Laptop Computer–Induced Erythema ab Igne in a Child and Review of the Literature
Andreas W. Arnold and Peter H. Itin
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Laptop Computer–Induced Erythema ab Igne in a Child and Review of the Literature

abstract

We report here the case of a 12-year-old boy with erythema ab igne on his left thigh caused by the use of a laptop computer. This is the youngest of the 10 reported patients with this laptop-induced dermatosis since its first description in 2004. Erythema ab igne is a reticular, pigmented, sometimes telangiectatic dermatosis that is caused by prolonged exposure to a heat or infrared source. In laptop-induced erythema ab igne, the localization on the thighs and asymmetry are characteristic. The heat originates from the optical drive, the battery, or the ventilation fan of the computer. Pediatrics 2010;126:e000
Erythema ab igne is a reticular, brownish-pigmented, sometimes telangiectatic dermatosis that is caused by prolonged exposure to a heat or infrared source such as a heating pad or hot-water bottle. Few reports have been published concerning laptop computers as new sources of erythema ab igne. Only 9 cases have been reported since 2004. In addition, 1 case report of a burn produced by a laptop computer has been published. Our patient is the youngest ever reported and has shown the typical pathognomonic presentation of laptop-induced erythema ab igne.

CASE REPORT

A 12-year-old boy presented with a brownish-pigmented, reticulate, livedo-like lesion on his left upper leg only (Fig 1). The patch was well defined, was mildly erythematous with telangiectasias, and showed no tendency to spread. No other skin abnormalities were stated. No further laboratory tests were performed, and a skin biopsy was not performed. The patient had no medical history until presentation for this condition. No other heat source known from the literature to cause erythema ab igne could be identified. He reported playing computer games for several hours per day with his laptop computer being located on his upper legs. He had played daily for some months (Fig 2). He recognized that the laptop got hot on the left side; however, regardless of that, he did not change its position.

DISCUSSION

Erythema ab igne was first described by the German dermatologist Abraham Buschke as Hitze melanose (meaning melanosis induced by heat). It was observed on the lower legs of patients who worked in front of open fires or coal stoves. In elderly patients, erythema ab igne develops on areas treated with hot pads and blankets, used mostly because of pain. Also, sitting too close to steam radiators or space heaters are risk factors. Several other sources such as heat radiating from a car engine, complication of a sauna belt, heated popcorn, fre-
quent hot bathing, or furniture have been reported. It is a common adverse effect of heating-pillow use by patients with gastrointestinal diseases, such as Crohn disease or pancreatitis, while warming their abdomen. In children, erythema ab igne is a rare disease. Since the introduction of central heating, the incidence of erythema ab igne has decreased.

Erythema ab igne is most often recognized by its highly characteristic appearance. Initially, only a mild and transient erythema develops. After repeated exposure, the lesion tends to get permanent and reticulate hyperpigmented and, finally, may be atrophic. The occurrence is usually asymptomatic; however, burning and itching have been reported by some patients. Few cases of bullous erythema ab igne have been reported, which indicates that there could be a transition from erythema ab igne to burns. Chronic exposure to submaximal heat with infrared radiation insufficient to produce a burn has been shown to induce dermal damage. Mild-to-moderate heat between 43°C and 47°C is enough to cause burns. Paulius et al showed such temperatures to be generated by computers. The heat produced by a computer may reach 44°C, which is enough to cause erythema ab igne. Computer-induced heat lesions are typically found on only 1 leg, normally on the left leg because the optical drives of laptops are located on the left side. Other possible heat sources are the battery and the ventilation-fan exhaust (Fig 3). The computer placed on a lap may completely or partially occlude the ventilation-fan exhaust, which then may even increase the computer’s temperature. All 9 reported patients had lesions on their upper leg, most of which were asymmetric and developed after several months of laptop use for an average of 6 to 8 hours/day (Table 1). The 1-sided distribution is nearly pathognomonic. The pathophysiology is still unclear. Histopathologic changes include hyperkeratosis, interface dermatitis, epidermal atrophy with apoptotic keratinocytes, and melanin incontinence. Erythema ab igne could histologically resemble actinic keratosis and, therefore, has been termed “thermal keratosis.” Chronic changes may lead to squamous cell carcinoma or, in rare cases, to Merkel cell carcinoma. The latency of developing malignant tumors seems to be long and extends to ≥30 years. They have a tendency to recur or metastasize (30%), which renders a significant clinical concern.

The history of thermally induced squamous cell cancer is well known and dates back to ancient times. It is apparently highest when exposure is from hydrocarbon-fueled heat. Kang cancer in China and Tibet is a result of large heated-brick platforms, called kangs, used to warm during cold seasons while sleeping or eating. Kangri cancer of Kashmir in India is caused by wearing a kangri, a pot of hot coals surrounded by a wicker basket. This has been used as portable water heater during winter. In Irish women, turf cancer, associated with standing close to peat fires for a long time, was known in the 18th and 19th centuries.

![FIGURE 3](image)

**Bottom of laptop with the ventilation fan and battery on the upper-left corner (view of user).**

<table>
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<tr>
<th>All Reported Cases of Laptop-Induced Erythema ab Igne From 2004 to 2010</th>
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In view of a small risk of malignant transformation, it has to be recommended that patients in whom erythema ab igne persists should be under regular control. The progression of erythema ab igne can be prevented by eliminating the heat source and discontinuing exposure early enough. There exists no specific therapy. After some time the reticulated maculae will fade spontaneously. Diagnosis is made clinically; no biopsy or laboratory investigations are necessary.

CONCLUSIONS

Laptop-induced erythema ab igne is a rarely reported new dermatosis. The popularity of laptop computers will likely increase this diagnosis in the future. Our patient has had only comparatively shortly used his laptop, which indicates that children’s skin is more sensitive to heat. This has to be taken in account when buying laptop computers for use by children. When using laptop computers on the thighs or knees for a long time, we recommend that heat protection (eg, the laptop’s carrying case) between the body and the computer be used. In agreement with Bachmeyer et al, we recommend providing a warning label on laptop computer packages.

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