Self-inflicted chemical burns caused by depilatory cream use: The price of beauty

ABSTRACT

Objective: The objective was to study and describe the presenting patient characteristics for those with chemical burns acquired from hair removal beauty products.

Methods: Retrospective single-center chart review was done to identify all burn injuries caused by the use of depilatory cream use.

Results: A total of seven patients who acquired burn injuries due to depilatory cream use were identified. Six were female and one was male. Patients’ age ranged from 3 to 43 years, with a mean age of 27.2 years. Total body surface area of the burns ranged from 0.18% to 0.79% including first- and second-degree burns; none of the patients acquired third-degree burns. Most of the injuries involved groin and pubic area. All patients were treated with wound care, and none required inpatient care. All of the patients who presented to follow-up visits showed re-epithelialization and good healing.

Conclusion: Depilatory cream is a corrosive chemical hair removal agent that can lead to unintended chemical burns if used improperly. Burn-care provider, as well as other health-care providers, should be aware of this unusual cause of chemical burn and educate their patients appropriately.

Keywords: Burn, chemical burn, depilatory cream, hair removal injury, self-inflicted burn

INTRODUCTION

Some men and women will brave inconvenience, discomfort, and even pain, in the name of beauty. One such example of this discomfort is the practice of using caustic chemicals to dissolve hair in a process called depilation. Depilatory products utilize thioglycolates to disrupt disulfide bonds found in hair follicles, effectively “melting” the hair. These bonds are also found in the epidermal skin layer, so while hair is the primary target, the skin may also be affected. Moreover, these products use sodium hydroxide (NaOH) or calcium hydroxide (CaOH) to raise the working pH of the product, which increases the efficacy of the thioglycolate but also increases the risk of chemical burn. As depilatory agents became more ubiquitous, we have seen an anecdotal rise in the number of resultant chemical burns.

METHODS

A retrospective chart review for cases of burn caused by hair removal products between February 2011 and December 2017 was performed from a single American Burn Association-verified burn center registry. The study protocol was reviewed and approved by the institutional review board. All patients with chemical burn secondary to hair removal product use were included. Patient demographics,
presentation, course and length of hospitalization, social history, and follow-up care were analyzed.

**RESULTS**

A total of seven patients meeting the inclusion criteria were identified, including six females and one male. Six patients were identified between 2015 and 2017 and one patient in 2013. Patients’ age ranged from 3 to 43 years with a mean age of 27.2. Total body surface area (TBSA) of the burns ranged from 0.18% to 0.79% including first- and second-degree burns; none of the patients acquired third-degree burns. The majority of the injuries were located in the genital/groin area; other areas of injury included dorsal wrist and cheeks. All of the injuries occurred after the use of chemical depilatory cream. All of the patients were treated by wound cleaning, mechanical debridement, antibiotic ointment, sterile petroleum gauze dressings, and gauze pads. None of the patients required inpatient care. Six of the patients were arranged to follow-up and three patients were lost to follow-up. All of the patients who presented to follow-up visits showed re-epithelialization and good wound healing. One patient did not require a follow-up visit because his wound only consisted of first-degree burns.

**DISCUSSION**

Deliberate body hair removal is an extremely common practice in the United States (US), especially for females. More than 99% of US women practice body hair removal, with the majority of them doing so regularly.[8] Such practice most likely stems from the fact that “hairlessness” has long been associated with femininity and ideal female standard of beauty.[9] While more popular among females, body hair depilation is not unique to women; shifting images of the “ideal” male body is also influencing men to engage in body hair removal.[4,5]

While body hair depilation is usually a harmless practice, it can lead to unintended injuries. Depilatory creams are caustic chemical agents that can be applied directly to body hair and then easily washed off. There have been only a few reports of burn secondary to depilatory cream use; one showcasing a single female burn after prolonged application of depilatory cream in her pubic area[6] and another describing a male patient with a penile burn after mistakenly applying depilatory cream instead of a moisturizer.[7] An Australian study published by Chang et al. investigated thermal burn injuries caused by microwave-heated hair removal wax.[8] The study analyzed 21 cases of microwave-heated hair removal wax burn and found that most of the injuries involve superficial and partial-thickness burns, although some injuries involved mid-dermal as well as full-thickness burns requiring skin grafts. Such injuries were likely caused by inadequate instructions and caution from the manufacturer, as the investigators found that microwave-heated wax samples often reached a temperature higher than 90°C. However, though sharing a common aim, waxing represents a different burn mechanism than chemical depilatory agents. To the best of our knowledge, this case series will be the first report to attempt the characterization of chemical burn injuries secondary to the use of depilatory cream.

Depilatory cream utilizes thioglycolates to disrupt disulfide bonds found in hair follicles. These products often contain other caustic agents such as NaOH or CaOH, which work to augment the efficacy of the primary ingredient. In this particular instance, they do so by lowering the working pH of the solution, resulting in increased thioglycolate activity. The Globally Harmonized System places many of these depilatory creams on Category 1 (most severe, of four categories) for skin and eye contact damage.[9] Unsurprisingly, one of the major side effects of such product is skin irritation. While the manufacturer’s instructions caution the user about limiting the total application time (<10 min), thorough rinsing after use, and avoiding sensitive skin areas, there has been steady, if not increasing, rate of patients presenting with chemical burns secondary to depilatory cream use.

A retrospective chart review revealed seven patients who presented with a primary burn injury caused by depilatory cream use [Table 1]. Seven patients included six females and one male. Interestingly, the only male patient was a 3-year-old boy who applied his mother’s depilatory cream to his groin area. His mother soon discovered what had happened, immediately washed his groin area, and presented him to the emergency department (ED). His injury consisted of a first-degree burn and did not require a follow-up visit.

The other six cases involved intentional cream use, four cases involving the pubic area [Figure 1]. US women’s pubic hair grooming practices have been studied previously and revealed that pubic hair grooming is a common practice with certain predictive characteristics that are associated with grooming preferences, such as age, race, educational level, and their partners’ preferences.[10] Unsurprisingly, pubic hair grooming injury incidence has been increasing, with razor-associated injuries being the most common mechanism of injury.[11] However, there appears to be a concomitant increase in the frequency of depilatory cream-related burns, especially involving pubic hair removal. Despite the manufacturer’s instruction that clearly warns the users against using the
Table 1: Patient characteristics, presentation, and treatment courses

| Patient | Gender | Age  | Race     | TBSA/degree of burn | Location                  | Length of hospitalization | Mechanism of injury/presentation | Treatment                                                                                     | Follow-up visits                                                                 |
|---------|--------|------|----------|--------------------|----------------------------|----------------------------|----------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| 1       | Female | 43   | Caucasian| 0.36 Second degree | Infrapannicular fold       | 1                          | Applied Nair on the bilateral inguinal/superior mons region for about 5 min. A few hours later, the patient started noticing discomfort; after about 5 h, she noticed skin separating and blistering, which prompted her to seek care | Wound cleaning and mechanical debridement with soap and water, then covered with antibiotic ointment, sterile petroleum gauze dressing, and gauze pads | 5 days after presentation showed well-healing injury site; no further follow-up visits were necessary |
| 2       | Female | 22   | Caucasian| 0.26 second degree | Right dorsal wrist         | 1                          | Applied Nair on arms and legs in the shower, left for about 3 min and brushed them off. However, she noticed redness and pain on her right wrist after shower. The wrist was erythematous and had blisters | Wound cleaning and mechanical debridement with soap and water, then covered and wrapped with antibiotic ointment, sterile petroleum gauze dressing, gauze rolls, and elastic bandage | 11 days after presentation showed well-healing injury site; no further follow-up visits were necessary |
| 3       | Female | 40   | Caucasian| 0.18 second degree | Inner labia                | 1                          | Applied Nair to groin area, left it for about 15 min and washed it off; she immediately noticed burning pain | Wound cleaning and mechanical debridement with soap and water, then covered with antibiotic ointment, sterile petroleum gauze dressing, and gauze pads | No show                                                                                     |
| 4       | Female | 14   | Other race| 0.3 second degree | Bilateral cheeks           | 1                          | Applied Nair to her legs in the shower; she then washed her hands and her face. She later noticed her face was burning, as well as hairless, linear red lines on her face | Wound cleaning and mechanical debridement with soap and water, then a layer of antibiotic ointment application | No show                                                                                     |
| 5       | Female | 35   | African American| 0.66 Second degree | Suprapubic area            | 1                          | Applied Nair to pubic/groin area and noticed skin sloughing off when wiping away hair. She immediately applied aloe with no relief | Wound cleaning and mechanical debridement with soap and water, then covered with antibiotic ointment, sterile petroleum gauze dressing, and gauze pads | 6 days after presentation showed well-healing injury site. Additional follow-up 13 days after injury, which revealed well-healing injury site; no further follow-up visits were necessary |
| 6       | Female | 33   | African American| 0.79 Second degree | Lower abdomen/superior mons | 1                          | Applied Nair to the pubic area and noticed burning sensation; she removed the cream but pain continued, which prompted her to go to a walk-in clinic | Wound cleaning and mechanical debridement with soap and water, then covered with antibiotic ointment, sterile petroleum gauze dressing, and gauze pads | No show                                                                                     |

Contd...
Further demonstrating the need to adhere to manufacturer use instructions, one patient presented with linear burns to her cheeks after applying hair removal cream to her legs per packaging instructions and then proceeded to wash her face. Only after she noticed that her cheeks were burning with linear red marks she realized that she had not adequately washed her hands after removing the excess product from her legs. This patient went on to heal from her injuries without issue through the use of simple wound care.

Thankfully, no patient acquired third-degree burns nor required inpatient care. All of the patients were treated with wound cleaning, mechanical debridement as needed for overlying devitalized/sloughing epidermis, and appropriate dressing care. Those who came to follow-up visit showed re-epithelialization and good wound healing. Likely, those who were lost to follow-up felt no need to be seen because of apparent wound healing, though we cannot rule out the possibility of further wound care needs sought at other institutions or practices.

This study highlights an unusual presentation of chemical burn secondary to depilatory cream use. While these injuries were limited to <1% TBSA first- and second-degree burns and did not require any inpatient care, the majority of patients presented with burns to their groin area, which has the potential for significant patient morbidity including pain, infection, and genitourinary injury. Burn and ED providers should recognize this unusual chemical burn presentation and be prepared to treat the patients appropriately, including patient education on potential health hazards and proper application of these products.

CONCLUSION

Depilatory cream is a corrosive chemical hair removal agent that can lead to unintended chemical burns if used improperly. Patients are often female, who present with partial-thickness chemical burns to the groin area after using these products for pubic hair removal. All of the burns had TBSA <1% and healed well with standard wound care. Burn-care providers, as well as other health-care providers, should be aware of this unusual cause of chemical burn and educate their patients appropriately.

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Conflicts of interest
There are no conflicts of interest.
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