

Thermal burn on denervated skin that developed after sun exposure on black clothing



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INTRODUCTION

This report describes the unusual development of a presumed severe thermal breast burn after a short period of sun exposure while wearing a tight-fitting black shirt. The patient had lost sensation in the right breast because of a previous right thoracotomy. The unique aspect of this case is that the burn was diagnosed initially as an allergic reaction then as an infection. The treating physicians were not aware that it could potentially be a severe thermal burn from brief sun exposure to a tight fitting black garment covering denervated skin. It is important for physicians to consider this diagnosis in patients who have insensate skin.

CASE

A 50-year-old woman with allergic rhinoconjunctivitis, severe persistent asthma, recurrent angioedema, and tracheobronchomalacia that had required a tracheobronchoplasty presented with a 3-week history of a worsening rash on her right breast. The rash was near the site of the previous tracheobronchoplasty, which was complicated by the development of chronic right-sided chest wall pain and sensation loss.

Approximately 3 weeks prior to admission, she was sitting in the sun in the middle of a hot day for approximately 10 minutes while wearing a tight-fitting black shirt. She did not do any physical activity during this time and did not feel anything unusual in the affected area. Later in the day, she noticed an irregular red patch on her right breast (Fig 1). Three days later, the rash developed into large, tense, noninflammatory bullae (Fig 2), which 7 days later

developed into ulcerations with central fibrinous debris (Fig 3). She denied having induration, pustules, vesicles, purulent drainage, or fever. She was initially treated by her primary care physician for a presumed cellulitis and completed a 10-day course of doxycycline plus topical mupirocin. The rash did not improve, and axillary swelling and pain developed; therefore, she went to the emergency department where she was treated with one dose of cephalexin but had a bronchospastic reaction so she was admitted to the hospital.

Allergy/immunology, infectious disease, dermatology and breast surgery services were consulted. Laboratory studies for an infectious etiology were done, and she was started empirically on vancomycin for a presumed worsening of the cellulitis. During the first infusion she had an anaphylactoid reaction so the vancomycin was discontinued.

Because of her otherwise well appearance and low concern for an infectious etiology, a decision was made to hold off on further antibiotic treatment. Her laboratory evaluation including cultures (blood, tissue, and wound) was unremarkable. There was no leukocytosis, eosinophilia, or neutrophilia. Her liver function tests and inflammatory markers (erythrocyte sedimentation rate, C-reactive protein) were within normal limits. Static sonographic images of the right breast showed no intraparenchymal abnormality and no fluid collection. Chest radiograph was normal. A biopsy from the skin lesion found vascular proliferation with associated inflammation.

While off all antibiotics, the patient was observed overnight in the hospital and then discharged. The breast lesions slowly healed off mupirocin and

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Fig 1. Right breast on day 1. Large, erythematous patches.



Fig 2. Right breast on day 3. Tense, noninflammatory large bullae.

without any other intervention except for topical petroleum jelly.

DISCUSSION

Although initially concerned for an allergic reaction and subsequently for a cellulitis, based on the appearance of [Fig 1](#), the patient had no improvement with appropriate antibiotic treatment. As the lesion progressed, the differential diagnosis included physical/chemical burn, traumatic ulcer, contact dermatitis, and diffuse dermal angiomatosis. She was not on photosensitizing medications and did not engage in any activity resulting in friction to the area. Her left side remained unaffected, presumably because of her positioning in the sun and ability to sense the heat before it had any effect. We also hypothesize that the lateral portion of her right breast was affected despite no direct sun light because of the



Fig 3. Right breast on day 10. Ulcerations with central fibrinous debris.

high temperature of the shirt overlying that desensitized area. The clinical history in the setting of the unusual appearance and progression of the rash, in conjunction with the nonspecific biopsy results, supported the likely diagnosis of a thermal burn at the site of denervated skin.

The chronic pain and skin desensitization experienced by the patient was a complication of the tracheobronchoplasty. The procedure had been performed through a right posterolateral thoracotomy 7 months before this presentation with resultant postthoracotomy pain syndrome (PTPS), a well-recognized entity. In addition to baseline pain, PTPS is frequently accompanied by changes to sensation to the chest wall. The causes of PTPS are thought to be multifactorial and include increased retractor time, retractor spreading, thoracotomy approach, and patient body mass index.^{1,2} However, although the exact etiology remains elusive, it is well documented that a large proportion of postthoracotomy patients have various degrees of chest wall sensation loss accompanying the pain.

A disruption of the intercostal nerves is the most cited of the proposed mechanisms.³ The resultant chest wall skin desensitization is thought to lead to impaired local thermoregulation.⁴ Because patients are unable to sense the affected area, they are vulnerable to thermal burns, most commonly from sun exposure, followed by heating pads, hot water bottles, and hot beverages.^{4,5} There are even case reports of thermal burns from contact with everyday objects such as sunglasses.⁶

What is most unusual about this case is the development of such a severe thermal burn from brief sun exposure to clothing-covered skin. The patient has large, pendulous breasts, which probably

caused the overlying black garment to be in close proximity to the skin, allowing the skin temperature to get hot enough to cause a burn. This phenomenon has been previously described in a study from France that reported a number of postmastectomy patients who developed localized breast skin burns after sun exposure while wearing tight-fitting black garments.⁷ This risk of developing a severe burn of denervated skin from sun exposure while wearing tight-fitting black clothing is not well recognized by patients or their physicians.

This case highlights several important points. Patients with loss of chest wall skin sensation are potentially susceptible to development of severe local burns from all sorts of unexpected and otherwise innocuous heat exposures and that sun exposure to black clothing could potentially generate underlying temperatures that are high enough to cause severe thermal burns. Although it is impossible to conclusively infer causation, it is certainly a strong possibility. This important information needs to be conveyed to patients who undergo any procedures that affect their cutaneous somatosensory status.

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