Skin Reaction Due to UVC Radiation Used to Inactivate SARS-CoV-2 Virus

Dear Editor,

With the severe acute coronavirus (SARS-CoV-2) pandemic, measures to inactivate viruses have been used intensively in all areas of life. Irradiation with ultraviolet C (UVC) has become a more common method for decontamination of both the environment and equipment. UVC is the UV light spectrum at a wavelength of 100–280 nm. UVC lamps with an emission peak of 254 nm are the most commonly used tools to inactivate or kill bacteria and viruses. However, UVC has harmful effects on human skin and tissues. Solar UVC is completely filtered by the stratospheric ozone layer of the atmosphere and cannot reach the earth.[1,2] For this reason, the harmful effects of UVC in humans are not something we encounter under normal conditions. Here, we want to present the skin findings of a healthcare worker who developed a skin reaction after a very short exposure.

A 25-year-old female healthcare worker presented with complaints of erythema, mild edema, itching, and burning around the neck. In her story, it was learned that during the 12-h watch period, she entered and exited her cabin intermittently about 10 times, for 1–2 min, and was exposed to the radiation of the UVC lamp in the cabin, which produces light at a wavelength of 254 nm. Her complaints started within 24 h of UVC exposure. In her dermatological examination, there was diffuse erythema and mild edema around the neck, which was sharply demarcated from the area covered by the clothes [Figure 1]. During sampling, our patient's face area was protected from reaction, by a protective mask, goggles, and a bonnet. Only area around the neck that is not covered by clothing is affected as sharply defined. Moisturizing cream containing triticum vulgare extract and cream containing 0.1% hydrocortisone-17-butyrate were used alternately, twice a day. One week later, it was observed that the erythema faded and the complaints of burning and itching regressed. There were also complaints of burning, stinging and blurred vision in the eyes. In the eye examination, punctate epithelial erosions were detected. It was followed up with topical carbomer and artificial tear drops and the findings were found to be regressed in the control. No new lesion or skin cancer developed in the 1-year follow-up of our patient.

UVC has the property of ionization and its mechanism of action mainly depends on the absorption of UV by nucleic acid components. UVC at 254 nm can induce cyclobutyl pyrimidine dimers (CPDs) in mammalian cells. These dimers are photoproducts formed by UV exposure. CPD induced by UV radiation interrupts transcription, translation, and replication of DNA, leading to bacterial cell death and viral inactivation. Therefore, UVC with a wavelength of 254 nm may also be a potential cause of skin cancer and dermatitis.[2] Buonanno *et al.*[3] showed that 222 nm UVC was effective in inactivation of airborne influenza virus and some coronaviruses. However, according to current evidence, the effect of UVC on inactivation of SARS-CoV-2 virus is unclear and the World Health Organization (WHO) has not recommended its use for disinfection.[4]

Figure 1: Erythematous lesions around the neck

During the pandemic, there has been a rapid increase in the number and variety of UVC lamps marketed to consumers for home use to inactivate the SARS-CoV-2 virus. A family of three has been reported with skin burns and eye damage caused by improper installation and forgetting of UVC lamps. In the reported cases, a diagnosis of UV irradiation-induced photokeratitis was made.[4] In our case, a first-degree burn occurred on the skin and corneal erosions as a result of repeated exposures to a 254 nm UVC lamp for a few minutes. No skin changes or cancer development were observed after 1-year follow-up.

If UVC can reach the earth's surface, or if artificial exposure to UVC occurs, it can penetrate the stratum corneum and upper epidermis layers of the skin. Therefore, its effects are expected to occur in more superficial layers.[1] In our case, despite the very short exposure, a rapid and intense picture emerged, but it resolved without leaving a trace. The effects of UVC exposure on humans are not normally encountered. Therefore, we think that this case is important in terms of showing the effects of short-term UVC exposure on the skin. It is important to increase the awareness of health workers in the areas where these lamps are used in order to prevent such risks.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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