

# Erythema ab igne: an old condition new again

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**E**rythema ab igne (EAI) is a reticular, erythematous, hyperpigmented eruption that may occur after chronic exposure to moderate levels of infrared radiation in the form of heat.<sup>1,2</sup> A case of EAI associated with the use of a space heater was reported by a 27-year-old healthy woman of South Asian background; she presented with a 3-month history of an asymptomatic rash on her lower legs, which was noticed 1 or 2 weeks after she began to use an electric space heater. The heater was placed approximately 30 cm away from the left side of her legs for 3–5 hours a day. The eruption began as reticulate erythematous patches on the lateral aspect of her left and the medial aspect of her right calf. She subsequently stopped using the heater and on presentation had nontender, reticulate, tan-brown patches with faint erythema in the above-mentioned areas. There was no evidence of telangiectasias, atrophy or nodules, and no systemic symptoms were reported.

## Comment

EAI was once a common condition seen on the legs of those who stood or sat too close to a fire.<sup>1,3</sup> Although the incidence of EAI has decreased since the introduction of central heating, it is still seen occasionally when localized areas of the body are repeatedly exposed to a heat source. The lesions seen by physicians now reflect the different sources of heat that are currently in use, and the distribution of EAI depends on the direction of the incident radiation, the contour of the skin and the interposition of clothing.<sup>1</sup> EAI may result from the repeated application of hot-water bottles or heating pads used to treat chronic pain — backaches, for example, or pain associated with pancreatitis or peptic ulcer disease,<sup>2,4–7</sup> as well as with primary or metastatic cancer.<sup>8</sup> It may also appear on the skin of individuals who sit close to space heaters, wood-burning stoves or fireplaces,<sup>2</sup> and it has been reported in association with exposure to a car heater<sup>9</sup> and furniture with built-in heaters.<sup>10,11</sup> EAI may be considered an occupational hazard for some people — the faces of silversmiths and jewelers and the arms of bakers, foundry workers and kitchen workers have been affected.<sup>1,2</sup>

Following a single exposure to infrared radiation insufficient to cause a burn, a mild and transient reticular erythema may occur. Repeated exposure causes a more marked erythema with noticeable hyperpigmentation and, occasionally, superficial epidermal atrophy.<sup>1</sup> The cumulative effects of exposure eventually resemble those of poikiloderma with erythema, hypo- and hyperpigmentation and reticulate telangiectasia, as well as diffuse hyperkeratosis.<sup>1</sup> Subepidermal bullae may also occur.<sup>12</sup> In severely affected individuals the reticular pattern is lost and a wide area of skin becomes pigmented and atrophic, with only the periphery showing the characteristic pattern.<sup>1</sup> Apart from a slight burning sensation, the lesions of EAI are typically asymptomatic.<sup>13</sup>

Microscopic changes depend on the type of heat, the length of exposure and the area of the body involved.<sup>14</sup> Histologically, EAI is similar to actinic keratoses,<sup>2,13,15</sup> with the epidermis showing squamous atypia.<sup>13–17</sup> There may also be an accumulation of dermal elastic tissue, which is an early sign of both UV radiation- and heat-induced skin damage.<sup>2,14</sup> Squamous cell carcinoma and neuroendocrine carcinoma, also known as Merkel cell carcinoma, may arise in the lesions of EAI on rare occasions.<sup>3,18–20</sup> The most common thermally induced cancer, squamous cell carcinoma,<sup>3,18</sup> tends to occur after a long latent period of over 30 years.<sup>16</sup> Squamous cell carcinoma in burn scars often begins as a chronic ulcer, which slowly enlarges and

*Review*

*Synthèse*

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**Fig. 1: Erythema ab igne on the legs. Note the reticulated, hyperpigmented patches on the lateral left and medial right calves.**

tends not to heal. Although these carcinomas tend to be of low to intermediate grade histologically, they may also be aggressive, with metastases and a poor prognosis reported in over 30% of cases.<sup>21</sup> Neuroendocrine carcinoma is an aggressive neoplasm, characterized by local recurrence in approximately 30% of cases and up to 30% mortality.<sup>22</sup>

The mainstay of treatment is to remove the source of infrared radiation immediately. Also, 5-fluorouracil cream has been reported to clear epithelial atypia.<sup>23</sup> A biopsy should be done if there is any evidence of cutaneous malignancy, such as nodules or ulceration, within the EAI lesion. In many of the darker skin types the inflammatory process may lead to residual hypo- or hyperpigmentation; the patient in this case may experience hyperpigmentation that could persist for months to years, and this can be treated with topical tretinoin or hydroquinone.

The prognosis of EAI is excellent if the underlying infrared radiation source is removed early. However, if exposure to the infrared radiation is not discontinued, pigmentary abnormalities may persist and cutaneous atrophy or malignancy may ensue. The patient in this case presented with early stages of EAI and the heat source was promptly

removed; it is likely, therefore, that her condition will resolve completely with time.

Physicians are well aware of the potential carcinogenic effects of cumulative UV radiation; the potential carcinogenicity of infrared radiation and the fact that it may enhance the aging and carcinogenic effects of UV exposure are not as well known, however.<sup>2</sup> EAI lesions may be easily overlooked, but the diagnosis is more obvious if the patient's clinical history and the distribution and distinctive appearance of the cutaneous changes are considered. Because EAI may indicate an underlying malignancy that is causing chronic pain and because it can eventually develop into a carcinoma, it is important that the condition be properly diagnosed and followed.

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