

# Erythema Ab Igne: A Case Report and Review of the Literature

Nhi Huynh, MD; Deba Sarma, MD; Christopher Huerter, MD

*Erythema ab igne (EAI) is a rare condition since the advent of central heating. Its incidence has been rising as heating sources are being used to treat chronic pain. Multiple activities that chronically expose patients to heating sources also have been documented with this condition. We present a case of EAI induced by the use of an electric blanket.*

*Cutis.* 2011;88:290-292.

## Case Report

A 53-year-old white woman presented to the dermatology clinic with discolored skin over the right thigh that extended down to the calf and had been present for many months. She reported mild tenderness of the skin and denied exposure to heating ducts and/or fireplaces at home or work. She did admit to using an electric blanket off and on for several years with direct contact on the affected skin. She denied any treatment to the affected skin. Physical examination revealed reticular, erythematous, and hyperpigmented patches on the mid and distal right lower extremity (Figure 1). Histopathologic examination of the skin of the lateral right calf revealed rare dyskeratotic cells, keratinocytic melanosis, minimal pigmentary incontinence, and focal upper dermal perivascular chronic inflammation with no notable atypia in the epidermis (Figures 2 and 3). Elastic stain (Verhoeff-van Gieson) revealed a considerable increase of elastic tissue, especially in the mid dermis (Figure 4). Iron stain (Prussian blue) was negative (not shown). The patient was advised to discontinue use of the

electric blanket and other sources of external heat on the skin.

## Comment

Erythema ab igne (EAI) is a rare condition characterized by reticular, erythematous, and hyperpigmented patches resulting from chronic exposure to external heat sources.<sup>1,2</sup> Before the advent of central heating, EAI was once considered a common condition, most often found on the distal extremities of individuals who stood or sat close to burning stoves or open fires.<sup>2</sup> Since the emergence of central heating, burning stoves or open fires are no longer a common cause of EAI; other sources of heat have been identified. Cases of EAI have been identified with repeated application of hot water bottles<sup>3</sup> or heating pads<sup>3-5</sup> in the treatment of chronic pain, such as backache that is associated with metastatic malignancy,<sup>3,6</sup> pancreatitis,<sup>3,4,7</sup> or peptic ulcer disease. Certain occupations that chronically expose workers to external heat sources such as silversmiths, jewelers, bakers, foundry workers, and kitchen workers also have given rise to cases of EAI.<sup>1</sup> Erythema ab igne also has been reported in individuals using electric space heaters,<sup>2</sup> car heaters,<sup>1,8</sup> heated recliners,<sup>3,9</sup> heating/cooling blankets,<sup>1,10</sup> heated popcorn kernels,<sup>3,11</sup> hot bricks,<sup>1</sup> infrared lamps,<sup>1</sup> wood stoves,<sup>1</sup> coal stoves,<sup>1</sup> electric stoves/heaters,<sup>1</sup> peat fires,<sup>1</sup> steam radiators,<sup>1</sup> and most recently laptop computers placed on the users' thighs or propped legs.<sup>3,12-14</sup>

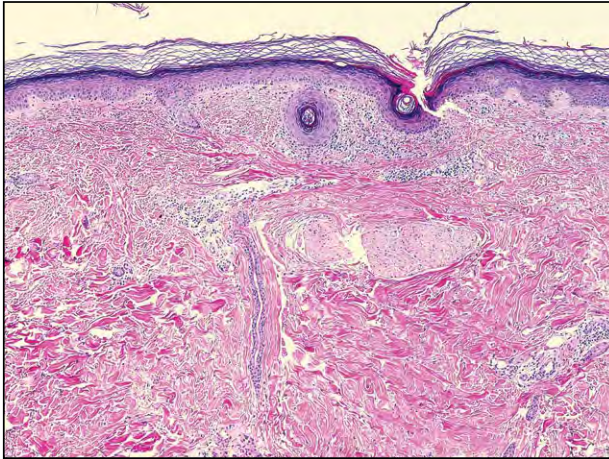


**Figure 1.** Reticular, erythematous, and hyperpigmented patches on the distal right lower extremity.

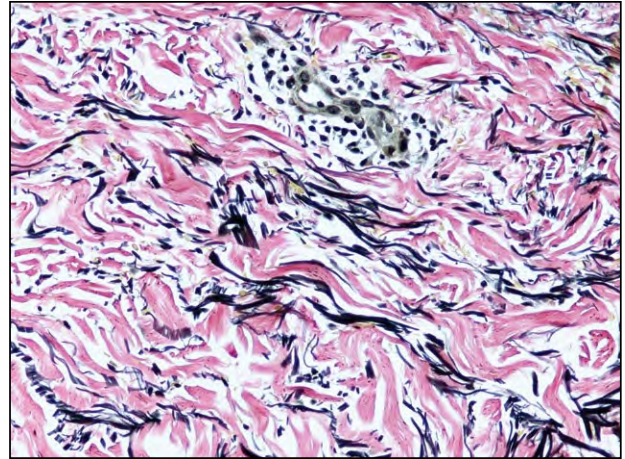
From Creighton University Medical Center, Omaha, Nebraska. Dr. Huynh is from the Department of Internal Medicine, Dr. Sarma is from the Department of Pathology, and Dr. Huerter is from the Department of Dermatology.

The authors report no conflict of interest.

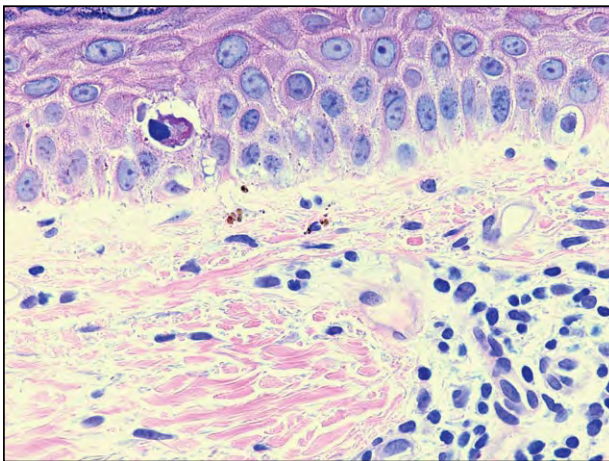
Correspondence: Christopher Huerter, MD, Department of Dermatology, Creighton University Medical Center, 601 N 30th St, Ste 5700, Omaha, NE 68131 (Christopherhuerter@creighton.edu).



**Figure 2.** Skin biopsy showed epidermal atrophy and upper dermal perivascular chronic inflammation (H&E, original magnification  $\times 4$ ).



**Figure 4.** Elastic stain showed increased elastic tissue, especially in the mid dermis (original magnification  $\times 20$ ).



**Figure 3.** Higher magnification showed a dyskeratotic keratinocyte in the epidermis, mild papillary melanosis, and superficial perivascular chronic inflammation (H&E, original magnification  $\times 20$ ).

The pathogenesis of EAI is not yet understood; however, it is suggested that chronic heat exposure denatures DNA in squamous cells in conjunction with UV radiation.<sup>3</sup> A single episode of heat exposure is insufficient to induce a burn or skin manifestation associated with EAI. Chronic heat exposure is needed to accumulate the damages, generating an initial pattern of erythema that then progresses to reticular hypopigmentation and hyperpigmentation. Although infrequent, subepidermal bullae<sup>1,15</sup> and diffuse hyperkeratosis may occur. In severe cases, poikiloderma; ulceration; and secondary skin malignancy, such as squamous cell carcinoma in situ, squamous cell

carcinoma,<sup>1,16,17</sup> and neuroendocrine carcinoma (Merkel cell carcinoma),<sup>1,3</sup> may result, though these malignancies are quite rare.

Histologically, EAI exhibits variable features that are nonspecific. In the early stages, EAI may appear normal on hematoxylin and eosin stains.<sup>3</sup> However, it also may reveal increased epidermal atrophy, rete effacement, basal vacuolar changes, and pigment incontinence.<sup>1,3,17</sup> The dermis may be infiltrated by lymphocytes, melanophages, histiocytes, and neutrophils, with dilation and congestion of the postcapillary venules.<sup>3</sup> Perhaps the most distinguishing feature of EAI is the increased elastic tissue in the upper and mid dermis,<sup>18</sup> and the presence of squamous cell atypia,<sup>3,17</sup> which resembles actinic keratoses.<sup>2,17</sup> Hyaluronic acid and iron deposition also have been described, though the deposition of iron may be anatomically related to the distal extremities.<sup>1,3</sup> In the presence of these nonspecific features, a clinical correlation is an important factor in the diagnosis of EAI.<sup>3</sup>

Erythema ab igne is more common in females and more likely to occur in patients who are overweight. Most of the patients with EAI are asymptomatic or present with a mild sensation of burning or pruritus.<sup>1</sup> The differential diagnosis of EAI includes solar elastosis, erythema dyschromicum perstans, acanthosis nigricans, actinic keratoses, livedo reticularis, livedo vasculitis, poikiloderma atrophicans vasculare, and cutaneous reactive angiomatoses.<sup>19</sup>

Erythema ab igne has an excellent prognosis. The most important treatment of EAI is immediate removal of heat sources to prevent further damage.<sup>1-3</sup> 5-Fluorouracil cream has been shown to be effective in eliminating atypical squamous cells in EAI.<sup>3,20</sup> In

severe cases in which pigmentation persists, tretinoin or hydroquinone could be used topically.<sup>2</sup> Biopsy is needed if there is evidence of malignancy, such as unrelenting ulcer, infiltrated borders, or nodules. In addition, the presence of EAI may be the first clue to an undiscovered malignancy,<sup>6,9</sup> such as metastatic adenocarcinoma, adenocarcinoma of the rectum, or pancreatic cancer, as a heating source such as hot water bottles is repeatedly used to relieve chronic pain induced by these undiagnosed cancers. These types of malignancies are especially more suspicious when the lesions of EAI are located on the abdomen, flank, or mid back.<sup>1</sup> Thus it is important to do a thorough patient history and evaluation to properly treat and follow patients with EAI.<sup>2</sup>

## REFERENCES

1. Runger TM. Disorders due to physical agents. In: Bologna J, Jorizzo JL, Rapini RP, eds. *Dermatology*. Vol 2. London, England: Mosby; 2003:1385-1409.
2. Tan S, Bertucci V. Erythema ab igne: an old condition new again. *CMAJ*. 2000;162:77-78.
3. Alotaibi LI, Hammadi AA. Erythema ab igne. *Emedicine* [serial online]. <http://emedicine.medscape.com/article/1087535-overview>. Updated April 23, 2010. Accessed November 18, 2011.
4. Chan CC, Chiu HC. Images in clinical medicine. erythema ab igne. *N Engl J Med*. 2007;356:e8.
5. Chatterjee S. Erythema ab igne from prolonged use of a heating pad. *Mayo Clin Proc*. 2005;80:1500.
6. MacHale J, Chambers F, OConnell PR. Erythema ab igne: an unusual manifestation of cancer-related pain. *Pain*. 2000;87:107-108.
7. Mok DW, Blumgart LH. Erythema ab igne in chronic pancreatic pain: a diagnostic sign. *J R Soc Med*. 1984;77:299-301.
8. Helm TN, Spigel GT, Helm KF. Erythema ab igne caused by a car heater. *Cutis*. 1997;59:81-82.
9. Meffert JJ, Davis BM. Furniture-induced erythema ab igne. *J Am Acad Dermatol*. 1996;34:516-517.
10. Dellavalle RP, Gillum P. Erythema ab igne following heating/cooling blanket use in the intensive care unit. *Cutis*. 2000;66:136-138.
11. Donohue KG, Nahm WK, Badiavas E, et al. Hot pop brown spot: erythema ab igne induced by heated popcorn. *J Dermatol*. 2002;29:172-173.
12. Bilic M, Adams BB. Erythema ab igne induced by a laptop computer. *J Am Acad Dermatol*. 2004;50:973-974.
13. Jagtman BA. Erythema ab igne due to a laptop computer. *Contact Dermatitis*. 2004;50:105.
14. Mohr MR, Scott KA, Pariser RM, et al. Laptop computer-induced erythema ab igne: a case report. *Cutis*. 2007;79:59-60.
15. Kokturk A, Kaya TI, Baz K, et al. Bullous erythema ab igne. *Dermatol Online J*. 2003;9:18.
16. Arrington JH 3rd, Lockman DS. Thermal keratoses and squamous cell carcinoma in situ associated with erythema ab igne. *Arch Dermatol*. 1979;115:1226-1228.
17. Weedon D. Disorders of elastic tissue. In: Weedon D, ed. *Skin Pathology*. 2nd ed. London, England: Churchill Livingstone; 2002:381-404.
18. Junkins-Hopkins JM. Disorders associated with physical agents: heat, cold, radiation, and trauma. In: Elder DE, Johnson BL, Elenitsas R, et al eds. *Lever's Histopathology of the Skin*. 9th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2005:355-371.
19. Mitsuhashi T, Hirose T, Kuramochi A, et al. Cutaneous reactive angiomatosis occurring in erythema ab igne can cause atypia in endothelial cells: potential mimic of malignant vascular neoplasm. *Pathol Int*. 2005;55:431-435.
20. Sahl WJ Jr, Taira JW. Erythema ab igne: treatment with 5-fluorouracil cream. *J Am Acad Dermatol*. 1992;27:109-110.



### NEED MORE INFORMATION?

Access these related articles in our online archives at [www.cutis.com](http://www.cutis.com)

- ▣ Erythema Ab Igne Following Heating/Cooling Blanket Use in the Intensive Care Unit
- ▣ Laptop Computer–Associated Erythema Ab Igne
- ▣ Laptop Computer–Induced Erythema Ab Igne on the Left Breast

Use our Advanced Search to find these articles and more online!