

# A Rare Case of a Chemical Burn: Dithranol with Salicylic Acid

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## ABSTRACT

A 16-year-old female with psoriasis presented to our Plastic Surgery Department with a significant chemical burn to the neck, upper torso and left cheek (TBSA 6%). She applied a concoction of cream prescribed by her dermatologist in her native country, Poland when she returned to the United Kingdom. A few hours after application she developed a burn with pH of 5. A review of the cream revealed a mixture of 19% dithranol and 5% salicylic acid. This combination is recognized for managing psoriasis, however the strength of dithranol in the combination given is of a high concentration (normally <3%). This alone can cause a burn to the skin if left for a prolonged period of time. Salicylic acid is an enhancer which augments the stability of dithranol and increases its penetration and efficacy. The concentration of 5% is also on the higher end. Our patient was admitted for pain relief and further irrigation till normalization of the pH which was achieved after 3 days. A worrying aspect in our patients' case is that she was given the cream to commence at home. High concentration preparation is normally commenced in a controlled setting under medical supervision.

## KEYWORDS

Dithranol, Salicylic Acid, Chemical Burn, Psoriasis

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## INTRODUCTION

Chemical burns represent up to 10%<sup>1</sup> of all cutaneous burns but it accounts for 30% of burns-related mortality<sup>2</sup>. There are two main types of chemical burns namely acid and alkali. Alkali burn is responsible for the majority of chemical burns. Copious irrigation to restore the normal pH of the skin is the main management of chemical burns<sup>3</sup>. If there are some residual components present, the chemical will continue to burn<sup>4</sup>. There is a predominance of industry related chemical burn but there has been a shift towards the domestic setting in recent years<sup>5</sup>.

We present a case of a young adult who accidentally applied a prescribed cream on an unaffected skin area resulting in a significant chemical burn.

## CASE REPORT

A 16-yr-old female was referred to our Plastic Surgery Department

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by Dermatology (Department of Plastic Surgery, Aberdeen Royal Infirmary, Scotland by our colleagues in Dermatology, Aberdeen Royal Infirmary, Scotland in November 2019) with a possible burn to her neck, upper torso and left cheek area. She is known to have psoriasis mainly affecting the anterior aspect of her lower limbs. She was seen by her dermatologist in Poland (country of origin) who prescribed her a cream made out of a concoction of multiple products.

### INFORMED CONSENT

Informed consent has been given by the patient for publication of the clinical images, which have no patient identifiers on them and the patient cannot be identified from the images.

She returned to the United Kingdom, her country of residence and applied the cream once to her lower limbs and followed the instructions given to her according to the patient. Notwithstanding, she started developing a peeling sensation with

discolouration and erythema to the neck which further progressed to cover her entire neck, left cheek, upper torso and upper limbs with tenderness to touch.

Two weeks after the onset she was referred to Dermatology by her general practitioner for a possible allergy or irritation following usage of the cream. She was further referred to our Burns and Plastic Surgery Department as it was deemed likely a burn.

Upon examination in our clinic there was a large erythematous purplish discolouration encompassing almost the entire neck, bilateral cheeks, upper torso and upper arms (TBSA ~ 6%) with peeling and desquamation. It was painful to touch with no signs of infection and no airway compromise. pH at admission was 5 and routine bloodwork was unremarkable.

She was admitted after 14 days of onset, as seen on Day 13 (Figure 1), due to the low pH and for pain relief. The wound was irrigated daily till the pH improved to 7 after 3 days. Further review of the



**Day 1**



**Day 3**



**Day 7**



**Day 9**



**Day 11**



**Day 13**

**Figure 1:** Progress of skin changes and burns to the neck and face from Days 1-13

cream prescribed found a mixture of 19% *Dithranol* and 5% salicylic acid in Vaseline.

## DISCUSSION

Dithranol (Anthralin) has been found to be very effective in treating psoriasis. It is a hydroxyanthrone and anthracene derivative which impedes keratinocyte hyperproliferation and granulocyte function and may also have an immunosuppressive effect <sup>6</sup>. It is available commercially in creams and ointments in 0.1% to 2% strength. A maximum commercial strength of 3% is available to be used under medical supervision. It can be used as a standalone treatment or in combination with other preparation like Lasser paste (Salicylic acid and Zinc Oxide), Vaseline, or tar. Its concentration in these preparations can be as high as 15% as per the British Association of Dermatologists <sup>7</sup>. These concentrations are indicated when commercial dithranol preparations have been ineffective or when phototherapy is less effective or contraindicated. Additionally, it can be used when systemic treatment is unsuitable or if the patient is against such a treatment. When such a high concentration is used, it is recommended for the treatment to commence at the dermatology day treatment centre under clinical supervision. Thereafter, it can be continued at home once patients have been instructed on its safe usage<sup>7</sup>. In this case our patient started treatment at home when she returned to her country of residence (UK). She was advised to apply it only to the affected areas and to wash it off after one hour, in which she followed. According to her, she did not apply it to her neck, face or upper torso. We suspect she may have unknowingly touched those areas and thus forgot to irrigate or rinse it off.

## CONCLUSION

The strength of the dithranol (19%) in the combination given to the patient is of a high concentration. This alone can cause irritation or burn to the skin if left for a prolonged period of time. Salicylic acid is an enhancer which augments the stability of dithranol and increases its penetration

and efficacy. The concentration of 5% is also on the higher end.

In our patient's case, not only did she receive a higher than normal dose of dithranol, her injury was exacerbated due to the inclusion of a high concentration of the salicylic acid, which enhanced the penetration of dithranol, thus further worsening the chemical burn.

Dithranol as a therapy is usually commenced on a low concentration to create tolerance. However, our patient was prescribed a high concentration which was unfortunate and besides that, it was commenced without medical supervision therefore resulting in the extensive chemical burn as mentioned.

## FINANCIAL DISCLOSURE STATEMENT

Authors report no financial conflict of interest.

## DECLARATION OF CONFLICTING INTERESTS

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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