Tanning caused by psoralen-photochemotherpy in Indian skin

Sir,

One of the common side effects of psoralen-photochemotherapy is excessive tanning of the skin. We had an opportunity to observe the extent of tanning that can occur in an individual with pigmented skin due to sparing of some abnormal skin folds.

A 54-year-old man with immunohistologically proven stage Ia cutaneous T-cell lymphoma (CTCL) was receiving trimethylpsoralen and ultraviolet A (PUVA) therapy for past eight months. The patient was initially given 8-methoxypsoralen (8-MOP), but he complained of excessive itching with this. After four doses, 8-MOP was successfully replaced with trimethylpsoralen, which the patient tolerated well. He also had scoliosis of the spine secondary to poliomyelitis since childhood. Cutaneous lymphoma responded well to PUVA therapy with complete resolution of lesions, both clinically and histologically. He denied regular sun exposure/sun bathing. There was no previous history of PUVA or ultraviolet B (UVB) therapy. He had received a total of 746 J/cm^2 of UVA over a period of eight months. One day, the patient noticed a few hypopigmented lesions on his trunk. Examination revealed diffusely tanned skin of the Fitzpatrick's skin phototype V over the trunk, face, and extremities. Due to the scoliosis, the posture of the patient was slightly tilted to the right side and, because of this, there were several folds of skin on the right side of his trunk secondary to the abnormal posture. On attaining a straight posture, the skin hided within the folds, became visible, and that was considerably lighter in color compared to the surrounding exposed skin. He was explained about the cause and assured that the change in skin color he was referring to as new lesions was normal skin color. Subsequently, four months after the discontinuation of the PUVA, the difference in color between the skin folds and exposed skin became less, though was still perceptible.

Though it is well known that PUVA causes hyperpigmentation, the extent of tanning that can be caused in pigmented skin has not been reported. In our patient, because of the abnormal skin folds on his trunk, the skin within the folds was completely protected from exposure to UV radiation in PUVA therapy. Hence it provided a direct comparison between two adjacent areas, one exposed to and the other protected from the PUVA therapy. Since the trunk is a nonexposed site and there was no history of sun bathing or occupation-related sun exposure, or previous UVA therapy, the changes in the skin type between the two areas of the skin was predominantly due to PUVA therapy.

The hyperpigmentation by PUVA is thought to be due to the stimulation of melanogenesis. Ultraviolet-induced melanogenesis occurs through several distinct mechanisms involving the interaction of UVR with membrane lipids, keratinocytes, and DNA. There occurs photoconjugation of psoralens to DNA in melanocytes. Subsequent mitosis and proliferation of melanocytes, and increased formation and melanization of melanosomes to keratinocytes occurs. Also, there is activation and increased synthesis of tyrosine mediated by stimulation of cAMP activity. Pigmentation due to PUVA may develop without clinically evident erythema, especially when oral 5-methoxypsoralen or trimethylpsoralen (as in our patient) is used.[1] In normal skin, after a PUVA exposure, the pigmentation maximizes about one week after exposure. It may last for several weeks to months after discontinuation of PUVA. As seen with sun-induced pigmentation, the individual's ability to tan is genetically determined. A few PUVA exposures are known to produce a much deeper tan than that caused by multiple exposures to solar radiation.[2,3]

The tanning after solar exposure occurs in two stages: one is the immediate oxidation reaction in pre-existing melanin by UVA radiation (320–400 nm), and the other is the delayed tanning reaction by UVB as well as UVA. It involves increased tyrosinase activity and increased production of melanin by melanocytes.[3,4] This mechanism may operate in PUVA-induced tanning also. On the one hand, understanding tanning induced by UVR is important, in addition to its intrinsic biological significance, because this pathway may lead to improvements in mechanism of photoprotection and generation of a tan without the deleterious effects of UVR. On the other hand, tanning may be undesirable and unacceptable side effect in pigmented people when photochemotherpy is given for therapeutic purposes.

The above case highlights the importance of explaining to the patients beforehand the amount of tanning PUVA may induce. It also highlights that in patients with CTCL receiving PUVA, there is a possibility of

inadequate exposure of UVA to lesions located in skin folds in patients with abnormal posture or in obese patients, which may lead to relapse.

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REFERENCES

1. Calzavara-Pinton P, Ortel B, Carlino A, Honigsmann H, De Panfilis G. A reappraisal of the use of 5-methoxypsoralen in the therapy of psoriasis. Exp Dermatol 1992;1:46-51.
2. Honigsmann H, Szeimies RM, Knobler R. Photochemotherapy and photodynamic therapy. In: Wolff K, Goldsmith LA, Katz SI, Gilchrist AS, Leffell DJ, editors. Fitzpatrick's dermatology in genereal medicine. 7th ed. New York: McGraw Hill; 2008. p. 2249-62.
3. Urbach F, Gange RW, editors. The biological effects of UVA radiation. New York: Praeger; 1986. p. 1-36.
4. Gilchrest BA, Park HY, Eller MS, Yaar M. Mechanisms of ultraviolet light-induced pigmentation. Photochem Photobiol 1996;63:1-10.