

Review Article

Computer-related skin diseases

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The use of computers has increased vastly, occupationally as well as for private use, and in the last decade, a number of reports have been published in which skin problems are ascribed to the (intensive) use of computers. Not only irritant or mechanically induced contact dermatitis has been reported but also allergic contact dermatitis. As this appears to be a new group of occupational dermatoses, we present a brief overview of these cases, and aetiologic factors are discussed.

Key words: allergic contact dermatitis; computer; irritant contact dermatitis; mechanical; occupational; skin. © Blackwell Munksgaard, 2003.

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In recent years, the use of computers has increased substantially, becoming practically universal, both for private use and occupationally. It is therefore not surprising that doctors, and particularly dermatologists, are increasingly confronted with patients claiming to be 'allergic to their computers'. So far, only a limited number of case reports have been published on this subject, some of which have been dubbed 'computer palms' and 'mouse fingers'. We present a brief review of these cases, to provide more insight into the aetiology of computer-related dermatoses.

Hand Dermatitis: Irritant versus Allergic Contact Dermatitis

6 cases have been reported of patients presenting with patchy, erythematous, scaly, and often vesicular dermatitis on the palmar aspect of the dominant hand (1–5). All of them, of whom 5 occupationally, worked on a personal computer (PC) for several hours a day. As the skin lesions were located on pressure points in contact with the PC mouse, the mouse pad or wrist pad, allergic contact dermatitis was suspected and patch tests were carried out.

2 female patients reacted to scrapings from the PC mouse, as well as to phthalates (dimethyl- and diethylphthalate, respectively) (4). Phthalates are so-called 'plasticizers', increasing the flexibility of plastics, and are usually found as sensitizers in flexible plastics like watches, whereas stiff plastic, as used in a PC mouse, rarely causes a contact

allergy (6). It might be that sensitization to plastic components is enhanced due to sweating and friction after prolonged contact with a PC mouse. This thought was recently expressed by Seishima and coworkers (7), who described a woman with an allergic contact dermatitis from hexavalent chromium in her cellular phone. The authors proposed that prolonged contact (2.5 hr per day) with the cellular phone in combination with sweating induced this rare contact allergy. Recently, Goossens et al. (5) reported the case of a female patient with a positive patch test reaction to resorcinol monobenzoate, an ultraviolet (UV) absorber used in plastics. Although scrapings from the mouse cover were shown to contain resorcinol monobenzoate, this patient did not react to these scrapings. The authors suggest a possible cross-reactivity with Myroxylon perirae resin (to which this patient also reacted), but friction and sweating may also explain these findings, as in the 2 previous cases.

A 4th woman, with a previous history of hand dermatitis and a known allergy to mercapto mix and thiuram mix, developed a vesicular dermatitis on the palmar aspects of her wrists, followed by an 'id-reaction' in her face. 1 week earlier, she had bought computer supplies, including a mouse pad and wrist pad made of neoprene (3). Both thiurams and mercaptans are used in the manufacture of neoprene and explain the allergic contact dermatitis from her new computer supplies.

In the last 2 patients, patch testing showed no relevant contact allergies. In both cases, irritant

contact dermatitis was ascribed to repetitive friction, sweating and pressure (1, 2).

'Keyboard Wrist Pads'

2 patients have been reported with asymptomatic, well-circumscribed hyperkeratotic plaques on the ulnar side of the wrist (8). Both had spent at least 10 years using a PC, on average for 6 hr each day. These 'keyboard wrist pads' appear to be the equivalent of knuckle pads, which may develop due to chronic pressure or friction.

'Computer Palms': Stage I Pressure Injury

Of comparable aetiology are the so-called 'computer palms' (9). 2 otherwise-healthy patients have been reported with symmetric, well-demarcated, non-blanchable erythematous patches with telangiectasia on the ulnar aspect of the palms. Both frequently leaned forward and applied pressure on their hands to relieve back strain. Long-term, pressure-induced ischaemia can lead to reactive hyperaemia, vessel engorgement and haemorrhage, which is further enhanced by shear and moisture. Therefore, the skin lesions in these patients are consistent with stage I pressure injury.

Screen Dermatitis

Skin complaints in people exposed to visual display terminals (VDTs) have been reported since the late 1970s. Clinically, a rosacea-like dermatitis can be seen (erythema, oedema, papules or pustules), while subjective symptoms include itch, pain and smarting (10). Some patients present with only subjective symptoms and no visible skin disease. Rarely, central nervous system symptoms are reported, i.e. dizziness, tiredness, headache and slurred speech (11).

The cause of these symptoms has been the subject of several investigations. Overall, there is much overlap with skin complaints in buildings with 'climate control' problems (12), which could explain why screen dermatitis is relatively more common in atopic patients. The same authors found psychosocial conditions and high work-related stress to be indicators for developing VDT-related facial skin problems. Likewise, Berg et al. (13) found that these patients frequently have sensitive skin: they are so-called 'stingers', reacting with stinging or itching when lactic acid (5%) is applied to the cheek. In a large literature study, screen dermatitis was found to show many similarities with skin damaged by UV light or ionizing radiation (11). In this study, not only clinical but also immunohistological manifestations were evaluated. Most striking was the

increased number of mast cells in screen dermatitis, containing histamine. The latter is known to be released when mast cells are exposed to UV light and may also account for symptoms of itch, pain, oedema and erythema in screen dermatitis. Furthermore, Langerhans' cells in the epidermis were significantly decreased or virtually absent in screen dermatitis as well as in skin damaged by UV light or ionizing radiation. On the other hand, levels of some neuropeptides were determined, and although several differences were found with normal skin, no single marker was 100% able to distinguish between healthy skin and screen dermatitis (10). Moreover, it is unclear whether VDTs leak electric or magnetic fields that affect our cells (11). In keeping with these findings are the conclusions of a case-referent study, stating that screen dermatitis most likely is the result of non-specific or irritant factors in subjects with sensitive skin (12).

Conclusion

The growing number of patients claiming to be 'allergic to their computers' may be partly due to the increased incidence of repetitive strain injury, which has also been reported due to computer use (14, 15). The incidence of genuine allergic contact dermatitis, however, appears to be low, and skin lesions can mostly be attributed to friction or other irritant factors. According to a Finnish study (16), mechanical trauma is not often reported as a cause of occupational dermatoses.

Allergic reactions to the plastic of the computer mouse may be caused by phthalates (plasticizers) or other plastic components, whereas allergic reactions to neoprene, e.g. the mouse pad, can usually be ascribed to thiourea but can also be caused by rubber accelerators like thiurams. Thiourea is particularly important because of the increasing use of neoprene as a substitute for latex, as also in the medical profession (so-called 'hypoallergenic-gloves' and orthopaedic braces manufactured from neoprene (17)). Dermatologists should remain alert to computers as a potential source of occupational dermatoses.

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