Acne vulgaris is a common skin disorder that affects 80–85% of teenagers and may continue into adulthood. Clinical studies suggest that 5-aminolaevulinic acid-based topical photodynamic therapy (ALA-PDT) is a potentially useful modality for inflammatory acne and for patients who are unable to tolerate isotretinoin or antibiotics (1). ALA is a prodrug that can be converted intracellularly by the haem biosynthetic pathway into the active photosensitizer protoporphyrin IX (PpIX). ALA degrades in the skin with a half-life of 24 h and endogenous PpIX-mediated photosensitization can last for up to 48 h, although it can be prevented by strict avoidance of exposure to light (2). The common acute adverse events of topical ALA-PDT are pain during exposure to light and mild acute inflammatory response (e.g. erythema) after exposure to light (3). In general, complete healing with good to excellent cosmetic outcome occurs within 2 weeks post-PDT. However, the potential risk of cutaneous photosensitization associated with light sources other than sunlight and bright electric lights may be underestimated. We describe here a case of persistent erythematous reaction after topical ALA-PDT due to long exposure to light from a cathode ray tube (CRT) monitor.

**CASE REPORT**

A 19-year-old male with 5 years’ history of intractable acne was referred for evaluation and treatment. The patient had used topical antibacterial cream, and oral isotretinoin and minocycline in the past. Physical examination revealed severe acne vulgaris involving the forehead, nose, temple and cheek areas, characterized as reddish follicular papules, pustules and cysts accompanied by diffuse erythema. The patient was recruited into an ongoing ALA-PDT clinical trial (split-face study of ALA dose effect, three-course PDT at 2-week intervals). Informed consent was obtained from the patient.

ALA cream of different concentrations (3, 5 and 10%, w/w) were freshly prepared using ALA powder (Shanghai Fudan-Zhangjiang Bio-Pharmaceutical Co., Ltd, Shanghai, China) and applied evenly to acne lesions; 3% ALA was applied to the right side of the face plus the nose, 5% ALA to the left side of the face plus the chin, and 10% ALA to the forehead. The ALA-treated areas were occluded with cling film and covered with thick gauze for light protection. After 3 h of incubation, the lesion surface was cleaned with wet cotton gauze to remove residual ALA (3). Superficial PpIX distribution was examined with a fluorescence camera (PD Imager, Curalux, Munich, Germany) showed the typical red fluorescence of PpIX on the left side of the face, which camera (PD Imager, Curalux, Munich, Germany) showed the typical red fluorescence of PpIX on the left side of the face, which was cleaned with wet cotton gauze to remove residual ALA (3). 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(8, 9). Adverse effects associated with ALA and endogenous PpIX are minimal (10). Short-term adverse effects are limited to erythema and peeling for up to a few days after treatment. Some of these acute responses may lead to hyperpigmentation that fades gradually over weeks to months (11). Although the current guidelines and (written or verbal) warnings mainly emphasize the avoidance of sunlight and bright electric lights, the potential risk of other common light sources (e.g. video-game, computer and television monitors) might be equally important for certain patient populations.

Colour CRT monitors have phosphor-coated screens. Phosphors are arranged as stripes and glow as dots of colour (i.e. emitting visible light) when exposed to a radiation beam generated from the CRT. Three beams are used in CRT colour monitors to excite the three colours (red, green and blue) in combinations needed to create the various hues that form the picture. Thus, a colour CRT monitor is a unique light source emitting a mixture of red, green and blue light, which coincidentally matches the light absorption spectrum of the PDT photosensitizer in the Q-band region. Typically, colour CRT monitors have a maximum luminance of 100–150 candela per square metre (cd/m²) (12). Thus, long exposure to a colour CRT monitor can excite residual PpIX molecules and other endogenous porphyrins and, consequently, cause cutaneous photosensitization. Although the light spectrum and intensity change constantly during video-game playing and the actual light for a few days, residual ALA and PpIX regeneration can continuously cause skin photosensitization in some patients, since the metabolic rate of ALA and PpIX varies from patient to patient (13).

The photobleaching kinetics of a photosensitizer have been used as a PDT dosimetry tool (14). However, although PpIX photobleaching can be monitored by measuring in situ fluorescence and such measurement usually shows the rapid depletion of PpIX at the end of light irradiation (15), this depletion might not ensure the absence of skin photosensitization, since the residual ALA can continue to re-generate PpIX. Clearly, the complete removal of residual ALA on the skin surface might minimize the risk of potential phototoxicity, but the intracellular ALA may still pose a risk in post-PDT photosensitization.

Younger patients with a history of playing video-games daily for long hours may also often present with more severe facial acne lesions, sometimes accompanied by secondary erythema. The potential cutaneous effect of long exposure to colour monitors certainly deserves further investigation.

In conclusion, this case report demonstrates possible cutaneous photosensitization caused by long exposure to a colour CRT monitor after topical ALA-PDT. Future guidelines and patient warnings should include an explanation of the potential risk of photosensitization associated with exposure to visible light generated from computer, video-game or television monitors.

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