

# Topical steroid menace: A case series of severe debilitating infections during the COVID-19 pandemic

Deena Patil, Kanakapura Nanjundaswamy Shivaswamy, Namitha Subramani Reddy, Tharayil Kunneth Sumathy

Department of Dermatology, M S Ramaiah Medical College and Hospital, Bengaluru, India

**Corresponding author:** Deena Patil, MD, E-mail: deenajc22@yahoo.com

## ABSTRACT

**Background:** Topical corticosteroids is a boon and also a bane in treating chronic skin conditions. The risk of cutaneous infections due to topical steroids increases with their potency, dose, and duration of treatment. Herein, we present a case series of severe debilitating infections secondary to topical steroid abuse. **Materials and Methods:** We came across five cases of severe skin infection following the prolonged application of topical steroids. These cases gave a history of the use of steroid creams for persistent skin conditions and the inability to visit the hospital due to the prevailing COVID-19 pandemic. **Observations:** We came across two cases of crusted scabies, two cases of Fournier's gangrene, and a case of erosio interdigitalis blastomycetica. These cases had been using topical steroids for a prolonged period for other dermatological conditions. **Conclusion:** We propose that, as crusted scabies and erosio interdigitalis blastomycetica mimic various other papulosquamous disorders, a KOH examination is a diagnostic tool. Topical steroid abuse is one of the predisposing factors for Fournier's gangrene.

**Key words:** Topical Steroids; Crusted Scabies; Fournier's Gangrene; COVID-19.

## INTRODUCTION

The skin, as a protective organ, provides both a mechanical and immunological barrier to environmental pathogens. The mechanical barrier is due to the arrangement of epidermal keratinocytes, tight junctions, and the lipid bilayer. The immunological barrier is by SALT (skin-associated lymphoid tissue), which constitutes keratinocytes, Langerhans cells, mast cells, and B- and T-lymphocytes [1]. Glucocorticoids produce qualitative and quantitative immunosuppressive effects on the immune system. Both the anti-inflammatory and immunosuppressive effect is exerted through the inhibition of NF-kB and other transcription factors. The risk of cutaneous infection to topical steroids increases with the potency, dose, and duration of treatment [2,3]. Herein, we present a case series of severe debilitating infections that caused a secondary to topical steroid menace.

## MATERIALS AND METHODS

During the period from January 2020 to December 2021, we came across five cases of severe skin infection following the prolonged application of topical steroids. All these cases gave a history of using steroid creams in view of persistent skin conditions and itching. The cases also expressed their inability and difficulty to visit the hospital due to the prevailing COVID-19 pandemic. These cases were seen as outpatient cases and inpatient referrals from other departments.

### Ethics Statement

A written informed consent was obtained from all the cases. The examination of the patients was conducted according to the principles of the Declaration of Helsinki.

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## Case 1

The first case was a 66-year-old male presenting with itchy, scaly lesions on the lower abdomen, lower back, and buttocks persistent for three months, of insidious onset, gradually progressive, associated with minimal nocturnal itching and no relieving factors. There were similar complaints in three other family members. He had a history of being treated for chronic plaque psoriasis with 0.05% clobetasol propionate cream, which he continued to apply to the skin lesions for one year. A dermatological examination revealed multiple, thick, scaly plaques in the gluteal area (Fig. 1a), flank (Fig. 1b), and lower abdomen, sparing the web spaces. Some plaques showed fissuring (Fig. 1c). Umbilical hernia was noted (Fig. 1d). Relevant routine blood investigations were normal. Serology for HIV 1 and 2 were non-reactive. KOH mount scraping from the lesion on the abdomen revealed *Sarcoptes scabiei* mites and eggs (Figs. 1e and 1f). A diagnosis of crusted scabies was reached.

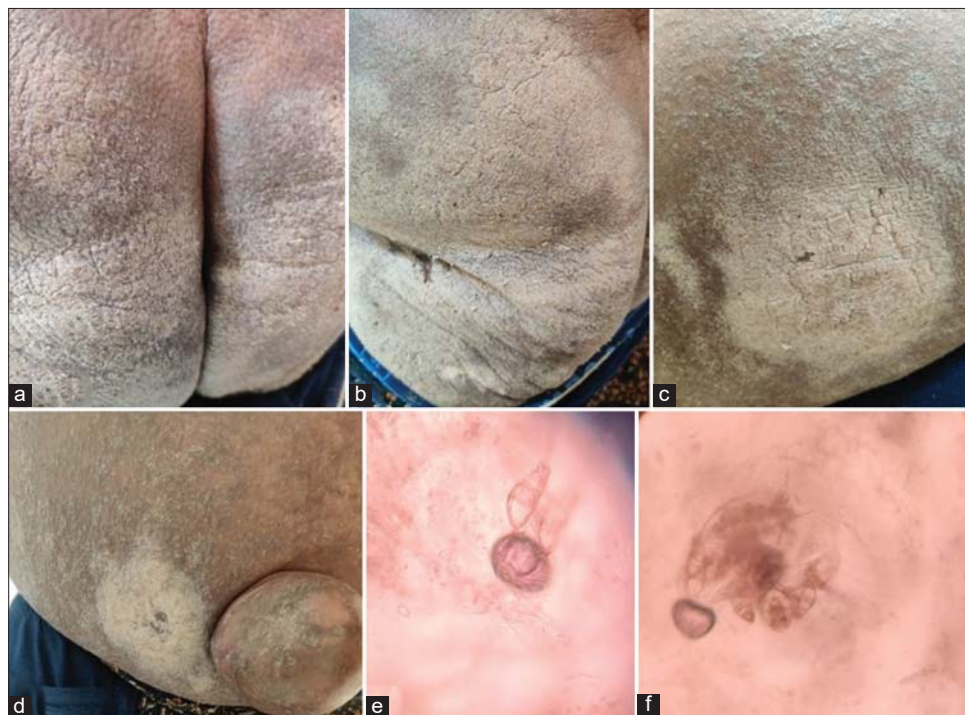
## Case 2

The second case was a 68-year-old male presenting with itching all over the body with scaly, crusted lesions on the back and web spaces present for eight months. The lesions were insidious in onset, gradually progressive,

and aggravated in the last two months. The patient was previously diagnosed as a case of exfoliative dermatitis and had been applying topical 0.05% clobetasol propionate cream and continued the application for the present symptoms as well. An examination revealed large areas of scaly, hyperpigmented plaques on the back on a background of mild erythema. Some ecchymotic patches and erythematous, discrete papules were also observed (Fig. 2a). Multiple, scaly hyperkeratotic plaques were present on the first web spaces of both hands and axillae with fissuring and crusts (Fig. 2b and 2c). Relevant routine blood investigations were normal. Serology for HIV 1 and 2 were non-reactive. KOH mount from the hyperkeratotic lesion revealed the *Sarcoptes scabiei* mite (Fig. 2d). A diagnosis of crusted scabies was reached.

## Case 3

The third case was a 62-year-old female presenting with itchy lesions on the hands present for four years, aggravated on and off on exposure to water and detergents, temporarily relieved by taking treatment. The patient was clinically diagnosed as allergic contact dermatitis and had been applying topical 0.05% halobetasol propionate cream. In view of persistent lesions, the patient continued to apply the cream to the lesions for more than six months. An examination



**Figure 1:** Thick, scaly plaques present on (a) the gluteal area, (b) flanks, (c-d) lower abdomen showing fissuring and umbilical hernia. (e-f) *Sarcoptes scabiei* mites and eggs (10% KOH mount, 400x).



**Figure 2:** (a) Scaly, hyperpigmented plaques present over the back on a background of mild erythema with discrete papules. (b-c) Scaly, hyperkeratotic plaques present over the first web spaces of both hands with fissuring and crusts. (d) *Sarcoptes scabiei* mite (10% KOH mount, 400x)

revealed hyperpigmented, hyperkeratotic plaques with thick, adherent, yellowish crusts and scales on the palms, extending to the web spaces and the dorsa of the hands (Figs. 3a and 3b). Discoloration and onycholysis of the fingernails on the right hand and the nails of the left thumb and index finger were present (Figs. 3c and 3d). Routine investigation revealed microcytic hypochromic anemia. Serology for viral screening was non-reactive. 10% KOH mount of the scrapings from the hyperkeratotic plaque showed pseudo hyphae with yeast-like cells (Fig. 3e). Thus, the final diagnosis was *errosio interdigitalis blastomycetica* of the palms.

#### Case 4

The fourth case was a 65-year-old male presenting with swelling and wound on the scrotal area persistent for five days, sudden in onset, progressive in nature, associated with foul-smelling pus discharge and pain. The patient had been applying a topical cream consisting of 0.05% clobetasol propionate, neomycin, and miconazole for eight months. An examination revealed hyperpigmented, scaly patches on the groin folds extending to the mons pubis, lower abdomen, medial aspect of both the thighs, with several areas of erythema and atrophic skin (Fig. 4a). A large ulcer was present on the scrotum, extending to the penile

shaft and glans penis with yellowish purulent slough over the penile shaft (Fig. 4b). Routine blood tests were normal, and HIV 1 and 2, HCV, and HBsAg were non-reactive. Tissue culture showed *Citrobacter koseri* and *enterococcus* species, which was pan-resistant to antibiotics. A KOH examination from the scaly plaque on the groin showed long, refractile branching hyphae. A diagnosis of Fournier's gangrene of the scrotum with tinea incognito was established.

#### Case 5

The fifth case was a 47-year-old male presenting with a burning sensation and itching on the scrotum persistent for six months. The patient had been using a combination cream of 0.05% clobetasol propionate, neomycin, miconazole, and chlorhexidine cream for the same. The patient also gave a history of a wound on the scrotal area with pain, associated with purulent discharge for which he had undergone debridement of the ulcers on the scrotal area one month previously. An examination revealed scaly, hyperpigmented patches on the groin folds, extending to the scrotum, mons pubis, and medial aspect of both thighs (Fig. 5a). Irregular, healing ulcers of 3 × 2 cm and 4 × 3 cm with yellowish slough over the floor were seen on the scrotum (Fig. 5b). Routine blood tests were normal and viral screening was non-reactive. Tissue culture done at the time of surgical debridement showed pan-resistant *Escherichia coli*. A KOH examination of the scaly plaques revealed long, branching, refractile hyphae. A diagnosis of Fournier's gangrene with tinea incognito was established.

Table 1 summarizes a detailed history of topical steroid use in all of the above-mentioned cases and their management.

## RESULTS

Among the five cases presented here, four were males and one was a female. The age distribution observed showed that there were four elderly patients (older than sixty years) one case in the fourth decade of life. The duration of the application of steroids in all cases ranged from three to eight months. The associated comorbidities were type 2 diabetes mellitus, hypertension, and chronic obstructive pulmonary disease. The topical steroids used by the patients belonged to class 1 (superpotent). The approximate amount of total steroid application in all cases varied from 15 to



**Figure 3:** (a-b) Hyperkeratotic plaques with thick, adherent, yellowish crusts and scales on the palms extending to the web spaces and on the dorsa of the hands with several fissures. (c-d) Yellowish-white discoloration with onycholysis on the fingernails over the right hand and nail of the left thumb. (e) Pseudo-hyphae with yeast-like cells (10% KOH mount, 400x).



**Figure 4:** (a) Hyperpigmented, scaly patches present over the groin folds extending to the mons pubis, lower abdomen, medial aspect of both thighs, with some areas of erythema and atrophic skin. (b) Large ulcer on the scrotum, extending onto the onto the penile shaft and glans penis with yellowish, purulent slough on the penile shaft.



**Figure 5:** (a) Scaly, hyperpigmented patches present on the groin folds, extending to the scrotum, mons pubis, and medial aspect of both thighs with some areas of atrophic scars. (b) Irregular ulcers with minimal yellowish slough on the scrotum.

120 gm/week. The severe infections were two cases of crusted scabies, two cases of Fournier’s gangrene, and one case of erosio interdigitalis blastomycetica of the palms. It was also noted that the patients with underlying diabetes mellitus had good control of their glycemic index.

## DISCUSSION

The first side effect of topical corticosteroids was reported in 1955, in which twenty cases experienced weight gain and sodium retention due to systemic absorption of topical fludrocortisone [4]. The anti-inflammatory property of topical corticosteroids is both a boon and bane in treating chronic skin conditions. The most common side effects of topical corticosteroids are seen on the site of application [3,5]. The potency of the steroid, vehicle employed, and site and duration of application determine the local adverse effects [5]. Apart from the immunosuppressive effect of topical steroids, epidermal thinning along with decreased formation of lipid lamellar bodies leads to delayed barrier recovery and, thus, makes the patient prone to cutaneous infections [3,5]. The most common infections seen as adverse effects of prolonged topical steroid application are tinea imbricata, demodex folliculitis, furunculosis, herpes simplex infection, granuloma gluteale infantum, and rarely crusted scabies [3,5,6]. Many times, the patient presents to the dermatologist with a bag of empty, twisted steroid tubes (tortured tube sign), which indicates a topical steroid menace [6]. It is also observed that, as the skin ages, there is epidermal thinning with reduced Langerhans cells and decreased antigen-specific immunity, which explains the increased susceptibility to skin infections [7].

Crusted scabies is a severe form of highly contagious infestation caused by *Sarcoptes scabiei*. In crusted scabies, there are around 4000 mites per gram of skin [8]. It is usually seen because of worsened host

**Table 1:** Case details of steroid use and their management.

Case (age/sex)	Symptom duration	Pre-existing condition for which the steroid was employed	Associated comorbidities	Topical steroid applied	Approx. amount of steroid applied per week	Present diagnosis	Treatment given
Case 1, 66 yrs./male	3 months	Chronic plaque psoriasis	*CVD, *T2DM, *HTN, §COPD	0.05% clobetasol propionate cream	60–90 g/week	Crusted scabies	Permethrin 5% cream, twice a week for 3 weeks T. ivermectin 12 mg, once a week for 3 weeks T. hydroxyzine 25 mg at night
Case 2, 68 yrs./male	8 months	Exfoliative dermatitis	§COPD	0.05% clobetasol propionate cream	100–120 g/week	Crusted scabies	Permethrin 5% cream, twice a week for 3 weeks T. ivermectin 12 mg, once a week for 3 weeks T. hydroxyzine 25 mg at night
Case 3, 62 yrs./female	6 months	Chronic hand dermatitis	*HTN	0.05% halobetasol propionate cream	30–40 g/week	Superficial hyperkeratotic candidiasis	Topical luliconazole lotion, twice a day Topical salicylic acid 6% ointment, at night
Case 4, 65 yrs./male	8 months	Tinea cruris	*T2DM	Topical 0.05% clobetasol propionate, neomycin, and miconazole	15–20 g/week	Fournier's gangrene	Injection linezolid 600mg   BID Injection clindamycin 300mg   BID (for Fournier's gangrene) Oral Itraconazole 200mg <sup>¶</sup> OD for 3 weeks Topical Luliconazole cream   BID for 3 weeks Surgical debridement done
Case 5, 47 yrs./male	6 months	Tinea cruris	*T2DM *HTN	Topical 0.05% clobetasol propionate, neomycin, miconazole, and chlorhexidine cream	40–50 g/week	Fournier's gangrene	Inj. Linezolid 600mg   BID (for Fournier's gangrene) Oral Itraconazole 200 mg <sup>¶</sup> OD for 3 weeks. Sertaconazole cream   BID (for Tinea incognito)

\*CVD, Cardiovascular disease; \*T2DM, Type 2 Diabetes Mellitus; \*HTN, Hypertension; §COPD, Chronic obstructive pulmonary disease; ||BID, bis in die; ¶ OD, omne in die

immunity to the mite. Some of the predisposing factors for crusted scabies are HIV infection, mental debilitation conditions, and immunosuppressive therapies [9]. There are very few reported cases of crusted scabies secondary to topical steroid abuse (Table 2) [10-12]. The characteristic feature of crusted scabies is the presence of hyperkeratotic plaques with millions of mites and a lack of intense itching as compared to classical scabies. Crusted scabies is a severe disease with higher mortality than classical scabies. The most dreadful complication is septicemia [8,9]. In a retrospective study conducted by Davis et al. in Australia on crusted scabies, a novel grading of the severity of scabies was suggested. The two cases of crusted scabies described there were graded as moderate severity [8]. The two important predisposing factors for crusted scabies in our cases were prolonged use of class I topical steroids and decreased skin immunity in aged skin [7,8]. Along with the clinical findings, the demonstration of mites, eggs,

and mite feces (scybala) is a diagnostic of scabies [9]. Along with topical scabicide drugs, oral ivermectin in three doses (0,1,7) is found to be effective in crusted scabies [8].

Cutaneous candidiasis presents in varied forms, such as intertrigo, paronychia, onychomycosis, erosio interdigitalis blastomycetica, and granuloma gluteale infantum. Various predisposing conditions for erosio interdigitalis blastomycetica are diabetes mellitus, prolonged exposure to moisture and detergents, and immunosuppressive conditions [13]. It presents as an erosion or ulcer with a white collarette of macerated epidermis in the interdigital web spaces (Table 2). It may extend to the fingers and palms with satellite lesions [13,14]. The patient usually complains of pain and pruritus in the affected area. In our case, there was maceration in the interdigital webspace with a hyperkeratotic plaque extending to the palms and fingers, which is a rare presentation in erosio

**Table 2:** Case reports of similar infections secondary to prolonged topical steroid use by other authors.

Current case	Other similar case report	Primary reason for steroid use	Duration of steroid use	Findings after prolonged use of topical steroids
Crusted scabies (case 1 and 2)	Ivana binic et al. (2010)	Skin changes secondary to hypothyroidism	5 months	<ul style="list-style-type: none"> <li>Hyperkeratotic scaly plaques on the trunk and limbs.</li> <li>Crusted lesions on the scalp and external ears.</li> </ul>
	Vincent Marliere et al. (1999)	Generalised eczema	1.5 months	<ul style="list-style-type: none"> <li>Hyperkeratotic crusted plaques on the dorsa of the feet, toes, and soles.</li> <li>Pruriginous, crusted papules on the hands and genitals.</li> </ul>
	Jaramillo et al. (1998)	Seborrheic dermatitis/psoriasis	36 months	<ul style="list-style-type: none"> <li>Hyperkeratotic and fissured plaques on the extremities and sacral areas.</li> <li>Dystrophic nails with hyperkeratosis.</li> </ul>
Erosio interdigitalis blastomycetica (case 3)	Luo DQ et al. (2011) Report of 4 cases	Non-healing interdigital ulcer	Case 1: 1 month Case 2: 3 months Case 3: 2 months Case 4: 2 months	<ul style="list-style-type: none"> <li>Non-healing ulcer with maceration on surrounding skin in the interdigital webspace of the foot.</li> </ul>
Fournier's gangrene (case 4 and 5)	Osime et al. (2002)	Skin bleaching	60 months	<ul style="list-style-type: none"> <li>Ulceration on the scrotal area.</li> </ul>
	Shyam verma (2020) Report of 4 cases	Tinea corporis	Case 1: 4 months Case 2: 1.5 months Case 3: 5 months Case 4: not mentioned	<ul style="list-style-type: none"> <li>Several painful, oval ulcers showing overhanging borders with some large ulcers adopting the pattern of striae.</li> </ul>

interdigitalis blastomycetica. Prolonged use of topical corticosteroids reduces the local inflammatory response and cell-mediated immunity, allowing candida to thrive and cause infection [13,14]. Sitheequa et al. suggested that a candida invasion in the epithelium initiates a hyperplastic response, which is responsible for chronic hyperplastic changes in oral mucosal candidiasis [15]. The probable factors responsible for atypical presentation of erosio interdigitalis blastomycetica in our case were prolonged use of corticosteroids, elderly age, and repeated contact with water.

Fournier's gangrene is a necrotizing fasciitis of perineum and genitalia with high mortality. It is more commonly seen in the fourth-to-sixth decade of life. In a study conducted in South India by Sockkalingam et al., the male-to-female ratio was 33:1 [16]. The major predisposing factors were diabetes mellitus, trauma, post-urogenital surgeries, and HIV infection [16,17]. To the best of our knowledge, there has only been a single case report of Fournier's gangrene secondary to prolonged topical steroid application wherein topical steroid was employed as a bleaching agent (Table 2) [18]. There are some case reports of skin ulceration secondary to steroid application as a result of epidermal atrophy and impaired wound healing, yet tissue cultures were negative [19]. Thus, prolonged use of steroid creams leads to ulceration and increases the susceptibility to infections. In our cases of Fournier's gangrene, both topical steroid application and trauma secondary to scratching were major predisposing factors.

## CONCLUSION

In all cases presented here, topical steroid misuse was the initiating factor for the manifestation of such severe debilitating conditions. In the presence of well-controlled diabetes mellitus and other comorbidities, elderly individuals should use topical steroids cautiously to prevent life-threatening infections. Herein, we propose that, as crusted scabies and hyperkeratotic erosio interdigitalis blastomycetica mimic various other papulosquamous disorders, a simple KOH examination aids in diagnosis. Prolonged topical steroid use is one of the predisposing factors for Fournier's gangrene, a life-threatening disease.

## Statement of Human and Animal Rights

All the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the 2008 revision of the Declaration of Helsinki of 1975.

## Statement of Informed Consent

Informed consent for participation in this study was obtained from all patients.

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