

Case Report

Erythema ab igne: Toasted Skin Syndrome

Vincent Ly, DO,¹ James E. Vandruff, DO,¹ Julia Fashner, MD, MPH, FAAFP¹

Abstract

Introduction

Erythema ab igne is a benign skin condition caused by long-term exposure to infrared radiation and/or heat. Erythema ab igne begins as a mild erythema over the previously exposed areas and develops into an erythematous reticulated hyperpigmentation with scaling and telangiectasias.

Clinical Findings

A 55-year-old female presented to the primary care clinic with concerns due to the development of a rash on her lower back in the previous 1 to 2 weeks. She had a history of chronic back pain and was using conservative treatment for pain management, including daily use of a heating pad for 15 minutes every hour.

Interventions

There is no definitive therapy for erythema ab igne. Elimination of the heat source may reverse the erythema and hyperpigmentation.

Outcome

The patient was counseled regarding the importance of limiting and/or discontinuing the use of the heating pad to facilitate resolution of the rash. The patient did not return to the clinic and resolution of the rash was not confirmed.

Keywords

erythema ab igne; erythema; erythema/pathology; hot temperature/adverse effects; hyperpigmentation/etiology

Author affiliations are listed at the end of this article.

Correspondence to:
Julia Fashner, MD, MPH,
FAAFP
University of Central
Florida College of
Medicine/HCA GME
Consortium
Ocala Regional Medical
Center Family Medicine
Residency
1431 SW First Ave.
Blitzer Building, Suite 7
Ocala, FL 34471
(Julia.fashner@hcahealthcare.com)

Introduction

Erythema ab igne (erə'THēmə ab ignē) is a benign skin condition caused by long-term exposure to infrared radiation or heat. In Latin, it translates to “redness by fire”.^{1,2} This condition has many other names such as hitze melanoses (German for “melanosis induced by heat”), ephelis ignealis, heat-induced circumscribed dermal melanosis, livedo reticularis e calore and toasted skin syndrome.²

Erythema ab igne begins as a mild erythema over the previously heat-exposed areas and develops into an erythematous, reticulated hyperpigmentation with scaling and telangiectasias present over the same area.³ Generally, the rash is reported to be asymptomatic and often is an incidental finding. Diagnosis of this derma-

tological condition is based on clinical findings and supporting history.

Historically, erythema ab igne has been associated with occupations that experience prolonged exposure to heat, such as bakers and metal foundry workers.⁴ It was also common in individuals with chronic exposures to fires prior to the development of central heating.⁴ The temperature required to produce the rash is lower than what is required to cause a burn, typically between 43 and 47°C or 107.6 and 116.6°F.^{5,6} With the increasing use of portable electronic technologies, there have been reported cases associated with exposure to heated car seats, heating pads, space heaters, hot laptops or hot water bottles.⁵



Figure 1. Examination of the rash demonstrated diffuse erythema with hyperpigmented reticulated telangiectasia.

Case Presentation

This case pertains to a 55-year-old female with a history of chronic back pain, fibromyalgia and morbid obesity. The pain had been located in the middle to lower back and did not radiate but was increasing in intensity and frequency. The patient lived a sedentary lifestyle but reported less mobility secondary to her worsening back pain. The patient was status-post thoracolumbar nerve block injection 4 months prior and had plans for a repeat injection.

She presented to the primary care clinic with concerns due to the development of a rash on her lower back over the previous 1 to 2 weeks. (**Figure 1**) The patient expressed worry that the rash would prevent her from receiving a second injection for back pain symptom management. She denied recent trauma or osteopathic/chiropractic manipulation. She noted she was seated or lying in bed for 20 to 22 hours a day. The patient was using conservative treatment for pain management, including a heating pad on her back. She reported attempting to keep the heating pad applied for only 15 minutes but often was applying the heating pad every hour throughout the day. Besides cosmetic concerns, the rash was asymptomatic.

The patient was counseled regarding the importance of limiting or discontinuing the use of the heating pad to facilitate resolution of the

rash. The patient did not return to the clinic and resolution of the rash was not confirmed. Additionally, due to the lack of follow-up to obtain a biopsy if necessary, a definitive diagnosis of erythema ab igne was not possible.

Treatment

There is no definitive therapy for erythema ab igne. Elimination of the heat source may reverse the erythema and hyperpigmentation.^{5,7} For cases that are chronic or improve minimally after elimination of the heat source, the use of topical steroids or tretinoin and hydroquinone may reduce the discoloration.⁷ Five-fluorouracil has been shown to help destroy the atypical cells that make up the reticulated rash of erythema ab igne.⁷ Mesoglycan with topical flavonoids has also been shown to reduce the discoloration.⁸⁻¹⁰

Discussion

A review of the literature found the majority of cases were reported in middle-aged to elderly adults suffering from chronic musculoskeletal pain, with lesions appearing after application of hot water bottles or heating pads.¹⁻¹⁷ In younger adult and pediatric populations, the incidence of erythema ab igne was more frequently associated with the use of heat-generating portable electronic devices such as laptops or space heaters.¹¹

The pathophysiology of the rash has not been fully established, but some studies indicate that thermal radiation exposure induces damage to the superficial blood vessels, which leads to epidermal vascular dilation.¹¹ The hyperpigmentation, which can occur in a reticular distribution, is thought to be due to deposition of hemosiderin.^{4,12,13} One study that obtained biopsies for pathological evaluation proposed radiant (infrared) energy enters the dermis and activates lysosomes.² The enzymes become free to diffuse into the tissue and digest susceptible substances such as collagens and elastic fibers. These condense with chronic exposure and produce elastosis or degenerative changes with increased deposition of elastin, resulting in the classic characteristic rash of erythema ab igne.² Other theories attribute the rash to repeated exposures to infrared radiation. The repeated exposures lead to a marked erythema, hyperpigmentation and occasional epidermal atrophy.¹⁴

Histologically, erythema ab igne resembles actinic keratosis with the epidermis showing atypical cells. There is also associated accumulation of dermal elastic tissue, which is an early sign of both UV radiation and heat-induced skin damage.¹⁴

Erythema ab igne can resemble other skin conditions, including livedo reticularis, livedo racemose, cutis marmorata and cutis marmorata telangiectasia.^{9,15} Livedo reticularis is characterized by a mottled reticular pattern and often has purple discoloration. These findings are due to impaired blood flow and occurs after exposure to cold temperature. These symptoms will resolve as the tissue rewarms.⁹ Like erythema ab igne, livedo racemose is also characterized by a violaceous net-like rash, but the rash is more widespread as opposed to being limited to a specific exposed area. Additionally, the shape is irregular, and this skin condition is also commonly associated with pathological conditions.¹⁶

Cutis marmorata is the physiological form of livedo reticularis and is a normal response of the body.⁹ This form is often seen in infants and resolves with age. Livedo reticularis may be indicative of underlying pathology, including lupus, vasculitis, toxins, etc. These types of pathology are differentiated from erythema

ab igne since cold exposure causes the discoloration as opposed to warm exposure in erythema ab igne.⁹ Cutis marmorata telangiectasia is characterized by persistent reticulated blanching erythema with possible atrophy. This condition is congenital and can be associated with vascular malformation, limb asymmetry, neurologic or ocular abnormalities. One distinguishing feature includes occasional ulceration development along the lines of atrophy. Additionally, due to its congenital nature, it can be accompanied by other anomalies including syndactyly, port-wine stain, clubfoot, etc.^{9,13}

Although erythema ab igne is largely a benign incidental finding, there are reports of associated insidious pathologies. There have been reported cases of erythema ab igne developing cutaneous malignancies such as squamous cell carcinoma or Merkel cell carcinoma.^{5,17} In other studies, erythema ab igne was a dermatological finding in patients with underlying malignancies such as colorectal, pancreatic, gastric, renal, breast and/or hematologic malignancies.³ It has been suggested that the underlying malignancy may serve as the source of chronic pain that leads patients to use heating devices that will lead to development of the rash.¹⁷

Conclusion

Heat is often recommended by physicians as conservative treatment for musculoskeletal or chronic pain. It is important to consider erythema ab igne as a potential complication when recommending this relatively benign treatment or as a potential diagnosis in patients with an unexplained rash who are utilizing heating modalities for pain control. With increasing use of portable electronics, practitioners need to revisit safe practice guidelines of heat-generating technologies. Differentiating this benign condition from similar looking rashes will ultimately prevent exposing patients to unnecessary testing, costly treatment and unnecessary referrals to specialists. Due to the risk of underlying malignancies associated with erythema ab igne, it is important the condition is properly diagnosed and followed in the primary care setting.

Conflicts of Interest

The authors declare they have no conflicts of interest.

The authors are employees of Ocala Regional Medical Center, a hospital affiliated with the journal's publisher.

This research was supported (in whole or in part) by HCA Healthcare and/or an HCA Healthcare affiliated entity. The views expressed in this publication represent those of the author(s) and do not necessarily represent the official views of HCA Healthcare or any of its affiliated entities.

Author Affiliations

1. University of Central Florida College of Medicine/HCA GME Consortium, Ocala Regional Medical Center Family Medicine Residency, Ocala, FL

References

1. Brzezinski P, Ismail S, Chiriac A. Radiator-induced erythema ab igne in 8-year-old girl. *Rev Chil Pediatr.* 2014;85(2):239-240. <https://doi.org/10.4067/s0370-41062014000200015>
2. Finlayson GR, Sams WM Jr, Smith JG Jr. Erythema ab igne: a histopathological study. *J Invest Dermatol.* 1966;46(1):104-108. <https://doi.org/10.1038/jid.1966.15>
3. Cross F. On a turf (peat) fire cancer: malignant change superimposed on erythema ab igne. *Proc R Soc Med.* 1967;60(12):1307-1308. <https://doi.org/10.1177/003591576706001223>
4. Baruchin AM. Erythema ab igne—a neglected entity?. *Burns.* 1994;20(5):460-462. [https://doi.org/10.1016/0305-4179\(94\)90043-4](https://doi.org/10.1016/0305-4179(94)90043-4)
5. LeVault KM, Sapra A, Bhandari P, O'Malley M, Ranjit E. Erythema Ab Igne: A Mottled Rash on the Torso. *Cureus.* 2020;12(1):e6628. Published 2020 Jan 11. <https://doi.org/10.7759/cureus.6628>
6. Miller K, Hunt R, Chu J, Meehan S, Stein J. Erythema ab igne. *Dermatol Online J.* 2011;17(10):28. Published 2011 Oct 15. <https://escholarship.org/uc/item/47z4v01z>
7. Sahl WJ Jr, Taira JW. Erythema ab igne: treatment with 5-fluorouracil cream. *J Am Acad Dermatol.* 1992;27(1):109-110. [https://doi.org/10.1016/s0190-9622\(08\)80818-3](https://doi.org/10.1016/s0190-9622(08)80818-3)
8. Gianfaldoni S, Gianfaldoni R, Tchernev G, Lotti J, Wollina U, Lotti T. Erythema Ab Igne Successfully Treated With Mesoglycan and Bioflavonoids: A Case-Report. *Open Access Maced J Med Sci.* 2017;5(4):432-435. Published 2017 Jul 18. <https://doi.org/10.3889/oamjms.2017.123>
9. Joshi AR, Golova N, Lakhiani C. Reticulated rash on boy's lower extremities. *Contemp Pediatr.* 2019;36(2):36-34.
10. Ozturk M, An I. Clinical features and etiology of patients with erythema ab igne: A retrospective multicenter study. *J Cosmet Dermatol.* 2020;19(7):1774-1779. <https://doi.org/10.1111/jocd.13210>
11. Riahi R, Cohen PR. What Caused This Hyperpigmented Reticulated Rash On This Man's Back? *The Dermatologist.* 2013;21(1).
12. Cavallari V, Cicciarelo R, Torre V, et al. Chronic heat-induced skin lesions (erythema ab igne): ultrastructural studies. *Ultrastruct Pathol.* 2001;25(2):93-97. <https://doi.org/10.1080/01913120117614>
13. Morrison M, Cotton J, LaFond A. Reticulated erythematous patch on teenager's foot. *J Fam Pract.* 2014;63(9):537-539.
14. Tan S, Bertucci V. Erythema ab igne: an old condition new again. *CMAJ.* 2000;162(1):77-78.
15. Kienast AK, Hoeger PH. Cutis marmorata telangiectatica congenita: a prospective study of 27 cases and review of the literature with proposal of diagnostic criteria. *Clin Exp Dermatol.* 2009;34(3):319-323. <https://doi.org/10.1111/j.1365-2230.2008.03074.x>
16. Sajjan VV, Lunge S, Swamy MB, Pandit AM. Livido reticularis: A review of the literature. *Indian Dermatol Online J.* 2015;6(5):315-321. <https://doi.org/10.4103/2229-5178.164493>
17. Jones CS, Tyring SK, Lee PC, Fine JD. Development of neuroendocrine (Merkel cell) carcinoma mixed with squamous cell carcinoma in erythema ab igne. *Arch Dermatol.* 1988;124(1):110-113. <https://doi.org/10.1001/archderm.1988.01670010074024>