



Case report

# Chemical burn following 50% trichloroacetic acid for acne: Presentation of a case and a focused review

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Received 22 April 2015; accepted 5 June 2015

Available online 14 June 2015

## Abstract

**Background:** Chemical peels are widely used minimally invasive procedures with both cosmetic and medical indications. Although known for their general safety and efficacy, peels can rarely result in significant complications.

**Objective:** Here we report the first case in the peer-reviewed literature of chemical burn from erroneous home use of 50% trichloroacetic acid.

**Methods:** A focused literature review was performed of complications relating to chemical peels.

**Results:** Chemical burns from trichloroacetic acid peels are rare. To our knowledge, this is the first such case reported with supporting histopathological data.

**Conclusions:** Physicians must be aware of the potential complications of chemical peels, prevention strategies, and treatment modalities.

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**Keywords:** Trichloroacetic acid; TCA; Chemical burn; Adverse event; Chemical peel; Hyperpigmentation

## 1. Introduction

The use of chemical peels to improve the appearance and quality of skin has been described as early as 1550 BC in the Egyptian Papyrus Ebers (Bryan, 1974). Ancient

Egyptian women, most famously Cleopatra, were known to bathe in sour milk to soften the skin. Since the 19th century, dermatologists have made use of various chemical agents to perform peels as a treatment for acne, pigmentary changes, actinic keratoses, and photoaging. In 2000, the chemical peel was the most popular minimally invasive cosmetic procedure with over 1 million treatments performed. Although this number has remained stable, in recent years peels have been surpassed by the rapid growth of botulinum toxin and soft tissue filler procedures (American Society of Plastic Surgeons, 2013). Trichloroacetic acid (TCA) holds an important place in the assemblage of chemical peeling agents, and is widely known for its safety and reliability. However, its use is highly technique-dependent and results rely heavily on the operator. TCA is frequently used dependably by the experienced

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Peer review under responsibility of King Saud University.



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practitioner, and there is a relative dearth of reports of complications related to TCA peels. Here we present a case of improper home usage of 50% TCA by a patient resulting in chemical burn. There are no similar reports in the peer-reviewed literature involving this strength of TCA, nor are there previously published histopathological data to support this unique complication. We also review adverse events related to chemical peels in the English literature.

**2. Case synopsis**

A 38-year-old Asian male with Fitzpatrick Phototype IV skin was using 10% TCA at home for treatment of acne. Seeing that his acne was improving with this regimen, he sought to achieve faster and more dramatic results. The patient then purchased 50% TCA online and applied it to his face. Upon application he felt severe stinging and noted white frosting of the skin. He tried to wash off the TCA with cold water; however, over the next few days, noticed that his skin began to change color. He presented to clinic for a consultation and evaluation 4 days after using 50% TCA. On examination of his face (Fig. 1) there was intense hyperpigmentation of the skin with an almost ecchymotic color, and sharp lines of demarcation. The skin was non-tender and no hyperkeratosis or peeling was noted. A biopsy was performed of skin from an involved area on the forehead near the hairline.

The microscopic specimen showed necrosis of the superficial spinous layer as well as focal full-thickness epidermal keratinocyte necrosis (Fig. 2). There was a mild superficial perivascular lymphocytic infiltrate with few neutrophils and eosinophils. Also, there was pigment found within many of the necrotic and remaining viable keratinocytes, likely contributing to the clinical findings. There was focal dermal pigment incontinence with few melanophages found in the papillary dermis. In addition, much of the

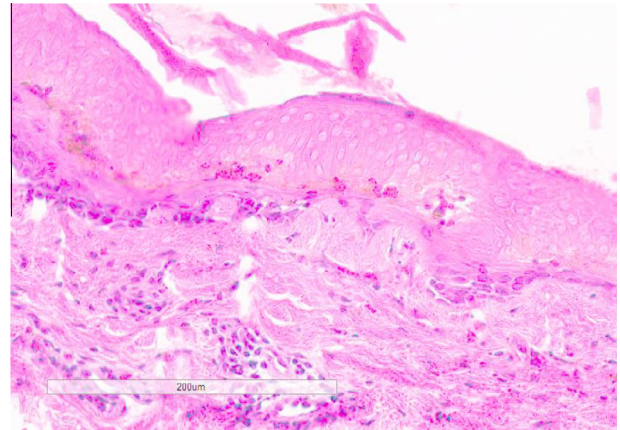


Fig. 2. Histopathological specimen from affected skin of the right forehead near the hairline showing epidermal necrosis and pigment incontinence.

epidermal pigment within the necrotic and remaining keratinocytes was retained. The histopathological findings correlated well with a chemical burn following TCA exposure.

**3. Clinical course**

This patient was started on a regimen of fluocinolone 0.01% cream, hydroquinone 4% cream, and tretinoin 0.05% cream, as well as aggressive moisturization. He was also instructed to use sun protection by wearing a hat and applying sunscreen every few hours. Unfortunately, this patient was subsequently lost to follow-up.

**4. Discussion**

TCA is one of the most widely used peeling agents, along with alpha-hydroxy acids (AHAs) and phenol.

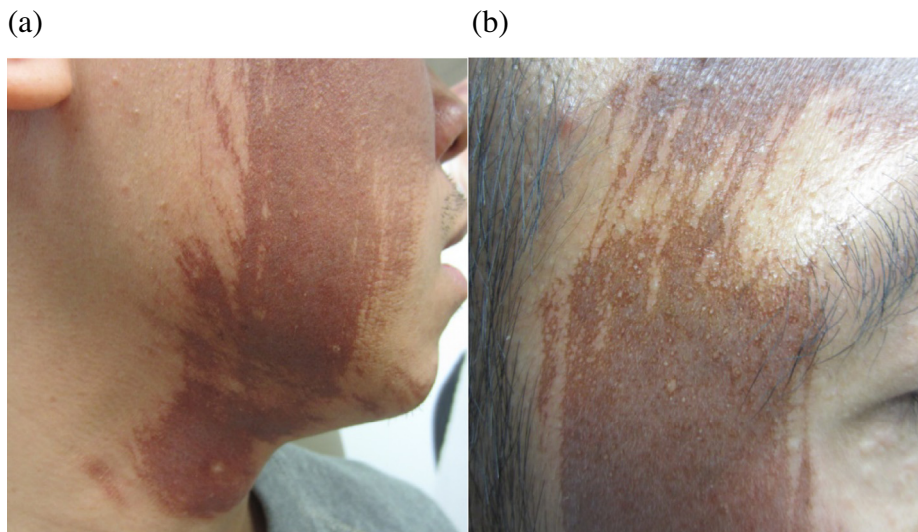


Fig. 1. Erythema and hyperpigmentation four days following 50% TCA application to the face (a) and temple (b).

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