melasma, post-inflammatory hyperpigmentation, and skin photoaging. These formulations frequently contain active ingredients such as hydroquinone, tretinoin, corticosteroids, alpha-hydroxy acids, and other depigmenting agents that improve skin appearance through modulation of melanogenesis and enhancement of epidermal turnover. Despite their clinical benefits, these products may cause adverse cutaneous reactions ranging from mild irritation to severe dermatitis, particularly when used inappropriately or in susceptible individuals. The increasing demand for cosmetic

and aesthetic treatments has consequently raised concerns regarding the safety of whitening products and the need for effective cosmetovigilance systems in clinical practice (Lucca et al., 2020; Paikray et al., 2024).

Adverse reactions associated with cosmetic products represent an important public health issue. Previous studies have shown that the skin is the most commonly affected organ in cosmetic-related adverse events, with erythema, itching, burning sensation, scaling, and dermatitis being among the most frequently reported manifestations. Irritant contact dermatitis (ICD) is one of the most common non-immunologic inflammatory skin reactions resulting from direct damage to the skin barrier by chemical agents. In aesthetic clinics, topical agents such as tretinoin and hydroquinone are recognized causes of irritation, especially during the initial phase of treatment or when prescribed at higher concentrations (Ferner, 2015; Del Pozzo-Magaña, 2024).

Among cosmetic-related adverse skin reactions, irritant contact dermatitis (ICD) and allergic contact dermatitis (ACD) are the two most common differential diagnoses. Although both conditions may present with facial erythema and scaling, their underlying mechanisms differ. ICD is a non-immunologic inflammatory reaction caused by direct damage to the skin barrier following exposure to chemical or physical irritants, whereas ACD is a delayed type IV hypersensitivity reaction that requires prior sensitization to an allergen. Clinically, ICD is more frequently characterized by burning, stinging, dryness, and symptoms confined to the site of exposure, while ACD commonly presents with intense pruritus, papules, vesicles, edema, and may extend beyond the area of direct contact. Recognizing these distinctions is essential for accurate diagnosis and appropriate management of cosmetic-related adverse reactions (Johansen et al., 2022; Fonacier et al., 2015). In the present case, these distinguishing clinical features guided the differential diagnosis and ultimately supported the diagnosis of irritant contact dermatitis.

From a clinical pharmacy perspective, distinguishing ICD from ACD at an early stage is essential because the management strategies, patient counseling, and follow-up recommendations may differ according to the underlying mechanism of the adverse reaction. Pharmacists play an important role in obtaining a comprehensive medication and cosmetic use history, assessing causality, identifying drug-related problems, and educating patients on the safe use of cosmetic products. The application of pharmacovigilance principles to cosmetic products, commonly referred to as cosmetovigilance, has therefore become increasingly important in improving patient safety in aesthetic practice (Raschi et al., 2021; Patel et al., 2021).

Although irritant contact dermatitis associated with facial whitening agents has been documented in dermatological literature, there is still a paucity of case reports focusing on the contribution of clinical pharmacy services in assessing causality, identifying drug-related problems, and providing evidence-based interventions in aesthetic practice. Most available publications emphasize dermatological diagnosis and treatment while providing limited discussion regarding clinical pharmacy involvement and patient education strategies. This represents an important knowledge gap considering the expanding role of pharmacists in multidisciplinary aesthetic healthcare services (Paikray et al., 2024; Lucca et al., 2020).

The novelty of this case lies in the integration of clinical pharmacy evaluation, adverse reaction causality assessment, and pharmacist-led patient counseling in the management of irritant contact dermatitis associated with facial whitening cream use in an aesthetic clinic. This report provides educational value by illustrating the practical application of clinical reasoning and cosmetovigilance principles in routine aesthetic care, highlighting the importance of interdisciplinary collaboration to optimize patient outcomes and medication safety.

Therefore, this case report aims to describe the clinical pharmacy evaluation, diagnosis, management, and outcome of irritant contact dermatitis associated with facial whitening cream use in an aesthetic clinic, while emphasizing the role of pharmacists in the identification and management of cosmetic-related adverse reactions.

CASE PRESENTATION

Case A 28 year-old women presented to an aesthetic clinic with complaints of facial redness, burning sensation, skin dryness, and peeling that had progressively worsened over the previous two weeks. The patient sought treatment

because the symtoms interfered with daily activities and caused cosmetic discomfort. Irritant skin reactions are among the most frequently reported adverse effects associated with topical depigmenting and keratolytic used in aesthetic dermatology (Ferneer,2015)

The patient reported that the symptoms started approximately five days after initiating a prescribed facial whitening cream regimen. Initially, mild erythema and skin tightness were noted, which gradually progressed to diffuse facial redness, scaling, and a persistent burning sensation. No fever, respiratory symptoms, mucosal involvement, or systemic manifestations were reported. The chronological relationship between topical product exposure and symptom onset suggested a possible cosmetic-related adverse reaction, which is commonly observed in cosmetovigilance reports (Lucca et al., 2020).

The whitening cream had been prescribed as part of a treatment program for post-inflammatory facial hyperpigmentation. According to the prescription record, the formulation contained tretinoin 0.05%, hydroquinone 4%, and dexamethasone 0.025%, applied once daily at night. The patient also confirmed that she had received counseling regarding the correct method of application at the time of prescription and stated that she followed these instructions throughout the treatment period. The patient denied using additional over-the-counter cosmetic products, herbal preparations, or topical medications during the treatment period. Both tretinoin and hydroquinone are recognized causes of skin irritation, particularly during the early stages of treatment (Del Pozzo-Magaña, 2024).

The patient had no previous history of atopic dermatitis, psoriasis, rosacea, allergic contact dermatitis, or other chronic dermatological conditions. Past medical history was unremarkable, and there was no history of chronic systemic disease such as diabetes mellitus, autoimmune disorders, or immunodeficiency. No known drug allergies or cosmetic allergies had been documented before this episode. Previous studies have shown that adverse cosmetic reactions may also occur in individuals without prior dermatological disease or allergy history (Paikray et al., 2024).

Medication history revealed no concurrent use of systemic medications, including antibiotics, corticosteroids, isotretinoin, antihistamines, or immunosuppressive agents. The patient had never undergone chemical peeling, laser procedures, or other invasive aesthetic treatments before the onset of symptoms. Family history was negative for chronic inflammatory skin disorders and hypersensitivity reactions.

The patient worked in an office environment and reported frequent exposure to sunlight during daily commuting. She denied smoking, alcohol consumption, and recreational drug use. No occupational exposure to known skin irritants or sensitizers was identified. Environmental and lifestyle factors may contribute to skin barrier disruption and increase susceptibility to irritant reactions during topical dermatologic therapy (Patel et al., 2021).

Physical examination demonstrated diffuse erythema involving both cheeks, forehead, and chin, accompanied by mild desquamation and skin dryness. No vesicles, pustules, ulceration, edema, or secondary bacterial infection were observed. Examination of other body areas was unremarkable. These findings were consistent with the clinical manifestations commonly reported in irritant contact dermatitis induced by topical cosmetic agents (Johansen et al., 2022).

Vital signs were within normal limits, including blood pressure of 118/76 mmHg, heart rate of 78 beats/minute, respiratory rate of 18 breaths/minute, body temperature of 36.7°C, and oxygen saturation of 99% on room air. The patient appeared generally well and showed no signs of systemic toxicity.

Initial diagnostic evaluation was based on clinical assessment and comprehensive medication history review. The temporal association between symptom onset and initiation of the whitening cream, together with the absence of systemic manifestations, suggested a topical treatment-related adverse reaction. Differential diagnoses at presentation included irritant contact dermatitis, allergic contact dermatitis, rosacea flare, and seborrheic dermatitis. Further diagnostic reasoning and causality assessment were performed to establish the final diagnosis.

CLINICAL REASONING

The diagnostic evaluation in this case was primarily based on the temporal relationship between the initiation of the facial whitening cream and the onset of cutaneous symptoms, combined with the patient's clinical presentation and medication history. The patient developed facial erythema, burning sensation, dryness, and desquamation within two weeks of using a topical formulation containing tretinoin, hydroquinone, and dexamethasone. These manifestations are consistent with adverse cutaneous reactions commonly associated with topical depigmenting and keratolytic agents used in aesthetic dermatology (Del Pozzo-Magaña, 2024; Ferner, 2015).

The combination of tretinoin, hydroquinone, and dexamethasone may further increase the risk of irritant contact dermatitis because each component affects the skin barrier through different mechanisms. Tretinoin accelerates epidermal cell turnover and reduces cohesion of corneocytes, resulting in transient impairment of the stratum corneum and increased transepidermal water loss, thereby making the skin more susceptible to irritation. Hydroquinone inhibits melanogenesis but may also exert direct cytotoxic effects on keratinocytes and melanocytes, particularly at higher concentrations or during prolonged use, further compromising barrier integrity. Although dexamethasone suppresses cutaneous inflammation and may initially reduce visible erythema, prolonged use of topical corticosteroids can induce epidermal atrophy, reduce lipid synthesis, and impair barrier repair. Consequently, the combined formulation may produce additive or synergistic effects on skin barrier disruption, increasing the likelihood of irritant reactions despite appropriate use under medical supervision ; Del Pozzo-Magaña & Lazo-Langner, 2024; Bhatia et al., 2023).

The first differential diagnosis considered was irritant contact dermatitis (ICD). ICD is a non-immunologic inflammatory skin condition resulting from direct damage to the epidermal barrier by chemical or physical irritants. Clinical manifestations typically include erythema, burning, stinging, dryness, scaling, and skin tightness localized to the area of exposure. The patient’s symptoms appeared shortly after initiation of treatment, were confined to the application site, and occurred in the absence of systemic manifestations, supporting the diagnosis of irritant contact dermatitis. Furthermore, tretinoin and hydroquinone are well-recognized irritants that may induce dose-dependent skin barrier disruption, particularly during the early treatment period (Johansen et al., 2022; Del Pozzo-Magaña, 2024).

Allergic contact dermatitis (ACD) was also considered as a differential diagnosis because cosmetic ingredients are common causes of delayed hypersensitivity reactions. However, several clinical features made ACD less likely. Allergic contact dermatitis often presents with intense pruritus, papules, vesicles, edema, or oozing lesions and may spread beyond the area of direct exposure. In contrast, the patient predominantly reported burning sensation and dryness rather than severe itching, and no vesiculation, edema, or dissemination of lesions was observed. Additionally, there was no prior history of allergy to cosmetic products or topical medications, although sensitization can occur in previously healthy individuals (Thyssen et al., 2007; Johansen et al., 2022).

Another differential diagnosis was rosacea, particularly erythematotelangiectatic rosacea, which may present with persistent facial redness and burning sensations. However, the patient had no previous history of recurrent facial flushing, telangiectasia, papules, pustules, or known rosacea triggers such as spicy foods, alcohol, or emotional stress. Moreover, the close temporal association with the initiation of topical therapy and the improvement following product discontinuation favored a treatment-related adverse reaction rather than a chronic inflammatory dermatosis (Patel et al., 2021).

Seborrheic dermatitis was also considered because facial scaling and erythema can occur in seborrheic areas. Nevertheless, the distribution of lesions in this case did not predominantly involve classic seborrheic regions such as the nasolabial folds, eyebrows, scalp, or retroauricular areas. Furthermore, the acute onset following exposure to a potentially irritating topical formulation was inconsistent with the usual chronic and relapsing course of seborrheic dermatitis (Borda & Wikramanayake, 2015).

The final diagnosis of irritant contact dermatitis associated with facial whitening cream use was established based on the cumulative clinical evidence. Key supporting findings included: (1) a clear temporal relationship between product initiation and symptom onset; (2) characteristic symptoms of erythema, burning sensation, dryness, and desquamation; (3) localization of lesions to the treatment area; (4) absence of features suggestive of allergic or infectious skin disease; and (5) significant clinical improvement following discontinuation of the whitening cream and implementation of supportive skin care measures. These findings align with established diagnostic criteria and clinical characteristics of irritant contact dermatitis reported in dermatological literature (Johansen et al., 2022; Ferner, 2015).

To further strengthen diagnostic confidence, causality assessment was performed using the Naranjo Adverse Drug Reaction Probability Scale, which yielded a score consistent with a probable adverse reaction. The temporal sequence of exposure, positive dechallenge response, lack of alternative explanations, and objective clinical findings supported a probable association between the whitening cream and the observed dermatologic reaction. Although rechallenge was not ethically performed due to the risk of symptom recurrence, the available evidence was considered sufficient to support the final diagnosis (Naranjo et al., 1981; Raschi et al., 2021).

Overall, the diagnostic process integrated patient history, clinical examination, differential diagnosis assessment, causality evaluation, and therapeutic response. This systematic clinical reasoning pathway enabled the identification of irritant contact dermatitis as the most plausible diagnosis and guided appropriate management to prevent further skin barrier damage and optimize patient outcomes.

DIAGNOSTIC ASSESSMENT

A comprehensive diagnostic assessment was performed to evaluate the patient's facial erythema, burning sensation, skin dryness, and desquamation following the use of a prescribed facial whitening cream. The diagnostic work-up included detailed history taking, physical examination, medication review, assessment of cosmetic exposure, and causality evaluation. No evidence of systemic involvement was identified during clinical evaluation (Johansen et al., 2022).

Routine laboratory investigations were not considered necessary because the patient exhibited localized cutaneous manifestations without signs of infection, systemic hypersensitivity, or underlying systemic disease. Current dermatological guidelines indicate that irritant contact dermatitis is primarily a clinical diagnosis based on patient history and physical examination findings (Fonacier et al., 2015).

Patch testing was not performed because the clinical presentation was highly suggestive of irritant contact dermatitis rather than allergic contact dermatitis. The patient demonstrated a clear temporal relationship between initiation of the whitening cream and symptom onset, symptoms were predominantly characterized by burning sensation, dryness, and localized erythema without vesiculation or intense pruritus, and significant clinical improvement was observed after discontinuation of the suspected product (positive dechallenge). Therefore, additional patch testing was considered unnecessary for routine clinical management, as the diagnosis could be established based on clinical history, physical examination, and therapeutic response in accordance with current contact dermatitis guidelines (Johansen et al., 2022).

No radiological imaging studies, ultrasound examinations, computed tomography (CT), or magnetic resonance imaging (MRI) were performed because there was no clinical indication for further structural assessment. The patient's presentation was limited to superficial skin involvement and lacked features suggestive of deep tissue pathology or systemic disease (Del Pozzo-Magaña, 2024).

To support diagnostic decision-making, a structured adverse reaction assessment was conducted using the Naranjo Adverse Drug Reaction Probability Scale. The causality assessment demonstrated a probable relationship between the whitening cream and the observed dermatological reaction. The diagnosis further supported by clinical improvement following discontinuation of the suspected product (Naranjo et al., 1981).

Table 1. Summary of Diagnostic Findings

Assessment Category	Findings
Chief complaint	Facial redness, burning sensation, dryness, and peeling
Duration of symptoms	2 weeks after initiation of whitening cream
Product exposure	Whitening cream containing tretinoin 0.05%, hydroquinone 4%, dexamethasone 0.025%
Physical examination	Diffuse facial erythema, mild desquamation, dry skin
Vesicles/Pustules	Not observed
Edema	Not observed
Secondary infection	Not observed
Systemic manifestations	None
Vital signs	Within normal limits
Laboratory tests	Not indicated
Imaging studies	Not indicated
Differential diagnoses	Irritant contact dermatitis, allergic contact dermatitis, rosacea, seborrheic dermatitis
Final diagnosis	Irritant contact dermatitis associated with facial whitening cream use

Table 2. Vital Signs and Clinical Examination

Parameter	Result	Reference Range
Blood pressure	118/76 mmHg	Normal
Heart rate	78 beats/min	60–100 beats/min
Respiratory rate	18 breaths/min	12–20 breaths/min
Body temperature	36.7°C	36.1–37.2°C
Oxygen saturation	99%	≥95%

Table 3. Naranjo Adverse Drug Reaction Probability Scale

Question	Score
Previous conclusive reports on this reaction	+1
Event occurred after drug administration	+2
Improvement after discontinuation (dechallenge)	+1
Alternative causes excluded	+2
Objective evidence present	+0
Total Score	6

Interpretation: Probable adverse drug reaction (score 5–8) (Naranjo et al., 1981).

The overall diagnostic assessment supported the diagnosis of irritant contact dermatitis associated with facial whitening cream use, based on the temporal relationship between exposure and symptom onset, characteristic clinical manifestations, exclusion of alternative diagnoses, and positive response following product discontinuation.

THERAPEAUTIC INTERVENTION

Following the diagnosis of irritant contact dermatitis associated with facial whitening cream use, the primary therapeutic intervention was the immediate discontinuation of the suspected causative product containing tretinoin

0.05%, hydroquinone 4%, and dexamethasone 0.025%. Withdrawal of the offending agent is considered the cornerstone of management for irritant contact dermatitis because continued exposure may further impair the epidermal barrier, prolong inflammation, and delay recovery. Early identification and elimination of the causative irritant are essential to prevent progression of symptoms and improve patient outcomes (Johansen et al., 2022; Fonacier et al., 2015).

Although the whitening cream contained dexamethasone 0.025%, the presence of a topical corticosteroid did not completely prevent the development of irritant contact dermatitis. Dexamethasone primarily suppresses inflammatory responses after skin irritation has occurred but does not eliminate the direct cytotoxic and barrier-disrupting effects of irritant agents such as tretinoin and hydroquinone. Tretinoin accelerates epidermal turnover and transiently impairs the stratum corneum, whereas hydroquinone may induce direct irritation through its effects on epidermal cells. Consequently, the anti-inflammatory activity of dexamethasone may reduce the visible severity of inflammation but is insufficient to fully counteract the cumulative barrier damage caused by these active ingredients. Furthermore, prolonged use of topical corticosteroids may itself impair epidermal barrier integrity by reducing keratinocyte proliferation, lipid synthesis, and skin repair, potentially increasing susceptibility to irritant reactions (Del Pozzo-Magaña & Lazo-Langner, 2024).

Supportive skin barrier restoration therapy was initiated using a ceramide-based moisturizer, applied twice daily to affected areas for 14 days. Moisturizers play a critical role in restoring skin barrier integrity, reducing transepidermal water loss, alleviating dryness, and promoting epidermal healing. Ceramide-containing formulations are particularly beneficial because they replenish essential lipids within the stratum corneum and improve skin hydration in patients with irritant dermatitis (Loden, 2012; Proksch et al., 2008).

In addition, the patient was prescribed a broad-spectrum sunscreen (SPF 50+, PA+++) for daily morning use with reapplication every 2–3 hours during outdoor activities. Sunscreen was recommended to minimize ultraviolet-induced skin irritation and prevent post-inflammatory hyperpigmentation, which may occur following inflammatory skin reactions. Photoprotection is considered an essential component of treatment in patients undergoing recovery from cosmetic-related skin irritation (Draelos, 2018).

No systemic corticosteroids, oral antihistamines, or topical antibiotics were prescribed because the patient exhibited mild-to-moderate localized symptoms without severe inflammation, pruritus, secondary infection, or systemic involvement. Avoiding unnecessary pharmacological treatment aligns with patient safety principles and reduces the risk of medication-related adverse effects. Current dermatological recommendations support conservative management for uncomplicated irritant contact dermatitis when symptoms are mild and localized (Fonacier et al., 2015; Johansen et al., 2022).

A pharmacist-led counseling intervention was provided to improve treatment adherence and prevent recurrence. Patient education focused on proper skin care practices, avoidance of potential irritants, appropriate sunscreen application, recognition of early signs of adverse reactions, and the importance of reporting new symptoms promptly. The patient was also advised to avoid exfoliating products, alcohol-based toners, and other potentially irritating cosmetic products during the recovery period. Pharmacist involvement in patient education has been shown to improve medication safety and therapeutic outcomes in dermatological and cosmetic care settings (Raschi et al., 2021; Patel et al., 2021).

Clinical monitoring was conducted through follow-up visits at Day 7 and Day 14 after intervention. During each assessment, the severity of erythema, burning sensation, skin dryness, and desquamation was evaluated through clinical examination and patient-reported symptoms. Monitoring demonstrated progressive improvement without the emergence of new adverse events. The absence of worsening symptoms or secondary complications confirmed the appropriateness of the selected management strategy (Ferner, 2015).

After complete symptom resolution, a gradual reintroduction strategy for aesthetic treatment was planned. The patient was advised that any future use of active depigmenting agents should begin with lower concentrations and reduced application frequency (two to three times weekly) under professional supervision. This approach was chosen to minimize the risk of recurrent skin irritation while maintaining therapeutic benefits for hyperpigmentation management. Gradual dose escalation is commonly recommended for topical retinoids and other potentially irritating dermatologic agents to improve tolerability and adherence (Draelos, 2018; Del Pozzo-Magaña, 2024).

Table 4. Summary of Therapeutic Interventions

Intervention	Dosage/Administration	Duration	Clinical Rationale
Discontinuation of whitening cream	Immediate cessation	Until symptom resolution	Eliminate causative irritant
Ceramide-based moisturizer	Apply twice daily	14 days	Restore skin barrier function
Broad-spectrum sunscreen SPF 50+	Apply every morning; reapply every 2–3 hours outdoors	Ongoing	Prevent UV-induced irritation and post-inflammatory hyperpigmentation
Pharmacist counseling	One-on-one education session	Throughout treatment	Improve adherence and prevent recurrence
Clinical monitoring	Follow-up on Day 7 and Day 14	2 weeks	Assess treatment response and safety
Gradual reintroduction of active agents	2–3 times weekly if clinically indicated	After recovery	Improve tolerability and reduce recurrence risk

The selected therapeutic strategy prioritized patient safety, elimination of the suspected irritant, restoration of skin barrier function, and prevention of future adverse reactions. The multidisciplinary approach involving pharmacist-led monitoring and counseling contributed to effective symptom management and favorable clinical outcomes.

THERAPEUTIC SEQUENCE

The therapeutic management in this case followed a stepwise clinical approach based on the severity of symptoms, suspected etiology, and patient safety considerations. The sequence of interventions was guided by the initial clinical assessment suggesting irritant contact dermatitis associated with the use of a facial whitening cream containing tretinoin and hydroquinone.

At the initial presentation (Day 0), the first and most critical intervention was the immediate discontinuation of the facial whitening cream. This decision was made to eliminate ongoing exposure to the suspected irritant, as continued application of topical depigmenting agents is known to exacerbate epidermal barrier disruption and prolong inflammatory responses. Early withdrawal of the offending agent is considered the primary and most effective step in the management of irritant contact dermatitis (Johansen et al., 2022; Fonacier et al., 2015).

On Day 1 to Day 3, the patient was observed for symptom progression without the introduction of systemic pharmacotherapy. During this period, no worsening of erythema, edema, or development of new lesions was noted. The decision to withhold corticosteroids or antihistamines was based on the absence of severe inflammation, pruritus,

or systemic involvement, thereby minimizing unnecessary pharmacological exposure and potential adverse drug effects (Ferner, 2015).

By Day 4, the patient reported a reduction in burning sensation and slight improvement in skin tightness. Clinical evaluation confirmed a gradual decrease in erythema intensity. At this stage, treatment was maintained without modification, reinforcing the principle of conservative management when clinical improvement is evident under supportive therapy alone.

At Day 7, a significant clinical improvement was observed, characterized by reduced facial erythema and resolution of burning sensation. Mild residual dryness and desquamation persisted. Based on this improvement, continued use of moisturizer and initiation of strict photoprotection with broad-spectrum sunscreen (SPF 50+) were reinforced to prevent post-inflammatory hyperpigmentation and support ongoing skin recovery (Draelos, 2018).

At Day 10, the patient showed near-complete resolution of inflammatory symptoms. No new adverse reactions were reported. At this point, patient counseling was intensified, focusing on avoidance of irritant cosmetic products and education regarding safe reintroduction of topical agents if clinically indicated. No escalation or de-escalation of therapy was required.

By Day 14, complete resolution of symptoms was achieved. The skin appeared clinically normal with no erythema or scaling. Given the favorable outcome, a preventive strategy was implemented, recommending gradual reintroduction of active dermatologic agents (if required in the future) at lower frequency (2–3 times per week) under professional supervision. This adjustment was made to reduce the risk of recurrence while maintaining therapeutic benefit for hyperpigmentation management (Del Pozzo-Magaña, 2024).

Throughout the entire treatment period, no changes to the core management strategy were required, as the patient demonstrated progressive improvement with conservative therapy alone. The chronological therapeutic sequence highlights the importance of early identification, prompt withdrawal of the offending agent, and stepwise supportive care in achieving optimal outcomes in irritant contact dermatitis associated with cosmetic products.

CASE TIMELINE

Below is the chronological sequence of clinical events for the reported case of irritant contact dermatitis associated with facial whitening cream use in an aesthetic clinic.

Table 5 Clinical case timeline

Time Point	Clinical Event	Details
Day -14	Initiation of treatment	Patient started using prescribed facial whitening cream containing tretinoin 0.05%, hydroquinone 4%, and dexamethasone 0.025% once nightly
Day -10	Early symptom onset	Mild facial tightness and slight erythema began to appear
Day -7	Symptom progression	Increasing facial redness and dryness noted; no systemic symptoms
Day -5	Worsening condition	Burning sensation and skin peeling developed; symptoms confined to application area
Day 0 (Clinic visit)	Clinical evaluation	Patient presented to aesthetic clinic with facial erythema, burning sensation, dryness, and desquamation; suspected irritant contact dermatitis
Day 0	Therapeutic intervention initiated	Immediate discontinuation of whitening cream; initiation of ceramide-based moisturizer twice daily; patient education provided
Day 1–3	Early follow-up phase	No new lesions; gradual reduction in burning sensation; erythema persists but stable

Day 4–6	Clinical improvement	Noticeable reduction in erythema and discomfort; no progression of symptoms
Day 7	Follow-up assessment	Significant improvement in skin condition; mild residual dryness; sunscreen SPF 50+ reinforced
Day 10	Recovery phase	Near-complete resolution of erythema; no new adverse reactions
Day 14	Outcome evaluation	Complete resolution of symptoms; skin returned to baseline condition; counseling on prevention and safe reintroduction of topical agents

This timeline demonstrates a clear temporal relationship between exposure to the whitening cream and onset of symptoms, as well as a positive dechallenge response following discontinuation of the product. The chronological pattern strongly supports the diagnosis of irritant contact dermatitis related to cosmetic use.

OUTCOME AND FOLLOW-UP OUTCOME

The patient showed progressive clinical improvement following discontinuation of the facial whitening cream and initiation of supportive therapy. Within the first week of intervention, a marked reduction in burning sensation and facial erythema was observed, indicating early recovery of the impaired skin barrier. Mild residual dryness and desquamation persisted but did not worsen, suggesting a favorable response to conservative management without the need for additional pharmacological escalation (Fonacier et al., 2015; Johansen et al., 2022).

At the two-week follow-up, the patient achieved complete resolution of cutaneous symptoms. Physical examination demonstrated restoration of normal skin appearance with no erythema, scaling, edema, or secondary infection. No systemic complications or delayed hypersensitivity reactions were reported. The absence of recurrence during this period further supported the diagnosis of irritant contact dermatitis related to topical cosmetic exposure (Del Pozzo-Magaña, 2024).

Throughout the observation period, no adverse effects were associated with the therapeutic interventions, including ceramide-based moisturizer and broad-spectrum sunscreen. The patient tolerated all recommended treatments well and demonstrated good adherence to prescribed skincare modifications. Pharmacist-led counseling contributed to improved patient understanding of irritant avoidance and appropriate cosmetic use, which likely supported adherence and recovery (Raschi et al., 2021; Patel et al., 2021).

No short-term complications such as post-inflammatory hyperpigmentation, secondary infection, or persistent erythema were observed. However, the patient was identified as being at potential risk for recurrence if re-exposed to high-strength topical depigmenting agents without proper titration and supervision. Therefore, preventive counseling was emphasized as part of long-term management strategy.

For long-term follow-up, the patient was advised to undergo periodic reassessment if resuming aesthetic treatments involving active topical agents. A gradual reintroduction protocol with lower concentrations and reduced frequency was recommended to minimize the risk of recurrent irritant reactions. Education regarding early recognition of adverse cutaneous symptoms was reinforced to ensure prompt discontinuation of offending products if symptoms recur (Draelos, 2018; Del Pozzo-Magaña, 2024).

Overall, the clinical outcome was favorable, with complete resolution of symptoms and no complications. The case demonstrates that early identification, prompt discontinuation of the causative agent, and supportive dermatological care lead to excellent recovery in irritant contact dermatitis associated with cosmetic use. Furthermore, it highlights the importance of clinical pharmacy involvement in improving patient safety and preventing recurrence through structured counseling and monitoring.

DISCUSSION

This case describes irritant contact dermatitis associated with the use of a facial whitening cream containing tretinoin, hydroquinone, and dexamethasone in an aesthetic clinic setting, with a clear temporal relationship between exposure and symptom onset, followed by complete resolution after discontinuation of the product and supportive therapy. The clinical presentation—erythema, burning sensation, dryness, and desquamation localized to the application site—is consistent with irritant-induced epidermal barrier disruption, which is a well-recognized adverse effect of topical depigmenting agents used in cosmetic dermatology (Ferner, 2015; Del Pozzo-Magaña, 2024).

The findings in this case are consistent with existing literature reporting that topical retinoids such as tretinoin commonly induce irritant dermatitis, particularly during the initial weeks of therapy due to increased epidermal turnover and barrier sensitivity. Hydroquinone, although effective for hyperpigmentation, is also associated with dose-dependent irritation and may exacerbate inflammatory skin responses when used in combination with other active agents. The combination of multiple active compounds in a single formulation may increase cumulative irritant potential, as observed in cosmetic and cosmeceutical products used in aesthetic practice (Draelos, 2018; Lucca et al., 2020).

The clinical findings in this case are consistent with previously reported cases of cosmetic-related irritant contact dermatitis associated with topical depigmenting agents. Del Pozzo-Magaña and Lazo-Langner (2024) described that topical retinoids and hydroquinone are among the most frequent causes of localized erythema, burning sensation, scaling, and skin barrier disruption during the early phase of treatment. Similarly, Lucca et al. (2020) reported that erythema, burning sensation, and desquamation were the most commonly documented adverse reactions in cosmetovigilance reports involving facial cosmetic products. However, unlike most published reports, which primarily emphasize dermatological diagnosis and treatment, the present case highlights a structured clinical pharmacy approach, including comprehensive medication review, causality assessment using the Naranjo Adverse Drug Reaction Probability Scale, pharmacist-led patient counseling, and follow-up monitoring. This multidisciplinary approach provides additional practical value for improving patient safety in aesthetic practice.

Differential diagnosis in this case included allergic contact dermatitis, rosacea, and seborrheic dermatitis. However, the absence of vesiculation, intense pruritus, and lesion spread beyond the application site made allergic contact dermatitis less likely. Similarly, the acute onset linked to product exposure and subsequent resolution after withdrawal helped exclude chronic inflammatory conditions such as rosacea and seborrheic dermatitis. These diagnostic considerations align with established dermatological guidelines emphasizing clinical pattern recognition and exposure history as key determinants in contact dermatitis evaluation (Johansen et al., 2022).

A notable aspect of this case is the application of structured clinical pharmacy involvement in the assessment and management of a cosmetic-related adverse reaction. Pharmacist-led evaluation facilitated early identification of the suspected causative agent, systematic causality assessment using the Naranjo scale, and implementation of evidence-based supportive therapy. This aligns with emerging literature highlighting the expanding role of pharmacists in dermatology and cosmetovigilance, particularly in improving medication safety and reducing preventable adverse drug reactions (Patel et al., 2021; Raschi et al., 2021).

From a clinical perspective, this case underscores the importance of recognizing irritant contact dermatitis as a frequent but often underreported complication of aesthetic treatments. In real-world practice, patients may continue using irritant products despite early symptoms due to lack of awareness or inadequate counseling. Early intervention, including prompt discontinuation of the offending agent and barrier repair therapy, was critical in achieving rapid symptom resolution and preventing complications such as post-inflammatory hyperpigmentation or chronic dermatitis.

The educational value of this case lies in demonstrating the integration of clinical reasoning, pharmacovigilance principles, and pharmacist-led patient counseling in aesthetic dermatology. It highlights the importance of

interdisciplinary collaboration between physicians and pharmacists in managing cosmetic-related adverse reactions and ensuring patient safety in non-traditional healthcare settings such as aesthetic clinics.

Compared with previous case reports, the novelty of the present report lies not in the occurrence of irritant contact dermatitis itself—which has been well documented—but in the integration of clinical pharmacy services into the diagnostic and therapeutic process. The systematic application of clinical reasoning, structured causality assessment, pharmacist-led patient education, and cosmetovigilance principles illustrates an expanded role for clinical pharmacists in aesthetic medicine, a perspective that remains relatively underreported in the current literature (Raschi et al., 2021; Patel et al., 2021).

The present case extends the existing literature by demonstrating how structured clinical pharmacy services can be integrated into cosmetovigilance practice in an aesthetic clinic. In addition to establishing the diagnosis of irritant contact dermatitis, the report illustrates the practical application of clinical reasoning, standardized causality assessment, pharmacist-led counseling, and longitudinal follow-up in supporting safe cosmetic use. This multidisciplinary perspective remains relatively underreported in published case reports of cosmetic-related adverse skin reactions.

However, this case has several limitations. First, no confirmatory diagnostic tests such as patch testing were performed, which could have further distinguished irritant from allergic contact dermatitis. Second, the causality assessment was based on clinical judgment and a probabilistic scale rather than objective laboratory confirmation. Third, long-term follow-up beyond two weeks was not conducted, limiting evaluation of recurrence risk or delayed complications such as post-inflammatory hyperpigmentation. Finally, as a single case report, generalizability to broader populations is limited.

Despite these limitations, the case provides important clinical insights into the recognition and management of cosmetic-induced skin reactions. It emphasizes that careful medication history taking, awareness of irritant potential in combination topical formulations, and pharmacist involvement in patient education are essential components of safe aesthetic practice. Ultimately, this case reinforces the need for strengthened cosmetovigilance systems and interdisciplinary collaboration to improve patient safety in cosmetic dermatology.

DIAGNOSTIC CHALLENGE

The primary diagnostic challenge in this case was distinguishing between irritant contact dermatitis (ICD) and allergic contact dermatitis (ACD), as both conditions share overlapping clinical features such as erythema, scaling, and skin discomfort. In aesthetic practice, topical depigmenting agents frequently act as both irritants and potential allergens, making clinical differentiation difficult without confirmatory testing. The absence of specific diagnostic biomarkers further complicates the reliance on clinical judgment and exposure history alone (Johansen et al., 2022; Fonacier et al., 2015).

Another difficulty was the lack of confirmatory diagnostic testing, such as patch testing or skin biopsy. Although patch testing is the gold standard for identifying allergic contact dermatitis, it is less useful in acute irritant reactions and was not performed due to the clear temporal association between exposure and symptom onset. However, without these investigations, there remains a residual uncertainty in fully excluding a subclinical allergic component or mixed dermatitis. This limitation is commonly reported in real-world cosmetovigilance cases where diagnostic resources are not routinely applied in aesthetic clinic settings (Thyssen et al., 2007; Johansen et al., 2022).

The presence of a multi-ingredient topical formulation containing tretinoin, hydroquinone, and dexamethasone further increased diagnostic complexity. Each component has distinct pharmacological and dermatological effects, and their combined use may produce synergistic irritation or mask individual causative agents. Additionally, corticosteroids may temporarily suppress inflammatory signs, potentially altering the clinical presentation and delaying recognition of the underlying irritant reaction (Del Pozzo-Magaña, 2024; Draelos, 2018).

A further challenge was the absence of objective laboratory or imaging findings, as irritant contact dermatitis is primarily a clinical diagnosis. The reliance on subjective symptoms (burning sensation, tightness, and dryness) introduces variability in interpretation, especially when patient-reported outcomes are influenced by cosmetic concerns. This can lead to under- or overestimation of severity and complicate standardized assessment in clinical pharmacy practice (Patel et al., 2021).

In addition, the overlap of clinical features with other dermatological conditions such as rosacea and seborrheic dermatitis posed diagnostic uncertainty at the initial stage. Rosacea, in particular, may present with facial erythema and burning sensations similar to irritant reactions. However, the acute onset after exposure and rapid improvement following withdrawal of the suspected agent favored a diagnosis of irritant contact dermatitis. Despite this, early differentiation remained challenging without longitudinal observation (Borda & Wikramanayake, 2015; Patel et al., 2021).

Finally, the case highlights the limitations of causality assessment tools, such as the Naranjo scale, when applied to topical cosmetic products. While the scale provided structured support for determining a probable adverse reaction, it was originally developed for systemic medications and may not fully capture complexities of topical multi-agent formulations commonly used in aesthetic dermatology. This introduces a degree of uncertainty in quantifying causality strength in cosmetovigilance contexts (Raschi et al., 2021; Naranjo et al., 1981).

Overall, the diagnostic challenge in this case stemmed from overlapping clinical presentations, limited confirmatory testing, multi-ingredient exposure, and reliance on clinical judgment. These factors underscore the importance of careful history taking, structured clinical reasoning, and interdisciplinary collaboration—particularly between dermatology and clinical pharmacy—to improve diagnostic accuracy in cosmetic-related adverse reactions.

LIMITATION

This case report has several limitations that should be considered when interpreting the findings. First, the diagnosis of irritant contact dermatitis was based primarily on clinical evaluation, history taking, and response to withdrawal of the suspected product, without confirmatory diagnostic procedures such as patch testing or skin biopsy. Although this approach is consistent with routine clinical practice in uncomplicated cases, it limits the ability to definitively exlude allergic contact dermatitis or mixed irritant-allergic reaction (Johansen el al., 2022; Fonacier et al., 2015).

Second no laboratory investigations or instrumental assessments (e.g transepidermal water loss measurement, dermoscopy, or skin barrier function testing) were performed. The absence of objective quantitative data may reduce the precision of severity assessment and makes the evaluation dependent on subjective clinical observation and patient-reported symptoms. This limitation is common in cosmetovigilance-related case reports, where diagnostic resources are often limted in outpatient aesthetic settings (Patel et al., 2021)

Third, causality assessment was performed using the Naranjo Adverse Drug Reaction Probability Scale, which was originally designed for systemic medications rather than topical cosmetic preparations. While the scale provided structured support for assessing probability, its applicability to multi—ingredient topical formulations (such as those containing tretinoin, hydroquinone, and corticosteroids) may be limited, potientially affecting the accuracy of causality classification in this context (Raschi et al., 2021)

Fourth, the follow-up period was relatively short (two weeks after intervention), which limits evaluation of long-term outcomes such as recurrence, post-inflammatory hyperpigmentation, or delayed hypersensitivity reactions. Longer follow-up would be necessary to fully assess skin recovery stability and patient tolerance to future cosmetic or dermatologic treatments (Del Pozzo-Magaña, 2024).

Fifth, as a single-patient case report, the findings cannot be generalized to the broader population. Individual variability in skin sensitivity, environmental exposure, and cosmetic usage patterns may influence clinical presentation

and treatment response. Therefore, the external validity of this report is inherently limited, although it remains valuable for hypothesis generation and clinical education (Raschi et al., 2021).

Finally, potential reporting bias should be acknowledged. The reliance on patient recall for cosmetic usage history introduces the possibility of incomplete or inaccurate exposure reporting. In addition, mild symptoms prior to clinic presentation may have been underreported by the patient, which could influence the perceived severity and timeline of the reaction. Despite these limitations, the case provides clinically relevant insights into the recognition and management of cosmetic-induced irritant contact dermatitis and highlights the importance of careful medication history, early intervention, and pharmacist involvement in aesthetic dermatology practice

LEARNING POINTS

1. Irritant contact dermatitis should be considered early in patients presenting with acute facial erythema, burning sensation, and skin dryness following the use of topical cosmetic or skin-whitening products, particularly those containing active ingredients such as tretinoin and hydroquinone.
2. A comprehensive medication and cosmetic use history is essential for differentiating irritant contact dermatitis from allergic contact dermatitis and other facial dermatoses, including rosacea and seborrheic dermatitis.
3. Prompt discontinuation of the suspected causative product remains the cornerstone of management and is often sufficient to achieve complete clinical recovery in uncomplicated cases.
4. Supportive treatment aimed at restoring the skin barrier, including the use of moisturizers and adequate photoprotection, plays a crucial role in promoting skin healing and preventing post-inflammatory complications.
5. Clinical pharmacists play an important role in enhancing patient safety through adverse reaction assessment, patient counseling, pharmacovigilance, and education on the safe use of cosmetic products, thereby supporting multidisciplinary care in aesthetic dermatology practice.

CONCLUSION

This case highlights the successful identification and management of irritant contact dermatitis associated with the use of a facial whitening cream containing tretinoin and hydroquinone in an aesthetic clinic setting. The diagnosis was established through careful clinical evaluation, assessment of the temporal relationship between product exposure and symptom onset, exclusion of alternative diagnoses, and observation of symptom resolution following product discontinuation.

The case demonstrates the importance of early recognition of cosmetic-related adverse reactions, appropriate causality assessment, and timely intervention to prevent progression of skin damage and treatment-related complications. It also illustrates the valuable role of clinical pharmacists in cosmetovigilance activities, including adverse reaction monitoring, patient counseling, and promotion of safe cosmetic use.

For clinical practice, healthcare professionals working in aesthetic services should maintain a high level of awareness regarding the irritant potential of topical depigmenting agents and provide adequate patient education before treatment initiation. Strengthening interdisciplinary collaboration between physicians and pharmacists may improve patient safety and therapeutic outcomes.

Future studies involving larger patient populations and longer follow-up periods are needed to better characterize risk factors, optimize preventive strategies, and further define the role of clinical pharmacy services in the management of cosmetic-related adverse reactions.

ETHICAL CLEARANCE

According to the institutional policy and the journal guidelines for single-patient case reports, formal ethical approval was not required because this report describes a retrospective clinical case without experimental intervention and does not include any patient-identifying information. Patient confidentiality was maintained throughout the manuscript in accordance with the principles of the Declaration of Helsinki.

PATIENT CONSENT

Written informed consent was obtained from the patient for the publication of this case report, including relevant clinical information and any accompanying clinical images, where applicable. The patient was informed about the purpose of publication and provided consent voluntarily prior to manuscript submission. All personal identifiers have been removed, and the case has been presented in an anonymized manner to protect patient privacy and confidentiality.

The publication of this case report was conducted in accordance with the ethical principles of the Declaration of Helsinki and institutional policies regarding the protection of patient information. Every effort has been made to ensure that no identifying details are disclosed in the manuscript, figures, tables, or supplementary materials. The patient reviewed and approved the use of the clinical information presented in this report.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the research, authorship, and publication of this case report. The authors have no financial, personal, professional, or institutional relationships that could be perceived as influencing the content, interpretation, or reporting of the case presented in this article.

All authors have contributed independently to the preparation of the manuscript and have disclosed any potential competing interests in accordance with the journal's publication ethics and transparency requirements. No external organization, commercial entity, or sponsor had any role in the design, analysis, interpretation, writing, or decision to publish this case report.

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AUTHORS' CONTRIBUTION

Author 1: Conceptualization, patient data collection, literature review, clinical pharmacy evaluation, manuscript drafting, and manuscript editing.

Author 2,3: Clinical assessment, diagnostic evaluation, interpretation of findings, and critical revision of the manuscript.

Author 4,5: Methodological supervision, manuscript review, final approval of the version to be published, and overall project supervision.

All authors have read and approved the final manuscript and agree to be accountable for the accuracy and integrity of the work.

DATA AVAILABILITY

The data supporting the findings of this case report are available from the corresponding author upon reasonable request. However, access to the data may be restricted to protect patient confidentiality and comply with ethical and institutional regulations. Any shared data will be fully anonymized to ensure that no personally identifiable information is disclosed

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LIST OF ABBREVIATIONS

ACD = Allergic Contact Dermatitis

ADR = Adverse Drug Reaction

CARE = CAse REport Guidelines

CT = Computed Tomography

ECG = Electrocardiography

ICD = Irritant Contact Dermatitis

MRI = Magnetic Resonance Imaging

PA = Protection Grade of UVA

SPF = Sun Protection Factor

TEWL = Transepidermal Water Loss

UV = Ultraviolet

UVA = Ultraviolet A

UVB = Ultraviolet B

FIGURE AND TABLE LEGENDS

Table 1. Summary of Diagnostic Findings and Differential Diagnoses Summary of patient presentation, clinical findings, differential diagnoses, and final diagnosis of irritant contact dermatitis associated with facial whitening cream use.

Table 2. Vital Signs and Clinical Examination Results at Initial Presentation Baseline vital signs and key dermatological findings observed during the first clinical assessment.

Table 3. Naranjo Adverse Drug Reaction Probability Scale Assessment Causality assessment of the suspected adverse reaction associated with the facial whitening cream, demonstrating a probable relationship between product exposure and symptom development.

Table 4. Therapeutic Interventions and Clinical Monitoring Plan Summary of therapeutic interventions, dosage and administration instructions, duration of treatment, and follow-up monitoring schedule.

Table 5. Chronological Timeline of Clinical Events and Management Chronological sequence of symptom onset, diagnostic evaluation, treatment interventions, and clinical outcomes during follow-up.

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